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PERMANENT SUBCOMMITTEE ON INVESTIGATIONS
Committee on Homeland Security and Governmental Affairs

Carl Levin, Chairman
John McCain, Ranking Minority Member

DEFENSE ACQUISITION REFORM: WHERE DO WE GO FROM HERE?
A Compendium of Views by Leading Experts

STAFF REPORT

PERMANENT SUBCOMMITTEE ON INVESTIGATIONS

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I. INTRODUCTION

The U.S. Senate Permanent Subcommittee on Investigations contacted over thirty experts from a broad range of backgrounds and solicited their views on a number of subjects relating to the DOD's acquisition process and how the DOD's procurement of major weapon systems can be improved.[1] In this compendium, the Subcommittee offers no recommendations of its own and endorses no particular expert prescription. Rather, with this project, the Subcommittee intends to publish expert views on defense acquisition reform and help develop a comprehensive record on shortcomings in the acquisition process that may inform congressional deliberations in the future.

While the experts who participated in this project offered a variety of views, a few common themes emerged. To help readers navigate their way through this compendium, the Subcommittee includes as an appendix a matrix that describes the specific prescriptions these experts offered regarding those themes. Otherwise, the Subcommittee notes the following:

- Nearly half of the experts feel that cultural change is required while over two-thirds believe improving incentives for the acquisition workforce is necessary for reform.
- Two-thirds of the contributors feel that training and recruiting of the acquisition workforce must be improved.
- Nearly half believe that DOD needs to attain realistic requirements at the start of a major acquisition program that includes budget-informed decisions.
- More than half of the submissions noted the need for strong accountability and leadership throughout the life-cycle of a weapon system – with several experts stating the need to further integrate the Service Chiefs into the acquisition process.

<u>Theme 1: Incentivization of the acquisition workforce</u>

Michael Sullivan, a defense acquisitions expert with over 30 years of government experience, believes that improvements to the acquisition process can best be achieved not by adding or discarding policies but by changing "the incentives that are now built into the system" that work against making the process more efficient. Christine Fox, the Pentagon's former Director of Cost Assessment and Program Evaluation, observes that "there are no career incentives for acquisition managers to say that their program is not progressing well, it is not worth the money, and should be slowed or cancelled."

Several of the experts consulted report that many program managers in major defense acquisition programs do not remain in their positions long enough to manage the program to its

[1] Questions sent to contributors can be found in Appendix A.

successful deployment or even to a major milestone. As a result, DOD may be unable to hold program managers accountable for those failures. Dr. Ronald Fox, former Assistant Secretary of the Army responsible for procurement and contracting, states, "As long as defense acquisition is largely in the hands of managers for whom it is merely one step in a career path directed elsewhere, we will continue to see the same quality, cost, and scheduling problems." Norm Augustine, former CEO of Lockheed Martin, and Dr. Dov Zakheim, former Under Secretary of Defense (Comptroller), also highlight constantly rotating program management as a problem that must be addressed.

To combat this shortcoming, in May 2007, the DOD required all top managers of major defense acquisition programs to sign tenure agreements with their respective service acquisition executives (SAE) stipulating that their tenure will correspond to the next major milestone closest to four years.[2] While this initiative was specific to program managers, many contributors including Frank Anderson, former president of Defense Acquisition University, believe that this policy is not being enforced.[3] Other contributors believe that tenure agreements should be broadened to include other acquisition executives, which could improve accountability and communication regarding the implementation of approved acquisition strategies.

Theme 2: Attracting and training a qualified acquisition workforce

About 70 percent of this project's contributors express the view that although Congress has taken steps to address deficiencies in the Department's acquisition workforce, more should be taken. Several contributors state that the Defense Acquisition Workforce Development Fund (DAWDF), which Congress established in 2008 to ensure that the acquisition workforce has the skills to ensure the DOD receives the best value for taxpayer dollars, should be continued and strengthened. Former Administrator for Federal Procurement Policy Dan Gordon states that improvements in training through the Defense Acquisition University will help the DOD workforce "buy smarter" in the current budget environment. Dr. Paul Kaminski, former Under Secretary of Defense for Acquisition and Technology, writes that the DOD needs to "attract quality people, and give them the training they need and the opportunity to learn from their mistakes before their mistakes cause major problems."

According to Irv Blickstein, a senior engineer with RAND Corporation, under the current personnel system, careers in acquisitions and contracting are simply not highly sought after as they do not offer the same opportunity for advancement as their operational counterparts. Many contributors believe that the DOD should create a clear career path for acquisition professionals similar to the military promotion system and designate acquisition billets to be on the same level as operational billets.[4] According to those contributors, that may grant more opportunity for promotion, thereby attracting a higher quality workforce. Furthermore, it would also encourage

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[2] Memorandum from the Under Secretary of Defense for Secretaries on Program Management Tenure and Accountability; Secretaries of the Military Departments; Directors of the Defense Agencies, May 2007.
[3] Sections 841 to 843 of S. 2410, the National Defense Authorization Act for Fiscal Year 2015, would address this issue by establishing a legislative requirement for program managers to remain in place until the next major milestone, subject to a limited waiver authority.
[4] This issue was addressed in sections 871 to 877 of the National Defense Authorization Act for Fiscal Year 2011.

those who choose a career in acquisition to stay in the field for most of their career so the DOD can reap the true value of its investment in their training.

Theme 3: Realism in program requirements and budgets

Several experts expressed the view that "requirements creep," that is, the unplanned addition of capabilities to a program that exceed the requirements originally identified, continues to contribute to cost overruns and schedule delays in major defense acquisition programs and that the failure to "start programs off right" inflates both acquisition and ownership costs.[5] Dr. Dov Zakheim notes that the DOD's current budgeting process suffers from unrealistic requirements at program inception, fluctuations in annual funding that drive-up costs, and a disconnect between the budget and defense acquisition processes. To address this problem, numerous contributors, including former Undersecretary of Defense (Comptroller) and DOD Chief Financial Officer Tina Jonas, recommend that implementing budgeting strategies earlier in the acquisition process would produce better outcomes for programs because requirements would be more stable and anticipated capabilities would be more often realized.

Theme 4: The role of the service chiefs into the acquisition process

Several of the experts consulted stated that, under the current acquisition process, operational requirements can be added later in the acquisition life-cycle by "committees" or lower-level officials within agencies and branches of the military not responsible for the successful deployment of the weapon system and outside the authority of the system's program manager or program executive officer. To alleviate this problem, several contributors, including Admiral Gary Roughead, former Chief of Naval Operations, call for the service chiefs to play a greater role in the acquisition process.[6] Retired General Norton Schwartz, former Chief of Staff of the Air Force, proposes that responsibility for short-term requirements should be assigned to combatant commanders and long-term requirements to the service chiefs. As any changes to requirements cause program costs to rise, Admiral Roughead states that Service Chiefs should

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[5] This issue was addressed by the Weapon Systems Acquisition Reform Act of 2009 (WSARA), which established a Director of Cost Assessment and Program Evaluation to ensure sound cost estimates and budgets in the early stages of major defense acquisition programs (section 101); established directors of developmental test and evaluation and systems engineering to ensure that programs start with a sound engineering basis (section 102); established technological maturity requirements to ensure that technological objectives are realistic (section 104); and required early trade-offs of cost, schedule, and performance (section 201).

[6] As to greater involvement by the uniformed military in the defense acquisition process, section 2547 of title 10, United States Code, enacted under section 861 of the National Defense Authorization Act for Fiscal Year 2011 (Public Law 111-383), established a permanent role for the chiefs of the armed forces in the acquisition process. Also, section 908 of the National Defense Authorization Act for 2008 (Public Law 110-181) requires each of the military departments to appoint a three-star military deputy to the department's service acquisition executive. In addition, section 105 of the Weapon Systems Acquisition Reform Act of 2009 (WSARA) (Public Law 111-23) requires that the Joint Requirements Oversight Council seek and consider input from the commanders of the combatant commands in identifying joint military requirements. And, in connection with a separate requirement for cost, schedule, and performance trade-offs throughout the acquisition lifecycle of major defense acquisition programs, WSARA provides for continuous engagement between senior military leaders and the civilian acquisition community. Finally, section 814 of the National Defense Authorization Act for Fiscal Year 2009 (Public Law 110-417) similarly provides for the engagement of senior military leaders in connection with "configuration steering boards" to help control those systems' costs and requirements.

have the authority to reject or approve requirement changes and be held accountable for those decisions.

Conclusion & Acknowledgement to Contributors

Over the last few years, both Congress and the DOD have taken significant steps to reform the defense acquisition process. As the GAO has recognized, the Weapon Systems Acquisition Reform Act of 2009 (WSARA) has "reinforced early attention to requirements, cost and schedule estimates, testing and reliability," allowing programs to develop more realistic goals and better overall strategies.[7] Similar observations have been made about various internal DOD policies, most notably, three iterations of "Better Buying Power."

With this mind, the Subcommittee makes two observations. First, among all those factors that have been identified as contributing to dysfunction in the defense acquisition system, cultural change is among both the most important and the least amenable to legislation and policy changes. It is, rather, a function of leadership throughout the chain-of-command and an incentive structure that threads through both the government contracting and acquisition workforce and industry that assigns a premium to cost-control and the timely delivery of needed capability.

Second, continued "sequestration" of the DOD's budgets will undermine any savings that could be achieved through even the most successful acquisition reform. As the Navy acquisition executive Sean Stackley notes in his contribution, "[s]equestration, alone, threatens to undo all of the Department's gains in productivity brought about by [those] initiatives." In his contribution, former Air Force chief financial officer (and currently the head of the Pentagon's Cost Assessment & Program Evaluation office) Dr. Jamie Morin similarly observes that sequestration has "impaired the stability of nearly every [DOD procurement] program and caused the Department to make decisions damaging many programs both in the short and long term," leaving the DOD unable to properly plan acquisition strategies because projected funding levels continue to fluctuate unpredictably.

The Permanent Subcommittee on Investigations would like to thank the contributors to this project for the time and effort put into submissions as well as the ongoing work they and the rest of the defense acquisition community are doing to improve our country's defense acquisition process. In all cases, the insights and recommendations of this project's contributors will be useful in Congress' continuing work to reform the current acquisition system.

[7] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-13-103 WEAPONS ACQUISITION REFORM: REFORM ACT IS HELPING DOD ACQUISITION PROGRAMS REDUCE RISK, BUT IMPLEMENTATION CHALLENGES REMAIN (2013).

II. BIOGRAPHIES AND ESSAYS PROVIDED BY CONTRIBUTORS

BRIGADIER GENERAL FRANK J. ANDERSON, JR., USAF (Ret.)

Chairman
Procurement and Acquisition Center of Excellence, LLC

Frank provides executive leadership coaching and consulting support for the following: acquisition and contract planning; organization planning; strategic planning; alternate dispute resolution support; expert witness support; human capital and workforce development; and small business development support. He has extensive experience managing large public sector organizations and large scale change initiatives. With knowledge gained from having held key leadership positions, and over 40 years of distinguished government service he understands how to navigate the complexities of federal contracting and program management. Frank is an active speaker and supporter of the national priority for hiring veterans.

Frank is a retired Brigadier General, United States Air Force, and past President, Defense Acquisition University. He was the first Director, Human Capital Initiative for the DOD Acquisition Workforce. He is a graduate of the Defense Systems Management College, Air Command and Staff College, Industrial College of the Armed Forces, and has a masters and bachelor's degree (Cum Laude) in business. He previously served as Commandant of the Defense Systems Management College, Head of Air Force Contracting (Deputy Assistant Secretary of the Air Force for Contracting), and Air Force Competition Advocate General. As Vice President of Defense Acquisition University, he led the strategic planning process that shaped the current DAU. He was recognized by Attorney General Janet Reno for his leadership of the first Federal Inter-Agency Working Group on Alternate Disputes Resolution and has led large contract ADR resolutions. He has served as a major weapon system program director, product group manager, director of contracting for the Air Force' largest acquisition center (W-P AFB, Oh), Commander of the Air Force in-plant contract management office for the B-1B Bomber Program, when the B-1B was the largest Major Weapon System Program. He has also served as a contracting officer with an unlimited warrant.

Frank was Level III certified in both Program Management and Contracting. Frank is the recipient of both the Distinguished and Meritorious Presidential Rank Award and was awarded the Department of Defense Distinguished Civilian Service Award twice (2004 and 2010). These awards are the highest performance excellence awards presented by the President and Secretary of Defense, respectively. He also received the National Contract Management Association's Charles A. Dana Award and Herbert Roback Memorial Award, the two highest awards presented by the Association. He is a Director on the Procurement Roundtable.

Views from Brigadier General Frank J. Anderson, USAF (Ret.)

Background:

I was invited to provide my views on deficiencies in the defense acquisition process; the steps that should be taken to improve the efficiency and effectiveness of the process, and the extent recent legislative and policy reforms may have resulted in improvements. A list of specific questions was provided to guide my consideration and response. I have focused specifically on the Defense Acquisition Workforce. In 2006, I was selected as the first Director of Human Capital Initiatives for the DOD Acquisition Workforce. **My reply is based on my opinions and a brief synopsis of the 2010 Defense Acquisition Workforce Human Capital Strategy (HCS) that was submitted to the House and Senate Armed Services Committees and the House and Senate Defense Appropriation Sub-Committees April 2010**. I led the team that wrote the 2010 HCS. The HCS is still the most comprehensive document on the defense acquisition workforce and was the baseline for the Department's strategy to improve the acquisition workforce by increasing size and quality of the acquisition workforce through 2015. The National Defense Authorization ACT (NDAA) for fiscal year 2011 Report, page 169, states the following:

> *"The acquisition workforce strategic plan submitted by the Department in April 2010, after several years of effort, provides a viable, data-driven approach to rebuilding the DOD acquisition workforce that is consistent with both the letter and the spirit of section 851 and section 1108. The committee commends the Department for the quality of the plan and urges the Department to continue to use this document as a baseline to drive DOD strategy for the acquisition workforce and report on progress in implementing that strategy over the period of the future years defense program."*

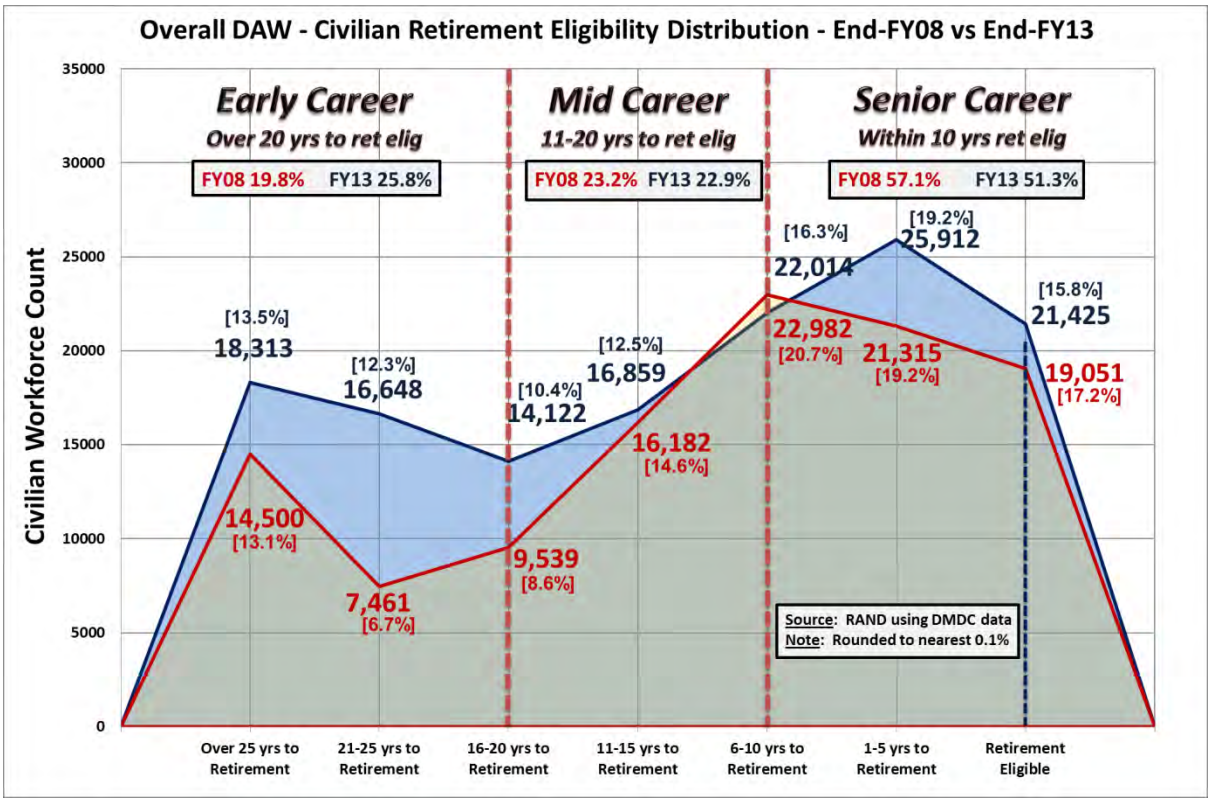
The importance of a right-sized, high quality acquisition workforce was captured in both the April 2010 DOD Acquisition Workforce Human Capital Strategy and the February 2010 Quadrennial Defense Review Report. See the QDR report, pages 77-78:

> *"To operate effectively, the acquisition system must be supported by an appropriately sized cadre of acquisition professionals with the right skills and training to successfully perform their jobs. To address personnel deficiencies, (DOD) will increase the number of acquisition personnel by 20,000 positions by 2015. (DOD) will continue to significantly enhance training and retention programs in order to bolster the capability and size of the acquisition workforce."*

While this strategy has been very successful and significant progress has been achieved, much more work remains. The Department has and continues to face hard, complex, and evolving force planning and workforce choices. Moving forward, follow through, adapting, continuous improvement, and finishing deployed initiatives are critical for future success.

Defense Acquisition Workforce Analytics

A comprehensive workforce analytic capability is critical for improving acquisition outcomes and the quality of the acquisition workforce. Workforce analytics provides data-driven insight on acquisition workforce size, count, composition, quality indicators, gaps and opportunities. This facilitates a fact based dialogue for deliberate workforce planning and decision-making.



The above graph, the Workforce Lifecycle Model (WLM), provides a visual display of the defense acquisition workforce in three cohort groups: Early Career, Mid-Career, and Senior Career groups. The WLM combined with other available tools enable analysis of new hires, bench strength, experience as measured by years of service, turnover, certification, cohort migration across a career, and retirement risk. It can be used to analyze gains, losses, and the distribution of gains, losses across organizations, within functional communities, and can be used at any level. This information supports risk analysis and data-driven decisions on hiring, development and retention initiatives.

In the chart above, the top line shows that the 2013 Years to Retirement Eligibility (YRE) distribution for the Defense acquisition workforce was 26/23/51 percent between the three cohort groups. The bottom line distribution of workforce members in the three cohort groups was 20/23/57 percent in 2008, respectively. A comparison of the 2008 and 2013 cohort groups clearly indicates there is a better balance between the cohort groups today, and the so-called "bath-tub effect" that resulted from previous hiring freezes were addressed and closed. This success is a direct result of Congress passing Section 852, the Defense Acquisition Workforce

Development Fund (DAWDF). The DAWDF is the driving catalyst in workforce improvements achieved to date. As an example, the government cost estimating workforce, which declined approximately 26 percent from 2001 to 2008, was targeted to grow by approximately 23 percent by 2015. The Department also grew the Defense Contract Management Agency and the Defense Contract Audit Agency. Contracting and pricing, program management, system engineering, and logistics, all grew as a result of having the DAWDF. Improvements in certification requirements were achieved. The number of people who met or exceeded their position certification requirements increased from 58 to 75 percent, a 17 percent increase. Between 2008 and 2013 educational attainment for Bachelors and Graduate degrees increased from 77 and 26 percent to 83 and 36 percent, respectively. Leadership initiatives including coaching were deployed. Real problems were successfully addressed. These workforce improvements will not be sustainable without the DAWDF. It is critical that Congress continue to fund the DAWDF.

The Challenge of Improving Acquisition Outcomes

Improving acquisition outcomes and ensuring a highly qualified acquisition workforce requires deliberate actions at the field/program level. This is where work occurs and requires better management and control of Key Leadership Positions (KLPs), tenure management, and the qualifications of individuals assigned to KLPs. KLPs are positions that entail significant levels of responsibility and are key to acquisition program success. Section 820 of the 2007 National Defense Authorization Act (NDAA), as amended, requires that for each Major Defense Acquisition Program (MDAP) and each Major Automated Information System Program, the Program Manager, Deputy Program Manager, Chief Engineer, Systems Engineer, Cost Estimator, and Product Support Manager positions be performed by a properly qualified member of the Armed Forces or full-time employee of the DOD. DOD added the lead major program contracting officer as a KLP. There are approximately 1000 KLPs today and there is no good reason for any KLP to be filled by an individual not fully qualified for the position.

The over used statement that "you can't hire a new employee to replace a 30 year expert" is catchy and very true. However, it is more accurate to state that when new employees are hired, they start a career development journey across their career life-cycle. If training and workforce development is done properly, then in time and when needed, these new employees will be prepared and ready to assume the most challenging jobs in the Department, civilian and military. The operational community is expert at following a structured and disciplined process of developing leaders to fill key operational leadership positions. There is a lifecycle career path that involves training, experience and performance results over time that leads an individual to a key command position. This lifecycle career path is deliberate, known, understood and consistently followed. The focus on required experiences during a career lifecycle is critical. This process has produced outstanding leaders in the right quantities with the right experiences in the operational community. The acquisition community must become more deliberate and disciplined in developing and selecting individuals to lead MDAPs and MAIS programs and other key acquisition organizations.

Tenure management is also a critical factor for improving acquisition outcomes. MDAPs and MAISs are very large business undertaking with significant national security implications, both in terms of the cost involved and the warfighting capability required. Consistent turnover in

key leadership positions creates undesirable inefficiency within programs. Both Congress and DOD have established standards and acknowledged the importance of managing, tracking and reporting tenure results. This is an area that continues to be a weakness in the system and represents a huge opportunity to improve acquisition outcomes. DOD policy is in place, but there is a gap in execution. Experience on a program is a function of time on that program and is a key element for developing high quality employees for both the government and the contractor. Tenure control can be implemented while providing appropriate flexibility.

Finally, DOD should move to a construct of risk-based manning with integrated management of the total acquisition workforce, including contractor support personnel. This includes strategically planning the right workforce mix between organic and contractor support personnel. The Department has made several attempts to define, and accurately count the acquisition "Total Force." There are Congressional requirements to accurately count the total defense acquisition workforce, e.g., section 324 of FY2008 NDAA and section 807 of the FY2008 NDAA. In addition, there are numerous GAO reports that have criticized the Department for its inability to accurately count contractor support. Most MDAPs use support contractors, but currently there is a lack of traceability for count and skill sets acquired. If we have skill gaps, then contractor support should be used to fill known skill gaps. We should know what gaps we filled. What are our targets? The concept of risk based manning is that priority manning should be provided for the most important acquisition programs and more risk (lower manning) accepted on selected lower risk acquisition activities.

Three People Recommendations to Achieve Improved Acquisition Outcomes

1. **Adopt risk based manning and ensure all Major Defense Acquisition Programs (MDAPs) and Major Automated Information Programs (MAIS) are right sized and right shaped with the right skilled people**

The DOD acquisition mission represents the largest buying enterprise in the world with purchases of a little less than $400 billion. Effective staffing of these programs are critical. Understaffed programs increase the risk of unsuccessful program execution. Proper staffing requires the right numbers, right skill mix, and appropriate certification and experience levels. The recently revised DOD Instruction 5000.02 "Operation of the Defense Acquisition System" requires program managers to include a program office staffing plan as an element of their acquisition strategy. Contractor support personnel should be included in the staffing models so DOD can develop appropriate analytical tools based on the actual size of a program office. Today, because of data gaps, DOD does not have good staffing models to forecast program office workforce requirements.

Proper staffing is a recurring issue for defense acquisition programs as documented by numerous GAO reviews and DOD-initiated studies. These programs are, in most cases, multi-billion dollar business enterprises and should be manned appropriately. DOD has the resources, but must get better at prioritizing where it should accept risk associated with manning decisions.

2. Deploy tenure management and comply with both statutory and DOD policy requirements

As stated above, proper staffing of MDAP programs with high quality acquisition personnel is a top priority. But once the right people are in place, they should stay in position long enough to achieve stated or agreed to outcomes – the tenure agreement. This is a leadership issue that will not be resolved unless there is senior level agreement between DOD and Service leadership. The current statutory and DOD policy requirements are appropriate and adequate. As a minimum there should be an upfront agreement based on time and/or significant milestones, as appropriate. The tools are currently in place to establish a viable data strategy to improve traceability and transparency of program office workforce. The challenge is that the concept of tenure control, especially for military leadership, conflicts with deeply help beliefs about promotions and career management. This issue is hard and has been discussed for years without actively moving forward.

3. Accurately count and track the total Defense Acquisition Workforce

The Department must define, track and accurately understand the acquisition "Total Force." It is critical for strategically planning the right workforce mix. Accurate and complete workforce information is the foundation for effective workforce planning and smart decision-making. This recommendation address longstanding problems. The objective is to continuously improve a comprehensive and real-time workforce analysis capability. Force planning is a multi-faceted process, guided by DOD Instruction 1100.22, Guidance for Determining Workforce Mix. This instruction provides guidance for determining the appropriate mix of civilian, military, and contractor support personnel within budget constraints and other internal and external factors. It is a risk-based approach in making workforce mix decisions.

Bottom line, DOD knows what needs to be done, and how to do it. But these are hard cultural changes that will require significant will power. Change is hard. These three recommendations, if comprehensively implemented as an integrated whole will provide a solid foundation for significant improvements in acquisition outcomes.

THE HONORABLE NORMAN R. AUGUSTINE

Retired

Norman R. Augustine is the retired chairman and CEO of the Lockheed Martin Corporation. He has held positions in industry, government, academia and the charitable sectors.

Born in Colorado, he attended Princeton University where he received Bachelor's and Master's Degrees in Aeronautical Engineering. He has served as a Chief Engineer at Douglas Aircraft Co., vice president of LTV Aerospace Corp. and chairman and CEO of Martin Marietta Corp. and has been chairman of the National Academy of Engineering, President of the American Institute of Aeronautics and Astronautics and chairman of the Defense Science Board. He has served as a trustee of Princeton, MIT and Johns Hopkins and is a Regent of the University System of Maryland and has written extensively on the subject of Defense Acquisition including "Augustine's Laws" which has now been published in six languages.

Mr. Augustine served as a director of Lockheed Martin, ConocoPhillips, Procter & Gamble and Black & Decker, and has been awarded the National Medal of Technology and received the Department of Defense's highest civilian award, the Distinguished Service Medal, five times. He was a member of the President's Council of Advisors on Science and Technology for 16 years and holds 33 Honorary Degrees.

Views from the Honorable Norman R. Augustine

The Acquisition Conundrum

It is highly unlikely that any nation on earth would decline an opportunity to trade its military equipment for that of the United States. Nonetheless, it is widely considered that America's equipment costs too much, takes too long to acquire, and too often fails to meet prescribed capabilities, particularly its reliability. In my three decades in industry, one in government and two in civic endeavors, I have found few if any parts of our government that are better managed than the Department of Defense. Yet, evidence of waste in defense acquisition has become almost a daily headline.

Defense acquisition in the United States is quite unique. It is a monopsony that has monopolies embedded within it. People's lives—even our nation's survival—depend upon it.

There is little if any evidence that nations that espouse centralized planning and government-owned production come close to matching the power of the Free Enterprise System broadly embraced by the U.S., including when providing defense equipment and services. Yet it is often overlooked that within that system the firms that provide equipment and services, and bear the immense fiduciary responsibility of doing so, must compete in the same markets for employees, capital and shareholders as Apple, Microsoft and Toyota. Further, over the decades the differing roles and responsibilities of government and industry have too often been permitted to degenerate into an intense adversarial relationship of a type that could never endure between a commercial buyers and sellers.

The management of defense acquisition has far more in common with the business world than with either government or military functions, but we build the highest possible barriers to keep people with business and management experience out of government. The government personnel system, designed in part to insulate workers from political capriciousness, more often than not simply insulates individuals from accountability—all while making government service increasingly unattractive.

The defense acquisition process—along with most of our nation's challenges, such as the provision of energy, building an economy, providing modern healthcare, protecting the environment and rebuilding our infrastructure—are deep in technological implications, yet of the 535 members of the nation's legislature only two individuals possess degrees in science and six in engineering. Over the years, those in the administrative branch responsible for managing acquisition programs have become increasingly unlikely to have had hands-on experience in business or management. In short, we are seeking to manage without experienced managers—and when we do find an experienced manager—military or civilian—they generally are moved out of their position before they have the opportunity to manage. The issue most assuredly is not one of dedication or native ability: the issue is a lack of relevant experience and the freedom to exercise that experience. One hundred managers with one year's experience should never be considered to be the same as five managers each with 20 years' experience.

In 1965 the Fitzhugh Blue Ribbon Panel summarized the problem in a single sentence: "Everyone is responsible for everything and no one is responsible for anything."

So what is to be done? By and large the answer to that question is well understood—in fact, many friends of mine such as former Deputy Secretary of Defense David Packard; the head of the Skunk Works Kelly Johnson; Air Force General Bennie Schriever; Admiral Wayne Meyer and Army General Bob Baer, among others, were providing the answer decades ago. What is required is simply Management 101. That is, decide what is needed; create a plan to provide it, including assigning authority and responsibility; supply commensurate resources in the form of people, money, technology, time and infrastructure; provide qualified leadership; execute the plan; and monitor results and strenuously enforce accountability. Ironically, little of this requires legislation—but it does require massive amounts of *will*…from *all* levels of government. Unfortunately, many of the problems are cultural—and it is difficult to legislate culture. But there is much that *could* be done.

Some appropriate actions within each of the above categories are addressed in the following sections:

I. <u>Decide What is Needed</u>

- Congress should provide a rolling ten-year planning budget for acquisition activities and require that all approved programs fit within that budget. Fewer programs should be pursued if that is necessary to permit each to be conducted on an optimum schedule, rather than engaging in numerous programs defined in isolation and suffering repeated costly schedule slippages due to the lack of available funds. In addition, short-term contingency plans for both upward and downward budgetary excursions should be maintained to help prepare for contingencies.
- The standard for initiating new programs, changing existing programs, or terminating programs, should be made extremely demanding.
- Wherever practicable, priority should be given to upgrading existing systems as opposed to developing all-new systems.
- The Service Chiefs should be reinserted into the acquisition chain of command (i.e., revise Goldwater/Nichols in this particular regard).
- Small Systems Engineering groups composed of engineers, cost analysts and warfighters should be created and should report to the Service Vice Chiefs to assist in assuring the appropriateness of each Service's requirements for new programs.
- The Requirements Definition Process should be modified such that it is an *iterative* process involving warfighters, independent cost estimators, engineers and budgeteers and tradeoffs and alternative solutions are broadly investigated. Further, the ability of a proposed undertaking to fit with the Congressionally prescribed defense acquisition ten-year budget plan should be a fundamental part of the requirements definition process.
- Cost analyses should include estimates generated by independent, professional cost estimating groups. Cost considerations bearing on acquisition decisions should be based, insofar as practicable, on lifecycle costs derived from discounted future cash flows—a practice embraced routinely in business but seldom, if ever, in government.

- Platforms should be designed at the outset to permit new components (electronics, weapons, propulsion, etc.) to be incorporated on a "plug and play" basis…as opposed to uniquely and deeply integrating such elements into the initial platform design.
- Commercial specifications should be adopted wherever possible rather than government specifications or defense-unique practices. In this regard, a complete "zero-basing" of the FAR, DEFAR, and the exemption processes applying thereto, is in order.

II. Prepare a Plan, Including Assigning Responsibility and Accountability

- Engineering Development of major systems should not be initiated until the USDA has personally certified that (1) the need is legitimate, (2) the proposed solution is appropriate, (3) the technology is proven, and (4) the funding fits within the Department's overall projected acquisition budget.
- Major programs (based on cost or consequence) should be managed on a separate track from lesser programs. In acquisition, one size does not fit all. High urgency developments should be provided greater management autonomy—as has been the case for many successful programs in the past.
- Government Program Managers should be placed clearly in charge of their programs. Other important contributors—financial, legal, contractual, etc.—should function in an advisory capacity, with a streamlined avenue of appeal to higher management levels when substantive disagreements cannot be directly resolved in a timely fashion.

III. Supply Resources

- Risk-based financial and schedule reserves should be provided for all programs and held in an overall DOD account by the Under Secretary of Defense for Acquisition and allocated only when clearly justified.
- Programs should be funded according to major milestones, not in annual increments. The U.S. is one of the few nations not to have adopted this practice.
- A capital budget should be established to provide up-to-date facilities and equipment that support acquisition endeavors. No successful U.S. company operates without a capital budget, yet the federal government continues to attempt to do so.
- Substantially increase investment in research and in high-potential-payoff organizations such as DARPA, where breakthroughs are most likely to be found.
- Special funds should be provided to support high-payoff (generally high-risk) prototypes that are not intended for production. This is essential not only to advance the state-of-the-art but also to assure the survival of critically important industry advanced design teams during eras of budgetary austerity.

IV. Provide Qualified Leadership

- An Acquisition Corps of Military Officers (not including civilians—unless current civilian personnel regulations are substantively revised) somewhat analogous to the JAG Corps, Medical Corps and Chaplain's Corps, made up of true professionals who in this instance devote their careers to the critical function of acquisition management,

should be established. Members would begin their careers by directing small projects and over time advance to the management of major acquisition programs.

- Program Managers should remain in their positions, at a minimum, from one major program milestone to the succeeding major milestone.
- Service Acquisition Executives should be broadly experienced in managing major projects.
- Government personnel policies should be revised to enable hiring critical personnel on a fast track—and this authority should be exercised. Exceptional service should be celebrated and individuals performing at an unacceptable level should be promptly removed from their positions.
- Government should be made a far more attractive place to work, including offering greater opportunity to exercise initiative, less duplicative oversight, enhanced career development (particularly for the civilian workforce) and fewer employment and work disruptions.
- Conflict of interest regulations should be thoroughly reviewed to verify that the important assurances they offer are balanced against the deterrent they can create to government service by individuals with industry management experience.
- The process for granting and renewing security clearances should be standardized across departments and agencies in order to increase flexibility of assignments and reduce redundancy and cost—except in cases where clear justification warrants special treatment.
- Senior "acting" or "unfilled" positions should be promptly filled or else deemed unnecessary and abolished.

V. Execute Plan

- In peacetime circumstances concurrency (between advanced development and full-scale development; between development and rate-production) should be minimized (although it cannot be altogether eliminated).
- Full production should be initiated only when performance, and especially reliability, specifications have been thoroughly demonstrated under realistic operating conditions.
- Fixed-price contracts should be used for serial production. Cost reimbursable incentive contracts should be used for development. Grants should be used for basic research.
- In the case of strategic nuclear systems, the relationship between DOD and DoE should be changed to that of a buyer and seller, respectively.

VI. Monitor and Enforce Accountability

- At the end of each fiscal year every Program Manager of a major program should write a three-page letter to the USDA with copies to the Armed Services Committees stating the current status and future outlook of the program for which the Manager is responsible (somewhat analogous to the stockpile-certification letter provided to the Congress by DoE Weapons Laboratory Managers).
- A formal review should be conducted to "zero-base" staffing levels in all headquarters and support organizations, including related contracted functions, and employment levels adjusted accordingly.

Were the above proposals to be implemented, it is my belief that the nation would benefit from a stronger defense at a lesser cost.

MR. DAVID J. BERTEAU
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David J. Berteau is Senior Vice President and Director of the National Security Program on Industry and Resources at the Center for Strategic and International Studies (CSIS) in Washington DC. His research and analysis covers national security plans, policies, programs, budgets, and resources; defense management, contracting, logistics, and acquisition; and national security economics and industrial base issues. Mr. Berteau is also an adjunct professor at Georgetown University and at the Lyndon B. Johnson School of Public Affairs, a Director of the Procurement Round Table, a Fellow of the National Academy of Public Administration, and an Associate at the Robert S. Strauss Center at the University of Texas.

Before he joined CSIS full time in 2008, he was director of national defense and homeland security for Clark & Weinstock, director of Syracuse University's National Security Studies Program, and senior vice president at Science Applications International Corporation (SAIC), as well as a non-resident Senior Associate at CSIS. He served at senior levels in the U.S. Defense Department under four defense secretaries, including four years as Principal Deputy Assistant Secretary of Defense for Production and Logistics. Mr. Berteau graduated with a B.A. from Tulane University in 1971 and received his master's degree in 1981 from the LBJ School of Public Affairs at the University of Texas.

Views from Mr. David J. Berteau

The President's Blue Ribbon Commission on Defense Management, also known as the Packard Commission, issued a report in 1986 with recommendations to improve the defense acquisition process.[8] Chief among those recommendations was a simple formula: establish a program with well-defined requirements and adequate resources, place competent professional program managers in charge, align their authority and responsibility with accountability, oversee them with short lines of command, and support them as they implemented their program. Crafted by Dr. William Perry, who later became the Secretary of Defense, the Packard Commission's recommendations were codified into statute in the Goldwater-Nichols Defense Reorganization of 1986. In many ways, though, defense acquisition processes today face challenges that are very similar to those that the commission tried to address, and the solutions proposed by the Packard Commission may no longer be sufficient or appropriate for the future.

It's important to note that the acquisition system is successful by many measures. The defense acquisition process designs, produces, operates, and sustains the most capable military systems in the world through the efforts of private sector companies, the Department of Defense (DOD), the Congress, the acquisition workforce, and the military and civilian personnel who test, train, use, and support these systems in war and peace. The core of acquisition success lies in aligning requirements, programs, and resources, including funding, technology, and an experienced, professional workforce. That alignment necessitates tradeoffs among needs, results, cost, timeliness, and risk. In theory, the defense acquisition process is the system in which those tradeoffs are defined and decided. In reality, though, these tradeoffs are made outside defense acquisition, and the system is forced to accommodate them.

Requirements

The first tenet of the Packard Commission approach was well-defined requirements. There are two different approaches to establishing requirements for military capability. One is to encourage military users to set requirements independent of available resources (and even somewhat independent of technology limits). This approach helps ensure that requirements are aimed at actual needs, not just what is affordable. The second approach constrains requirements by incorporating cost elements into the process. This approach helps ensure that the military will be more likely to afford what it needs.

The Packard Commission reports focused on aligning requirements with cost and schedule as well as user needs and technology potential. Such a focus calls for joint military-civilian decision making on requirements. Current law[9] vests authority in the Joint Requirements Oversight Council (JROC). The statute aligns more with the unconstrained approach to requirements; all of the statutory members are military officers whose role under the law is to "assist the Chairman of the Joint Chiefs of Staff". Civilian officials are JROC "advisors" under Title 10. The statute does not mandate that the JROC collaborate with the Defense Acquisition Executive in setting requirements that will determine acquisition decisions.

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[8] The author served as Executive Secretary to the Commission 1985-1986.
[9] Title 10, U.S. Code, section 181, "Joint Requirements Oversight Council"

However, under the current leadership in DOD in the Office of the Secretary of Defense (OSD) and the Joint Chiefs of Staff (JCS), collaborative participation in requirements processes seems to be the norm. This includes a mix of the two approaches, with requirements initially unconstrained by resource limits but ultimately considering those limits as part of the collaborative process. There is probably little need for dramatic change in Title 10 at this time.

Resources

The second tenet of the Packard Commission approach was the provision of adequate resources. One of the strengths in DOD is its reliance on a fiscally-disciplined, longer-term programming process. By preparing each year a five-year spending plan, called the Future Years Defense Program or FYDP, DOD has a reliable framework for defense acquisition. Long-term programs like weapon systems need a dependable plan for funding. In theory, this could provide the basis for implementing the Packard Commission approach.

There is a widely-held view that changes in budgets are a primary cause of poor performance in the defense acquisition system. Recent years have seen an increased degree of uncertainty in defense budgets. In the last four years DOD has twice (FY2011 and FY2013) operated for fully half of the fiscal year under one or more Continuing Resolutions, which set appropriations regardless of requirements or projections. The Budget Control Act of 2011 forced DOD to reduce its planned FYDP spending by nearly 8%, with commensurate reductions to planned spending in the five years beyond the FYDP. Compliance with the second tranche of Budget Control Act cuts forced DOD to sequester an additional $38 billion in FY2013 and reduce planned spending by another $30 billion in FY2014. Current law extends these budget levels through FY2021.

Both DOD and the congressional armed services committees recognize that these funding caps are set without regard to the demands of force posture, force management and sustainment, or force modernization. To date, however, Congress has been unwilling to enact some of the key DOD proposals to reduce spending in a balanced manner, including reductions in the rate of annual increases in military pay and benefits. As a result, a disproportionate share of defense budget cuts have been taken in Procurement and Research and Development (R&D) accounts, increasing budget instability for acquisition programs and contracts.

Without congressional action, current trends threaten to undermine the entire defense acquisition system simply by reducing the funds available for contracts to an unsustainable level. Recent research from the Center for Strategic and International Studies (CSIS)[10] shows that, since the peak of defense spending in 2008-2009, contract obligations for products, services, and R&D are down 25%, while non-contract outlays (basically, spending for military and civilian personnel and retirees) is up. If those trends continue for the next decade, fully two-thirds of defense spending will be on personnel by 2023, leaving far too little for contracts.

While the Packard Commission recommendation for adequate resources was focused on individual programs, the overall level of defense spending may make it impossible for any program to be funded adequately. Only the Congress can fix this problem.

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[10] "DOD Contract Trends, 2000-2013", Center for Strategic and International Studies.

Professional Acquisition Workforce

The lack of adequate funding will put an even greater emphasis on the third tenet of the Packard Commission recommendations, the need for a professional, competent acquisition workforce. As stated in his appearance before the Senate Armed Services Committee[11] on April 30, 2014, Under Secretary of Defense Frank Kendall noted that "The capability of our government people, our professionals, to oversee contracts, to get the business deal right, to understand the risk, to ensure that contractors are complying, is central to our success."

This paper looks at the three central workforce elements: military personnel, federal civilian employees, and contractors who provide technical support to those government personnel.

Military personnel select or are assigned to acquisition and contracting specialties at various states of their careers. Historically, Air Force officers[12] (and to an extent, Navy officers) may select acquisition careers at or near the beginning of their career; Army officers typically move into acquisition and contracting at or near the end of their second tour of active duty. Training and experience opportunities vary widely both across and within the military services, but there are some significant challenges for such personnel.

The most significant of those challenges is the mismatch between the overall promotion system for military officers and the need for stable, experienced program management in defense acquisition. Good program managers should ideally remain with their programs for four years or longer[13]; but the military system requires officers to move far more frequently than that or risk falling behind their peers in competitiveness for promotion. This advancement system of up-or-out is codified in statute, the Defense Officer Personnel Management Act of 1980, or DOPMA. Since the Packard Commission report and the concomitant Goldwater-Nichols requirements for officers to serve in joint duty billets to be eligible for promotion above the grade of O-6, these promotion disadvantages for military acquisition professionals have increased. Perhaps the single greatest step Congress could take to improve defense acquisition would be to amend DOPMA to adjust the overall military promotion dynamics to encourage and support longer time on duty for acquisition professionals and particularly senior program officials. There was an attempt to undertake these DOPMA modifications a few years after the Packard Commission recommendations, but it died in committee. Changes to DOPMA are worth another look.

Federal civilian employees: The second challenge is in recruiting, training, and retaining career civilian acquisition personnel. Cuts in those personnel in the 1990s, coupled with very little hiring of new people, have led to an imbalance in the demographics of the civilian

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[11] Senate Armed Services Committee Hearing on the Proposed Fiscal Year 2015 Defense Authorization for the Defense Acquisition System, April 30, 2014 (Video at http://www.armed-services.senate.gov/hearings/14-04-30-reform-of-the-defense-acquisition-system)

[12] Air Force enlisted personnel also provide additional military personnel with deep knowledge and experience in acquisition and contracting.

[13] "Defense Acquisitions: Department of Defense Actions on Program Manager Empowerment and Accountability." Government Accountability Office, November 9, 2007.

acquisition workforce. Too much of that workforce is older, and not enough is younger. Too much of that workforce has too little experience.

Beginning in the mid-2000s, Congress created a path for DOD to begin to correct that acquisition workforce demographic imbalance. That path is the DAWDF, the Defense Acquisition Workforce Development Fund, created in the Fiscal Year 2008 National Defense Authorization Act (NDAA). DOD has used the authorities and funding available under DAWDF to recruit and train thousands of new acquisition professionals. The challenge now is to retain them, with lower defense funding levels, is to retain those new personnel. Government-wide civilian pay freezes, DOD hiring freezes, restrictions on training and conferences, and fewer major defense systems on which to work. Perhaps the biggest challenge for this new workforce, however, is to provide challenging work that will engage the intellectual ambitions of these younger workers. Congress needs to support employee mentoring, workforce mobility, and training in order to support retention of this rebuilding workforce.

Support Contractors: The third element of the acquisition workforce is sometimes overlooked. It is the contractors who provide technical support to civilian and military acquisition personnel. Such support should be managed to avoid having contractors performing inherently government functions, but such contractors can deliver value in areas that military and civilian personnel cannot. First, support contractors can provide technical capabilities that are either in short supply from in-house government personnel or that command salaries far above federal pay rates. Second, support contractors can be surged when workloads are at peak levels and reduced when the need wanes. This is hard to do with military or federal civilian workers. The keys for support contracts are sufficient government experienced personnel to provide management and oversight and clear requirements for the tasks to be done under contract.

Technology and Innovation

Along with supporting the acquisition military and civilian workforce, success in the defense acquisition system requires access to emerging technology and innovation. Other papers submitted as part of this compendium will cover the ways in which DOD buys and uses the results of R&D. Typically, these results come from DOD direct R&D expenditures, from reimbursable Independent R&D (often called IRAD), and internal company R&D from defense prime contractors. DOD has used these R&D results for decades to help the U.S. military maintain its technological superiority.

However, that may not be enough for the future. Increasingly, innovation in both technology and process is coming not from DOD laboratories and contractors but from commercial firms in the global economy. These innovations, which come from outside the traditional defense communities, are harder for DOD to identify and incorporate. There are two challenges with "outside innovation". The first is for DOD to know where to look for these innovations. What is it that global commercial companies are doing of which DOD is unaware? How does DOD know what it doesn't know? How does DOD measure the value of that outside innovation?

The second challenge is the set of barriers DOD faces in using that technical or process innovation. Many of these barriers are in the defense acquisition system, ranging from the absence of a requirement to the myriad of regulatory systems with which government contractors need to comply but that don't apply to commercial companies. Congress should encourage DOD to identify and pursue outside innovation and should ask DOD for legislative proposals that could reduce the barriers to incorporating such innovation into DOD programs and contracts.

Recent Gains

It is easy to think of the defense acquisition system as having more problems than solutions. As a result, each year sees new initiatives within the government and new legislation in the NDAA. Some of these are worthwhile. Recent changes in statute, government regulation, and DOD guidance have worked to improve both the processes and the outcomes. The Weapon System Acquisition Reform Act of 2009 (WSARA) added significant value through its emphasis on better cost analysis, systems engineering, and developmental testing and with the creation of the office of Performance Assessment and Root Cause Analysis, or PARCA. Actions by DOD have strengthened the alignment of requirements and programs and resources, both under the Better Buying Power initiatives and through thousands of implementation-focused decisions by DOD program and acquisition officials. However, opportunities remain for DOD, the federal government, and the Congress to take additional action. This paper has focused on several key issues and has primarily recommended positive steps that Congress can take. Like WSARA in 2009, the right actions by Congress can provide the authorities and protections DOD needs.

There is one additional step that Congress can and should take, and that is in the way it exercises its constitutional oversight role. Most oversight focuses publicly on problems, errors, and missteps in the government. Reports from the Government Accountability Office (GAO), the offices of the Inspectors General (IG), or DOD contract audit and administration agencies also emphasize the negative. It is important to point out problems and to highlight possible corrective actions, but it equally important to highlight successes and progress. Congress can do better in this regard, selecting successful programs and managers for constructive oversight attention in hearing, speeches, commentary, and reports. Most of us learn from what others do well, and the Congress can help spread information about what works as well as what does not.

Conclusion

The defense acquisition system delivers substantial capability to the U.S. military, whether in the form of major systems, information technology, meeting rapidly evolving operational needs, or performing support services at home and abroad. There is room for improvement, and in some areas only congressional action can deliver that improvement. The greatest need is to support hiring, training, and retaining the best people. The Packard Commission recommendations still make sense, and Congress and DOD would do well to continue to implement them.

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Mr. Blickstein is a Senior Engineer at RAND Corporation, has 50 years of experience in the field of Defense Analysis and Management with a specialty in Planning, Programming and Budgeting as well as Acquisition. For the past thirteen years, Mr. Blickstein has managed the research of activities of a series of projects in support of the office of the Chief of Naval Operations and the Undersecretary of Defense, Acquisition, Technology & Logistics. The projects have covered a wide variety of topics including, directed energy, unmanned vehicle, reviews of foreign acquisition programs, sea basing, naval shipyards, operating & support costs in the DOD, evaluation of Navy Enterprises and the cost analyses of both ships and aircraft. He has studied the cost of statutory and regulatory constraints in the DOD and currently co-manages a large project with the Performance Assessments and Root Cause Analysis branch of USD AT&L.

He has served on two studies that developed or improved the analytic functions for the leadership of the Navy and the Director of National Intelligence. Mr. Blickstein serves on the Chief of Naval Operations Executive Panel. He served 31 years in the Department of Defense before joining RAND, 18 as a Senior Executive and was awarded four Presidential Rank awards. He received the Department of the Navy's Meritorious Public Service Award in 2011 for his service on the CNO's Executive Panel.

The views expressed in this essay are those of the author alone and do not necessarily represent those of RAND Corporation.

Views from Mr. Irv Blickstein

Acquisition Policy and Requirements Process Perspective

This paper responds to a request of Senate Permanent Subcommittee on Investigations, which intends to publish it as part of a compendium of views and insights of our country's leading experts on defense acquisition reform in a report entitled *Defense Acquisition Reform: Where Do We Go From Here?* This paper covers two aspects of the issue: (1) Role of the Service Chief in the Acquisition Process and (2) the Military Officers in the Acquisition Workforce. While neither is a question specifically posed in the request from Senators Levin and McCain, both issues are at the heart of several of the points they raise.

Both Congress and each new Administration since the late 1970s have made acquisition reform a priority, and yet the expression "acquisition is broken" continues to crop up in the trade literature and in speeches on Capitol Hill. It may well be that, as can be noted by the questions raised by the senators, we have come to believe that if only we had a little more, and more binding regulation, all would be right in the world. The tenor of the questions suggests we know the answers: more jointness (even though studies suggest that approach is a failure in some program acquisition), more combatant command perspectives (even though the focus of acquisition is on long-term commitments and not near-term fixes), more small business engagement and open architectures to encourage innovation (even though our fundamental problem is in not adequately understanding the framing assumptions that underlie a program). The list goes on, but it should give us pause to consider that less may actually be more. This paper examines two aspects of the state of Acquisition. It deals with having the *right* people on both the requirements and acquisition side of the item to be procured as well as having the leadership of both sides engaged early and together rather than late and separate. The two aspects are as follows:

- The role of the Service Chief in the requirements processes both within the Military Department and JROC process, and the relationship of those requirements processes to the acquisition world.[14]
- The fault line between the uniformed officers who manage most acquisition programs in the material establishment and those in the operational portions of the Military Departments.

Role of the Service Chief in the Acquisition Process

In our 2011 RAND report[15] The Goldwater-Nichols Act and its Effect on Navy Acquisition, we opined that the act "created an impenetrable wall between a military-controlled requirements process and a civilian-driven acquisition process to the detriment of both." That wall continues to confound sound decision-making to this day albeit occasionally breached by

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[14] GAO Report 14-520, observed the role of Service Chiefs' in managing and overseeing Major Weapons Programs, but asserted, shortsightedly, that such a change could not guarantee an improvement in the success of Major Weapons Programs. I concur; no one thing will solve a problem that large.

[15] See Irv Blickstein et al., *The Perfect Storm: The Goldwater Nichols Act and Its Effect on Navy Acquisition,* Santa Monica, Calif.: RAND Corporation, OP-308-Navy, 2010

the congenial personalities of some major players. How did we get here? Goldwater-Nichols provided that:

"The Office of the Secretary of the Navy shall have sole responsibility within the Office of the Secretary of the Navy, the Office of the Chief of Naval Operations, and the Headquarters, Marine Corps, for the following functions:

- Acquisition
- Auditing
- Comptroller (including financial management)
- Information management
- Legislative affairs
- Public affairs

Similar statements applied to the Army and Air Force.

The act further directed the Secretary to designate a single organization within the Secretary's office—that is, a Service Acquisition Executive (SAE) — to manage acquisition and stipulated that person would be a civilian official. It is noteworthy that even after the legislative changes had been enacted, Senator Nunn continued to voice concern about the balance between uniformed and civilian command and control. Senator Nunn's concern over barriers between the military department secretary and service chief is reflected in the following:

> Another area that was of concern is in the consolidation of the military and civilian staffs in the military departments. The conference agreed to consolidate several functions, such as acquisition, comptroller, inspector general, and legislative liaison, under the Secretaries of the military departments and directed that the service chiefs not set up competing bureaucracies within their staffs. In the conference, *I was concerned that we not create an impenetrable wall between the staffs of the Service Secretary and the Service Chief*. (RAND study cited earlier)

What has been the effect of Goldwater-Nichols? For one, I have heard a series of service chiefs say "I can't talk to PEOs (Program Executive Officers); they don't work for me." While that may be only partially true, the communication processes for effective program execution between service acquisition executives and service chiefs are cumbersome at best, and dysfunctional at worst. This problem was partially caused by The National Defense Authorization Act of 1987 (NDAA 1987), which attempted to deal with several policy concerns not addressed by the Goldwater-Nichols Act. For example, it attempted to resolve the problem of the excessive number of briefings that program managers had to give to gain program approval; it also addressed the need for a streamlined reporting chain from PMs (Program Managers) to PEOs to the Senior Acquisition Executive. Note, however, there is an absence of the service chief from that chain.

When communications at the top are poor, the rest of the bureaucracy follows suit. The result is a lack of communication and near gridlock. For example, service chiefs and military

department secretaries make program affordability decisions in the resource allocation processes based on strategy and overall financial deliberations rather than the effect on a single acquisition program. Large programs, begun in good times, fall to the budget scalpel under tighter times. The DDG 1000 Destroyer, for instance, was pared down from nineteen ships to three. We are currently seeing the same process affect the F-35.

The reason that this has occurred over the past 25+ years, is the complete separation of the requirements and acquisition processes (and chains of command) exacerbated by the insertion of the JROC (Joint Requirements Oversight Board) in the Joint Chiefs of Staff organization with the Service Vice Chiefs representing the Service. While assuring that the requirements emanating from a military department cannot be met with a solution from another military department is a reasonable idea, the requirement for the JROC has added approximately one year to the already overly long acquisition process, and the JROC has a veto before a program can move forward.

Of course, I have painted a dark picture of the nexus between the requirements and acquisition processes. Sometimes these are overcome by the stature of a service chief or an acquisition executive, or by the general desire for the two to work together. But on the main, that doesn't happen or happen often, and the two processes are not in harmony with each other. But this really doesn't have to happen, and the fix is quite simple.

While changing Goldwater-Nichols legislation would be fraught with difficulty in this divided Congress, there is a simple way to move toward a solution. In the mid-1990s, the major defense acquisition approval board, the DAB (Defense Acquisition Board), was chaired by the Undersecretary of Defense (AT&L) and ***co-chaired (***emphasis added) by the Vice Chairman of the Joint Chiefs. While the Undersecretary called the meetings, he usually deferred or coordinated the times so that the Vice Chairman could or would attend. As Vice Chairman, the four star flag or the general officer could receive the information he or she needed to be prepared for the decision meeting. The joint chairmanship was eliminated in one of the many changes to the DAB instruction, to the detriment of the Department of Defense and a smoothly operating acquisition and requirements process.

If reinstituted and more important, if instituted at the military department level (the DAB equivalent), would give the service chief a role (in addition to his or her stake) in the acquisition process. Thereby having the ability to obtain information from and question the PEO. This would mean that program briefs to the acquisition executive would also include leadership from the requirements community and would not create an addition burden or reporting requirement. In the case of the Department of the Navy, that would also include organizations and flag or general officers with resource responsibility. In that sense, it would be a "twofer" as the organization that changes requirements and pays the bill would also understand the effect on the acquisition process and costs thereto.

Note that this change has the principal result of increasing communication. Moreover, conversation without substantive knowledge can be frustrating and self-defeating.

Military Officers in the Acquisition Workforce

The challenge to understanding and communicating also stems from another significant, but more subtle, change that stipulated that an officer could not reach flag rank, without having had a joint duty assignment.[16] Underlying this requirement were lawmakers' perception that the services did not send their best officers to joint duty assignments, preferring to keep them in their own ranks. Indeed, many saw a joint duty assignment as a backwater and an indication that an individual's military career was not progressing well. Officers resisted going to such assignments and, if assigned to a joint billet, tried to leave them as soon as they could. Stipulating that promotion to flag rank could not occur without a joint duty assignment ensured that the services would be willing to assign their best officers to such billets. But how did we get to this point?

A principal goal of the Goldwater-Nichols Act was to improve our military's ability to fight jointly; consequently, not only weapon systems but also officer experience and training now had to include joint duty and considerations. Senior-level officials reported that they, too, saw a need for better communication among the military departments and more joint collaboration in operations. However, an unintended consequence of requiring officers to serve in a joint duty assignment to achieve flag or general officer rank was the migration of line officers away from the acquisition assignments because of the pressure of satisfying additional demands during a career whose length did not expand to accommodate them.

This migration became a particular concern in the Department of the Navy since it had maintained a blended workforce in its acquisition processes. Before Goldwater-Nichols, there existed a rich mix of naval officers along with technically oriented civilians working across the material establishment. Program offices, systems commands, laboratories and field activities were generally managed by military officers who rotated into the material establishment from operational billets and brought with them a wealth of fleet experience. Coupled with them were a group of highly skilled engineers and scientists who, working with former line officers, developed and procured the nation's naval weapons systems.

Upon implementation of Goldwater-Nichols, the creation of an acquisition workforce resulted in a formulaic career path for those who wanted to work in acquisition. The establishment of the Acquisition Corps, first in 1990 and later modified in 2005, created a pool of qualified AWF (Acquisition Workforce) personnel. For example, the Navy's Defense Acquisition Workforce Improvement Act (DAWIA) operating guide (2011) stipulated that the AWF would move to greater responsibility and authority by demonstrating exceptional analytic and decision-making capabilities, job performance, and qualifying experience. In so doing, it established certification levels for officer positions starting with junior officers, through various levels to the captain/colonel level. While this experience, training, and job experience appear to make sense, all were in acquisition-level jobs, and none were in operational positions or those involving the development or approval of requirements. An officer faced a simple choice: he or she could go down one path or the other but not both. It is Hobson's choice.

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[16] Flag rank refers to generals in the Army, Air Force or Marine Corps or admirals in the Navy, so called because those achieving that rank are authorized a flag with the number of stars on it denoting their specific rank, e.g., a brigadier general's flag would have one star.

This, in effect, created a decision point for officers: Either move down the acquisition road to eventual flag/general officer rank, or stay with the operational community. Joint assignments for acquisition community officers became more difficult because of the mandated course work and acquisition assignments needed for progression. The new DAWIA workforce structure also demanded new educational mechanisms to prepare individuals for careers in the acquisition workforce. The Defense Acquisition University (DAU) was established with a heavy civilianized structure and outlook. This new institutional training slowed the agility of acquisition, and the demand for military personnel to participate in the DAU courses affected career assignments and rotation.

Exacerbating the "civilianization" of the workforce was an unintended consequence of Goldwater-Nichols emphasis on joint warfighting to satisfy promotion requirements. Before Goldwater-Nichols, officers had more time to rotate through positions related to both the operational realm and the material management process, giving those officers a deeper understanding of the civilian side of the acquisition process. With the rigid requirement of joint duty service, however, officers no longer had time to rotate between operational duty assignments and material management assignments if they wanted to achieve flag or general officer rank in an operational role. Furthermore, those who devoted their energies to acquisition saw their operational experience decline in comparison to the counterparts who served only in line assignments, which meant they lost some credibility when it came to weighing in on the value of a particular performance requirement. As the number of officers serving in acquisition roles decreased, a sense emerged that the acquisition process "belonged" to the largely civilian material establishment, not the operational community. Further, the requisite understanding and knowledge to be able to address issues with a common lexicon was disrupted without the use of the contractor interlocutor.

The result was that while a line officer could move into the acquisition community late in his/her career, it was very difficult and could require waivers. Thus, the Goldwater-Nichols and DAWIA Act built a wall between the two communities with the result that few line officers understood the acquisition processes and the AWF officers were stigmatized as civilians in uniform with whom did not understand the operational needs of their service. And fewer military acquisition officers held command positions in the field before turning to acquisition jobs.

That is not to say that there is not a role for restricted duty officers in the acquisition workforce. However, a blended workforce should contain officers with current warfighting training and perspective to ensure a rich mix of talent is available to the acquisition leadership. Furthermore, it is important that officers in the acquisition community be able to understand and argue the veracity of a stated warfighting requirement based upon personal experience. Operational experience coupled with their newfound understanding of the acquisition process would provide a more informed view of what is needed and what the acquisition community is able to produce at a given price. And it is equally fair to demand of the line community that the expense of achieving a requirement is the most cost effective way to accomplish its mission.

Conclusion

Role of the Service Chief in the Acquisition Process

Looking back, Senator Nunn's concern that the implementation of the law would *create an impenetrable wall between the staffs of the Service Secretary and the Service Chief has been validated*. The barrier could be mitigated by the personalities of the players involved, and that varies over time and across various military departments. To hear a chief of service state that he cannot talk to a PEO because he is outside my chain of command should put us on notice that there is a systemic problem with the implementation of Goldwater-Nichols.

A simple change in the leadership of the acquisition decision process to include the chiefs of service would lead to a greater sense of ownership in what is being procured and would reduce requirements that are difficult to impossible to produce while at the same, deter requirements that defy the art of the possible. In this day of constrained resources, the issue of affordability would come into play at each of the acquisition decision fora as the service chief or representative would be held accountable for being part of a process that approves the procurement of an unaffordable weapon system.

Military Officers in the Acquisition Workforce

The movement of officers between operational and requirements jobs and the acquisition jobs should be encouraged and even mandated. The days when an officer is assigned to a service headquarters directly from an operational position and then put in charge of a system requirement, having little to no experience in the setting of a requirement, needs to be reexamined. Allowing more officers to move more easily between the AWF and the line community would provide more realism in the development of requirements and reduce unreasonable demands upon the acquisition community.

Neither suggested changes require a change in law.

GENERAL JAMES CARTWRIGHT, USMC, Retired
Harold Brown Chair in Defense Policy Studies
Center for Strategic and International Studies

General James Cartwright retired from active duty on 1 September 2011, after 40 years of service in the United States Marine Corps. Unique among Marines, General Cartwright served as Commander, U.S. Strategic Command, before being nominated and appointed as the 8th Vice Chairman of the Joint Chiefs of Staff, the nation's second highest military officer. General Cartwright served his four year tenure as Vice Chairman across two Presidential administrations and constant military operations against diverse and evolving enemies. He became widely recognized for his technical acumen, vision of future national security concepts, and keen ability to integrate systems, organizations and people in ways that encouraged creativity and sparked innovation in the areas of strategic deterrence, nuclear proliferation, missile defense, cyber security, and adaptive acquisition processes.

Born in Rockford, IL, he attended the University of Iowa and was commissioned a Second Lieutenant of Marines in 1971. He was both a Naval Flight Officer and Naval Aviator who flew the F-4 Phantom, OA-4 Skyhawk, and F/A-18 Hornet. In 1983 he was named Outstanding Carrier Aviator of the Year by the Association of Naval Aviation. General Cartwright graduated with distinction from the Air Command and Staff College, received a Master of Arts in National Security and Strategic Studies from the Naval War College, completed a fellowship with the Massachusetts Institute of Technology, and was honored with a Naval War College Distinguished Graduate Leadership Award.

General Cartwright currently serves as the inaugural holder of the Harold Brown Chair in Defense Policy Studies for the Center for Strategic & International Studies. In addition, General Cartwright serves as a member of The Raytheon Company Board of Directors, a Harvard Belfer Center Senior Fellow, a defense consultant for ABC News, and a member of the Board of Governors for Wesley Theological Seminary.

Views from General James Cartwright, USMC, Retired

Based on the research conducted in support of this effort, we[17] assessed there are at least three key areas of risk, for which incremental change and existing process are insufficient to provide the competitive leverage we must have to succeed.

1. Capacity: the ability to field sufficient forces and capabilities to meet the intent of the strategy
2. Agility: the ability to stay ahead of the threat, to adapt to changes in the threat, and to do so in operationally relevant timelines
3. Affordability: the ability to field, train, equip and operate the force at a resource level the American people are willing to provide.

Based on the findings we developed a set of recommendations for departmental leadership to advocate and process changes to implement. The assessment matrix of candidate concepts and technologies is available if required. The top three recommendations are provided for the purposes of this assignment:

1. Independent Operational Research/Systems Analysis: detailed operational research to identify:
    a. Capability gaps
    b. Capacity shortfalls
    c. Adversary tactics and capabilities
2. Segregation of platform and mission equipment and increased use of Modularity and Service Oriented Architectures
    a. Increased agility in adapting new and existing capabilities against potential and actual adversaries
    b. Increased agility in combined arms, across multiple domains
    c. Increased agility to leverage commercial advances into military applications
3. Training & Readiness
    a. Reduce training required for complex functions via the introduction of intuitive interfaces
    b. Reduce life cycle impact of training and readiness on military systems
    c. Maximum leverage of automation
    d. Smart leverage of man's cognitive capacity and capability.

I. Independent Operational Research/Systems Analysis

The Joint Chiefs should be responsible for translating civilian derived strategy to military tasks and identifying to the Secretary of Defense those tasks they are unable to perform at a level necessary to ensure success in executing the strategy. The military services should be

[17] I was assisted in my research by Harold Brown Chair in Defense Policy Studies Center for Strategic and International Studies, and research assistants at the Belfer Center for Science and International Affairs, Harvard Kennedy School including Peter Bacon, Amy Chang, Abby Deift, Jonathan Hillman, Ben Simms, and Ariel Robinson of the Center for Strategic and International Studies.

responsible for organizing, and training for their domain unique tasks. Civilians should be responsible for acquiring the necessary capabilities to accomplish the military tasks. Combatant Commanders should operate the military forces and capabilities in consonance with the strategy, and under the direction of the National Command Authority. Independent Operational Test & Evaluation should determine if the capabilities acquired by acquisition authorities can accomplish the tasks they were designed for. Independent Operational Research/Systems Analysis should determine when gaps between capability provided and capability required exist. These responsibilities are neither precise nor in compliance with current practice intentionally.

Recommendations:

1. Task the Joint Chiefs with the responsibility for translating civilian derived strategy to military tasks and identifying to the Secretary of Defense those tasks they are unable to perform at a level necessary to ensure success in executing the strategy.
2. Task the Office of the Secretary of Defense to assume the responsibility to acquire the capabilities to accomplish the tasks prescribed by the Joint Chiefs.
3. Task an independent operational test and evaluation organization to determine if the capabilities acquired will accomplish the known tasks and maintain maximum agility to adapt to changes over their lifecycle.
4. Task the Combatant Commanders to operate the military forces and capabilities in consonance with the strategy, and under the direction of the National Command Authorities.
5. Task an independent operational research/systems analysis organization to determine when gaps between capability provided and capability required exist.

II. Segregate Platform & Mission Equipment and incorporate broader use of Modularity and Service Oriented Architectures

Platform domain attributes generally have utility life spans measured in years. These long timelines tend to lead to mission/requirements creep, as the reality of changes in the threat and technology opportunities occur. Use of modularity, open commercial standards, service oriented architectures and software defined networks in acquiring and fielding mission equipment can significantly increase agility.

The concept of decoupling the platform and its extended service life from the mission equipment in order create a more agile response to the operational imperatives should seek to reduce time to respond to adversary and or technological change from years and months, to days and weeks. The reduced timelines associated with decoupling platform and mission equipment should also have a chilling effect on the necessity to gold plate or fall victim to the constant creep of requirements by allowing more targeted capability improvements throughout the life of the platform and mission equipment. Mission Equipment, updates would likely run the gamut, from software patches to entire capability suite replacements through modularity. Open architectures, software defined networks, up to date computational power are a few of the necessary elements of today's modern mission equipment suites. Mission equipment related standards, will change over time as innovation responds to need. Not falling into a trap of a single standard for life and avoiding chasing every possible upgrade especially when they do not offer operationally significant improvement, has to be actively managed.

Recommendations:

1. Task Military Service Acquisition Executives with the responsibility to provide domain unique platforms to accomplish strategy derived tasks.
2. Task Under Secretary of Defense for Acquisition Technology & Logistics with the responsibility to provide mission equipment for the platforms in order to accomplish strategy derived tasks.
3. Task the Under Secretary of Defense for Acquisition Technology & Logistics to establish a department configuration control board responsible for platform/mission equipment interface standards.
4. Task the Under Secretary of Defense for Acquisition Technology & Logistics to establish a department configuration control board responsible for mission equipment device and data standards.
5. Task the independent operational test and evaluation organization to ensure the interface standards are complied with and provide the desired level of compliance to ensure fleet wide leverage.
6. Task the Under Secretary of Defense for Acquisition Technology & Logistics to continually survey industry, labs, FFRDCs and universities for emergent standards that add operationally significant capabilities.
7. Task the Under Secretary of Defense for Acquisition Technology & Logistics, in conjunction with service acquisition executives to provide facilities where qualified businesses can test products against real data and interface devices.
8. Task the Under Secretary of Defense for Acquisition Technology & Logistics to ensure incentive structures for new or improved capabilities make maximum use of commercial equipment and best practices.
9. Task the Under Secretary of Defense for Acquisition Technology & Logistics to ensure incentive structures for new or improved capabilities prioritize best strategies for rapid fleet introduction.

III. Training & Readiness

People are the military's greatest asset. The QDR and other Pentagon studies have also acknowledged the demands for increased skill levels, in both direct and indirect compensation is consuming significant proportions of the department's resources. During the industrial age man partnered with machine to increase capacity beyond the limits of man alone. Today that same kind of leverage is possible as man begins to partner with automation and learning machines. We posed three important questions:

1. What tasks are better accomplished through automation
2. What tasks require human cognitive skills and where to locate man to best perform his cognitive role
3. What tasks do we want man in the loop even if we could automate the task?

A revolution is taking place in medicine as significant as the concept of triage, developed in the civil war. Life saving technology available to be applied by any soldier on the battlefield, allows us to treat wounds far more severe than historically possible with a higher likelihood of survival. The triage concept with corpsmen, nurses, doctors, and field hospitals, is being replaced. In its best day, triage saved 60% of those with life threatening injuries. Today, doctors

and nurses presence on the battlefield is minimal, if at all. Medical technology and modern transportation have improved survival rates to better than 90% if the injured can be reached and evacuated within an hour.

Today's military education is base-lined against a high school graduate with 1-2 years of vocational training incurred in the service member's first enlistment. Modern military equipment and the constant updating of that equipment is outpacing the educational protocols. Better integration up front of man-machine interfaces would allow more intuitive interfaces, performance of complex functions, reduction or elimination of task saturation under stress and substantially reduce time to train. Whether it is to provide simplified first-aid or operate complex equipment, better understanding of man/machine interface technology is essential.

Reduced time to train has a second and likely equally important benefit. The military consumes over 50% of the average life of a machine in training activities. Intuitive interfaces are demonstrating significant reductions, in the use of operational machines for training. Freeing up machines dedicated to training and drastically reducing that portion of the machine's life consumed in training, increases its availability for actual operations.

Automation and machine learning has demonstrated higher than man competency in many complex tasks, and the list of functions automation can conduct is growing rapidly. Automation through machine learning allows doctors to treat significantly higher patient loads, engineers to oversee more processes simultaneously, and could do the same for many military functions, e.g. logistics, maintenance, medical and operational functions such as artillery and missile battery fires along with platform operations.

Where in the cognitive architecture should man be physically located? Current research indicates there is no one right answer. Data indicates more intuitive interfaces, and more tasks automation, leads to a reduction in the number of personnel and physical facilities required. Cognitive architectures offer the best opportunity to reduce training and readiness requirements, increase capability and capacity at substantially reduced cost.

Recommendations:

1. Task the Under Secretary of Defense for Acquisition Technology & Logistics to charter a group to focus on more intuitive man machine interfaces with an objective of 90% of fielded equipment operated by a high school graduate with less than two years additional vocational training.
2. Task the Under Secretary of Defense for Acquisition Technology & Logistics to require this same group review, identify and develop cognitive architectures for military tasks.

THE HONORABLE THOMAS P. CHRISTIE
Retired

Thomas Christie last served as the Director of Operational Test & Evaluation (DOT&E), Department of Defense, retiring in February 2005 after four years in that capacity. In this role, was responsible for setting policy and procedures within the Defense Department for the testing of new weapon systems, weapons support systems, equipment and munitions, for overseeing the operational testing of these systems and reporting the results independently to the Secretary of Defense and the Congress. Prior to his confirmation as the DOT&E, Christie was Director of the Operational Evaluation Division for nine years at the Institute for Defense Analyses (IDA), a Federally Funded Research and Development Center (FFRDC).

At the Department of Defense, between 1985 and 1989, he was the Director of Program Integration reporting directly to the Undersecretary of Defense for Acquisition and was responsible for implementing the establishment of the new Office of the Defense Acquisition Executive and the processes whereby this new organization managed the defense acquisition system. Prior to that, he had served in two separate positions in the Office of the Assistant Secretary of Defense (Program Analysis and Evaluation), first as the Director of Tactical Air Division and then as the Deputy Assistant Secretary of Defense for General Purpose Programs. Before coming to the Pentagon in 1973, Christie was the Director of the Weapon System Analysis Division at the Air Force Armament Laboratory, Eglin Air Force Base, Florida. He graduated from Spring Hill College in 1955 with a bachelor's degree in Mathematics and from New York University in 1962 with a master's degree in Applied Mathematics.

Views from the Honorable Thomas P. Christie

Developing, Buying and Fielding Superior Weapon Systems

The current Defense Department acquisition process that develops, tests, and procures new weapons for U.S. combat forces has evolved over the past five decades in response to multiple defense management strategy initiatives, external reform proposals and lessons-learned from the field. The conventional wisdom notwithstanding, the process as spelled out in DOD's directives and instructions is fundamentally sound and could avoid its unending cost overruns, delays and performance failures, if it were implemented in a better informed and rigorously disciplined manner.

We should not waste time in this short paper re-inventing bromides for the bureaucracy to cogitate and self-appointed reformers to contrive. Essential ingredients to a viable weapons acquisition system include:

- budgeting with truly independent estimates of program development, procurement and support costs;
- an evaluation process, again independent, to find and correct reliability problems early and throughout the entirety of a program's life cycle;
- conducting combat realistic operational tests of weapons and honest and complete reports to permit decision makers inside and outside the Pentagon to make properly informed judgments.

Anyone familiar with the way the system has broken down up to now knows these are needed, but there is also more. There are other features of the process that need attention and must be executed, not circumvented, to achieve successful weapons at affordable cost in a reasonable time. These other aspects include:

- insisting on discipline throughout the decision-making process;
- cleaning up the front end of the process where dubious requirements and buy-in cost and schedule promises are greeted without criticism and committed to;
- demonstrating - through empirical field testing, not success oriented modeling and simulation - new technologies before each major decision-maker approval point;
- establishing and carrying out event-based strategies accompanied by realistic pass/fail criteria for each phase of a program;
- conducting continuous independent evaluations of programs all the way through development, testing, production, and even after introduction in the field - to include training exercises and combat results, and

Nothing in today's laws and regulations prevent any of the above; most are actually called for, and yet they almost never happen.

The Need for Reform Is Not New

Proceeding with any new weapon system development, production and fielding with the Pentagon acquisition process as currently implemented (or, perhaps more appropriately, not implemented) will only continue the debacles of the past. Both past and present Pentagon leadership has been painfully aware that "Something's wrong with the system," as Secretary of Defense Donald Rumsfeld told Congress in 2005.

Later, Secretary of Defense Robert Gates was perceptive in stating -

> "First, this department must consistently demonstrate the commitment and leadership to stop programs that significantly exceed their budget or which spend limited tax dollars to buy more capability than the nation needs…
>
> Second, we must ensure that requirements are reasonable and technology is adequately mature to allow the department to successfully execute the programs…
>
> Third, realistically estimate program costs, provide budget stability for the programs we initiate, adequately staff the government acquisition team, and provide disciplined and constant oversight.
>
> We must constantly guard against so-called "requirements creep," validate the maturity of technology at milestones, fund programs to independent cost estimates, and demand stricter contract terms and conditions."

Once again, there is nothing wrong with the assertions, but even with Secretary Gates' many subsequent program alterations, a few actual cancellations, and some modest overhead savings, can anyone say that the Pentagon has transformed into what Gates said he wanted? More, much more, actual implementation is required.

Congress has behaved similarly - with words more grandiose than actions. In 2009, it weighed in with its latest attempt to rescue the Pentagon's acquisition processes: the Weapon Systems Acquisition Reform Act of 2009 (WSARA 2009). In addition to reestablishing test and evaluation and system engineering capabilities eliminated by the Clinton administration with Congress' consent, WSARA 2009 directed the application of several ideas that had been advocated for decades; these included independent cost assessments; evaluating trade-offs of cost, schedule and performance; and competitive prototype development and testing.

But will the Pentagon actually follow what Congress says it intends with this legislation, or will it exercise the many loopholes that Congress consciously inserted into virtually every requirement - at the explicit request of top DOD management - to permit circumvention of most, or all, of these reforms? History suggests the latter.

The Problem is Not Lack of Study

It is difficult to find another process that has been studied more than DOD acquisition. Every few years, yet another high-level study is commissioned to review DOD management in general and the acquisition process in particular, or Congress steps in and legislates, in great detail, how the Pentagon should organize and carry out its mission. The commissions, studies, and statutes are many.

The common goal for many of these efforts has been "streamlining" the acquisition process. Typical techniques recommended were efforts, not always successful, to reduce management layers, eliminating reporting requirements, replacing regulated procurement with Commercial off the Shelf (COTS) purchasing, reducing oversight from within as well as from outside DOD, and eliminating perceived duplication of testing.

Advertised as reform, most of these efforts have had the real effect of reducing oversight. While oversight by government agencies and the associated reporting requirements can indeed be burdensome, they are not the causes of the continuing miserable record of program stretch outs and cost growth. This is true independent of whether those agencies and their reporting requirements are internal to DOD, such as the Defense Contract Management Agency (DCMA), independent cost analysis groups, operational test and evaluation organizations; or external entities, such as the congressional committees and the Government Accountability Organization (GAO). This finding is borne out by my decades of participation in the acquisition process and some of the more competent official reviews, such as that done in 1990, a streamlining review performed by the Defense Science Board (DSB).

That 1990 DSB review, covering some 100 major defense acquisition programs, concluded that failure to identify and admit to technical problems, as well as real costs, before entry into what was known as Full-Scale Engineering Development (FSED) – also called Engineering and Manufacturing Development (EMD) -- was the overwhelming cause for subsequent schedule delays, often years, and the resulting cost growth. Oversight enabled the discovery and reporting of test failures during FSED/EMD that often necessitated additional time and dollars for system redesign, testing and retesting of fixes, as well as costly retrofits of those fixes. It is a viable question, however, whether these delays caused more, or less, schedule alteration to utility in the field than discovering the problems late, after deployment; without question, testing and finding problems early, before serial production, is cheaper – by a very large margin.

After all the reforms of previous decades, here we are in 2014 and what's demonstrably different from the past? Major defense programs are taking 20 to 30 years to deliver less capability than planned, very often at two to three times the cost. It all may be worse now than ever before.

The basic problem is not the official directives. Instead, Pentagon acquisition officials too often have approved "low-balled" estimates of the costs and time required to deliver new capabilities, and ignored independent assessments that were often available and more realistic. Time and again, early-on funding for building and testing prototypes to better understand

technical and operational issues has gone by the wayside. A powerful – overwhelming – factor in the making of these slipshod decisions is the competition for dollars inside the bureaucracy: approve the money now, lest it be grabbed by another program.

A typical hardware program will involve three to five administrations and ten, or more, congresses. By the time the technical and cost issues finally become known in the current system, few, if any, of those involved initially are still around, and those who are refuse to admit they had been wrong, to cut their losses before the problems worsen, or to discipline the system by making an example of program officials and their contractors who have sold the department and the taxpayers a bill of goods.

What Is Needed?

There isn't much that knowledgeable observers of, and participants in, this process haven't already identified as problems and have proposed solutions for. They all appear in existing acquisition directives and instructions. Implementing them, rather than exercising their loopholes, is the starting point for fixing the process.

With the current national fiscal environment and the lack of significant threats projected for the foreseeable future, waivers of the procedures and criteria for success that the regulations were designed to uphold should be few and far between, if they occur at all. In addition, they should be escalated to the Secretary of Defense for major, and even some lesser, programs. Finally, the Defense Department should not proceed with any program with waived requirements until the Congress and its independent arm, the GAO, have evaluated the rationale for the requested waivers, and the appropriate Congressional committees give explicit, statutory approval to proceed. There is no rationale for not taking the necessary time for scrupulous analyses to determine whether we should embark on a new program, and the responsibility and accountability must be clearly established and accepted at the top of the system.

The Front End: Setting Requirements

Hard-nosed discipline on the part of decision-makers at the front end of the process is crucial to reining in the appetite of the requirements community and precluding ill-informed development decisions based on immature technologies and optimistic projections of system costs, schedule, and performance. Upfront realistic cost estimates and technical risk assessments, developed by independent organizations outside the chain of command for major programs, should inform Defense Acquisition Executives. The requirement for those assessments to be independent, not performed by organizations already controlled by the existing self-interests sections of the bureaucracy – as is the case now, even after WSARA 2009 – is essential.

The existing process has heartily approved presumed quantum leaps in claimed capability that are reflected in high-risk, often unattainable, technical and operational requirements. Many of these questionable system performance goals have resulted from the salesmanship of the DOD research and development communities, combined with industry lobbying, in successfully

convincing the user and the rest of the acquisition community that the hypothetical advanced capabilities could be delivered rapidly and cheaply

In case after case, Pentagon decision-makers have acquiesced to programs entering FSED/EMD and even low-rate initial production before technical problems are identified, much less solved; before credible independent cost assessments are made and included in program budget projections; and before the more risky requirements are demonstrated in testing. This is nothing more than a "buy-in" to "get the camel's nose under the tent."

Among the Many False Reforms

The process has become even more cumbersome with increased involvement of the Joint Chiefs of Staff (JCS). Over the years, the Joint Requirements Oversight Council (JROC) and the Joint Capabilities Integration and Development System (JCIDS) process were established to ostensibly provide the combat forces a greater voice in setting requirements. There is, however, little evidence that the "reformed" process has made any significant changes to programs as originally proposed by the advocates.

***Real Reform*: Considering Alternatives**

Approval to proceed with any new development should depend on requirements, both technical and operational, that are attainable, affordable and testable and are based on realistic threat and funding projections. Most crucial to an effective new start is the conduct of an independent Analysis of Alternatives (AOA) that explores other approaches to meeting an identified need. The proposed solutions should run the gamut from continuing existing systems, to incremental improvements to those systems, to launching the development and procurement of a new system. In fact, DOD's regulations call for AOAs to be completed and/or updated before each "Milestone" review, but in reality they have been few.

A thorough AOA should be a hard and fast prerequisite for any Milestone review. It should focus on an independent life cycle cost estimate (R&D, procurement and operating and support) and on the affordability of the various alternatives. It should also include realistic projections into the out years for cost, force levels, manpower support requirements, total procurement quantities, and affordable annual procurement rates. Done properly, an AOA should generate cost and schedule thresholds as well as key performance parameters (including measures of effectiveness, survivability, interoperability, and reliability and maintainability thresholds) upon which the rationale for a new program is based and where it fails in comparison to others. The performance thresholds should include both technical and operational measures that, in turn, should guide the planning and execution of both development and operational testing focused on those key parameters that constitute the justification for proceeding with the new program.

These independent analyses should be updated at regular intervals, not just for each program milestone. The process should be one of continuous evaluation, incorporating updated cost estimates and system performance projections, based on experience in development and

testing to-date. Periodic program assessments should weed out programs that are falling behind schedules, growing in cost and falling short of key measures of effectiveness and suitability.

***Real Reform:* Fly-Before-Buy/Competitive Prototype Demonstration**

The "Fly-before-Buy" philosophy should be the mandated standard for all programs. Perhaps a better term would be "Fly-before-Decide." Done properly, it will demand the demonstration, through actual field testing of new technologies, subsystems, concepts, etc. to certain success criteria before proceeding at each milestone, not just the production decision. Accordingly, successful and competitive prototype development and testing should be a hard and fast prerequisite for any new development proceeding into the FSED/EMD phase. The Achilles heel of many a defense program has been its failure to adhere to this strategy, resulting in technical difficulties and costly development delays that could have been avoided had the decision-maker demanded successful completion of realistic prototype testing and evaluation.

Critical to the success of such a strategy is allocating sufficient up-front funding and schedule to permit a robust comparative evaluation of prototype systems in an operational environment during the Demonstration/Validation (Dem/Val) phase. The Department has paid only lip service in the past to the competitive prototype demonstration requirement spelled out in its own directives. DOD should establish, adequately fund, and maintain operational units (e.g., aircraft squadrons, ground force brigades/battalions), independent of R&D organizations, to conduct tests and experiments to effect this concept.

***Real Reform:* Event-Based, Not Schedule-Based Decisions**

DOD's experience with systems entering operational testing prior to completion of sufficient development testing is chronicled in innumerable GAO and several Defense Science Board (DSB) reports in recent years. A May 2008 DSB Task Force Report on Development Test and Evaluation found that, in the ten year period between 1997 and 2006, over two–thirds of Army systems failed to meet their reliability requirements in operational testing. In almost all these cases, the systems had entered OT&E with little or no chance of success, based on the failures demonstrated during development testing. These programs had not met the criteria for successful completion of development testing and had entered OT&E doomed to fail.

The acquisition decision authority should impose an event-based strategy on programs with meaningful and realistic pass/fail criteria for each stage of development and production. Only if the criteria are satisfied (through actual testing where applicable) should the decision-maker allow a program to proceed to its next phase. For example, when a program is approved at Milestone B to move into EMD, approval to successfully pass a future Milestone C and proceed into low-rate initial production should be predicated on the program demonstrating specific performance/reliability/cost thresholds. Failure to achieve these goals should result in program termination or at least significant restructure until they are met.

***Real Reform*: Continuous Evaluations**

As a new program begins, a process of continuous and independent evaluation must be established to track the program through development, testing and production, and eventual fielding and employment by operational forces. In the early stages, such evaluations should be based on emerging test results and updated cost estimates and should focus on those attributes or capability measures that formed the basis for program approval. These evaluations should be updated with results presented to senior leadership on a routine basis, certainly at least annually. Such evaluations should inform decisions whether or not to proceed with the program or to restructure the program goals and acquisition strategy.

It is extremely important that this process of continuous evaluation extend beyond development. Organizations, independent of both the development and operational communities, should be established and maintained to track experience with new and existing systems in the field, evaluating data gathered in training sorties and exercises as well as in combat, where applicable . Assessments should include not only the usual measures of system performance, but also all aspects of system supportability, to include reliability, availability and maintainability (RAM), as well as safety, training, and human factors.

Feedback loops from the field to the requirements and acquisition communities should be established and maintained throughout the life of a weapon or system. Such arrangements should take full advantage of operational experience in developing plans and requirements for starting a new program, determining needed fixes for deficiencies encountered in the field, continuing and/or upgrading existing systems. Such lessons learned should be invaluable to the acquisition community in shaping its approach to the development of new systems as well as to the T&E and analytic communities in structuring their evaluations of similar systems in the future.

Conclusion

As the country enters what promises to be a prolonged period of fiscal austerity, it can no longer afford the extravagance of spending hundreds of billions of dollars and not receiving the capabilities it paid for. Fortunately, we have an extensive base of experience, derived from both military and commercial programs that we can draw upon to avoid the mistakes of the past. These lessons have been codified in DOD regulations, and the evidence shows that the vast majority of cost overruns and schedule delays come from avoiding their requirements, particularly in the initial stages of a program.

We have the tools and expertise we need to make substantial reductions in the cost overruns, performance disappointments, and schedule slips that plague our weapon programs. What we do not have, or have not had consistently, is the determination to apply the available tools, especially when it means canceling programs that are generating careers in the Pentagon and jobs and votes outside it.

MR. JONATHAN ETHERTON
President
Etherton and Associates, Inc.

Jonathan Etherton, President of Etherton and Associates, Inc., has over 30 years of experience working in and with Congress and the Executive Branch on national security funding and acquisition policy issues.

He served 18 years as a staff member in the United States Senate, including 14 years on the professional staff of the Senate Armed Services Committee. While serving on the Committee staff, Jon Etherton was responsible for managing public policy and budget issues before the Subcommittee on Acquisition and Technology, including; acquisition policy, funding for technology base and research and development programs, industrial base policy and selected defense trade issues. Serving as the principal Republican committee staff member for acquisition policy and reform from 1985 to 1999, he played a leading role in the development and enactment of such legislation as the Federal Acquisition Streamlining Act of 1994 and the Federal Acquisition Reform Act of 1996 (also known as the Clinger-Cohen Act). After leaving Capitol Hill in February 1999, Jon Etherton served first as Assistant Vice President, then Vice President, for Legislative Affairs at the Aerospace Industries Association of America.

Jon Etherton served as a member of the Acquisition Advisory Panel, a Federal Advisory Committee appointed pursuant to section 1423 of the National Defense Authorization Act for Fiscal Year 2004 to review and make recommendations on all Federal acquisition laws, policies and regulations. Jon Etherton is a member of the Procurement Roundtable, a member of the Board of Advisors of the National Contract Management Association and also serves as the Senior Fellow for Acquisition Reform at the National Defense Industrial Association.

Views from Mr. Jonathan Etherton

To maintain the world's finest military, the Department of Defense needs three things: high quality people, realistic and constant training, and cutting-edge technology and support from industry. If we have the first two but not the last, we risk losing our ability to protect our national security interests around the world. Rapidly falling defense budgets underscore the need to achieve major reductions in the costs of what we acquire as well as the costs of acquisition processes and organizations themselves. Neither the current acquisition process nor its outcomes appear affordable. Yet given all of the time and energy put into the prior reform efforts and the persistence of many of the same problems in federal acquisition that were identified decades ago, it is reasonable to ask, "What will be different this time?" To reach a more successful result, the government must make careful assessments of our past experience and leverage new capabilities.

Three basic principles should underpin our future efforts toward acquisition reform. First, individual and organizational authority and accountability are better guarantors of performance than increasing compliance requirements. Second, acquisition decision-making should be based on evidence of strong performance and outcomes rather than on beliefs, opinions, or arbitrary preferences. Third, process requirements should be matched with the resources available to properly implement them, particularly in the domains of human capital, performance measurement systems, and program funding.

To begin with, successful acquisition reform will require evidence-based decision-making. In the past, it was difficult to know exactly what outcomes resulted from acquisition strategies and behaviors in specific circumstances. Today we have analytical tools and "Big Data" capabilities to track and understand the real cost and savings drivers in the acquisition system on a systemic, scientific, and statistically-significant basis rather than by anecdote or even individual case study. If fully implemented, analytical tools can measure the value of different acquisition approaches across the federal enterprise. The Pentagon and Congress no longer need to guess at solutions to the problems in the Defense Acquisition System when both can measure the costs of particular practices compared to their outcomes in order to promote success and learn from failure. Because these emerging tools track, record, and analyze data continuously, continuous improvement of the acquisition process is now a possibility.

The Department of Defense and Congress have already demonstrated the validity of the evidence-based approach to acquisition management. The 2013 *Annual Report on the Performance of the Defense Acquisition System* and the more in-depth 2014 *Report* use such an approach to evaluating acquisition practices, and while not conclusive in many areas, they do draw conclusions where the data are clear, such as "Programs with bad starts often continue to have problems." The *Reports* are admirably clear about what we can derive from their analyses and what requires further study. The Congress also strengthened this evidence-based approach in the reforms it implemented in the 2009 Weapon System Acquisition Reform Act. The Act significantly strengthened the Department's ability to learn from its successes and failures through the office of Performance Assessment and Root Cause Analysis, an improvement evident in both *Reports*.

We must use emerging capabilities within the DOD to analyze the performance of the acquisition system beyond major defense acquisition programs. These analyses should rely on data already collected and analysis already performed, or data collection and analysis capabilities already planned for incorporation in defense business systems. Further, the Department and Congress should use these tools to capture and weigh different approaches to complying with new overhead requirements and the cost of alternative approaches to audits and oversight. Not only will this data offer keen insight into the most efficient way to meet new requirements, it will enable better cost-benefit analyses of current and future legislation and regulation. In my view, the aggressive and systematic deployment of evidence-based analysis is the single greatest tool for overcoming institutional opposition to transformative change of the federal acquisition process.

The availability of lessons learned from past acquisition reform efforts is another factor which should give us hope for meaningful change. Among the richest source of such lessons is the experience with the comprehensive reform effort of the 1990s. Of all the reforms attempted by Congress and the Administration during that period, arguably the least successful were those meant to transform the acquisition culture. Laws were enacted that sought to encourage and reward acquisition professionals for using innovative as opposed to rule-based approaches. For example, various pilot program authorities were created to allow agencies to experiment with innovative strategies in larger programs, but these either did not establish successful models for broader agency use, as in the case of the Defense Enterprise Programs that were intended to streamline the management of major defense acquisition programs, or were never used at all. Most of these authorities were later repealed.

A number of factors undermined these efforts. As the Congress passed the major acquisition reform legislation, the Department of Defense was cutting the acquisition workforce quickly and drastically as part of the National Performance Review. For example, the acquisition workforce in the Department dropped from 460,516 in Fiscal Year 1990 to 230,556 in Fiscal Year 1999. While some reduction was certainly warranted by changes to the acquisition process and the reduction of defense spending, these reductions went too far and jettisoned too many of our seasoned professionals. Further, the laws did not reconfigure the workforce to effectively manage a process that significantly streamlined the contract formation and administration and needed correspondingly greater oversight of the requirements determination process to maximize competition and provide for effective contract management.

In the ‘90s, the theory behind workforce reform was that removing rules would cause judgment and discretion to fill the void. That theory did not play out in practice. Despite passionate cheerleading from the top, agencies did not develop or fund the education programs and opportunities needed to equip the workforce for the new acquisition model. Most of the oversight community still assessed performance in terms of compliance with rules and procedures, countermanding the emphasis on increased authority and accountability.

The lesson from the 1990s for our current efforts is that Congress and the Pentagon must fully fund the training and other workforce initiatives to implement the transformation of the acquisition process. The success of defense acquisition will always depend on the capability of a limited number of people inside and outside government whose resources of time and attention

are finite. Increased skill, relevant experiences, and cultural adjustment of the workforce will occur only gradually and only with adequate funding and congressional oversight.

Congress and the Pentagon can begin to take steps toward a more skilled acquisition workforce. Congress should review and grow the annual amount in the Defense Acquisition Workforce Development Fund and use it to fund an acquisition workforce improvement plan until it is seamlessly integrated into the normal programming and budgeting process. The Department should establish and sustain consistent and standard training, education, certification, and qualification for the acquisition workforce. It should follow the proven Defense Human Capital Management Planning and Competency Modeling processes to identify recruitment, training, retention, and divestment proposals for the consideration of Congress.

In addition to an increased focus on the acquisition workforce, Congress and the Pentagon should improve the requirements generating workforce. The budget for the acquisition workforce improvement plan should expand to address the needs of the requirements community, especially in the areas of non-major program, services, and information technology acquisition. The Department should improve requirements development by sustaining centers of expertise in requirements analysis and development, and agencies should ensure that all acquisitions of complex services (e.g., information technology or management) occur only with express advance approval of requirements by the program manager, user, and the contracting officer, regardless of the type of acquisition vehicle used.

While some acquisition workforce and cultural reforms may not have enjoyed hoped-for success in the '90s, others were quite successful. Opening up the federal market to commercial items has likely saved the government tens of billions of dollars at least and gave the Department of Defense and civilian agencies access to commercial technologies they could not afford to research and develop in-house. The simplified procedures for low-dollar procurements significantly reduced paperwork and manpower. Many redundant, costly statutory requirements were eliminated. For a time at least, the DOD and the civilian agencies were operating under very similar statutory requirements and policies.

Future acquisition reform efforts should solidify and build further on these reforms. Congress should reaffirm and even expand commercial item preference, both as a way to maintain access to cutting-edge technology during a period of shrinking defense research and development and as a way to avoid substantial overhead and compliance costs. Each major program should have a separate stable program funding account based on capital budgeting at Milestone A. The Department should budget for, and the Congress should fund, a management reserve in this account.

With regard to reviewing existing acquisition statutes and regulations, the so-called Section 800 Panel of legal, government, and industry acquisition experts provided detailed recommendations that led directly to the acquisition reform legislation of the '90s. While such an in-depth process may be less feasible today, a process of assigning sunset dates to existing statutes and regulations at reasonable intervals and providing for open public

comment could foster continuous improvement, particularly by eliminating process requirements that do not have proven value.

Among the lessons learned from past reform efforts is the degree to which lack of effective management of the requirements process can undermine efforts to reform the process downstream. Numerous improvements can and should be made to the current requirements development process. First and foremost, the Congress should explicitly align the requirements, acquisition, and budget processes under the purview of the Service Chief and centralize accountability for Service acquisition performance in the position of each Service Chief. Next, the Department should amend Instruction 5000.2 to require a consultation with industry partners across the large, medium, and small business tiers about current and future technologies to help define requirements prior to Milestone A for all major programs. In addition to this initiative, the Department should establish regular roundtable discussions hosted by the Deputy Secretary of Defense with industry executives to share long-range capability development plans and to align industry with defense strategic planning.

One final lesson from past acquisition reform efforts is the great impact of boundary conditions on the success for any contemplated improvement. Perhaps the greatest challenge to reform is that each stakeholder or decision-maker in the process can only affect a relatively narrow piece of the larger enterprise and often must deal with institutional conditions or behaviors that, while out of their reach, may still dictate success or failure. Further, some of these conditions result from aspects of our political system and human nature that are either incorrigible or highly resistant to change. No policy can succeed without accounting for these conditions and their possible impacts. These boundary conditions are sufficiently influential that they deserve brief enumeration here.

The federal military and civilian personnel hiring and promotion systems for civilian employees and military service members impact the education and experience of acquisition personnel and, in the case of the military, the amount of an officer's career that can be devoted to acquisition versus operational assignments while allowing her to remain competitive e for promotion.

The budget, planning, and programming processes in the federal government dictate decisions about schedules and the availability of resources and require that a number of competing public policy imperatives be reconciled, of which cost-effective acquisition is only one. The incentives embedded in these processes can have a decisive effect on the structure, size, and pace of technology maturation of federal acquisition programs, which can further have a decisive effect on cost as compared to value for a specific acquisition program.

While the industry faces significant barriers to entry into and exit from the federal market, companies' behavior in the buyer–seller relationship is not dictated solely by changes to federal acquisition policy. Other considerations also influence a company's response to a policy change, such as the need to demonstrate sustained shareholder value to institutional investors. Also, the federal sales of a commercial company may be quite small as a proportion of its total sales in the global marketplace, reducing that company's willingness to participate in a highly

regulated federal marketplace. These factors limit the extent to which the government can influence the behavior of companies that supply needed services and technology.

The federal audit and oversight structure and process also create challenges. The community that performs oversight and audits sometimes judges acquisition decisions based upon a narrow set of data around a specific transaction when other factors such as the use of individual judgment, innovative approaches, and prudent risk-taking in support an agency's mission may be more relevant to the overall success of the acquisition. This limited focus and the assessment of program success that it may inform can give an inaccurate picture of a program's performance and may discount a well-reasoned decision to not strictly follow the rules to achieve a better overall outcome.

Last, the news media and outside organizations' judgments of the performance of a federal program or agency have a major impact on perceptions and the support of the public and Congress for a program or a given set of policies over time. Whether accurate or not, these judgments can become the common understanding of a program's success and even dictate the perception of success or failure of the individuals responsible for managing the program.

The fundamental question remains, "Where do we go from here?" The past has shown that process is no less important than substance.

The recent experience with the development and passage of the Weapons System and Acquisition Reform Act (WSARA) of 2009 serves as a good model for a rapid legislative process where complex issues involving multiple stakeholder communities are in play. WSARA was introduced as free-standing bill in February 2009 and was the subject of focused hearings during which the Committee considered input from all interested stakeholders. The process continued through the markup of the bill and during the House–Senate conference. The process was very collaborative and allowed for a reasonable alignment among both Houses of Congress and the Department of Defense before final passage in May 2009. That alignment proved essential for successful implementation.

Similarly, the process Congress and the Executive Branch followed for acquisition reform in the 1990s, spanning several years through the passage of the Federal Acquisition Streamlining Act and the Federal Acquisition Reform Act and the Information Technology Management Reform Act, was very successful. That process was very complex process and yet still orderly and structured to allow for the impact of the great changes that occurred while it was ongoing, including the fall of the Soviet Union, the emergence of the internet, and the growth of an advanced commercial electronics industry. The process kept the essential staff and Members of both parties and multiple committees fully engaged, and it accommodated hard political realities to produce well-grounded, relevant, and meaningful reform. Further, Congress effectively tapped the expertise and experience of acquisition professionals from all stakeholder perspectives in government, industry, and academia throughout the process.

The scope and scale of acquisition transformation currently contemplated by the Congress has much in common with the aspirations that drove the multi-year process of the 1990s. Any future process of such magnitude will encounter new and unexpected problems,

issues, and opportunities, and all the parties must be prepared to accept criticism and be open to reconsidering and revising policy approaches as the evidence may dictate. Both chambers of Congress, the Executive Branch, and the industry must establish and sustain communication and collaboration throughout such a process.

The acquisition system today remains in a state of equilibrium held in place by a complex set of forces, including the boundary conditions enumerated above. History suggests that nothing short of some more fundamental disruption of such forces will prevent the system from settling back into a state very similar to what exists today, which is likely to be neither affordable nor supportive of our national defense strategy over the long run in the face of emerging threats. A consensus is forming around the need and the direction for action. The challenges and the emerging capabilities to address them warrant a new attempt at transforming the acquisition process. All of these factors offer reasonable hope that, with patience, collaboration, and the steady application of new information, fundamental reform may result.

THE HONORABLE CHRISTINE H. FOX

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Christine Fox is currently the Assistant Director for Policy and Analysis at the Johns Hopkins University Applied Physics Laboratory. Previously, she served as Acting Deputy Secretary of Defense between December 2013 and May 2014. With her appointment, Ms. Fox became the highest-ranking female official in history to serve in the Department of Defense.

Until July 2013, Ms. Fox served as the Director, Cost Assessment and Program Evaluation in the Office of the Secretary of Defense. She was appointed to that position in November 2009. A presidential appointee confirmed by the U.S. Senate, Ms. Fox served as the principal staff assistant to the Secretary of Defense for analyzing and evaluating plans, programs, and budgets in relation to U.S. defense objectives and resource constraints.

Ms. Fox possesses three decades of experience as an analyst and research manager focusing on defense issues, with a special emphasis on operations. She formerly served as the President of the Center for Naval Analyses (CNA), a Federally Funded Research and Development Center. Ms. Fox also served as a member of NASA's Return to Flight Task Group, chartered by the NASA Administrator to certify the recommendations made by the Columbia Accident Investigation Board.

Ms. Fox received a Master of Science degree in applied mathematics and a Bachelor of Science degree in mathematics from George Mason University.

The views expressed in this essay are those of the author alone and do not necessarily represent those of the Johns Hopkins University.

Views from the Honorable Christine H. Fox

In this essay, I will tackle two important aspects of defense acquisition management suggested for this compendium: first, culture and accountability; second, budgeting and resource allocation.

Culture and Accountability

When all is said and done, it is individual people, not processes, rules or organizations, which are responsible for the acquisition of defense systems. To be effective and make a positive difference, defense acquisition professionals must have expertise, proper incentives, and enough time with a program to really understand it. With regard to expertise, it is important to note that the Department has been making a concerted effort to improve the skills and professionalism of the defense acquisition workforce, first with Under Secretary Ashton Carter and now with Under Secretary Frank Kendall. But the Department still has a long way to go due to the gutting of the acquisition workforce during the 1990s and then outsourcing many core acquisition responsibilities to private contractors. This is going to take time and an investment in people. We must stay the course, even though declining defense budgets are putting more pressure on the Department to reduce further its civilian workforce, including its acquisitions professionals, many of whom were hired in the last decade and have only recently become seasoned in their craft.

The Department is putting a lot of emphasis on pushing our program managers to change from an attitude of deference to private industry to a frame-of-mind more appropriate for a government customer accountable to the U.S. taxpayer. The challenge here is that program managers are evaluated on how quickly they can move their program to the next milestone before rotation to a new assignment. With this metric of achievement these managers have a strong incentive to move the program forward, even if it should be slowed or reconsidered completely. At this time there are no career incentives for acquisition managers to say that their program is not progressing well, it is not worth the money, and should be slowed or cancelled. It is difficult to change this culture; however, the defense acquisition leadership could incentivize more forthright, open, and honest reporting by visibly rewarding someone who has the courage to do it. This will send the right message to the workforce and encourage others to do the same.

The rotation policies of military acquisition managers also work against thoughtful, informed decisions based on experience. This suggests re-thinking the mix of military and civilian leadership in key program management positions. Military expertise is clearly needed, but so is deep knowledge of acquisition processes and program specifics. More leadership opportunities for civilians in program management positions could help achieve a better balance of operational experience and program knowledge.

To do this, we need to make government civilian careers more appealing to highly talented individuals. Every public message sent to the civilian workforce over the last 4 years has been that they are the least valued part of our defense enterprise; excess overhead and bloated bureaucracy as opposed to skilled professionals performing critically important functions in support of America's national defense. To attract the top talent we need to better compete

with private industry for top talent. That means showing potential recruits that a career in government service is highly valued, respected and rewarded.

Part of showing acquisition professionals, military and civilian alike, that their service is valued is to reward good performance. The capabilities of our acquisition workforce are improving significantly yet the environment continues to move in the direction of more and more oversight, much of which is Congressionally mandated. Some additions have been helpful, but others put our managers in the position of constantly defending their programs to oversight committees rather than spending their time managing their programs. As part of the Strategic Choices and Management Review Secretary Hagel directed last year, we considered potential efficiencies in the acquisition process. A common complaint heard was that program managers were spending more and more time defending their programs to contractors hired to conduct mandated oversight–contractors who often knew little about the program. Secretary Kendall took this feedback for action and is working to streamline the acquisition process, while retaining an appropriate degree of oversight. He will need the partnership of Congress to achieve this goal.

In summary, the acquisition community has made progress toward rebuilding a cadre of talented individuals capable of effectively managing complex programs but more work is needed. We need to carefully consider the appropriate balance of civilian and military acquisition professionals; we need to incentivize managers to speak up when their program is not performing; we need to make certain that our career civilian workforce understands it is valued; and we need to scrub the oversight requirements to ensure that we have both an effective and efficient acquisition process.

Budgeting and Resource Allocation

For a program to be successful, in addition to competent program management, it needs to be properly resourced. There is a tight relationship between requirements, program decisions and budgeting. If the requirements are too ambitious and the cost and schedule overly optimistic, the Department will end up with poor performing programs. Over the last 6 years, many programs have been cancelled because they reached too far with unrealistic expectations for cost and schedule. Achievable goals, clear-eyed assessments and proper resourcing are the keys to success. All too often, the Department has found itself down a path in an acquisition program based on a promise or belief that the program will be easier or cheaper than it actually turns out to be. Hard realism early in the process is critically important.

These procurement afflictions are well understood and there are attempts within the Department to rectify the situation. For example, the current Vice Chairman, ADM Winnefeld, revised the Joint Requirements Oversight Council (JROC) to include the Under Secretary for Acquisition and the Director, CAPE. The dialogues at JROC meetings now incorporate a cost and acquisition management perspective, along with a discussion of military needs, before a program's requirements are set. This is a major change that should be continued and even strengthened in the future.

Ultimately, though, the trade-offs among programs, requirements, and costs must be made at the highest levels. The military and civilian leadership of the services and OSD currently spend countless hours meeting to discuss these trade-offs. Ultimately, the Secretary of Defense makes many of the big trade-off decisions personally. A key challenge here is information management. The many complex choices must be distilled to their essence in order for senior leaders to have the time to absorb the necessary information to make such difficult decisions. This type of distillation is very difficult to do well. Furthermore, program information from the military services is often presented from an advocacy perspective.

The role of CAPE has been essential to bringing balanced, fact-based information to the leadership to make these decisions. The Weapons System Acquisition Reform Act (WSARA) did much to increase CAPE's role and influence. As Director, CAPE, I benefitted from WSARA but, even more importantly, I relied on a talented staff of analysts who could present thoughtful and unbiased assessments at a level appropriate for the most senior leadership. It is vital that CAPE retain highly capable analysts and continues to perform its role as honest broker within the Department. It is also vital that the cost analysis be fully integrated with the program analysis as WSARA mandated.

The work of CAPE cost analysts has helped the Department properly allocate resources, provide programs needed stability and, ultimately saved billions of dollars. An Independent Cost Estimate not only provides an estimate, it also identifies areas where a program manager can negotiate with a contractor to achieve greater savings. A good example of this has been for multi-year contracts.

Multi-year contracts provide stability, which supports more efficient and, therefore, cost-effective, contract execution. Both private industry and the government benefit from multi-year agreements. But there are many important lessons learned from CAPE's analysis of multi-years. First, an independent cost assessment of the contractor offer is mandatory in order to achieve the full savings potential. A contractor's assurance that an offer is 10% less than single year contracts is often based on an inflated single year estimate. Second, because a multi-year contract commits the Department’s resources for a long period of time, the Department leadership must be certain that this is a program they will want, even if budgets decline in the future or a significant, competing requirement materializes later. Finally, the Department has a responsibility to articulate these assessments to Congress since it ties their hands as well. However, I believe that Congress also has a responsibility to listen and help the Department achieve the large savings a multi-year affords, if at all possible.

The challenge of multi-years is the uncertain fiscal future in which the Department has little certainty about out-year budgets. That uncertainty also has a damaging impact on the performance of our acquisition programs overall. Every time an acquisition program is changed—stretched, truncated or redesigned—the costs go up. All of the work to improve planning and program management is undercut by this budget uncertainty, particularly sequestration.

Summary

Each year that I was involved in the program and budget process, first as Director, CAPE and then as acting Deputy Secretary, the Department leadership worked very hard to put together an integrated plan that met military needs to the maximum extent possible, even though those needs required the Department leadership to recommend changes to military benefits and compensation, force structure, and modernization programs. But once that tightly crafted package left the Department, it was pulled apart into a series of individual issues with individual constituents and individual political pressures.

To have a chance at funding the modernization the U.S. military needs to deal with more technologically capable adversaries, congressional leaders will need to make some very hard decisions. First, critically important modernization programs are not affordable under sequestration-level budgets. We must find a way to de-trigger sequestration before FY2016. But, they are not affordable under the President's budget as well if structural reforms like curbing military compensation and reducing excess bases are disallowed. Nor is military modernization affordable if the Department is forced to retain weapons programs and force structure that military leaders assess to be less important than other priorities in its tightly crafted budget package. If we find a way to make these tough decisions and responsibly manage our programs, then I do believe we can afford to acquire much needed weapon systems.

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Dr. Fox is a member of the Harvard Business School faculty where he has conducted research on the management of large engineering development projects, and taught courses on defense and aerospace project management. He holds a B.S. degree, cum laude, in physics, from LeMoyne College, and M.B.A. and Ph.D. degrees from Harvard University. He has served as faculty chairman of the Harvard Business School General Management Area. In 2006 he was inducted into the Defense Acquisition University Hall of Fame.

Dr. Fox has served as Assistant Secretary of the Army, where he was the senior Army official responsible for Army acquisition procurement and contracting. In that capacity he served as the principal Army witness before the Appropriations and Armed Services Committees of the U.S. Senate and House of Representatives. He also served as Deputy Assistant Secretary of the Air Force for Management Systems. His work in governmental positions earned him the Exceptional Civilian Service Award from the Air Force and the Distinguished Civilian Service Award from the Army.

Prior to joining the Harvard faculty, Dr. Fox served four years as a Naval Officer and later as project manager for the design and pilot test of the Navy's Polaris Program Cost Planning and Control System, introducing the work package costing concept to large engineering development programs. That concept has been adopted as a standard planning and control tool by the Department of Defense, NASA, and large commercial engineering development and construction projects.

He is author of several articles and books, including: Arming America: How the U.S. Buys Weapons, Harvard University Press; The Defense Management Challenge: Weapons Acquisition, Harvard Business School Press; Managing Business-Government Relations, Richard D. Irwin, Inc; Critical Issues in the Defense Acquisition Culture, Defense Systems Management College; Challenges in Managing Large Projects, Defense Acquisition University Press; and Defense Acquisition Reform 1960-2009, U.S. Army Center of Military History.

Views from Dr. J. Ronald Fox

Fifty years of trying to the solve the persistent problems of defense acquisition have left those problems largely intact—projects that often cost substantially more than budgeted, take longer than scheduled, and/or fall short of achieving their technical performance objectives.

These problems are common for two main reasons. First, they are the natural outcome of the incentives built into the defense acquisition process. Second, many defense acquisition program managers are generally not sufficiently trained to do the job that faces them, whereas industry program managers are generally well trained and experienced to perform their jobs. The results are what we see.

What's needed is both more comprehensive training for government acquisition managers and significant changes in the incentives built into the acquisition process.

During the past 50 years, more than 28 major studies of defense acquisition reform have been commissioned by presidents, Congress, secretaries of defense, government agencies, study and analysis organizations, and universities. The findings and recommendations have been consistent. Each of the seventeen secretaries of defense since 1960 has taken steps to bring about more effective and efficient management of defense acquisition. Yet the problems persist. In 2013, major defense acquisition programs were still taking 10 years or more to design, develop, produce, and deploy initial, operationally capable units. Cost overruns of 25 to 40 percent or more are still common.

Government and Industry Roles in Defense Acquisition

Counterproductive incentives are motivating both government and industry personnel to maintain this unsatisfactory status quo. Overcoming these incentives requires a clear understanding of the limited role of government program managers on large defense acquisition programs. These managers do not perform the actions typically associated with the term *manager*. Because DOD development and production programs are contracted out to the private sector, the principal functions of the government program manager and staff are planning, contracting, monitoring, controlling, and evaluating the schedule, cost, and technical performance of the contractors and the government agencies that provide services and support. The term *technical performance* is used here in the broadest sense to include not only the engineering aspects of a weapon system or a software program but also the contractor's management of resources and subcontractors**.**

Defense contractors, for their part, have three important goals: achieving the program's technical performance objectives, meeting schedules and payrolls, and providing stockholders with attractive returns on their investments. Understandably, industry managers strive to obtain additional work and profit through contract changes and/or additional contracts.

Managing technical performance, in this sense, poses demanding industrial management challenges for government personnel. Program managers must oversee the performance of companies—often very large companies—whose managers are not only motivated to fulfill their

corporate goals but also are well trained and experienced in the defense acquisition process and in methods of estimating costs, measuring progress, allocating overhead, calculating profits, and measuring return on investment.

Most of the recurring problems of cost growth, schedule delays, and failure to achieve technical performance cannot be solved or avoided simply by better engineering, better forms of contracting, multiyear procurement, or more prototypes. Rather, they require frequent (monthly, weekly, and sometimes daily) negotiations between government and industry—negotiations that require government managers well trained and experienced in the acquisition process, knowledgeable in industry operations and incentives, and as highly skilled in negotiation as their industry counterparts. This is often not the case.

Other factors add to the difficulty. The short tenure of many politically appointed senior acquisition officials makes it difficult to institutionalize acquisition reforms. Further, the incentives of the source-selection process often reward lowball contractor bids, followed by incentives that can penalize contractors who spend less than all the allocated funds. Finally, many of the current practices of defense acquisition have great value to key participants in industry, the military services, and/or Congress, predisposing them to resist change.

A Rare Opportunity for Lasting Change

One of the most penetrating analyses of defense acquisition problems appeared as a U.S. GAO report entitled *Weapons Acquisition: A Rare Opportunity for Lasting Change,* prepared by a GAO team under the direction of Paul L. Francis. Published 22 years ago, it is fully relevant today. Unlike the many acquisition studies that preceded it, this report stressed the acquisition "culture"—a blend of practices, beliefs, and doctrine—as a formidable barrier to acquisition reform. This report cited incentives of both government and industry as key upholders of the defective acquisition culture.

Little in that culture has changed since then and it is as clear to today's GAO researchers as it is to me that the Defense Department must replace the counterproductive incentives if there are to be significant and lasting improvements in the defense acquisition process.

Acquisition reforms typically seek to promote sound management practices such as realistic estimating, thorough testing, and accurate reporting. These practices are generally applauded but frequently short-lived. They conflict with the very basic and strongly reinforced incentives to continue the development and production of a weapon system irrespective of problems encountered. In contrast, practices not normally viewed as good management techniques—such as concurrency and unrealistically low estimates—continue because they are aligned with the incentives; that is, they minimize the risk that programs will be cut back or canceled.

The Defense Marketplace versus the Private-Sector Marketplace

The U.S. economic system is built on the concept of free enterprise regulated by the invisible hand of competition. A business can make what *it* wants, but the public will only buy

what *it* wants. The private-sector marketplace is the testing ground not only for products but also for methods of production and management. A well-managed, efficient firm will prosper and a poorly managed one will fail. Lower costs usually mean higher profits. Investors take risks that, if successful, will be rewarded by higher returns.

Many defense acquisition problems are rooted in the illusion that defense acquisition fits naturally into this picture of free enterprise. In fact, government and industry—managing and overseeing large acquisition programs paid for with taxpayer funds—operate in a mixed-motive environment. They generally have the same goal of technical performance, but often have differing goals for cost because there is often little competition in a large engineering development acquisition program once the initial contract is awarded. This important feature of the defense acquisition marketplace requires government program managers and contracting officers to be highly skilled at negotiating with industry contractors.

Government Program Managers

For decades, many have observed that government program managers and their staffs are intelligent and hardworking. Program managers, along with most other government managers in defense acquisition, genuinely want to acquire advanced weapon systems that meet performance objectives at reasonable costs. But in practice, too few government managers know much about the financial incentives and the processes of controlling costs, schedules, and technical performance at work in large private-sector contractor organizations. As a result, government managers, often with the best intentions, have great difficulty making the decisions and taking the actions required to reward lean industrial organizations.

Effective and efficient management of major acquisition programs requires government program managers and contracting officers highly skilled in achieving a crucial balance between the adversarial role and the pure partnership role in their relations with industry—a balance that produces what is referred to as a *wise buyer*. Achieving that balance requires years of acquisition training and experience. One must learn to cope with the complexities of the acquisition process, the ins and outs of day-to-day negotiations, and the forceful marketing tactics within government, within industry, and between government and industry. What is needed is not an adversarial relationship characterized by animosity and suspicion, but rather (in the words of a former commander of the Army Materiel Command) "a business relationship characterized by professional acquisition managers trained and experienced to perform rigorous analyses and tenacious bargaining, with unambiguous regard for the best interests of one's own side."

Army, Navy, Air Force, and Marine Corps program managers and contracting officers are nominally responsible for monitoring three areas of contractor activity: achieving the technical performance called for in the contract, meeting the program's schedule requirements, and performing work within the specified budget. But these goals are not best achieved in an adversarial relationship any more than they are best achieved in a cozy partnership. If a major defense acquisition program is to run smoothly and efficiently, it should be structured so that fulfilling the government program's objectives gives a contractor a reasonable opportunity to earn a return on investment comparable to commercial returns.

Ensuring this requires specific technical knowledge and skills well beyond what many recent government program managers, senior military officers, and some assistant secretaries in the military services have acquired. If the complex defense acquisition process is to be managed more effectively and efficiently, the Defense Department must develop more skilled and experienced acquisition managers and support staffs to manage the complex continuing negotiations between one part of government and another and between government and large industrial firms. These tasks cannot all be delegated to contracting officers.

Immediate Steps Required to Improve Defense Acquisition Management

Managing taxpayer-funded acquisition programs costing hundreds of millions of dollars is too important and too complex to be conducted by government military and civilian personnel with part-time acquisition careers. The military services need to provide clear and comprehensive career paths for government acquisition managers, both military and civilian. A career in acquisition needs to begin early in a person's government service and include training and experience comparable to that provided in industry. As long as defense acquisition is largely in the hands of managers for whom it is merely one step in a career path directed elsewhere, we will continue to see the same quality, cost, and scheduling problems.

This is hardly a radical change. Fifty years ago, the military had few space-based warfare personnel or IT personnel, but those needs were recognized and are being fulfilled. At the moment, some first steps have been taken to fulfill the need for more professional acquisition personnel, but they are only first steps. The Defense Acquisition University provides important training for program managers and their staffs, but much more training time is required to enable students to practice dealing with more real-life examples of the difficult challenges they will encounter on the job. As recently as early 2014, program managers have stated (in a DOD survey concerning program manager training and experience) that they need more time to train for their jobs.

It is imperative that future program managers be required to complete a minimum of six months of formal *advanced* training, in which they learn to deal effectively with hundreds of realistic examples of the challenges and dilemmas both they and contracting officers will encounter. Managers in training should analyze these challenges, discuss the strengths and weaknesses of the available options, and plan the implementation of selected options to deal effectively with the challenges. Instructors will need to be familiar with industrial management practices, skilled in conducting practical training with interactive sessions, and up-to-date in their practical knowledge of the challenges, opportunities, and constraints experienced on major acquisition programs in the field. It may be difficult to recruit such instructors, but they do not need to be academics or theorists; they need to be effective practitioners and experienced coaches.

The Need for Extended Follow-Up

Reform without determined follow-up is insufficient; that has been one of the problems with previous attempts at acquisition reform. Much effort is devoted to initiating reforms, but too little to the day-to-day and year-after-year work of ensuring that changes take place and

become institutionalized. Lasting improvement requires a system of incentives strong enough to overcome the incentives that reinforce the status quo.

The steps to be taken include:

- Effective root-cause analyses need to be performed routinely on each major cost growth, schedule slippage, and technical performance shortfall on major acquisition programs. Solutions for the problems should then be implemented, tested, and institutionalized so that the same problems do not occur on other acquisition programs. The Air Force, for example, has adopted this policy successfully in response to a series of serious aircraft accidents.
- In the current contracting system, a company often seeks to increase its profits by expanding or extending a program's contractual work through contract changes. Instead, it should be possible for contractors to earn attractive profits routinely in response to getting the job done well, on time, and at *lower* cost.
- Congress needs to stop accepting program stretch-outs as a tactic for funding new programs; this practice encourages uneconomic production rates.
- Acquisition management careers need to provide enhanced promotion opportunities for military and civilian personnel who make the difficult decisions associated with successful management of major acquisition programs. People who perform these tasks effectively are worth a great deal to the defense department, to Congress, and to American citizens. It is unrealistic to expect to retain them in government service if they see no future opportunities in DOD acquisition management.
- The acquisition careers of military officers need to be extended to provide opportunities beyond age 45. The current system encourages many capable military officers to leave the service and seek second careers in industry. DOD needs to listen to Army and Air Force lieutenant colonels and colonels and to Navy commanders and captains to learn their views on the advantages and disadvantages of the current acquisition career field.
- The contractor source-selection process needs to place more weight on selecting more realistic proposals, in part by giving far greater weight to a contractor's record of realistic cost estimates and past performance. The current system often rewards overoptimistic cost estimates that serve only as door-openers for costly future contract changes and sole-source follow-on contracts. Unless these changes are made, it is useless to discuss more realistic contractor proposals.

Conclusions

The combination of our continuing need for a strong defense and our alarmingly high federal deficit are placing intense pressure on the defense acquisition process. In fact, the process can realistically be improved to take this pressure. The keys to serious improvement include a strong Secretary of Defense and well-qualified service acquisition executives. The latter need to be managers chosen because they have industrial experience and expertise in defense acquisition, they are professionally committed to efficient and effective acquisition, and they understand why past reform efforts have failed to achieve those goals.

It is clear that military and civilian acquisition managers need more experience in program manager assignments and need to be unrelenting in taking steps to improve the management of acquisition programs. There is little likelihood that the cost of major acquisition

programs will stabilize—much less decrease—until more skilled government acquisition managers at all levels have these abilities, these motives, and these incentives. Minor adjustments or corrections to the present acquisition process simply will not do the job.

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The views expressed in this essay are those of the author alone and do not necessarily represent those of the Government Accountability Office.

Views from Mr. Paul Francis

The Acquisition Culture: Complicated, Inefficient, and in Equilibrium

An oft-cited quote of David Packard, former Deputy Secretary of Defense, is: "We all know what needs to be done. The question is why aren't we doing it?" To that point, reforms have been aimed mainly at the "what" versus the "why." They have championed sound management practices, such as realistic estimating, thorough testing, and accurate reporting. Today, these practices are well known. Yet, poor outcomes— cost growth, schedule delays, large support burdens, and reduced buying power—have been persistent for decades.

At this point, we should build on existing reforms—not necessarily by revisiting the process itself but by tackling incentives. To do this, we need to look differently at the undesirable outcomes of weapon systems acquisition. Some are clearly due to honest mistakes and unforeseen obstacles. However, they also occur not because they are inadvertent but because they are encouraged by the incentive structure. It is not sufficient to define the acquisition problem as an objective process that is broken. Otherwise, reforms should have fixed it. The challenge is greater than that. It is more accurate to view the problem as a sophisticated process whose consistent results suggest it is in equilibrium. If we think of the requirements, funding, and acquisition processes as being in equilibrium, then the challenge for getting better outcomes is greater. The rules and policies are clear about what to do, but other incentives force compromises. The persistence of undesirable outcomes such as cost growth and schedule delays suggests that these are consequences that participants in the process have been willing to accept.[18]

Reforms and policies have mainly addressed the mechanisms for acquiring new weapons. The acquisition of weapons is much more complex than policy describes and involves very basic and strongly reinforced incentives to pursue new weapons. Thus, the practices prescribed in policy are only partial remedies. Accordingly, rival practices, not normally viewed as good management techniques, comprise an effective stratagem for developing a weapon because they reduce the risk that the program will be interrupted or called into question. Seen in this light, the acquisition culture is at the same time rational yet unresponsive to methods or policies that would restrict it. It will take considerable and sustained effort to change the incentives and inertia that reinforce the status quo.

Digging deeper into acquisition culture, the process of acquiring new weapons is (1) shaped by its different participants and (2) far more complex than the seemingly straightforward purchase of equipment to defeat an enemy threat. Collectively, as participants' needs are translated into actions on weapon programs, the purpose of such programs transcends efficiently filling voids in military capability. Weapons have become integral to policy decisions, definitions of roles and functions, justifications of budget levels and shares, service reputations, influence of oversight organizations, defense spending in localities, the industrial base, and individual careers. Thus, the reasons "why" a weapon acquisition program is started are manifold; acquisitions do not merely provide technical solutions.

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[18] For further reading, please see GAO, Weapons Acquisition: A Rare Opportunity for Lasting Change, GAO/NSIAD-93-15 (Washington, D.C. Dec. 1992).

For example, program proponents in both the executive and legislative branches can, on a given acquisition, fall into philosophical camps that create a high stakes debate over whether Solution A or Solution B is the right one. Can sound acquisition practices thrive under these circumstances? Consider the following: Why would the Army, after promoting the lightweight family of combat vehicles in the Future Combat Systems program for 5 years, then turn to a 70-ton Ground Combat Vehicle when FCS was canceled? Why would DOD at the same time defend producing 2 competing versions of the Littoral Combat Ship while canceling the competing engine for the F-35 because it was too expensive? Why is the $10 billion-per-year Ballistic Missile Defense System managed largely outside the mechanisms of the acquisition process? Why, after defending the DDG 1000 Zumwalt class destroyer as essential to future naval warfare, would the Navy cancel it in favor of continuing with the growth-limited DDG 51 Arleigh Burke class destroyer? In the space launch services debate of today, does the United Launch Alliance or SpaceX have the right solution? The answers to these questions will not necessarily be found in acquisition policy nor encourage good acquisition practices.

While individual participants see their needs as rational and aligned with the national interest, collectively, these needs create incentives for pushing programs and encouraging undue optimism, parochialism, and other compromises of good judgment. Under these circumstances, persistent performance problems, cost growth, schedule slippage, and difficulties with production and field support cannot all be attributed to errors, lack of expertise, or unforeseeable events. Rather, a level of these problems is embedded as the undesirable, but apparently acceptable, consequence of the process. These problems persist not because they are overlooked or under-regulated, but because they enable more programs to survive and thus more needs to be met. The problems are not the fault of any single participant; they are the collective responsibility of all participants. Thus, the various pressures that accompany the reasons why a program is started can also affect and compromise the practices employed in its acquisition. Take cost estimating for example. There have been myriad reforms to make cost estimates more rigorous and realistic, but do these address all of the reasons why estimates are not already realistic? Realism in cost estimating generally means higher costs. While cost realism is the goal of policy, cost optimism is much more useful to program survival.

What to do? Use this construct of acquisition culture as a lens to allow us to see systemic problems from a different vantage point—one that admits the power of incentives that do not align with the presumption that the acquisition process seeks to buy the best system for the best price. Reforms of the future must take the acquisition culture into better account.

The Art and Mechanics of Funding Weapon Acquisitions

Understanding the art and mechanics of obtaining funding for weapon system acquisitions helps explain why decisions are made that run counter to sound practice or policy. First, there is an important difference between what investments in new products represent for a private firm and for DOD. In a private firm, a decision to invest in a new product, like a new car design, represents an expense. Company funds must be expended that will not provide a revenue return until the product is developed, produced, and sold. In DOD, new products, in the form of budget line items, can represent revenue. An agency may be able to justify a larger budget if it

can win approval for more programs. In this sense, weapon system programs can be seen as revenue generators, which have a different set of incentives than expenses.

Second, budgets to support major program commitments must be approved well ahead of when the information needed to support the decision to commit is available. Budget decisions depend heavily on the promises and projections of program sponsors. Take, for example, a decision to start a new program scheduled for August 2016. Funding for that decision would have to be included in the fiscal year 2016 budget. This budget would be submitted to Congress in February 2015—18 months before the program decision review is actually held. DOD would have committed to the funding months before the budget request went to Congress. It is likely that the requirements, technologies, and cost estimates for the new program—essential to successful execution—would not have been reliable at the time of funding approval. Contentious budget battles create incentives for sponsors to be optimistic and make it hard to change course as projections fade in the face of information. This is not about bad actors; rather, optimism is a rational response to the way money flows to programs. Once the hard-fought budget debates put money on the table for a program, it is very hard to take it away later, when the actual program decision point is reached. Ironically, then, weapon systems end up being at the same time prematurely funded and underfunded—dual characteristics that stymie management and oversight. The conundrum is that without these enablers, programs may not survive the budget battles.

Third, to the extent a program wins funding, the principles and practices it embodies are thus endorsed. So, if a program is funded despite having an unrealistic schedule or requirements, that decision reinforces those characteristics, not sound acquisition processes. Pressure to make exceptions for programs that do not measure up are rationalized in a number of ways: an urgent threat needs to be met; a production capability needs to be preserved; despite shortfalls, the new system is more capable than the one it is replacing; or the new system's problems will be fixed in the future. Funding decisions involve more than the program at hand: they send signals as to what is acceptable. Thus, it is funding approvals that ultimately define acquisition policy.

What to do? DOD and Congressional decision makers have to reinforce desirable acquisition principles when they make decisions to fund new programs. Programs that do not measure up should not be funded; those that do embody sound principles need to win the budget battles. We must also more closely align budget decisions and program decisions. While there is not an obvious remedy to this problem, ways to have budget decisions follow program decisions need to be explored, without sacrificing the discipline of establishing long-term affordability.

Deferred Consequences Make It too Easy to Accept Risks Like Concurrency

Weapon acquisition programs by their nature involve risks, some much more than others. The desired state is not zero risk or elimination of all cost growth. But we can do better than we do now. The primary consequences of risk are often the need for additional time and money. Yet, when significant risks are taken, they are often taken under the guise that they are manageable and that risk mitigation plans are in place. Risk mitigation plans are prepared today, but they have everything in them but the likely time and money consequences of risk. In the

short term, when decisions are at hand, risks thus appear free of consequence. Yet in today's climate, it is understandable—any sign of weakness in a program can doom its funding.

Over the years, acquisition reform has emplaced a number of mechanisms to capture risk (including Technology Readiness Levels, Preliminary Design Reviews, and Critical Design Reviews). But, in keeping with rival incentives, there are increasing signs of "leakage", that is, programs are approved that do not measure up to these standards. There is more pressure to discount the value of TRLs (because they are too hard) and to not conduct PDR before milestone B (also because it is too hard). A novel strategy for eluding oversight and discounting risk is to conduct system development and early production before holding a milestone B decision. Since many policy and statutory requirements are triggered by the milestone B decision (such as acquisition baselines, operational testing, and Nunn-McCurdy cost reporting), conducting as much of the program activities beforehand can marginalize oversight. This has been the primary approach taken in missile defense. More recently, the Unmanned Carrier-Launched Airborne Surveillance and Strike system proposed a strategy to develop, produce, and deploy several full systems on carriers before holding a milestone B decision. Although there was time to hold a milestone B decision, the program was approved as planned. Costs and risks will be hard to track without a formal baseline and when the program reaches milestone B, it will be in production and unstoppable despite remaining risk.

Concurrency—committing to another stage in acquisition while significant work in the previous stage is unfinished—is a key risk taken with known negative consequences that are routinely underestimated and accepted. "Fly before buy"—which embodies the non-concurrent principle—is still a fundamentally sound approach to acquisition. This does not have to mean every single test must be done before key decisions, such as starting production; but key tests must be done. When significant concurrency is planned from the start, those risks can be debated ahead of time (although their consequences would likely go unrecognized). The silent killer in this area is latent concurrency; that is, concurrency that is not planned or discussed ahead of time but occurs because key acquisition progress, marked by test results, is delayed but the program must proceed as planned because money is already approved and the industrial base is up and running. As noted above, these risks are routinely judged acceptable because they are free ("never enough money to do it right, but always enough money to do it over"). Ballistic Missile Defense, the F-35, and the Ford Class Carrier are all recent examples of pushing forward in acquisition while key tests lag behind. Oversight is necessarily compromised.

What to do? If programs are to take significant risks, whether they are technical in nature or related to an accelerated schedule, these risks should be declared and the resource consequences acknowledged and provided for. Less risky options and potential off-ramps should be presented as alternatives. Decisions can then be made with full information, including decisions to accept the risks identified. If the risks are acknowledged and accepted by DOD and Congress, the program should be supported. Regarding concurrency, an acquisition strategy should establish test priorities in which a critical path is established that includes key test events that cannot be delayed if other key program commitments/decisions are not. This would be the heart of "fly before buy" and would include independent evaluation. Some musts for testing: rigorous testing in science and technology with disciplined use of Technology Readiness Levels; use of competitive prototyping wherever possible; high fidelity development testing of integrated

prototypes before production begins; continuous monitoring of the operations and support consequences of test results.

Important Factors to Consider in Attracting, Empowering, and Rewarding People

The Defense mission in general and the acquisition mission in particular have tremendous cache' for the emergent workforce. However, such a career has disincentives, such as lower opportunities to have impact and to see results because of poorly planned acquisitions that drag on and squeeze out other programs to pay for overruns. A new person entering the workforce would have to think twice about whether they want to enter a career where the new product development cycle is 3-5 times that of the private sector. Rewarding top performers is not necessarily a matter of financial compensation. Paying people more to work in a dysfunctional acquisition environment is not a good reward for top performers. Rather, the key reward is in creating an environment in which top performers are listened to, candor is rewarded, and the reporting of "bad news" is neither discouraged nor punished. Top performers need to be empowered in establishing business cases and acquisition strategies that are realistic and follow best practices. So, more discipline in approving programs that have an executable business case—a top goal of acquisition reform—will also make Defense acquisition a more attractive career. Such a business case and resulting development require skill sets in key areas, including systems engineering, cost analysis, logistic support, software engineering, operations research (to analyze, for example, the sensitivity of cost and schedule to performance requirements), contracting, and business acumen. DOD has recently gone through an analysis of key skills and disciplines needed by the acquisition workforce. This should give DOD a good starting point for knowing what core competencies are essential to get good value for the taxpayer. But, people with these skills will not stay in the acquisition workforce if their programs cannot be executed and thus languish.

The careers of acquisition managers need special attention. Program managers and Program Executive Officers must play a principal role in defining the business case for any new acquisition. This means being involved before Milestone B so that they can participate in the discussion of requirements, cost, and schedule tradeoffs, as well as evaluating the progress of emerging new technologies being considered for inclusion. They must walk a fine line: that is, they must have a powerful voice in developing the business case without becoming advocates for the program. Their job must be to make sure that unrealistic requirements, technical advances, compressed schedules, and low cost estimates do not creep into the business case. They should function as gatekeepers and must be empowered to say "no".

But this is not their job today. In today's environment, PMs and PEOs, particularly in the early stages of an acquisition, are held accountable for winning funding approval and defending the program in DOD and before Congress. This encourages optimism versus realism, and makes accountability for succeeding PMs and PEOs very difficult. If a poor business case succeeds in winning approval for a program, the original PM and PEO are long gone by the time reality sets in. Both military and civilian managers must be put in a better position to succeed. Program managers are routinely put in charge of programs that are not executable. The dual responsibility of promoting a program while managing it puts program managers in an untenable position—it grinds some of DOD’s best people up. Moreover, an acquisition career for military officers is

still not at par with other careers. Tenures for program managers are already specified in DOD policy, but it is not enforced. A sound business case is essential to holding managers accountable for results. This, coupled with tenures for program managers and other executives, would provide needed accountability. Dr. Ronald Fox has written extensively about the business acumen deficit that DOD weapon system program managers operate with today and the need to develop such acumen in future program managers. See "Defense Acquisition Reform, 1960-2009: An Elusive Goal (Washington, D.C.: U.S. Army Center of Military History, 2011).

What to do? Put both staff and managers in a better position to succeed by starting programs with executable business cases. Make better use of time certain development so that acquisition staff can see results on a 5-year cycle instead of a 15-year cycle. Shortened development cycles can be made possible by robust science and technology investments to retire technological risk early and by making delivery time a key factor in trading off requirements. The shortened cycle will also enable better accountability.

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Views from the Honorable Jacques S. Gansler, PhD

Improving Defense Acquisition of Goods and Services

While there is widespread recognition that **today's defense challenge** is to deal with the **declining budgets** and the **growing security challenges**; there is **great reluctance to make changes** (by the Congress, the Administration, the Military, the industry, and the unions) - - yet **change** (in the way the DOD's business is done) **is clearly required** - - from the "requirements" process and the regulation/oversight "rules," on through the "acquisition" process (including: research, development, and demonstration; budgeting; competition and source selection; cost, schedule, and performance incentives; program and budget stability; logistics; and support).

Today's environment presents many challenges for the Department of Defense as it attempts to modernize the nation's forces. The following issues must be highlighted:

- **Significantly shrinking budgets; with considerable uncertainty about the budgets for the future.** As a result of the ending of Iraq and Afghanistan contingency operations, and in response to the nation's budgetary problems, the DOD's budgets have declined significantly. In the past, the DOD could rely on personnel reductions in order to constrain future costs. Today, however, the active military force structure is projected to decrease to near an all-time low; thus, further reductions in troop end-strength are unlikely. Additionally, the Budget Control Act of 2011 introduced budget "sequestration"—that is, automatic cuts imposed because deficit reduction targets were not met; and Congress has rejected repeated requests from the Secretary of Defense for Base Closures (to match the force reduction).
- **Worldwide security concerns:** Terrorism; pirates; cyber vulnerabilities; regional and religious conflicts; growing irredentist movements; nuclear and biological weapons profilication; etc.; **and much uncertainty about "what's next".**
- **High costs, overruns, and schedule slippages in the DOD's purchases of goods and services.** The DOD continues to struggle to contain the costs of its weapons programs. Yet, the underlying causes of cost growth - - over-optimism, estimating errors, unrecognized technical issues, requirements creep, and budget, quantity, and schedule changes - - have proven difficult to overcome.
- **A rapidly-changing world** – in technology, geopolitics, economics, and security.
- **An increasing share (over 50%) of defense acquisition dollars going to buying services** (from I.T. to wartime field support); but all policies, practices, regulations, etc. are based on buying "goods" - - yet acquiring an engineer, or a software program, is definitely different from acquiring a tank.

Clearly, **a very challenging environment!** However, significant change is definitely required at both the prime and subcontract levels - - **yet there are very high barriers** (from all of the involved institutions) to make the required changes.

Required Actions:

- **Utilize appropriate forms of competition**:

  The American system of incentives (institutional and individual), and the overwhelming historical evidence, **demonstrate** that competition will not only reduce costs, but, (equally important), produce higher–performance and higher-quality products; and do it much faster; while focusing more attention on customer needs. Using appropriate forms of "fair" competition (i.e. with equal requirements and regulations applied) throughout the acquisition cycle will help ensure that its significant benefits are realized. Although, competition is largely accepted at the initiation of development, and for initiation of production, it is often resisted during production; even though it is the key to ensuring that a real incentive is given for contractors to ensure they meet cost, schedule, and performance requirements - - as was proven on the engines for the F-15 and F-16; where competition was maintained, and **both** engines got higher reliability and lower costs; in this case (known as "the great engine war") the Air Force says there was a **net savings** of $4 Billion - - yet this "dual sourcing" of the engines was not continued on the F-35. Competition into production can produce significant cost savings; and it should be encouraged, in all its various forms and credible options.

  Federal agencies should focus on their **public** core competencies (i.e. inherently governmental functions -- such as policy, fiscal management, oversight, and warfighting). Competition should be introduced into all other activities, to get the "best value" from either the private or the public sector; i.e. attaining higher performance, at the lowest cost. History provides many examples where this has been a successful strategy. There have been over 3000 **public vs. private competitions** (for non-inherently-governmental work, currently being done by government employees) and the results were: an average of over 30% cost savings (no matter if the government employees or a contractor won); with improved performance and greater cost visibility.[19] And the public sector won over 50% of the competitions (with significant cost savings). Importantly, a study has shown that, in spite of the efficiencies from these competitions, only 5% of the government workers were involuntarily separated (most either transferred to other government jobs, or retired voluntarily and were employed by the winning contractor).[20] Yet, ignoring the overwhelming **demonstrated** benefits (in terms of cost reductions and improved performance) Congress has restricted future public/private competitions (even though two of the last competitions were won by the public sector, with 70% and 82% cost reductions!).

  In addition to the above, **current law** requires that 50% of all depot work (a multibillion activity that is **not** inherently-governmental work) must be done, sole-source, by government workers (even though it is an ideal area for competition - - using "public/private partnerships").

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[19] Trunkey R. Derek, Robert F Trost, Christopher M. Snyder, "Analysis of DOD's Commercial Activities Program," Center for Naval Analysis, Dec 1996

[20] 21. Gansler, J.S. and W. Lucyshyn, Competitive Sourcing: What Happens to Civilian Employees?, IBM Center for The Business of Government Report, Oct 2004

- **Make human capital sourcing decisions based on total costs**. What constitutes the right mix of contractor and government employees often hinges on individual views on the proper role of the government. While the use of private sector providers has historically expanded and contracted, as a result of political forces; there is no doubt that some functions are "inherently governmental," and that these tasks **must** be performed by government employees. Still, it appears that "insourcing" is sometimes promoted for its own sake, while the underlying rationale (be it cost savings or inherently governmental status) is misconstrued or misrepresented. Recent government policies, aimed explicitly at increasing the government workforce, accomplished little in the way of reducing costs and, as described below, may significantly increase long-term costs.
  Before making a human capital sourcing decision, a complete analysis of costs, (that will enable accurate comparisons between private and public sector service providers), is needed. Clearly, direct costs must be considered. However, indirect costs, or "overhead," should also be incorporated into a cost comparison methodology. Indirect costs include shared costs; fixed costs; overheads; individual benefits; and variable costs. Accordingly, accounting techniques must be quite sophisticated if they are to fully capture these types of indirect costs. Presently, however, these are not adequately accounted for in the cost comparison methodologies used by government agencies. Several studies (by both the CBO and the OMB) found that, for example, it would be **90% cheaper** to use competitive contractors, (when full benefits, overhead, and rotational base are included), for deployed operational support.[21],[22] But, again, such findings have been ignored. For example, the Air Force believed they could save 40% by "insourcing" maintenance (based on the difference in hourly pay; but excluding all other factors).

- **Reduce the regulatory burden**. Both the Congress and the Executive Branch continue to write more and more legislation and regulations - - creating increasing auditing, oversight, and reports to be submitted by DOD and/or their contractors. In fact, the number of pages in the Code of Federal Regulations, by 2011, had reached 180,000 pages.[23] And, **both the OMB and the SBA estimated that regulatory compliance costs, by 2008, had reached $1.752 Trillion** (up from $1.1 Trillion in 2005, and $843 Billion in 2001).[24] Clearly, it is necessary to determine the costs (in dollars; and, therefore, in security) of current and additional regulation; and to evaluate the relative benefits and costs in schedule and performance impacts, of being changed (i.e. increased or reduced).

- **Make cost a requirement.** Traditionally, the Military have argued that "cost is not a military requirement" - - but it should be! Since, given a budget appropriation for a program, the **quantity** that is affordable is determined by the unit cost. As stated by Lanchester's Law, the total force effectiveness is proportional to the individual weapon's effectiveness times the quantity **squared**. So unit cost, which drives quantity, is clearly a military requirement - -which should receive the same (or more) attention as given to the

[21] Congressional Budget Office (CBO). (2005). Logistics support for deployed military forces. Washington, DC:.
[22] Congressional Budget Office (CBO). (2008). Contractors' support for U.S. operations in Iraq. Washington, DC:.
[23] McLaughlin, Patrick A., On The Human Cost of the U.S. Regulatory System, August 1, 2013.
[24] Crew, Clyde Wayne Jr., Ten Thousand Commandments, Competitive Enterprise Institute, 2013.

weapon's performance requirements, (during the design of the weapon, and its production). Additionally, life-cycle cost should receive the same attention; since O&M dollars are similarly limited; so they also affect the quantity of weapons that are affordable.

- **Use a "Best Value" Tradeoff Source Selection Strategy for Complex and High-Knowledge-Content Work**. In the (false) belief that it will save money, (in this period of reduced budgets) many of the competitions for goods or services are now being decided on the basis of "lowest price/technically acceptable (LPTA)". This works fine for interchangeable, simple commodities. But for complex weapons or sophisticated services, it leads to simply "buying cheap" - - which usually leads to inferior performance, and much higher life-cycle costs. Obviously, the preferred source-selection basis, (for complex, sophisticated procurements) is "best value" (i.e. the balanced combination of costs, risks, and performances).

- Another acquisition practice that has gotten out of hand is the **trend to large numbers of "winners" on Phase I of IDIQ contracts**. To simplify the acquisition of an Indefinite Delivery and Indefinite Quantity of a good or a service, the DOD has moved to a two-step process - - first, they compete firms to determine who is sufficiently qualified in a given area; ideally the "winners" of this phase are a few (e.g. 2 to 5) contractors. During the second phase, these contractors then compete for each task order, as they come out. This should speed up the process; and result in effective competition among qualified sources. However, (primarily to avoid protests), the results have been to award to a large number of firms on the first round (for example, on the Navy's "SEAPORT E" IDIQ, there were 2200 first-round "winners"; who all, then, can bid on the tasks as they come out. This not only drives up the government's costs for the evaluations, but the industry "bid and proposal" costs, in their government-reimbursed overheads. Clearly, this is a high-cost process; that must be changed.

- **Reduce Barriers to Buying Commercial and to Dual-Use Industrial Operations**. There are two required (industrial base) changes:
  1) the removal of the "barriers" to the DOD buying from commercial or foreign firms (when they offer the "best value"),
  2) the removal of the "barriers" to firms integrating their commercial and defense operations in the same facilities (in order to gain the cost and performance benefits from the "economics of scale" of the higher volume; and, to gain the performance and cost benefits from the "technology transfer" between the sectors.

  One example (of the latter need) was when Boeing was building commercial and military transports together in Wichita, the DOD requirement for "specialized cost accounting" and detailed auditing **forced** them to move the commercial production to California - - thus, raising the price for both sectors, because of the reduced volume in the plant.

  Many people don't realize that, today, there is **twice the overall R&D investment being made by U.S. commercial firms as by the total U.S. federal government.**[25] So, in

[25] David Mowery " Military R&D and Innovation" (University of California Press, 2007)

many areas (such as I.T. and advanced manufacturing) the commercial world leads the government world in developing and applying advanced technology.[26] However, because of the required, detailed auditing and regulations (even at the subcontract level); and the shutting-out of the world market, due to export controls (e.g. if a commercial item is subcontracted on an export-controlled end item; then, the subcontracted item cannot be exported) as a result, many top-level commercial firms consciously avoid doing defense business. So, the DOD loses their technological leadership and low-cost focus.

Similarly, the "spending on R&D by the rest of the world" significantly leads the U.S. (commercial plus government) in developing and applying advanced technology. So that, today, **every U.S. weapon system contains foreign parts - - because they are higher performance;** not just because they are less expensive.

When the DOD decided to "harden" their soldiers'-carrying vehicles against "road-side bombs" (the largest killer and maimer of fighting men and women in Iraq and Afghanistan) they found that the best armor came from Israel; the best shock absorbers came from Germany; the best tires came from France; and the best design for the undercarriage (against mines) came from South Africa. Then, the Israel-owed armor company (Plasan) set up its plant in Vermont (to address the U.S. labor concerns).

Implementation of Changes

The literature is clear, about how to successfully implement changes in large organizations. Two things are required: first, **recognition of the need for change**; and, second, **a leadership team, with a vision, a strategy, and a set of actions.** Clearly, today there is widespread recognition of the need for changes in the way the DOD does its business; but the leadership (with a clear vision; a desirable and achievable strategy; and a set of actions (that can achieve widespread alignment and motivation); is not visible - - and the leadership team must be aligned at all levels (Congress, the Administration, key DOD appointees, the military, and industry).

One critical area that has been grossly undervalued is **the DOD acquisition workforce**. Without sharp, experienced leaders, managers, and buyers, Machiavelli's 16th Century prediction (about the difficulty of making change in government) will be realized. We must recruit, train, and reward top people for the critical acquisition positions.

It can be done! A successful "story" (case history) of a DOD weapon system, that applied all of the changes described above, is the Joint Direct Attack Munition (JDAM)- - whose job was to add a guidance and control package to convert all "dumb bombs" into "smart bombs". The Chief of Staff of the Air Force wrote the "requirement"; which he said had only 3 parts: 1) hit the target; 2) work, when the button is pushed; and 3) cost under $40,000 each (so the DOD could afford to buy enough of them). The senior people in the Air Force (recognizing the importance of the program) picked a previously-successful **leader** (Terry Little) as the Program Manager (who was willing to make the required changes). His strategy was to use **continuous competition** (through the prototype phase); to make maximum use of **commercial** subsystems;

[26] National Science Foundation, S&E Indicators 2006; OECD, Main S&T Indicators database, Nov. 2004

and to **focus on accuracy, reliability, and cost**. (The latter was a particular challenge, since the "independent cost estimate" (based on historic, similar-complexity systems) was $68,000; and he had a "requirement" to achieve under $40,000.

The result of the JDAM "best value" source selection (between the competitive prototypes) was that the accuracy and reliability were both **better** than the required performance; and that **both** competitors bid a unit cost of around $18,000! Clearly, a success story; and **a demonstration that it can be done!**

THE HONORABLE DR. J. MICHAEL GILMORE
Director, Operational Test and Evaluation (DOT&E)
Department of Defense

Dr. J. Michael Gilmore was appointed by President Obama with the advice and consent of the Senate to be Director of Operational Test and Evaluation on September 23, 2009. He serves as the senior advisor to the Secretary of Defense on operational and live fire test and evaluation of Department of Defense weapon systems. Previously, Dr. Gilmore was the Assistant Director for National Security at the Congressional Budget Office (CBO) where he led a division performing analyses of major policy and program issues in national defense, international affairs, and veterans' affairs. Dr. Gilmore is also a former Deputy Director of General Purpose Programs within the Office of the Secretary of Defense, Program Analysis and Evaluation (OSD(PA&E)). As the Deputy Director, he was responsible for developing, formulating, and implementing Secretary of Defense policies on all aspects of Department of Defense general purpose programs, including analyzing the operational effectiveness and costs of U.S. conventional military forces and supporting programs. Before serving as Deputy Director, Dr. Gilmore served as the Division Director of Operations Analysis and Procurement Planning, within the Office of the Deputy Director, Resource Analysis and prior to that as an analyst for Strategic Defensive and Space Programs Division, Office of the Deputy Director, Strategic and Space Programs. Dr. Gilmore's service with Program Analysis and Evaluation covered 11 years.

Early in his career, Dr. Gilmore worked at the Lawrence Livermore National Laboratory, Livermore, California performing research in the laboratory's magnetic fusion energy program. He also worked as an analyst with Falcon Associates, McLean, VA, and as an analyst and, subsequently, manager in the McDonnell Douglas Washington Studies and Analysis Group. Dr. Gilmore is a graduate of the Massachusetts Institute of Technology, Cambridge, Massachusetts, where he earned a B.S. in Physics. He subsequently earned a M.S. and Ph.D. in Nuclear Engineering from the University of Wisconsin-Madison.

Views from the Honorable Dr. J. Michael Gilmore

Mr. Chairman, Senator McCain, thank you for the opportunity to contribute to the Defense Acquisition Reform Compendium. The country's process for acquiring its very complex defense systems is equally complex, often inefficient, and sometimes produces systems that have little operational utility, do not demonstrate a clear improvement over existing systems, or do not enable Soldiers, Airmen, Sailors, and Marines to accomplish their missions in combat. One of my goals is to assure the Department's leadership is provided accurate, comprehensive, and timely information regarding weapon system operational performance so that it can wisely use increasingly constrained defense resources. The following details my specific views on how the acquisition system can be improved.

Requirements and Needed Expertise

The foundation of the acquisition system is the requirements generation process and the people who craft those requirements. I have observed two limitations in requirements definitions:

- Requirements stated in terms of technical parameters that are not mission-oriented;
- Requirements that are defined under a limited range of conditions, when the Services themselves clearly indicate in their approved concepts of operation and employment, and the Department's war plans indicate that systems will and must be employed across a broad array of combat conditions and threats.

For example, the Navy is developing and procuring the P-8 aircraft primarily to find and kill enemy submarines and perform reconnaissance. Yet, the P-8's Key Performance Parameters (KPPs) require only that the aircraft fly a certain range carrying a certain number of sonobuoys and communicate using certain radios. In an extreme case, the contractor could deliver an aircraft that met all the KPPs but have no mission capability whatsoever. Such an airplane would only have to be designed to be reliable, equipped with self-protection features and radios, and capable of transporting weapons and sonobuoys across the specified distances, but would not actually have to have the ability to successfully find and sink threat submarines in an Anti-Submarine Warfare mission. When I raised this issue to the Vice Chairman of the Joint Chiefs of Staff, he agreed that narrowly focused KPPs such as those used for the P-8 were a problem. The lack of KPPs related directly to mission effectiveness will inevitably create disconnects between actual operational effectiveness and high-level acquisition reviews that during system development primarily track satisfaction of KPPs.

KPPs sometimes specify the performance needed under benign conditions, yet operators are expected to and must employ the system---per the Services' own concepts of operation and the Department's war plans---under a broad range of much more challenging combat conditions. In particular, the Services themselves state in their validated and published concepts of operations and tactics guides how and where they will use the system; and, intelligence agencies determine the characteristics of the threats that the system will actually encounter – again, often only a narrow range of those conditions are captured in the KPPs alone. For example, if a laser

minehunting system can find mines in calm, clear waters, that does not mean it will provide a useful minehunting capability in the turbid waters all-to frequently observed and encountered in likely operational areas worldwide.

Therefore, valuable reform would re-emphasize the critical value of rigorous analysis in highlighting how the equipment will enable the warfighter to achieve what is needed in combat under the range of conditions specified in validated concepts of operation and war plans. This analysis, which is attempted in many cases but is cogent in only a few (the analysis is, by no means, easy to execute) should focus on answering the "So What?" question: that is, why is the level of performance validated as required really needed to succeed in combat, and is it feasible technically to achieve? For example, a reliability threshold might be chosen that requires the system to operate with an average of 500 hours between system failures/aborts. There are instances in which that numerical requirement is not well-connected to the combat mission, and requires the contractor to over-engineer the system to achieve that requirement, when, in the context of a mission, a system demonstrating 200-hours between aborts is completely suitable and can satisfy combat mission needs.[27]

Clear analytical and engineering rigor, therefore, should be re-emphasized within the process as a key means to examine trade-offs in the art of the possible and operational needs across the spectrum of operating conditions. Without such rigor, the choice of thresholds and objectives can be driven by subjective desires and can lead to disappointing results. For example, the requirement for mean time between system aborts (MTBSA) validated for the manned combat vehicle within the Future Combat Systems (FCS) program was much longer than the MTBSA achieved by the much less complex Bradley Fighting Vehicle after several decades of operation and upgrades. This very long MTBSA for FCS was not achievable and was one of several unachievable FCS requirements, a program that the Army spent 10 years and almost $20 billion trying to execute before it was terminated. There were many engineers who knew many of the FCS requirements were unachievable at the program's outset. Had that $20 billion been expended on successfully developing and fielding systems satisfying achievable requirements, the Army would not now be facing the substantial modernization challenge it is confronting. To avoid future problems of this magnitude, the Department's requirements and acquisition processes should include explicit, documented input from engineers independent of both the operators and prospective service program offices of the technical feasibility of proposed requirements.

Thus, requirements generation must include both operators and engineers (Science, Technology, Engineering, and Mathematics (STEM)-degreed with experience in complex system design, development, and testing). The former providing a constant reminder and push to keep the focus on the operational mission needs and help answer the first part of the "So What?" question; and the latter to provide the needed engineering expertise to determine what is possible relative to what is needed and can be verified through testing. Unfortunately, the Department

[27] Reliability thresholds are not based solely on mission accomplishment but may also take into account logistics and spare part costing and life-cycle costs. Nonetheless, we have observed on numerous occasions that these additional considerations lack a cogent quantitative or analytical backing.

has steadily outsourced and lost its in-house engineering civilian workforce since the 1990s.[28] Although this problem has been recognized and the pendulum is slowly swinging back the other way, the Department's continued inadequate ability to recruit and retain engineers will be detrimental to the development of requirements, as well as to the Department's ability to competently oversee and manage the development of these systems---which are among the most complex endeavors attempted by anyone anywhere on the planet.[29] As it stands, the Department has little choice but to continue with the status quo. Progress away from the status quo will only be possible if the Administration seeks and the Congress grants much greater flexibility than currently exists in hiring and compensating engineers and scientists, and the Department's leadership, through its actions, makes it abundantly clear that their contributions are critical, valued, and used throughout the Department, including at its highest levels, to make decisions.

Increased Emphasis on Testing and Its Results

Testing is not and must not be treated as yet another non-substantive hurdle to be surmounted during program development. The substantive purpose of a test and evaluation program is to characterize system capabilities across the intended operational conditions so that problems with system performance are not discovered at the worst possible time---in combat when lives will be lost if operational performance is not fully understood. Test and evaluation also verifies that testable requirements are met or not met, and provides key information for decision-making to enable, at least in theory if not practice, sound decisions on allocating resources and managing system development and procurement. This is, quite simply, the "fly-before-buy" concept, and I support it whole-heartedly. Rigorous testing early and often is essential for program managers and acquisition executives alike – without it, we can fool ourselves into believing that a program's maturity is higher than it actually is and we run the risk of discovering system shortfalls later in program development, or as stated above, in the worst possible case when the Soldiers, Sailors, Airmen, and Marines employ it in wartime.

Of particular note, both developmental testing and operational testing must be rigorous if a program is to be successful. Developmental testing (DT) is essential for verifying specifications, examining and verifying subcomponent and full system design aspects, and conducting the structured performance measurements to ensure the technology and engineering are sound. Likewise, operational testing, both earlier in program development as well as just prior to full-rate production (or full system deployment), is essential for characterizing the system's mission-level capabilities in the various operational conditions that the user will employ the system when using the Service's concept of operations and developed tactics. Operational testing (OT) can and does identify key issues with systems' combat effectiveness. This information is provided to acquisition authorities for decision. Decisions by those authorities to

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28 For example, http://www.nytimes.com/2008/06/25/us/25engineer.html cites a 35 percent drop in engineers within Air Force acquisition from 1994 – 2008.

29 A 2007 MIT survey showed that the average annual starting salary in finance and high-tech was more than $70,000, compared with $37,000 at the Defense Department, and the protracted development time for military projects "amounts to a professional death sentence" for scientists and engineers who want to keep up to date with technological advances. (IBID).

fix problems can affect program schedules if they judge the associated fix worth the delay. As several previous studies have found, it is not testing itself that causes program delays, but rather the results of the tests and the revelation of performance problems that cause delays.[30] There have been many examples where operational testing identified critical system performance problems when systems were employed in an operationally realistic environment that provided opportunities for correction before system fielding or deployment.[31] Similar arguments apply to need to conduct survivability testing early and under as realistic conditions as possible. For example, testing of Mine Resistant Ambush Protected vehicles was done on an expedited basis that provided leaders early insight to the protection capabilities of these key systems. DT, live-fire testing, and OT serve different roles, all are essential, and all provide critical information at crucial points during an acquisition program's life.

As such, in order to obtain information early and often, I recommend requiring that an operational assessment (OA) be conducted for all new-development major defense systems other than rapid acquisitions, prior to Milestone C---the key point when a decision to begin production is made. Such an operational assessment should exercise the system under operationally realistic field conditions and with sufficient adequacy to uncover significant mission shortfalls and reliability problems if they exist. I note that the Army, in particular, already adopts this best practice and conducts Limited User Tests prior to low-rate initial production (Milestone C decision) for nearly all its new-development major acquisition programs.

Second, the Department continues to lag the academic community and commercial industries on applying scientific experimental design techniques in testing. I have made the widespread adoption and use of these techniques one of my initiatives during my time as DOT&E, and the operational test community has made great strides to change the modus operandi to conform better to the well-established best practices and techniques afforded by these scientific methods. Several studies by the Defense Science Board and National Research Council have advocated such analytical methods, and the culture is starting to shift in the right direction. Not only do the scientific test and analysis methodologies (also referred to as design of experiments or Design of Experiments (DOE)) provide a rigorous and defensible approach for scoping operational tests to support robust characterization of system performance, but also provide a methodological approach to developing tests. The logical framework of DOE helps guide test planning discussions. While characterizing system performance in OT is essential, the real benefits of experimental design and analysis techniques are realized when applied early in the acquisition process when system design can be modified and improved. Industry players and other Government agencies have traditionally applied DOE in testing that is more closely analogous to the Department's developmental testing. The results have been improved system safety, optimized performance, rapid detection of performance shortfalls, and reductions in cost. The Department's acquisition community as a whole would see more comprehensive benefits from applying a scientific approach to testing if rigorous statistical techniques were applied in contractor and developmental testing routinely. These techniques should be applied in contractor testing, early and late developmental testing, and in operational testing. Currently, pockets of

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30 See http://www.dote.osd.mil/pub/reports/20110603TEofDefensePrograms(3844).pdf; http://www.dote.osd.mil/pub/presentations/20110523ReasonsBehindProgramDelaysMaster.pdf; and http://www.dote.osd.mil/pub/presentations/20110830Program_delays_Nunn-McCurdy_final.pdf.

31 See http://www.dote.osd.mil/pub/presentations/Value_of_Operational_Testing_and_Evaluation.pdf.

excellence exist in these communities, but the application is far from wide-spread or standard. In my view, the acquisition community should institutionalize these methods through written policy across the entire acquisition system, particularly in the Department's engineering and program office core and the supporting institutions that conduct early developmental and operational testing. In particular, the Department should require the use of these techniques be included in requests for proposals (RFPs) and their inclusion in industry responses to those RFPs be given substantial credit by those in the Department evaluating those responses for purposes of contract award.

To facilitate the institutionalization of these methods we need to provide education and training to the existing test and evaluation (T&E) workforce, hire-in people with the capability to be immediate practitioners of DOE, and develop best practices and methods that adapt existing methodologies to the Department's unique applications. In particular, the government should actively engage with Science, Technology, Engineering, and Mathematics (STEM) programs within universities to generate a pipeline for future qualified T&E and acquisition professionals. DOT&E and USD(AT&L) currently sponsor research and students to help build this pipeline and generate interest in the Department's acquisition system, but those funding streams are limited and do not provide the needed magnitude to greatly affect the incoming workforce. Continued Congressional support of funding for STEM programs is essential.

Focus on Reliability Early to Curb Operation and Support (O&S) Costs

While always important, it is especially important in the current fiscal climate that system reliability is emphasized early in the acquisition process. Reliable systems cost less overall (because they require less maintenance and fewer spare parts), are more likely to be available when called upon in combat, and enable a longer system lifespan. Reliability is more effectively and efficiently designed-in early (design for reliability) vice being tested-in late. While more up-front effort is required to build reliable systems, the future savings potential is too great to ignore. Programs that invest in reliability improvements early in their life cycle are expected to get the greatest return on investment and concomitant reduction in life cycle costs.

Despite the implementation of several policies intended to encourage development of more reliable systems, the fraction of DOD systems assessed as reliable during operational testing has not improved. Many programs still fail to reach reliability goals. Test results from the last few decades indicate that the DOD has not yet realized statistically significant improvements in the reliability of many systems. This failure stems from a number of sources including inadequate requirements, unrealistic assumptions, lack of a design for reliability effort prior to Milestone (MS) B, or failure to employ a comprehensive reliability growth process. For example, the reliability thresholds for some programs were unachievably high or disconnected from what was really needed for the mission. Other unrealistic assumptions include choosing an initial reliability value for their reliability growth curve that was significantly higher than comparable systems have been able to achieve, or choosing an optimistic initial value for the growth curve without an adequate design-for-reliability effort (which should occur prior to the growth program) to achieve that initial value. In many cases, a program's reliability growth goal, while documented in a Test and Evaluation Master Plan (TEMP) or Systems Engineering Plan (SEP), was not supported by contractual obligations or funding.

The solutions to these problems lie in part in the points mentioned above: re-emphasizing analytical rigor in the generation of requirements, an active emphasis on the results of testing early in the program, as well as on strong leadership that relies on test results to make the hard decisions about program management and progress in the face of cost and schedule pressures.

Strong Leadership is the Key to Success

Even if we had perfect policy and process, the success of the acquisition system will always be dependent on the judgment and choices of those empowered to make resource allocation, program management, and other decisions. It is therefore unlikely that the acquisition system can be "fixed" solely by the passage of policy updates or legislative reforms. Program success ultimately derives from the leadership's ability and willingness to make sound decisions and hold people, including itself, accountable. Acquisition decision makers will always be faced by pressures of cost, schedule, performance, technology limitations, operational needs, and politics. They must juggle the many competing motivations and incentives for program initiation and development. Leaders must have the authority and confidence to say "no," even when the momentum and pressure are high, when the facts reveal that a course deviation is essential to a program. The willingness and ability to say "no" to high-risk schedules, optimistic cost estimates, and optimistic claims of technical readiness and to support those decisions within and outside the Department using cogent arguments based on the facts are essential. Leadership that does this sends a strong message by directly challenging the powerful incentives that can otherwise lead to the adoption of unachievable requirements embodied in high-risk programs that fail.

In that regard, one of the key enablers for decision makers is timely, accurate, and unbiased information. The Department, through previous Congressional reforms, has established in-house independent sources of crucial program information. The Office of Cost Assessment and Program Evaluation (CAPE), as well as DOT&E, for example, are appropriately and uniquely situated to provide independent and unbiased assessments to decision makers. There is constant criticism of these organizations' independent activities and pressure to constrain their independence. Continued strong support by the Congress and successive Administrations of these pockets of independent and objective expertise and evaluation remains, in my view, based on 29 years of experience with defense programs and resources, essential.

THE HONORABLE DANIEL I. GORDON
Associate Dean for Government Procurement Law
George Washington University Law School

Daniel I. Gordon was appointed Associate Dean for Government Procurement Law at the George Washington University Law School, effective January 1, 2012. Prior to his appointment, he served as the Administrator for Federal Procurement Policy, a position to which he was nominated by President Obama and confirmed by the Senate in 2009. As the Administrator, Mr. Gordon was responsible for developing and implementing acquisition policies supporting over $500 billion in spending by the United States government each year. Prior to joining the Administration, he spent 17 years at the Government Accountability Office (GAO), where he was appointed Deputy General Counsel in 2006 and Acting General Counsel in April 2009. Before he began at GAO, Mr. Gordon worked in private practice handling acquisition-related matters. Mr. Gordon holds a B.A. from Brandeis University, an M.Phil. from Oxford University, and a J.D. from Harvard Law School. He has also studied in Paris, France; Marburg, Germany; and Tel Aviv, Israel.

Before joining the Administration, Mr. Gordon served as a member of the adjunct faculty at the George Washington University Law School, and he is the author of articles on various aspects of procurement law.

Views from the Honorable Daniel I. Gordon

Chairman Levin, Ranking Member McCain, and Members of the Subcommittee, I thank you for inviting me to share my views on defense acquisition reform with the Subcommittee through this submission. I am the Associate Dean for Government Procurement Law Studies at the George Washington University Law School, whose Government Procurement Law Program has, for more than 50 years, been the premier academic venue for the studying and teaching of procurement law in this country. This submission is based on my statement on defense acquisition reform submitted to the House Armed Services Committee earlier this year.

Faced with the daunting combination of your long list of questions and a strict page limit, I will point out three key points that don't get enough attention and three myths that may cause mischief, and then offer three suggestions for your consideration.

Three points to keep in mind

First, one piece of the puzzle you are dealing with really is different today: according to the information in the Federal Procurement Data System, ***DOD is spending far less money on contracts than it has for years***. Whether mainly due to the winding down of the wars in Iraq and Afghanistan, or because of budgetary pressures here at home, DOD's spending on contracts dropped more than $50 billion between fiscal years 2012 and 2013 (from $361 billion to $308 billion). It's especially interesting to see that contract spending at the next biggest contracting agencies barely changed: spending on contracts at NASA and the Departments of Energy, Health & Human Services, Veterans Affairs, and Homeland Security – combined – remained essentially unchanged at approximately $89 billion. Whatever the cause, and however painful it has been, the fact is that DOD has found ways to substantially reduce spending on contracts. That is not to diminish the challenges and threats ahead, but to serve as a reminder that DOD procurement spending, despite what many believe, is not on an upward trajectory.

Second, when you are looking at defense procurement – especially when you are analyzing the problems and thinking about possible solutions – it is worth remembering that ***defense procurement spending falls into several very different categories***. Much of DOD's spending on contracts is for major weapon systems, and contracting for major weapon systems has unique characteristics – some would say unique pathologies. To give two concrete examples: first, the rise of indefinite-delivery, indefinite-quantity (ID/IQ) contracting has sped up the purchasing of goods and services in a way unimaginable 25 years ago, but that form of contracting is largely irrelevant to major weapon system procurements; and second, the problem of "concurrency," the overlap between development and production, which has plagued major weapon system procurements, is largely irrelevant to most acquisitions for non-military goods and services.

DOD's spending on contracts other than for major weapon systems is broadly similar to acquisition spending at other federal agencies: much of it is on IT systems and support, and most of it is on services, rather than goods. Procurement of services is especially challenging – but civilian agencies, which also spend more on services than on goods today, face similar challenges. To the extent that Members of Congress decide to focus on major weapon system

procurement, they can safely continue down the path of special rules, with limited impact on the rest of the federal procurement system. If, however, Members propose to change the way that DOD buys services or goods other than in the context of major weapon systems, I would urge caution in creating one set of rules for DOD and a different set for civilian agencies. The similarity of our statutory and regulatory legal framework for acquisitions across the federal government (other than for weapon systems) is an asset, and creating DOD-unique rules for procurement of goods or services that are not unique to DOD could cause costly inefficiencies.

Third, when you are looking at how DOD buys, and especially where it falls down in its buying, it can help if you ***distinguish the three phases of the acquisition process***: acquisition planning, competition and award of contracts, and management of contract performance. I submit to you that the middle phase – the competition for, and award of, contracts – is, somewhat surprisingly, the phase with the fewest problems. Past Congresses have enacted clear rules that mandate full and open competition as the norm in our federal procurement system, with various exceptions, and it is striking how little of the criticism of the DOD procurement system goes to the competition and award system (I'll address bid protests, which do relate to that phase, in a moment). The weak links in our procurement system are what come before and after: poor acquisition planning, especially poor definitions of what the government is trying to buy, and lax contract management, a weakness that was appropriately highlighted in the report of the Commission on Wartime Contracting. If it is of interest, I can provide information on the efforts I have been involved in to improve acquisition planning and contract management.
Of relevance to those who are focused on drafting potential bills: the acquisition planning and contract execution phases are those least amenable to legislation. You can legislate mandates for competition in awarding contracts, but legislation may not be the right tool to improve competence in writing requirements or managing contractors. That said, the Weapon Systems Acquisition Reform Act of 2009 (WSARA) has been praised, by GAO and others, for helping reduce some of the risks arising during the requirements-writing and cost-estimating processes.

Three myths about the challenges we face

First, it is not true that our defense procurement system is broken. At GW Law School, we teach international and comparative government procurement, and I can assure you that our federal procurement system, including at the Department of Defense, is in many ways a model for the world. Moreover, our warfighters could tell you about the high-quality support that contractors routinely provide around the world, including in war zones – and America's enemies know first-hand the power of the extraordinary weapon systems that DOD successfully procures. The backbone of our procurement system, both at DOD and in the civilian agencies, is our acquisition workforce, and their skills, experience, and professionalism are invaluable assets for our country. They are the ones who implement the constant stream of mandates from the Congress and the Executive Branch leadership and see to it that our service members, our civil servants, and our citizens get the astonishing range of goods and services they need.

It is tempting to harp on the negative, and to forget that most of the picture is positive. One scandal about one contract at one agency can obscure the hundreds of thousands of contracts that are properly executed each year. Similarly, while it is disappointing that the share of procurement dollars going to U.S. small businesses regularly falls short of the statutory goal of

23 percent, it is an impressive achievement that more than 20 percent of the relevant federal prime contract dollars do go to our small businesses – and that is without taking into account the billions of dollars going to American small businesses through subcontracts. Likewise, despite the frustration that many of us feel regarding the number of sole-source contracts, the majority of DOD contracts are subject to full and open competition. Moreover, over the past 10 years, contracting agencies have substantially increased competition in the award of large orders under multiple-award ID/IQ contracts.

Even in the points of greatest pain in the area of major weapon systems, cost overruns and schedule delays – a topic that I will return to shortly – I would characterize the situation as not significantly worse than before, and more than one expert has suggested that there are signs of improvement, which are at least in part attributable to WSARA. Indeed, to the extent that there have been changes in the defense procurement system over the past 25 years, they have been far more positive than negative. Before the procurement reform of the 1990s, DOD was still buying items as mundane as ashtrays using military specifications; if ashtrays are being purchased today, I am confident that commercial off-the-shelf ones are being bought. More importantly, when DOD buys office supplies, furniture, computers, and thousands of other commercial items, they are purchased in dramatically faster and more efficient ways than they were 25 years ago.

Second, the main causes of cost overruns and schedule delays in major weapon systems are not incompetent federal employees or nefarious contractors. A web of unhealthy incentives often lead to unrealistically low prices and overly optimistic schedules at the time contracts are awarded. GAO's Paul Francis has described these problems as a "sophisticated process whose consistent results are indicative of its being in equilibrium." There is effectively a silent conspiracy, with the various participants acquiescing in what they know, or should suspect, are unrealistic baselines – and, if you'll forgive my bluntness, members of Congress play key roles in that conspiracy. Later, of course, those very knowledgeable stakeholders will declare that they are "shocked, shocked" that the weapon system has overrun the initial price and schedule. Fortunately, it is in this area that WSARA's reforms may bring the most important improvements. I should also salute the commendable effort that Under Secretary of Defense Frank Kendall and his team are leading to achieve affordable programs and to control costs throughout a program's lifecycle.

It is worth remembering that, in the final analysis, what matters is not whether an artificial initial baseline is met. When we acquire a major weapon system, which in many cases is an unprecedented technological achievement, ensuring that American warfighters remain far superior to our country's enemies, what ultimately matters is whether the weapon system is procured at a reasonable life-cycle cost on a tolerable schedule, and that it performs well. While in too many cases, we are disappointed with the results, and in those cases we certainly do need to understand why, in other cases, despite the delays and the cost increases, ultimately the United States obtains an affordable weapon system that strengthens our already remarkable military.

Third, and contrary to what you often hear, particularly from our colleagues in the media and at DOD, only an exceedingly small fraction of procurements are protested. In research at GW Law School, the results of which were published last year, we found that fewer

than one percent of federal procurements are protested – that is, more than 99 percent go forward without a bid protest being filed. Moreover, when protests are filed, whether at GAO or the Court of Federal Claims, a large percentage are dismissed within a few days. While it may seem that there is hardly a contract award without a protest, that is not true. What is true is that in procurements where hundreds of millions of dollars are at stake, protests are much more likely to be filed. Those procurements are the exception, however, and I see no reason for Congress to be troubled by the few weeks that GAO or the Court devotes to looking into complaints that contracting agencies violated the law in their handling of some of those very large acquisitions.

Suggestions for your consideration

First, help eliminate procurement-related requirements that are cost drivers but that provide little benefit. Both the United States Code and the Federal Acquisition Regulation continue to contain requirements that were enacted because of a scandal or a problem that occurred once – though we have often long forgotten what or when. As tempting is it is to introduce a bill adding new requirements, I would urge you to focus instead on eliminating requirements that are not needed. While you have the constitutional power both to micromanage agencies' procurement processes through legislation and to demand that DOD send you reports even if they are never read, that does not mean it would be wise to do either. It would be better to hold an oversight hearing in which you hold agency leadership accountable for the conduct of procurements than to enact new statutory requirements. As you know, Under Secretary Kendall is leading a review of statutory and regulatory requirements to identify those that increase overhead with little benefit. I applaud that effort and urge you to do what you can to support it, including in enacting legislation to remove statutory requirements that fail the cost/benefit test.

Second, strengthen the federal acquisition workforce. For more than a decade after the U.S. won the Cold War, and under both Democratic and Republican Administrations, we slashed the size of the federal acquisition workforce, including at DOD. At the same time, and especially after 2001, we dramatically increased spending on contracts – more than doubling procurement spending between 2000 and 2008 – with a corresponding burden on the understaffed, under-trained contracting offices. As the Gansler Commission reported in 2007, that meant that the Army's contracting personnel faced a 600 percent increase in workload since 1992. While we finally began increasing the size of the acquisition workforce around 2008, that has now stalled, but without us having hired enough contracting officers and contract specialists to handle the workload they face. Just as important, we need to continue improving the training provided by the Defense Acquisition University and others, so that the acquisition workforce is equipped with the knowledge and skills they need to buy smarter in today's environment. That means better training for purchasing services, and creation of specialized acquisition cadres, at least in large entities such as the military services, to help run procurements in areas that demand education and experience in the field, such as the acquisition of IT and professional services.

Third, do your part, individually and collectively, to change the culture of "bashing" those who work in the procurement world, both contractors and federal employees. Whenever a scandal erupts, some rush to tar all contractors with the stain of corruption. That is a disservice to the vast majority of contractors, who make extraordinary contributions to our national defense and to the good functioning of our agencies, both military and civilian. The injustice of bashing

contractors is especially keen for defense contractors, many of whom have seen their employees killed on the front line, whether in Benghazi or Baghdad, Africa or Afghanistan.

Bashing federal employees in the acquisition workforce is equally unjustified and even more counterproductive. We need our contracting officers to exercise judgment, innovate, and be willing to take risks. Yet the current toxic atmosphere of "fed bashing" has increased risk aversion in contracting offices. Again and again, I have been told of cases where acquisition staff take steps that are not justified as business decisions, but that are perceived as reducing short-term risk. Examples include buying professional services based on low price, rather than using the tools in our system to do tradeoffs between price and past performance or other indicators of quality; and providing inadequate information to companies at post-award debriefings, because providing more information is viewed as increasing the chances of a protest.

Our federal acquisition personnel today work in a demoralizing environment of sequestration, pay freezes, and furloughs, and they often feel that their contributions are neither respected nor appreciated, including by Congress. Both our federal acquisition workforce and the contractors who serve the federal government need encouragement, and I urge you to do what you can to support them in their important work.

In conclusion, I would again commend you for your work in this important, but challenging, area, and thank you for the opportunity to provide my views. I would be pleased to respond to any questions you may have.

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Greenwalt has broad-ranging experience in the field and has served in senior positions at the Pentagon, in Congress, and in the defense industry. As Deputy Under Secretary of Defense for industrial policy, he advised the Under Secretary of Defense for Acquisition, Technology, and Logistics on all matters relating to the defense industrial base. In Congress, Greenwalt served as deputy director for the Surveys and Investigations staff of the House Appropriations Committee, as well as a professional staff member for the Senate Armed Services and Senate Governmental Affairs Committees. As a Senate staff member, Greenwalt's work on reforms of management and acquisition practices led to the Clinger-Cohen Act of 1996. Greenwalt has also worked for Lockheed Martin as director of federal acquisition policy and at the Government Accountability Office. Immediately before joining AEI, Greenwalt was vice president of acquisition policy at the Aerospace Industries Association where he developed and coordinated the aerospace industry position on a variety of related issues.

The views expressed in this essay are those of the author alone and do not necessarily represent those of the American Enterprise Institute.

Views from Mr. William C. Greenwalt

Why Acquisition Reform is Important and Why Now?

If there is one constant in the history of U.S. defense acquisition it is a long-standing dissatisfaction with the acquisition system. Despite hundreds of studies and the enactment of decades of legislation, regulations, policies and rules, frustration with the system is now greater than ever. The reasons for this dissatisfaction have varied over time, are often linked to the budget cycle, and reflect changing values and expectations of what leaders in the Pentagon and Congress want from the acquisition system. Agreeing on what goals currently need the most emphasis and recognizing the reality of how limited resources constrain choices is a first step in addressing acquisition reform in the coming years.

There are at least six goals or criteria that can be used for evaluating the success of the acquisition system: efficiency, effectiveness, innovativeness, competitiveness, fairness, and accountability. Emphasizing any one these variables over the others has an effect on the acquisition system -- sometimes positive, sometimes negative. To a great degree, the history of acquisition reform has depended on how these factors are defined and when they are out of balance with national security needs and resources.

In the post-Cold War downturn, the acquisition process was mired in burdensome accountability measures and processes designed to prevent fraud and ensure the fairness of competitions, but really never achieving either objective. As the budget was cut, the Department could no longer afford the costs of this system and as a result, acquisition reforms of the early 1990s emphasized process and competitive streamlining. To address declining innovation and the consolidation of the defense industry, there was a focus on accessing commercial contractors who had up to this time refused to do business with DOD because of burdensome oversight mandates and audit requirements. While these reform efforts could have gone much farther than they did, they allowed for a limited application of commercial information technology advances and business practices into DOD operations and platforms.

As the defense budget rose as a result of 9/11 and the wars in Afghanistan and Iraq, accountability measures increased in reaction to cases of wartime waste, fraud and abuse. These measures restored many of the process barriers that previous reform efforts had done away with and unfortunately impacted acquisitions that had nothing to do with the initial problem of services contracting in a warzone. In the meantime, urgent wartime requirements still needed to be met which led to the creation of a rapid acquisition system to get around the increasingly ossified acquisition process. A smaller number of defense unique contractors results in more sole-source contracting and growing process barriers make it more difficult to entice new commercial contractors into DOD contracting. As a result, innovativeness, competiveness and efficiency are decreasing and overhead and oversight costs are increasing. Future acquisition reform will require a more streamlined, efficient process, effective competition and greater innovation and collaboration across increasingly stovepiped commercial and defense industrial bases.

Thus, the current environment and budget decline presents many of the same problems that faced acquisition reformers in 1990. But before recreating and expanding on legislation in the Federal Acquisition Streamlining Act (FASA) of 1994 and the Clinger Cohen Act of 1996 (which should be a priority), there are two differences that make this downturn harder to address then the last one. First, in the early 1990s the lack of an immediate threat associated with the breakup of the Soviet Union and a newly modernized force courtesy of the Reagan defense buildup allowed the Pentagon to pause and neglect long-term military innovation. Today, there is more risk in taking a "procurement holiday" since the force has not been effectively modernized since the 1980s as defense budget increases of the last decade have primarily focused on addressing anti-terrorism operations. Secondly, there is a rising threat from a proliferation of commercial and military technologies that are being incorporated by potential adversaries into capabilities that will erode our current military advantage.

A declining and aging capital stock and a rising threat requires a need for new innovations and investments to maintain our armed forces ability to deter, and if need be, fight and win future wars. Rather than reaching out to the commercial base while allowing the defense unique industrial base to atrophy through consolidation as in the 1990s, the Pentagon's future needs will require greater collaboration and innovation from both bases. Funding this collaboration will be difficult to achieve as rising personnel and operations and maintenance costs crowd out weapon systems modernization and R&D. New approaches are necessary and acquisition reform has to address the reality of this squeeze on resources and focus on freeing up money from business reform to pay for modernization.

To address this situation, Congress should consider two concurrent acquisition reform approaches. The first is a long-term effort to design a new system from the ground up while the second is a short-term approach to expand on exceptions, exemptions and carve-outs to the current acquisition system to support business reform, new innovation and modernization.

Legislative Sunsets and Zero-Basing the Process

To build a new system it is first necessary to force action. This can be done by enacting a legislative sunset of procurement laws, regulations and reporting requirements that would require Congress and the Administration to review the existing system in its entirety rather than just add to it. Current rules, laws, and regulations should be given a mandated periodic review – ideally of five years while new legislation that requires an action should pass with a sunset on them. Legislation that waives or provides exemptions to the current process should however remain permanent until the underlying reason for the exemption is eliminated. Legislative sunsets should initially focus on the codified portions of Title 10 – chapters 138, 139, 140, 141, 143, 144, 144a, 145, 146, 148, and 149 as well as the notes contained in the code which correspond to stand-alone provisions in various National Defense Authorization and Appropriations Acts.

Upon review of these provisions, Congress will see that many of them are legislative earmarks that have been enacted over the years that favor one portion or another of the industrial base. As the reasons behind these legislative earmarks may no longer be valid, Congress should re-evaluate this legislation at least every five years. The executive branch should also be forced

to review the FAR, DFARs and DOD internal policies and justify their decisions to the Congress as to why they have kept certain provisions.

To support such a zero-based assessment of current acquisition laws, rules, regulations and practices, a trusted group of outside experts is likely to be required to give Congress and the Pentagon specific advice on what to cut, what to leave in place and what to add. Two panels, one strategic and one tactical, each with different but complementary missions should be established to provide guidance on the framework of a new acquisition system.

The first panel should be comparable to the 1986 Packard Commission and should provide strategic guidance on the goals of the acquisition system, what kind of industrial base the military needs, and what kind of acquisition system would encourage its creation. The second panel would be similar to the Section 800 panel established in the 1991 NDAA and it should look at translating the first panel's strategy into legislation and regulatory language while scrubbing existing laws, regulations, policies and practices to conform to this strategy. The Section 800 panel was most successful when it provided Congress with line-in, lineout changes to legislation so new legislation could be easily written. This new panel should provide the same service but for laws, regulations, policies, and practices.

Expand Acquisition Flexibilities to Address Near Term Challenges

While it will take many years to re-create a new system from the ground up, today's environment can be addressed by expanding on exemptions to the current system tailored to specific types of acquisitions. Rapid acquisition authorities can be expanded to address near term needs. Commercial item acquisition and privatization can be utilized to achieve business streamlining in services and IT to free up dollars to modernize. Multiyear procurement and acquisition pilots similar to those enacted in FASA can help modernize and maintain existing production lines. Finally, expanding the use and applications of Other Transactions Authority (OTA) can revolutionize research and development by emphasizing the development of stand-alone operational prototype programs to deliver leap-ahead technologies.

Rapid acquisition authorities that were enacted after 9/11 led to the creation of a number of rapid acquisition entities and processes. Many of these emulated the acquisition buying practices of Special Operations Command, which has had its own long-standing special acquisition authority. Now that hostilities are coming to an end these ad-hoc organizations and processes are in danger of being eliminated. Immediate steps should be taken to ensure that these organizations and processes are not dismantled and become absorbed into the traditional acquisition system. As a way of maintaining these practices and changing how DOD buys near term capabilities, rapid acquisition authorities in title 10, USC 2302 (note) should be amended to apply beyond wartime requirements and allow their use to support combatant commanders' needs that can be deployed in less than two years.

It is imperative that DOD enacts business reform to free up resources to support modernization and research and development. To save real money, DOD must look at its bloated overhead and processes that create limited value and increase government and industry costs. To drive overhead costs down, Congress should look to resurrecting the 1990s concept of

adopting best business practices and focus the work of GAO and the DOD IG on benchmarking, improving information (at the least cost to the taxpayer) to support management decisions, and identifying these practices. Anything that reduces the operations and maintenance tail should be considered – public-private partnerships, rationalizing the organic base, performance based logistics and contracting, adopting proven commercial solutions in logistics, IT, training, maintenance, and construction, and outsourcing. The latter would require the legislative moratorium on the conduct of DOD public-private (A-76) competitions to be repealed. The mantra in times of budget austerity should be whatever is cheaper and qualitatively better to meet DOD's business needs should be embraced.

The way to adopt many of these commercial practices is to bring in those companies who have experience saving other organizations billions of dollars in overhead costs. Commercial contracting procedures and incentives will be key in adopting these practices and enticing the right industry talent that can revolutionize DOD's operations. The statutory commercial item exemption has been the primary tool in getting non-traditional commercial companies to participate in the DOD marketplace. Unfortunately, this exception, established in 1994 to a broad range of legal and regulatory requirements for commercial products and services (most significantly unique cost accounting and audit requirements), has been undermined as new restrictions have been applied to commercial contracting in the last decade. Some of these address issues related to the globalization of the commercial supply chain, but others represent a growing distrust by DOD's oversight community of commercial competition and profit margins. This has resulted in a reinterpretation of the need for detailed government unique cost and pricing data for commercial contracts and subcontracts that does not exist in the commercial world. Recent legislative efforts to clarify the coverage of the Truth in Negotiations Act to these commercial contracts have only clouded the issue further.

These new restrictions and regulations have incentivized many emerging commercial companies to stay away from DOD contracting. And those commercial companies that currently sell to the military are now faced with the choice of opting out of the government marketplace or radically changing their structure to conform to these requirements. Such changes would result in these companies looking even more like defense unique firms both in cost to the government and in reduced innovation potential.

Congress needs to send a clear signal that it does not want the commercial item exemption to be gutted. A first step to reinvigorate commercial contracting authorities would be to roll the clock back and prohibit any regulatory requirement added since 1998 to be applied to a commercial item. Other actions that would support commercial contracting would include strengthening the current commercial item preference and grandfathering past commercial items from any new regulatory commercial item determinations. The current statutory preference for commercial items in 41 U.S.C. 3307 should be strengthened by requiring for business services and IT acquisitions that commercial solutions must be the primary baseline to be first considered, and require justification such as conducting a cost–benefit analysis before considering any government-unique solution or technology above and beyond current commercial performance thresholds. In addition, the application of ITAR and new defense-unique intellectual property and supply chain mandates has had a chilling effect on commercial contracting and exempting commercial items from these requirements should be considered.

Congress should also establish a definition for a commercial entity that would allow all products and services delivered by that entity to be covered by the commercial item exemption. These entities could be entire firms or subsidiaries within a parent firm that would only sell to the DOD products and services that are commercial items, as defined in FAR Part 12. Finally, DOD should be required to review its requirements, standards, test and evaluation, and technology certification processes to alleviate tendencies to rely solely on government-unique solutions from a government unique industrial base versus reliance on commercial standards, practices and technologies.

While services and IT acquisition should focus on best commercial practices, major defense systems are in a different category and need a different approach -- although commercial item acquisition will be necessary to transform various subsystems and improve embedded IT and communications networks. While the underlying law that the Weapons System Acquisition Reform Act recently improved upon can be argued is the best legislative framework for a 15-25 year development and deployment cycle for a major weapons system, the reality is we should not be taking that long to develop and deploy these capabilities.

Still, the current legislative system of milestone certifications particularly at milestone C is valuable in ensuring that the Pentagon does not produce items that are still undergoing major development and technology issues. The problem is that in our current system it takes so long to get to a valid milestone C decision, we have no capability to show for it until we get to this point, and often then find out that it is more expensive to produce an item so production numbers are cut. The legacy of this can be seen in the vast number of Nunn-McCurdy breaches that occurred on programs that are now in production. The current legislative oversight structure of WSARA, MDAPs, MAISs, and Nunn-McCurdy are now part of the problem as they continue to institutionalize a flawed process. Even if the process works right in compliance with legislation it will take too long and limit innovation by freezing technology advances and incentivizing incremental advances to effectively adhere to the statutory milestone certification mandates.

Before tackling changes to the acquisition process for weapons acquisition, Congress must first address the procurement holiday of the last several decades. The first place to look is at DOD's legacy production lines. The US has spent an incredible amount of capital to get to the point of developing a hot production line. Historically, once we have done this, we then proceed to buy uneconomic quantities of a system and then close the line prematurely. Despite all of the past problems, cost overruns in development, and great investment, quantity has a quality all of its own. We should not shut these lines down and instead use them to recapitalize the force either now or incrementally until the budget situation improves.

Enough resources need to be walled-off to maintain current production lines. It would be a huge waste of taxpayer dollars to break multi-year contracts, close lines and write off billions of dollars in investments that were made to get to the point where the Pentagon can finally produce operational capability for our forces and our allies. Without some type of budgetary firewall, even harder choices about future production are looming. Fewer weapons will be bought with more money as unit costs skyrocket; Nunn-McCurdy breaches will become commonplace, and termination fees will rise. Some production lines might survive on life support through reliance on foreign sales or maintenance contracts. The better option is to find

the money to keep current production lines open to support a larger force when the next crisis hits. Congress should consider additional multiyear procurements to provide stability for production lines and establishing new pilot programs (Congress can use a modified version of the pilot program language originally in FASA) to allow for the testing of new acquisition techniques to reduce production costs of existing systems.

The next priority should be to build breakthrough capabilities. Future capabilities need to be nurtured and design and development teams should work on real programs with real operational value to the warfighter. In the place of traditional 15-year major development programs DOD should focus on building operational prototype systems that can be deployed within one- to two year and three- to five-year timeframes. These operational prototype systems should provide U.S. forces with real capabilities and not be technology demonstrators designed to sit on a shelf. This "fly before you buy" approach is different in the sense that these systems not only demonstrate capability but can be used in a conflict. They also have the added benefit that if only a few are needed (and they work) the acquisition program could stop there.

Rapid acquisition techniques with both commercial and defense unique providers can be used to deploy operational prototypes within 2 years. For the medium term, DOD should use OTAs. These two categories of prototypes (short-term and medium-term) not only can provide needed capabilities but can also serve as the basis for future programs as the budget situation improves.

The Defense Department, with an eye to 1950s acquisition practices that were also resource constrained, should focus on potential technological "game changers" such as rail-guns, lasers, missile defense, advanced propulsion systems and unmanned systems, as well as building next-generation prototype upgrades to current systems. Under OTAs, consortiums of defense unique and commercial companies and the defense labs could be pulled together to build competitive prototype systems to test these technologies and concepts in an operational environment. These consortia could be initially modeled on OTAs that the Army has established for munitions, robotics and rotary wing technology portfolios and have the added benefit of breaking down the stovepipes between the commercial and the defense unique industrial bases.

OTAs are critical to acquisition reform as they allow the waiver of most acquisition rules by starting off with a clean sheet of paper in determining the relationship between the government and industry. OTAs are the single best tool to bring non-traditional companies and ideas into the defense marketplace, as has been seen with unmanned systems, robotics, IT and advanced materials. OTAs could also be the testing ground for new acquisition procedures with traditional defense contractors as was envisioned under the original statute if agreement between Congress and DOD can be found before using them for this purpose.

NASA's Space Act of 1958 is the original source of OTA authority. This authority was first given to DARPA in 1989 and later expanded to the rest of DOD. NASA's authority is much broader than DOD's and Congress should consider removing current restrictions on defense OTAs and granting new authority for a more expansive production OTA authority. This expanded production authority would allow companies who develop technologies in an OTA to

sell these products as a commercial item to the US military just like new launch vehicle providers are now doing for NASA.

Other options to consider improving OTAs at DOD would be to negotiate defense-wide OTA agreements with individual firms. OTA terms and conditions likely need to be tailored for different firms depending on their specific concerns about the federal procurement system and consideration should be given to establishing an OTA Center of Excellence to negotiate such agreements. Rather than being forced to give OTAs to defense unique primes to access non-traditional contractors in the supply chain, Congress could explore establishing OTA subcontract authority that could be issued under FAR Part 15 contracts with large defense-unique primes. This could be difficult, however, due to privity of contacting issues and any such OTA subsystem may need to be provided as Government Furnished Equipment.

For purposes of Nunn-McCurdy reporting, operational prototypes should be their own stand-alone programs. Any transition to production from an operational prototype program should be categorized as a new program that meets milestone C certification under current law. Splitting these efforts gives DOD greater certainty in cost estimating and limits unnecessary Nunn-McCurdy threshold breaches.

Conclusion – Effective Oversight and Workforce Improvements

As Congress begins its task of reform, it won't be easy. The hardest part may be to accept that failures and even fraud are sometimes inevitable and cannot be legislated away. Past reactions to failure and fraud have made success even unlikelier as risk-averse behavior and mind-numbing bureaucratic processes have increased waste and destroyed creativity and innovation. Sometimes the best course of oversight action in reaction to the scandal of the day is to not legislate but to ensure that criminals are going to jail and that there is enough flexibility in the system to buy what the warfighter needs.

Acquisition workforce reform may be one of the hardest issues to address. DOD needs quality program managers with the authority to manage and balance various requirements on the program rather than being victims of stovepiped legal, testing, and contracting compliance chains. Poor performers need to be replaced when programs go awry and better training that reflects the reality of new acquisition problems like commercial item procurement and services contracting are needed. Civil service reform will be vital to the success of acquisition reform and Congress should look at reviewing, maintaining and strengthening the acquisition workforce pilot program. As a way of quickly bringing in new managers and experts, Congress should also look to amend legislation that authorizes the use of "Highly Qualified Experts" to specifically allow these individuals to manage and oversee the acquisition workforce which by regulation but not statute they are prohibited from doing.

In the current budgetary environment, there is nothing more critical to national security than getting acquisition right. If we get it wrong, we will end up with a hollow, unready force with old outdated equipment unable to meet the threats of the present or the future, let alone the past. DOD cannot continue with business as usual as the stakes are too high and Congress can be a valuable force for change in this effort.

I want to express my thanks to the subcommittee for this opportunity to provide my views on how Congress can help reform defense acquisition.

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Views from Mr. Todd Harrison

Rethinking Competition in Defense Acquisitions[32]

Improving the performance of DOD's acquisition system is a perennial concern for Congress. It has taken on a new sense of urgency in recent months due to the budget constraints imposed by the Budget Control Act of 2011 and the inability of Congress to implement reforms in other areas, such as military compensation, base closures, and the size of DOD's civilian bureaucracy. Acquisition reform is the one area of reform that appears to have broad congressional support. Previous efforts to reform the acquisition system have focused on creating more opportunities for competition, both to reduce costs and to incentivize better contractor performance. The Weapon Systems Acquisition Reform Act of 2009, for example, requires the Department of Defense to use acquisition strategies that "ensure competition, or the option of competition, at both the prime contract level and the subcontract level."[33]

If used appropriately, competition can be a powerful force to drive down costs, spur innovation, and improve the performance of weapon systems. In the quest to increase competition, DOD and Congress have, in some instances, attempted to artificially create competition where it does not naturally exist. But competition is not a cure-all for the problems that plague defense acquisitions. This paper explores the incentives competition provides for contractors and when those incentives may not align with the goal of reducing costs.

One of the reasons competition does not always reduce costs is that the U.S. defense industry is not a traditional free market with many buyers and sellers and limited regulation. The defense industry can be more accurately characterized as a monopsony with the U.S. government as the sole customer and chief regulator. There are few (if any) other buyers for many of the major weapon systems DOD procures, such as stealthy aircraft, aircraft carriers, nuclear-powered submarines, and specialized communications and electronics equipment. Where there are other potential customers, such as allies and partner nations, sales must still be approved through the U.S. government and tend to be much lower in quantity. Moreover, in many sectors of the defense industry there are a limited number of vendors capable of producing the weapon systems DOD requires—just one or two primes in some sectors. In these situations, the barriers to entry for competitors can be high, and artificially creating competition requires a large and sustained investment by DOD.

For example, as the only customer for many of the weapon systems it buys, DOD pays the full development cost for these systems through cost reimbursable contracts or higher fees on fixed-priced contracts. In order to create an opportunity for competition, DOD typically pays (directly or indirectly) for two or more contractors to develop the similar systems. Even if DOD pays for the development work only once and gives the same design to two or more companies for production (a "build to print" approach), it must still pay for the establishment of multiple production lines. Once development work is complete, DOD can down-select to a single vendor

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[32] *(This paper summarizes a report published by CSBA in 2012. The full report can be found at: http://www.csbaonline.org/wp-content/uploads/2012/12/Competitive-Pricing-Mode.pdf)*

[33] Weapon Systems Acquisition Reform Act of 2009, Pub. L. No. 111-23, § 202, 123 Stat. 1704 (2009).

for production using a competitive process. This effectively ends the competition and grants the winner a monopoly for future procurements of the same system.

Another option is to split the award between competing contractors to maintain the prospect of future competition. A split award, however, means that neither contractor receives as many orders and thus neither can progress as far down the learning curve as they could if only one firm were engaged in production. Thus, the cost of each unit will not decline as much as it would if one company were building all of the units.[34]

Proponents of competition argue that these additional costs from redundant development work and reduced learning can be offset by the competitive pressure among contractors to drive down prices. For example, the Institute for Defense Analysis (IDA) estimated that a competitive procurement of the Joint Strike Fighter engine would reduce total procurement costs by 11 to 18 percent.[35] IDA's conclusion is based on analysis of two previous engine procurements in which dual sourcing was used, the F-100 engine used in the F-15 and F-16 fighters and the F-404 engine used in the F/A-18 fighter. Such historical data only reveals what happened to costs in these programs when dual sourcing was used. To calculate the savings from competition, one also needs to know the counterfactual—i.e. what would have happened had dual sourcing *not* been used. Historical analysis is, therefore, insufficient to know if competition actually reduced costs from what they would have been otherwise.

Analysis using game theory has shown that the way a competition is structured can be a determining factor in whether competitive pressure is sufficient to produce real savings.[36] In some instances, the structure of the competition can actually incentivize contractors to bid higher and drive up costs. For example, consider a multi-round competition with a split award where the winner receives a larger share of the order. To maintain the possibility of competition in the future, the losing company receives part of the order, albeit a smaller share. The winner also gains an advantage in future rounds of competition because it will have a lower unit cost relative to the loser of the first round. If the split in award is large enough (i.e. the winner gets a much larger share) and the learning curve steep enough (i.e. unit costs decline rapidly as more units are built), the company that loses in the first round may never be able to overcome the cost advantage of its competitor in subsequent rounds. In such a case where the company that loses the first round cannot win future rounds, its only rational bidding strategy is to bid a high price and maximize profits from the smaller award it will receive in the remaining rounds of competition. The company that wins the first round knows that bidding high is the only logical choice for its competitor, and thus it is incentivized to bid high as well in subsequent rounds to maximize its profits, knowing it will still win each round. In this type of situation, the competition essentially transitions from a race to the bottom in terms of price in round one, to a race to the top in terms of profit in subsequent rounds.

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[34] Some argue that the lack of competitive pressure may increase the learning percent for a sole-source contractor, thus reducing the savings achieved by awarding all of the units to one contractor. This hypothesis is difficult to test without conducting a controlled experiment in which both a sole-source contract and a competitive process are used in parallel for the same acquisition. The model presented in this paper can account for a potential difference in learning percent by using different values for the learning percent in the sole-source case and competitive cases.

[35] Woolsey, J. (2008). *Evaluating the Costs and Benefits of Competition for Joint Strike Fighter Engines*. IDA Research Notes, Fall 2008, p. 4.

[36] See Harrison, T. *The Effects of Competition on Defense Acquisitions.* CSBA, August 2012.

The game theory analysis suggests that several program-specific factors should be assessed to understand when competition may not be effective at reducing costs:

- Development and First Unit Costs: The ratio of development cost to first unit cost is an indicator of how much of the total program cost is due to development versus production. A higher ratio means a greater share of the costs are due to the upfront development work required, which makes the added cost of funding two development contractors more difficult to recoup through competition. A higher ratio also means the production work—the source of any potential savings from competition—is a smaller share of the overall program cost. Thus, a higher development cost or lower first unit cost will make competition less effective.
- Rate of Learning: The learning percent is a measure of how quickly costs decline due to production efficiencies as more units are produced. The learning percent varies for different industries and different types of manufacturing processes. A lower learning percent means learning happens faster, giving a greater advantage for the company that wins the first round of competition and potentially making competition less effective.
- Quantity: As more units are procured, a greater share of the costs are shifted into production work. Thus, a smaller quantity makes competition less effective since redundant development costs are a larger share of overall costs and less of the work can be competed during production.

While reducing the acquisition cost of a weapon system should be a major factor in determining whether or not competition makes sense for a particular program, it is not the only factor to consider. The long-term cost of operating and sustaining (O&S) a weapon system is also an important consideration. O&S costs can be higher if two sets of equipment designed and built by different companies must be maintained, since different tooling and training may be required. But if some or all of the maintenance is contracted out, competition for maintenance work could help promote efficiency and lower costs.

The potential impacts on the industrial base should also be a consideration in selecting an acquisition strategy. While awarding a contract on a sole-source or winner-take-all basis may reduce costs, it could also knock competitors out of the marketplace. In some sectors of the industrial base, losing a single company would mean a significant reduction in overall industrial capacity and could effectively eliminate the possibility of competition in future acquisitions. While this may be unavoidable in some sectors of the industrial base given future budget constraints, the Department should make such decisions with an understanding of the long-term consequences and risks. The additional cost of competition may at times be a price worth paying.

Operational risks should also be a consideration in structuring a competition. As major weapon systems become more expensive and more capable, the number of different types and the total quantity of weapon systems procured is steadily declining. With a force more consolidated in a smaller number and variety of platforms, a design flaw or unanticipated failure in a system could take a significant portion of the military's combat forces offline until the problem is resolved. The same could occur if software is compromised through a cyber-attack or an accidental error in programming.

Innovation is another factor that should be considered. An acquisition strategy that continues competition over several rounds can induce contractors to continue innovating their designs and manufacturing processes. The increase in innovation resulting from competition cannot always be quantified, particularly if the innovation takes the form of qualitative improvements in the system being produced.

While competition has an intuitive appeal as a way to drive down costs in defense acquisitions, it is not always effective. Competition can, under certain circumstances, drive up acquisition costs by incentivizing contractors to bid higher. The key question is when is competition not a viable option for reducing acquisition costs? And when competition does have the potential to reduce costs, how can it be properly structured to increase the likelihood that savings are realized? Instead of blindly assuming competition will always work, acquisition professionals should "game" how companies are incentivized to bid under different competition structures and build their acquisition strategies accordingly.

THE HONORABLE TINA W. JONAS
President
UnitedHealthcare Military & Veterans

Ms. Tina W. Jonas serves as President of UnitedHealthcare Military & Veterans. Previously, she served as President of Logistics Health Incorporated (LHI), and as a Senior Vice President of Optum Health based in Minneapolis, Minnesota. Ms. Jonas served as an Executive Vice President of Operations at PASSUR Aerospace, Inc., since July 2010 to April 15, 2012. Ms. Jonas joined PASSUR Aerospace, Inc. as an Executive Vice President of Operations of Sikorsky Aircraft Corporation, where she served as Director, Operations Planning & Analysis since September 2008. She was responsible for leading and managing Sikorsky's global planning for production and supply chain operations - including production planning for all military, commercial and aftermarket business. Her responsibilities also included facilities management for operations worldwide and integrated operations management for $500 million in aftermarket business for Sikorsky.

She served as Undersecretary of Defense, Comptroller and Chief Financial Officer for the Department of Defense (DOD). She joined the DOD in 2004. Ms. Jonas served as an Assistant Director and Chief Financial Officer for the Federal Bureau of Investigation. She is a recipient of numerous awards, including the Department of Defense Medal for Distinguished Public Service (Bronze Palm), Chairman of the Joint Chiefs of Staff Joint Distinguished Civilian Service Award, the Department of the Navy Distinguished Public Service Award, the Army Distinguished Civilian Service Award and the Coast Guard Distinguished Public Service Award as well as the DOD Inspector General's Award for Excellence. She is a frequent public speaker and has appeared on CNN and in leading national publications such as the New York Times and the Washington Post. She is a Member of Business Executives for National Security. She holds several awards, including the Silver Anvil for Public Communications, the Department of Defense Medal for Distinguished Public Service, and accolades from the Joint Chiefs of Staff, the Army, the Navy, and the Coast Guard.

Her executive education includes studies at Harvard University, Kennedy School of Government, Northwestern University, Kellogg School of Business, and the UTC Executive Education Program at the University of Virginia, Darden School of Business. She attended the Kennedy School of Government's program for Senior Managers in Government at Harvard University. Ms. Jonas holds a Master's degree in Liberal Studies from Georgetown University in 1995 and a Bachelor of Arts in Political Science from Arizona State University in 1982.

The views expressed in this essay are those of the author alone and do not necessarily represent those of the UnitedHealthcare.

Views from the Honorable Tina W. Jonas

Opportunities for Improved Capabilities in a Fiscally Constrained Environment

Introduction

The nation's fiscal condition and the resulting impact on the budget are well known. According to the Congressional Budget Office (CBO), annual budget deficits are expected to increase from $469 billion in 2015 to about $1 trillion from 2022 to 2024 due to an aging population, increasing health care costs, expansion of subsidies, and interest payments. Discretionary spending, including defense, is constrained by the Budget Control Act (BCA) — although exceptions are provided for overseas contingency operations and emergencies. CBO projects that for 2014 discretionary outlays will be $1.2 trillion—down 2% or $22 billion from 2013. Nondefense spending will increase by $8 billion and Defense spending will fall by $30 billion.[37]

Concurrent with this fiscal trend, security challenges continue and the requirement for new military capabilities remains. For those in the Department of Defense (DOD) who are responsible for planning, budgeting and procuring weapons systems, the task is considerable. Particularly in an era of declining resources, it is critical to have clear alignment of priorities to ensure that the military has the exact mix of capabilities it needs to defend our interests—both now and in future. The tradeoffs between readiness and investment are constant even when resources are ample. However, the risk of miscalculation seems greater in a fiscally constrained period.

Improving resource allocation in support of the acquisition of major weapons systems through alignment of key stakeholders

The current system for resource allocation can be effective if there is early and solid alignment on strategy and programs among key stakeholders—both internal and external. When there is not good alignment, seams become evident in the budget allocation or execution process. Misalignment can lead to costly change, poor decision-making, and potentially expensive reversals (e.g., cancellation of a program or changes in programs) if addressed late in the budget cycle. Additionally, significant senior military and civilian leadership time is spent de-conflicting and correcting problems in the budget allocation process due to misalignment.

To mitigate this risk, DOD should develop processes that allow stakeholders to focus on disciplined adherence to DOD's overall strategy, priorities, and basic program management principals. Processes that foster early collaboration (e.g., during development of requirements) would align the Department's priorities, highlight areas of disagreement and gaps, and identify potential risks to proper resource allocation, program execution, and timely deployment of military capabilities.

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[37] *"Updated Budget Projections: 2014 to 2024,"* Congressional Budget Office, April 2014, pps. 1-5

Increasing funding stability to improve DOD's planning, programming and budgeting to include the use of multi-year contracts

DOD's program and acquisition professionals employ various strategies to reduce risk and ensure that programs are appropriately structured and have stable funding. Many professionals successfully use multi-year contracts because they are an effective tool to provide stability, predictability and value. The tradeoff for stability and value provided by multi-year vehicles is limited flexibility. Multi-year contracts carry significant penalties for changes or cancellation and careful thought should be given to their use. Changes in priorities, in year budgets, and appropriations can be very disruptive for programs using these vehicles. Again, as with other programs, early alignment with key stakeholders on the use of these vehicles is important to successful program execution.

Ensuring budget flexibility to respond to emerging requirements

The Congress has provided important authorities, such as reprogramming authority, emergency designation, and overseas contingency funding to help DOD fulfill its missions and meet in year contingencies. These and other authorities are critical to allow DOD to properly operate and should be reviewed regularly and enhanced if appropriate. By maintaining close cooperation with its oversight committees in Congress, the Department ensures the viability of these important authorities.

Changes to the resource allocation process could improve the prioritization of requirements and ensure budgets are more effectively aligned

Fundamentally, misalignment of priorities, competing priorities, or duplication of efforts in the current fiscally constrained environment may negatively impact DOD's ability to fund important military capabilities. At the strategic level, changes to processes and organizational structure may be required to improve prioritization and reduce risk. As stated, early collaboration (e.g., during development of requirements) among stakeholders would align priorities, identify risks and improve the resource allocation process. At the program and budget level, best practices such as the use of realistic cost estimates and baselines are critical and ensure efficient allocation of resources.

Improvements to annual budget submissions

DOD submits thousands of pages of budget justification to Congress. These materials, briefings, hearings, and discussions significantly augment the knowledge of Congress and staff on the status of the Department's major weapons programs. Additionally, the GAO, the Inspectors General, and other audit entities inform Congress of the status of the DOD's portfolio of major weapon systems, contributing to sound oversight.

One approach to increase clarity and understanding would be to publish a consolidated major weapons systems budget volume. That volume would describe the weapons system and the requested budget amounts and quantities. It would also include the appropriate program metrics regarding cost, schedule and performance measured against agreed standards and baselines. A

complete published budget volume for major weapons systems could substantially contribute to understanding of the performance and cost of these systems.

DOD's current budget strategy for the acquisition of major weapons systems and affordability

According to a recent GAO report, DOD's 2013 portfolio consists of 80 major programs and is estimated at $1.5 trillion. The size of the 2013 portfolio decreased from 85 to 80; however, it is estimated to be $14.1 billion more than the 2012 portfolio. The 80 programs have cost increases of $12.6 billion versus a year ago and are on average 2 months late on schedule. According to GAO, these programs will consume about one-third of all expected development and procurement funding during the next 5 years. GAO stated:

"With the decline in the availability of discretionary funding, DOD cannot afford to miss opportunities to address inefficiencies in these programs to free up resources for additional high priority needs such as support of current operations." GAO concludes: "The total acquisition costs are driven by the 10 costliest programs, which represent 59 percent of the current portfolio's total cost." [38]

Given these challenges, the Department's most senior leadership should consider a specific focus on elements of cost growth in the top 10 major weapons programs. Close collaboration by the Undersecretary of Defense (Comptroller) and the Undersecretary of Defense for Acquisition and Technology and Logistics (USD/AT&L) as well as the Service Chiefs and acquisition executives would lead to better alignment and allocation of resources and ultimately better outcomes.

Conclusion

In a fiscally constrained environment, DOD must align key stakeholders to execute its strategy, mitigate risk, and provide improved military capabilities.
DOD should:

- Develop processes to focus stakeholders on early and disciplined adherence to DOD's overall strategy, priorities, and basic program management.
- Use multi-year contracts to provide stability, predictability and value.
- Use reprogramming authority, emergency designation, and overseas contingency funding to meet in year contingencies.
- Use of realistic cost estimates and baselines to ensure efficient allocation of resources.
- Publish a comprehensive budget volume for major weapons systems to contribute to the understanding of the performance and cost of these systems.
- Focus senior leadership on elements of cost growth in the top 10 major weapons programs.

[38] GAO-14-340SP Assessments of Selected Weapons Programs, March 31, 2014, pps.1-6

DR. PAUL G. KAMINSKI
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Dr. Kaminski served as the Under Secretary of Defense for Acquisition and Technology from October 3, 1994 to May 16, 1997. He was responsible for all Department of Defense (DOD) research, development, and acquisition programs. He also had responsibility for DOD logistics, environmental security, international programs, the defense industrial base, and military construction. The annual budget for these entities exceeded $100 billion.

His previous government experience includes a 20-year career as an officer in the U.S. Air Force. During 1981-1984, he served as Director for Low Observables Technology, with responsibility for overseeing the development, production and fielding of major "stealth" systems (e.g., F-117, B-2). He also led the initial development of a National Reconnaissance Office space system and related sensor technology. Early in his career, he was responsible for test and evaluation of inertial guidance components for the Minuteman missile and terminal guidance systems for our first precision guided munitions.

Dr. Kaminski is Chairman of the Defense Science Board, and serves as a member of the Director of National Intelligence Senior Advisory Group, the Senate Select Committee on Intelligence Technical Advisory Board, and the National Academies Air Force Studies Board. He has served on the President's Intelligence Advisory Board, the FBI Director's Advisory Board and is a member of the National Academy of Engineering, a Fellow of the Institute for Electrical and Electronics Engineers, and a Fellow of the American Institute of Aeronautics & Astronautics. He has chaired the board of the RAND Corporation, currently chairs the boards of both Exostar and HRL (Hughes Research Labs); and is a Director of General Dynamics, Bay Microsystems, CoVant Technologies, the Johns Hopkins Applied Physics Lab, and the USAF Academy Endowment. He serves as an advisor to the MIT Lincoln Laboratory, and has authored publications dealing with inertial and terminal guidance system performance, simulation techniques, Kalman filtering and numerical techniques applied to estimation problems.

Dr. Kaminski was born in Cleveland, Ohio. He received a Bachelor of Science from the Air Force Academy, Master of Science degrees in both Aeronautics and Astronautics and in Electrical Engineering from the Massachusetts Institute of Technology, and a Ph.D. in Aeronautics and Astronautics from Stanford University. He and his wife, Julie, have two children, and six grandchildren.

Views from Dr. Paul G. Kaminski

Acquisition Policy

1. **What changes would you recommend to the statutes, regulations, and policies governing DOD acquisition of major weapon systems to ensure that major weapon systems are delivered on time, at a reasonable cost, and provide the needed capability? For any recommended changes, please specify the statute, regulation, or policy and the precise change that you would recommend.**

The premise of question 1 is flawed. No combination of statutes, regulations and policies can ensure that major weapons systems are delivered on time, at a reasonable cost, and provide the needed capability. The acquisition system depends upon people making good decisions involving complex issues. Good decisions come from good judgment. And as Will Rogers has said "good judgment comes from making some bad decisions." So we need to attract quality people, and give them the training they need and the opportunity to learn from their mistakes before their mistakes cause major problems. The training needed is analogous to a good flight instructor who lets the student get into trouble, but not too much trouble for the instructor to recover. We have too many statutes, policies and regulations today, and we need a process to allow waivers to provide some maneuver space for the acquisition leader. We also need to provide that leader with some contingency reserves. What military leader would consider launching an attack without reserves? Shouldn't the same apply to an acquisition leader? The size and nature of the reserves must be related to the expected risk.

2. **Do you see the need for any change to the current acquisition chain of command for our largest major defense acquisition programs, under which program managers report to program executive officers, who report to service acquisition executives, who report to the Under Secretary of Defense for Acquisition, Technology, and Logistics? What changes if any would you recommend to the role of the service chiefs in this process, as outlined in section 2547 of title 10, United States Code?**

I do see the need to get the service chiefs into the acquisition chain. They are involved today in the requirements chain. But we would benefit by having the chiefs lead a Development Planning process much like that that was used by the Air Force in the late 1960's through the 1980's. I am now co-chairing a study on Development Planning for the Air Force Studies Board of the National Research Council. This study should be completed in the Fall of 2014. The idea is to begin with the National Security Strategy and identify needs and gaps after considering the threat, current capabilities, risk, programs of record, CONOPS, technology maturity, test capabilities & limitations, schedule and cost. The output could include recommended changes in strategy, new programs of record, termination of current programs of record, or block changes to current programs of record. A robust Development Planning program would not only provide for better acquisition requirements, but it would allow for better identification and management of risk, and it would provide a critical training ground for key personnel involved in requirements and in acquisition, training that would improve judgment and lead to better decisions.

3. What changes if any would you recommend to how DOD tests major weapon systems to ensure that they will be delivered to combatant commanders on time, at a reasonable cost, and with the required capability? Do you support the concept of "fly before you buy" for major defense acquisition programs?

Testing is critically important to acquisition and delivery of needed capabilities on time and on cost. If we wish to turn inside potential adversaries in fielding new capabilities, then we must turn inside those same adversaries in our test programs. Doing so requires anticipating future test needs and investing in time to field effective and efficient test capabilities when needed. We are not making timely and balanced investments in test facilities and test personnel today. So we are paying hundreds or even thousands of government and industry engineers while we all wait for test results that are late to need. Testing also needs to make best use of modeling and simulation (M&S) capabilities, and validate those M&S capabilities to allow M&S to fill in data between more widely spaced test points and reduce the time and cost of testing. "Fly before buy" is a great concept. But you must buy enough to obtain sufficient test results to decide, and you must keep an engineering and production team in place to insure that you can produce more of what you have tested – a challenge if the test take a long time.

4. What changes would you recommend to ensure that DOD better addresses concurrency risk in the design, development, test, and production of major weapons systems to help ensure that they are not being procured while important design and/or testing activities are still ongoing? What is your view of the use of the requirement for prototypes, and where appropriate, competitive prototypes? What steps would you recommend to improve the transition of new technologies into major weapon systems?

Concurrency risk can be addressed to a large degree by the acting on the test recommendations above. They can be further addresses by planning for a series of block changes. The interval between block changes must be aligned to the cadence of the mission – electronic warfare systems will require more frequent block changes than a tanker. This issue was addressed more completely in the 2010 Defense Science Board Summer Study "Enhancing Adaptability of U.S. Military Forces". See http://www.acq.osd.mil/dsb/reports/ADA536755.pdf Chapter 3. Regarding prototypes, I believe they can play an important role in managing risk. But one must recognize that there are many different roles for prototypes. They include prototypes to test new CONOPS, to test new technologies, to assess our ability to integrate systems, and even to assess our ability to test.

5. What changes would you recommend to the process by which DOD identifies and mitigates risk (including but not limited to technological-, integration-, and manufacturing-risk) early in the lifecycle of major weapon systems? Is the Department making appropriate use of technology readiness levels and similar measures in the acquisition process?

The major recommendation I would make to identify and manage risk is the implementation of the Development Planning process mentioned above. Technology readiness measures are a useful and necessary concept. But they are not sufficient. We also need to address stability of major external interfaces, test readiness levels, and integration readiness levels.

6. What changes would you recommend to ensure that better accounts for full life-cycle costs, including the operation and sustainment costs, in the acquisition of major weapon systems?

Life cycle costs are not being effectively addressed today for a variety of reasons. One reason is the lack of authority of the program manager who must deal with arcane rules and allocations, for example those associated with depots; lack of incentives for most decision makers (including the Congress) to spend scarce money today to reap savings far into the future; and lack of incentives for industry to invest in programs such as Performance Based Logistics (PBL) when the programs are competed every 3 years (or less) and the business case for significant investment doesn't close in 3 years.

7. To what extent should the DOD encourage the use of "time-certain development," "spiral development" and "incremental acquisition" strategies to procure major weapons systems? Should the acquisition process itself be shortened to reduce the decision-making cycle time and overhead costs associated with the acquisition of major weapons systems? If yes, how?

There is a need for appropriate application of approaches such as "time-certain acquisition, spiral development, and incremental acquisition strategies via block changes. Again, I refer to Chapter 3 of the 2010 Defense Science Board Summer Study "Enhancing Adaptability of U.S. Military Forces" which includes examples of the benefits obtained. Doing this well requires excellent systems engineering up front, and use of the Development Planning approach would significantly help to decide when and where the various approaches would be best applied to identify and manage risk.

Requirements Process

1. What changes if any would you recommend to the Joint Capabilities and Integration Development System (JCIDS) process and the role of the Joint Requirements Oversight Council (JROC) in the requirements process to ensure that major weapons systems are affordable, reliable, and responsive to the operational needs of the combatant commanders?

The JCIDS process needs to be streamlined and better integrated with acquisition. Again, I believe that a robust Development Planning process as outlined above would produce a better outcome. We need a more robust process to better address the issues associated with integrating spectrum management, electronic warfare, cyber offense and defense, and C4ISR across our forces and across our various acquisition programs. We also need to significantly enhance our testing, exercise and M&S capabilities to develop the architectures and CONOPS needed to deal with degraded operations – including degradation in critical infrastructure which we depend on.

2. What changes to the acquisition process would you recommend to reduce the risk of requirements creep, or "gold-plating", in connection with the acquisition of major weapons systems?

A change in requirements (or reallocation of requirements in the Development Planning process) is not a bad thing. The threat is changing, technology is changing, budgets are changing and we must adapt. Gold plating is bad, especially when driven by a very long acquisition cycle

which creates the incentive to include everything but the kitchen sink in the requirements for a new system because who knows when we will have the next opportunity for enhancement or replacement. The block changes approach described earlier allows for a time phased, logical approach to manage risk while dealing with changes in the threat, need, budget and advancement of technology. This approach has been applied successfully in many programs. The F-16 is a very good example.

3. To what extent should the combatant commanders play more of a role than they do today in the requirements process? What changes if any would you recommend to the role played by combatant commanders?

Our combatant commanders have a limited term of service and therefore have a tendency to focus on their short term needs. But their needs are real and need to be considered in a Development Planning context. Their needs should receive particular attention in the block changes being considered to upgrade or enhance performance of fielded systems. Their needs for M&S, testing and exercises should also be considered to enable them to assess and plan for the impact of degraded operations.

4. What changes to the requirements process would you recommend to ensure that operational requirements that are needed rapidly by combatant commander within their area of responsibility are satisfied in a timely manner? What changes would you recommend to address the risk that rapid acquisition could result in the proliferation of systems that will be difficult to maintain?

Achieving a reasonable balance between short term needs, long term efficiencies and effectiveness requires the Development Planning process to make informed tradeoffs and adjustments. M&S and exercise tools are especially important here to examine whether and when different combatant commanders can share scarce resources rather than require those resources to be dedicated to their command.

5. What improvements can be made in the DOD's use of market research in the requirements process to maximize small business participation in the acquisition of major weapons systems and associated products and services? How can we assure that small business innovations are effectively incorporated into major weapon systems?

Small business can enhance our acquisition process through the introduction of innovation at smaller scales than would be considered in larger business environments. The block changes approach described earlier provides an excellent mechanism to allow small business to innovate and propose new approaches to address needs, and mature their approaches so they can compete with other alternatives when it is time to decide what should be considered at the next block upgrade. This process allows for similar competitions (e.g., 2 or more companies competing for the same subsystem or component), or dissimilar competitions (e.g., companies competing with different subsystems of components based upon competing concepts).

6. What changes would you recommend to ensure the appropriate consideration of open-system architecture and the proper management of intellectual property rights in the acquisition of major weapon systems and associated technologies?

We must demand open systems to reduce the time and cost associated with integration of our major systems, and the ability to be efficient in incorporating incremental changes to those systems. This can be accomplished while preserving private industry's ability to protect intellectual property that they have developed. But we must be more careful in demanding wholesale government ownership of intellectual property of the entire supply chain so we can exercise options to "build to print". Obtaining such ownership would be very expensive, and would offer limited value in supply chains that are turning over production of components several times during the typical lifetime of a DOD weapons system.

7. What is your view of Configuration Steering Boards? What steps would you recommend to make Configuration Steering Boards more effective in controlling the growth of requirements?

Configuration Steering Boards are necessary to manage complex systems with complex interfaces. To be effective, they must be supported by a sound systems engineering foundation, and tools (e.g., M&S, system integration labs (SILS), cost models, and other test capabilities) to address a variety of " what if" questions. These boards will make better decisions if they operate in the context of the Development Planning process described earlier.

8. In connection with how the DOD generates and reassesses requirements throughout the lifecycle of a major weapons system, what improvements, if any, can be made to how the DOD manages the trade space among the cost, schedule, and performance parameters of those systems to ensure its overall affordability?

Better management through the life cycle will require several changes. The first is the establishment of a Development Planning foundation. Next is the removal of the many constraints that limit the authority of the program manager (e.g., limitations associated with use of depots, limited reprogramming authority, policies that limit the effective use of PBL, limited terms of program managers to name a few). Market research and M&S tools used to benchmark best commercial practice would also help. A fundamental issue is the lack of incentives for most decision makers (including the Congress) to spend scarce money today to reap savings far into the future. I also note that support costs do not receive the same scrutiny and attention that acquisition programs receive in either the Executive Branch or the Congress.

THE HONORABLE FRANK KENDALL III

Under Secretary of Defense (Acquisition, Technology, and Logistics)
Office of the Secretary of Defense

Senate Confirmed in May 2012, Mr. Frank Kendall currently serves as the Under Secretary of Defense for Acquisition, Technology and Logistics (AT&L). In this capacity, he is responsible to the Secretary of Defense for all matters pertaining to acquisition; research and engineering; developmental testing; contract administration; logistics and materiel readiness; installations and environment; operational energy; chemical, biological, and nuclear weapons; the acquisition workforce; and the defense industrial base. He is the leader of the Department of Defense's efforts to increase the Department's buying power and improve the performance of the defense acquisition enterprise. Prior to this appointment, from March 2010 – May 2012 he served as the Principal Deputy Under Secretary and also as the Acting Under Secretary.

Mr. Kendall has over 40 years of experience in engineering, management, defense acquisition, and national security affairs in private industry, government, and the military. He has been a consultant to defense industry firms, non-profit research organizations, and the Department of Defense in the areas of strategic planning, engineering management, and technology assessment. Mr. Kendall was Vice President of Engineering for Raytheon Company, where he was responsible for management direction to the engineering functions throughout the company and for internal research and development. Before assuming his current position, Mr. Kendall was a Managing Partner at Renaissance Strategic Advisors, a Virginia-based aerospace and defense sector consulting firm.

Within government, Mr. Kendall held the position of Director of Tactical Warfare Programs in the Office of the Secretary of Defense and the position of Assistant Deputy Under Secretary of Defense for Strategic Defense Systems. Mr. Kendall is a former member of the Army Science Board and the Defense Intelligence Agency Science and Technology Advisory Board and he has been a consultant to the Defense Science Board and a Senior Advisor to the Center for Strategic and International Studies. Mr. Kendall also spent ten years on active duty with the Army serving in Germany, teaching Engineering at West Point, and holding research and development positions.

Over the course of his career as a public servant, Mr. Kendall was awarded the following federal civilian awards: Defense Distinguished Civilian Service Medal, Secretary of Defense Meritorious Civilian Service Medal, Presidential Rank Award of Distinguished Executive (Senior Executive Service), Presidential Rank Award of Meritorious Executive (Senior Executive Service), and Army Commander's Award for Civilian Service. He also holds the following military awards (US Army): Meritorious Service Medal with oak leaf cluster, Army Commendation Medal, and National Defense Service Medal.

Mr. Kendall is a Distinguished Graduate of the U.S. Military Academy at West Point and he holds a Master's Degree in Aerospace Engineering from California Institute of Technology, a Master of Business Administration degree from the C.W. Post Center of Long Island University, and a Juris Doctor degree from Georgetown University Law Center.

Views from the Honorable Frank Kendall III

Dear Senators Levin and McCain:

Thank you for your April 16, 2014, letter regarding improvements in defense acquisition. I look forward to seeing the ideas put forth in response to your request. Enclosed for your use, and hopefully for inclusion in your assembled compendium, is an article I recently wrote for our defense acquisition workforce on the status of the Better Buying Power (BBP) acquisition improvement initiatives that I am implementing within the Department of Defense. The current version of BBP contains over 30 specific initiatives spread over several major focus areas. Under our "continuous improvement" approach to improving acquisition system performance, the Department is also considering the next steps to improve efficiency and productivity. Your compendium will be helpful to that process.

I agree with your view that acquisition improvement, as opposed to acquisition reform, should be our goal. We have seen enough attempts at acquisition reform to know that there is no easy or simple way to dramatically improve acquisition outcomes. The Weapon System Acquisition Reform Act took major steps in the right direction. However, now we are at a point where our focus should be on the professionalism and incentives of people in government and industry who make thousands of individual acquisition decisions each day, rather than on "rule sets" or organizational responsibilities. When, as mentioned in your letter, "inefficient, outdated, and (at times) imprudent practices" occur, they are manifested in those thousands of individual daily decisions.

As the Defense Acquisition Executive, I offer the following actions that Congress could take to help the Department, and over 150,000 acquisition workforce professionals, be more effective and productive as we acquire products and services for our Warfighters:

1. <u>End the threat of sequestration</u>. Nothing is causing more inefficiency in the Department than the continuing uncertainty about future budgets. The threat of sequestration makes sound planning impossible and causes inefficient execution as our managers try to cope with unpredictable program profiles for both development and production.

2. <u>Continue to fund the Defense Acquisition Workforce Development Fund (DAWDF)</u>. The Department has made excellent use of this fund to bring new acquisition professionals onto the team. Increasingly we are using DAWDF funds to provide much needed training and practical experience to all our acquisition career fields, including program management, engineering, and contracting. DAWDF is a valuable resource that is providing a high return on investment.

3. <u>Work with the Department to simplify the rules we already have</u>. We do not need more rules, in fact I believe we have too many already. I have a team working with congressional staff on a legislative proposal that is intended to provide a simpler and more easily understood and implementable set of requirements for our program managers – without sacrificing the good intent behind the original legislation. Our managers are faced with a vast and confusing array of overlapping statutory requirements that is in

need of simplification. I look forward to working with Congress and for your continued support for this activity.

4. Avoid highly restrictive rules which particularly limit our ability to make the best decisions about risk management actions or business arrangements. The Department acquires a huge range of products and services with widely varying risk profiles, degrees of urgency, and business situations. We need the flexibility to tailor how we do business to the situation. No best practice is universally applicable. I have seen far too many program plans in the last 4 years where our managers have tried to force fit a program into what they thought was the approved "school solution" way of doing business. There is no one type of contract, or one set of decision points, or one set of risk mitigation techniques that applies to all programs.

5. Reduce the counter-productive incentive to obligate funds on a fixed schedule. For 4 years I have worked to train and encourage our acquisition workforce to take time to get good business deals for the Taxpayer by conducting appropriate upfront analysis, and by doing the systems engineering and planning necessary for successful programs. At the same time our program managers live in a world in which they are punished for not obligating the funds they control on set schedules. We should have realistic plans to execute our budgets, but when a manager has sound reasons to delay obligation, that behavior should not be punished. I have worked successfully with the Under Secretary of Defense (Comptroller) to provide a more balanced approach to how we handle obligation reviews within the Department, and we would like to work closely with Congress in striking a similar balance on this matter.

6. Allow, or even require, Services and Agencies to hold a management reserve to be applied when problems arise in development programs. Development of new products inherently involves risk. Even with the best of risk reduction or mitigation actions as a prerequisite, developing any cutting edge technology-based new product embodies cost and schedule risk. It is also not efficient to plan and budget for a very low risk development program profile; a modest degree of challenge to our managers and contractors coupled with well-structured incentives results in more efficient overall execution. Under our current practices, we are forced to take funding from one program to address any shortfalls that emerge in another program. Large businesses do not operate this way; they plan for risk and hold reserves available to manage aggregate risks. While Congress would need to provide the Department this authority, I believe there is great value in exploring how a transparent and flexible account could address the inevitable problems that some development programs will encounter. It likely would be of great utility to the Department and would improve Warfighter and Taxpayer outcome.

7. Help the Department improve professionalism of our government acquisition workforce. At day's end, workforce strengthening, rather than any new set of best practices or set rules, is the most effective way to improve defense acquisition. Defense acquisition is a human endeavor that requires a high degree of professionalism in multiple disciplines for success. I have asked all Department acquisition leaders to make leaving behind a stronger, more professional workforce (military and civilian) their most important

personal legacy. Our current budget environment instability, years of pay freezes, furloughs, revolving door limitations, threats of workforce reductions, a relatively inflexible civil service system, "up-or-out" career management, and the effects of over a decade of conflict all work against this goal. I would like to work with Congress to find creative ways to recruit, retain, and incentivize our professional government workforce. These are the people we depend on to structure and implement successful programs. While I also have concerns for the health of the industrial base, we have the tools we need to motivate industry using contract financial incentives. Together I believe we should explore ways in which we can do more to strengthen our government workforce. Today we have a large number of high quality acquisition professionals doing their best to support the Warfighter and protect the Taxpayer, but I believe we can do more to build on what we already have.

I close with a final comment about the complexity of defense acquisition system and what it really takes to succeed. Over the last few years I have published a quarterly article on some aspect of acquisition in the Department's Acquisition, Technology, and Logistics magazine. To give you a sense of both scope and scale of what we do, I am enclosing a list of those articles with links to them. I do not anticipate running out of topics to write about over the next few years. Over my 40-year plus career in this field I have heard, and in some cases been subject to, a lot of ideas on how to "reform" acquisition. We should not forget that we have the best equipped military in the world and we have prevailed in multiple modern conflicts with unprecedented battlefield dominance. If acquisition of military equipment were professional football we would have a dominant team, even if there is an occasional fumble or interception. A highly successful professional football team puts it all together: spotting talent; recruiting; training and conditioning; designing offenses, defenses, and special teams around the talent on the team; effective practice; careful study of individual opponents strengths and weaknesses; sound game plans and play calling; openness to innovative ideas; the ability to create surprise; a thorough 'odds of success' understanding for each option; and constant attention to thousands of details. So it is with defense acquisition. At the end of the day, it is about motivation, skills, training, experience, and leadership of the fielded team. I ask for your support of the ideas expressed above and in the enclosed. I look forward to working together to build on the professional defense acquisition team that has already contributed so much to the United States of America by enabling the most capable military in history.

Sincerely,

[SIGNATURE]
Frank Kendall

THE HONORABLE DR. JOHN F. LEHMAN
Chairman
J.F. Lehman & Company

John Lehman is Chairman of J.F. Lehman & Company, a private equity investment firm. He is a director of Ball Corporation, Verisk, Inc. and EnerSys Corporation. Dr. Lehman was formerly an investment banker with PaineWebber Inc. Prior to joining PaineWebber, he served for six years as Secretary of the Navy. He was President of Abington Corporation between 1977 and 1981. He served 25 years in the naval reserve.

He has served as staff member to Dr. Henry Kissinger on the National Security Council, as delegate to the Force Reductions Negotiations in Vienna and as Deputy Director of the U.S. Arms Control and Disarmament Agency.

Dr. Lehman served as a member of the 9/11 Commission, and the National Defense Commission. Dr. Lehman holds a B.S. from St. Joseph's University, a B.A. and M.A. from Cambridge University and a Ph.D. from the University of Pennsylvania. He is currently a Fellow of Gonville and Caius College, Cambridge University.

Dr. Lehman has written numerous books, including *On Seas of Glory, Command of the Seas* and *Making War*. He is Chairman of the Princess Grace Foundation USA and is a member of the Board of Overseers of the School of Engineering at the University of Pennsylvania.

Everett Pyatt, who contributed to this essay, is the Leader of the Project for Defense Management and Acquisition Leadership at the McCain Institute for International Leadership, a part of Arizona State University. He was formerly Assistant Secretary of Navy and Acquisition Executive.

Views from the Honorable Dr. John F. Lehman

Thank you for the opportunity to comment on the status of the acquisition system and offer suggestions for improvement. I offer them from the perspective of a former Secretary of the Navy responsible for executing President Reagan's decision to have a 600 ship Navy. It includes opinions of Everett Pyatt who as Assistant Sectary was a key individual in program execution and Navy acquisition management reforms.

We knew that affordability was the major challenge. Others believed that the task was impossible within the time frame. Yet the 600 ship Navy was nearly complete when the Soviet Union collapsed. Key to achieving this end was clear focus on ship affordability recognizing that budgets were limited and a high/low mix of ships was necessary to satisfy military needs and desired force levels.

Program execution depended upon maximum use of design stability, firm control of design changes and planned upgrades over system life. These were implemented in a competitive procurement environment giving maximum incentive to contractors to lower costs rather than justify the highest costs possible in a negotiated procurement. If competition had not been a tool, as it is not today, then program completion would have been impossible. Use of competition also preserved the industrial base for when Navy had to be recapitalized.

Management reforms were implemented. An excessive layer of bureaucracy, the Navy Materiel Command was eliminated, clarifying lines of authority and responsibility, and shortening the decision cycle. Realizing that top quality people were needed to manage acquisition program, the Navy Materiel Professional program was initiated. Separate selection boards identified candidates for this role and billets through the four star level were identified and limited to Materiel Professionals.

I made these decisions because they were necessary to implement the President's Navy plan and prepare the Navy for future acquisition challenges.

But times have changed. Affordability has not been a consideration until programs are terminated, competition in production has ceased to exist and the acquisition workforce, decimated in the 1990s has not regained the skills it once had.

The following conclusions are derived from program results shown in a recent USD (AT&L) analysis of acquisition performance, GAO reviews of system performance and USD (AT&L) annual summaries of Selected Acquisition Reports (SAR) which are the only data base to define cost performance. Annual reports by the Director of Operational Testing provide some insight into technical performance.

Regarding cost performance, the GAO annual analysis show that cost growth/overruns total over $400 billion. Part of this is a sunk cost but roughly half remains a future cost subject to change by dedicated management. This is not happening. In fact the last SAR summary showed continued cost growth in the F-35 program despite claims by the contractor and program office that costs were declining. The last SAR summary lists net cost growth of more than $10

billion in 2013 when quantity reductions and economic (inflation) corrections are removed. (This amount would be higher, but has been reduced by some programs being under budget.) These are not under the control of acquisition managers. Management does not seem to attach a high priority to cost control.

But all is not bad. About half of the major acquisitions are very close to cost plan. The other half is the problem programs. Too little acknowledgement is given to these successful program managers.

Affordability is ignored now. Major programs do not include cost as a key performance parameter. Yet there is plenty of evidence to show that program plans and budgets do not coincide. Long-term projections of ship and aircraft programs made over the past decades and presented to the Congress have clearly shown that plans far exceed resources. Changes have not been made to bring unit cost in line with expected resources. The result has been disarmament by the acquisition system.

Competition has been relegated to near nonexistence. Recent decisions have eliminated competition for the future fighters, the F-35 engine, ground vehicles and much of shipbuilding.

The source selection process is not a good predictor of future program success. Every troubled program (except carriers) won a source selection.

The joint requirements process seems to have made changes that increase requirements frequent and easy but changes needed for cost control purposes virtually impossible to obtain.

Finally program turbulence caused by the Congressional Budget and Appropriation process makes program planning and execution very difficult and often very costly as production rates change.

Changes Needed

A fundamental responsibility of the Congress is to provide for the defense of the United States. This requires money, but the willingness to spend for defense varies widely, leaving defense managers uncertain about future plans. The first reform step necessary is for the Congress to inform the Executive of possible Defense top lines, expressed as a range of percentages of GDP. This would allow the Executive to plan programs and present alternatives within that range.

Once a topline range is determined, program affordability ceilings can be set. A major current challenge is the recapitalization of Strategic Forces. Current plans include rebuilding of the triad. Cost estimates vary, but the range seems to be $30-50 billion a year for 10-15 years. This requires an increased topline or reduction in other forces investment.

Long-term program plans can then be developed and designed for efficient implementation using all the tools now available.

Current system performance with the $400+ billion cost growth makes it clear that cost focus is inadequate. There are many reasons for cost growth ranging from excessive technical risk to poor management performance by the contractor or government. While all programs suffer from the vastness of the bureaucratic layers of decision making, each program has a different mixture of problem causes and cannot be generalized to some simple formula.

Real change involves change in the business and technical environment and the government management attitude.

Part of the reason for this poor performance is the lack of competition in major acquisitions other than the initial source selection to award the decade's long monopoly of the winner. The current system rewards the winner with all of the production with prices determined by a negotiation process that leaves the supplier firmly in control of prices. Even though there are extensive rules and regulations governing cost and price, the supplier is in the position of justifying the highest price both for projects and overhead. Profits depend on it. Government negotiators are at a great disadvantage, both in experience and system knowledge. Should-cost studies are a limited use tool and have not shown much impact.

A competitive environment changes management motivation. Instead of some inexperienced negotiator having to figure out reasonable prices, management will do it in an attempt to win business. Our experience in the 1980s confirmed this dynamic. It can be seen in action now in the Air Force launch vehicle program. The potential entry of a competitor has caused the entrenched sole source supplier to reduce prices in an attempt to derail the competition. Hopefully the Air Force does not surrender.

Many have argued that competition is a wasteful duplication. This argument is applied only in the defense industry; the rest of the economy is based on maintenance of a competitive environment. Defense should be also. But competition is not just about cost, it is about performance, technological creativity and customer support. Defense should follow the national economy, not just rely on a poorly functioning regulated system.

Competition is also about maintenance of a long-term industrial base. Current acquisition policies have resulted in the elimination of a competitive base for fighter aircraft since it is planned to terminate production of other fighter aircraft in favor of the poorly performing F-35 program. This is the right time to initiate a competitive program for Navy use, making it clear that the F-35 is not necessarily the only choice. Similarly all major system categories should not be allowed to atrophy to sole source situations. A major tool for achieving long-term competition is dual source production, even at low production rates. Current manufacturing technology makes this possible.

Government management needs to be strengthened. Existence of over $400 billion in cost growth makes it clear the current system has not produced the desired results. Falling budgets make it imperative that more attention be paid to cost control, not just relegated to some backroom staff as is the current case.

The Navy had two acquisition executives, one for system development, the second for production and logistic support. This resulted in the ability to focus on cost control, both in production and operation. Since this organization was abolished, cost growth has accelerated and reflected in the DDG-1000, Ford class carrier, Littoral Combat ship and others.

It is time to restore this balance by reassigning one of the existing Service Assistant Secretaries the role of Acquisition Executive for Production and Logistics. This person would also be the alternate, assuring that there is always an Acquisition Executive rather than a vacancy as has been the case far too often. Effective management requires continuity of purpose, a condition often missing in the turbulence of government.

The acquisition process needs to be rationalized and decision flows simplified. Months are involved in getting requirements decisions, more in the procurement process, and the milestone decision process. Flow charts of the process defy explanation and cause bewilderment in their complexity. The Joint Requirements Board even has a routine and expedited path for approval. Bureaucracy excels.

Bureaucracy must be reduced. Navy performance improved by elimination of the Navy Materiel Command. Other Services should take the same step. There are many other candidates for elimination. That approach is much better than just mandating and across the board reduction.

In conclusion, performance data shows the Defense Acquisition System does not work by any rational measure. But recent successes in streamlining the process for urgent warfighting needs demonstrates that the larger problem can be fixed; it is not impossible to return common sense and line authority and accountability to achieve success. Both Polaris and Minuteman programs, each more challenging for their day than any current major program, took just over four years from concept to IOC. That is the kind of accountable, streamlined system that we should have as our goal. It can be done, and your committee should be the leader in bringing this about.

THE HONORABLE ELIZABETH McGRATH
Director
Deloitte Consulting LLP

The Honorable Elizabeth (Beth) McGrath is a director at Deloitte Consulting LLP. As a member of the Federal Strategy & Operations practice, she advises federal government and commercial organizations on strategies that help further innovation and improve business operations. Ms. McGrath has multi-disciplined strategic and operational management experience acquired during a highly lauded federal career that culminated at the undersecretary level in the Department of Defense (DOD). A proven thought leader, she possesses exceptional interpersonal skills with specific experience in strategic planning, performance management, investment review, program management, and organizational transformation.

Prior to joining Deloitte, Ms. McGrath served as the Deputy Chief Management Officer for the DOD. During her tenure she addressed numerous management challenges with a variety of approaches, including instituting an investment review process for the department's $7 billion in business IT systems, authoring its Strategic Management Plan, and overseeing needed improvements to its business architecture and security clearance processes. She also served as Principal Staff Assistant (PSA) and advisor to the Secretary and Deputy Secretary of Defense for matters relating to management and the improvement of business operations.

Previously, Ms. McGrath was the vice chair of the Federal Suitability and Security Clearance Performance Accountability Council, overseeing government-wide security clearance process reforms. She also served as the Deputy Director for Systems Integration, Defense Finance and Accounting Service (DFAS), where she created a financial migration strategy that included a comprehensive architecture and identification of DOD-wide systems valued at more than $1 billion. In addition, she has held a variety of business/acquisition roles within the Department of the Navy.

Ms. McGrath holds a Bachelor of Science degree in economics from George Mason University and is a graduate of the Federal Executive Institute. She is a member of the National Academy of Public Administration; obtained acquisition certification in program management, financial management, and logistics; and was a long-serving member of the DOD Acquisition Professional Community. Her extraordinary accomplishments earned her numerous awards, including: the DOD Medal for Distinguished Public Service (twice conferred), the Presidential Rank Award, the Office of the Secretary of Defense Exceptional Civilian Service Medal, and the National Intelligence Meritorious Unit Citation. She has been recognized by Government Computer News with the Defense IT Executive of the Year award and has also received multiple Federal 100 awards.

Views from the Honorable Elizabeth McGrath

Culture and Accountability

What steps would you recommend to change the culture within the acquisition workforce to increase cost consciousness and pursue affordability as an operational requirement?

Understanding the cost elements of a program should be of interest to everyone. It starts with the business case (Analysis of Alternatives) generated by the user community that articulates the mission need along the cost of current operations/capabilities. This is not simply the budgeted amounts for sustainment, but rather includes all cost associated with execution. Each member of the program office and all overseers should be knowledgeable in cost of a program.

What steps would you recommend to develop the core competencies of the acquisition workforce and make it more capable of obtaining better value for the taxpayer-becoming as skilled a buyer as private industry is a seller?

Adding (or increasing) industry personnel to the acquisition training conducted at DAU – both as participants and instructors would provide a real time industry perspective to the cost conversation.

What is your assessment of the Defense Acquisition Workforce Development Fund (DA WDF)? Do you believe that the DAWDF should be continued? Would you recommend any changes to the structure or function of the DA WDF?

Ensuring that money is set aside for training is important. I would suggest that additional measures be put in place to assess the value of the training. I would also assess and address retention of the acquisition workforce.

How can the DOD better empower PMs and PEOs to make sound program management decisions and ensure accountability? Should the DOD restructure how PMs and PEOs are transitioned in and out of programs in relation to key decision points?

Tying PM tenure to major milestones is important, but transparency and communication of program progress to the oversight community will go a long way in easing the transition of program managers.

Do you believe that the qualification requirements established by the Defense Acquisition Workforce Improvement Act (DAWIA) are working, or would you recommend additional requirements or better enforcement of existing requirements enhance the performance of the acquisition workforce? What steps would you recommend to improve the qualifications of acquisition personnel holding key leadership positions or otherwise ensure that members of the acquisition workforce are fully qualified to meet their responsibilities?

The requirements for a program manager of a commercial based Information Technology program are very different than a weapon system. Establishing IT specific curriculum would greatly benefit the delivery and implementation of IT programs. I also believe that providing training to the User community (in addition to acquisition professionals) will also significantly increase the success rate of these types of programs.

What steps would you recommend to help ensure that top performers within the acquisition workforce are rewarded for their performance and empowered to manage programs with success?

A qualified and engaged workforce is directly related to acquisition program success. Alignment of incentives between accountability and responsibility among key participants (end user, acquisition, and program manager) is also key to achieving successful program outcome. An equitable incentive structure tied to critical milestones can help foster shared reward and therefore shared responsibility in maintaining baseline metrics for measurable outcomes.

What steps would you recommend to improve the recruitment, hiring, and retention of talented and capable mid-and senior-level executives to fill the growing number of high level vacancies within the DOD acquisition workforce?

I believe that establishing a pay scale for program managers with salary ranges above the General Schedule would attract more talent. That, coupled with incentive structures that rewarded performance would help with retention. Additionally, programs seemed to be discussed only when there is bad news to tell – celebrating/communicating program successes would contribute greatly to recruitment and retention.

<u>Acquisition Policy</u>

What changes would you recommend to the statutes, regulations, and policies governing DOD acquisition of major weapon systems to ensure that major weapon systems are delivered on time, at a reasonable cost, and provide the needed capability? For any recommended changes, please specify the statute, regulation or policy and the precise change that you would recommend.

I would suggest a review of all statutes, regulations and policies in place today with the intent to reduce by 40-50%.

Do you see the need for any change to the current acquisition chain of command for our largest major defense acquisition programs, under which program managers report to program executive officers, who report to service acquisition executives, who report to the Under Secretary of Defense for Acquisition, Technology, and Logistics? What changes if any would you recommend to the role of the service chiefs in this process, as outlined in section 254 7 of title 10, United States Code?

For Business IT systems, the business community (through the Defense Business Council) should holistically and comprehensively understand the current business environment, the additional needs (requirements) and total cost of operations. The acquisition community (to include overseers) should help drive the successful delivery of a solution and should keep the Business Council informed of progress.

What changes would you recommend to ensure that DOD better addresses concurrency risk in the design, development, test, and production of major weapons systems to help ensure that they are not being procured while important design and/or testing activities are still ongoing? What is your view of the use of the requirement for prototypes, and where appropriate, competitive prototypes? What steps would you recommend to improve the transition of new technologies into major weapon systems?

There are many documented benefits of prototyping to include: eliminating ambiguities and improving accuracy in interpretation of system requirements and functionality and well as ensuring that the solution meets the needs of the user (does what it is supposed to). Prototyping use should be continued.

What changes would you recommend to ensure that better accounts for full life-cycle costs, including the operation and sustainment costs, in the acquisition of major weapon systems?

For business programs, ensuring that the Department understands the Return On Investment before making the "go" decision is important. This aligns to increasing the cost consciousness.

Should the acquisition process itself be shortened to reduce the decision-making cycle time and overhead costs associated with the acquisition of major weapons systems? If yes, how?

The acquisition cycle for Information Technology should strive for IOC in 12-18 months. The DOD policy put in place for Business IT (the Business Capabilities Lifecycle) established policy to enable a faster market delivery model. The Department should continue to push the acquisition of IT to deliver faster, but also to have a clear understanding of the desired outcome and cost **before** contract award.

Requirements Process

What changes if any would you recommend to the Joint Capabilities and Integration Development System (JCIDS) process and the role of the Joint Requirements Oversight Council (JROC) in the requirements process to ensure that major weapons systems are affordable, reliable, and responsive to the operational needs of the combatant commanders?

Both the JROC and the Defense Business Council (the JROC for business requirements) should be accountable to the Deputy and the Secretary for their actions and decisions.

What changes to the requirements process would you recommend to ensure that operational requirements that are needed rapidly by combatant commander within their area of responsibility are satisfied in a timely manner? What changes would you recommend to address the risk that rapid acquisition could result in the proliferation of systems that will be difficult to maintain?

While I do not have specific experience within the rapid acquisition processes – establishing and maintaining an enterprise perspective on the entire mission area (by the JROC or the Defense Business Council) will enable each member to understand what capabilities that have, what they need and whether it's a long or near term need.

What changes would you recommend to ensure the appropriate consideration of open-system architecture and the proper management of intellectual property rights in the acquisition of major weapon systems and associated technologies?

Both open system architecture and intellectual property rights should be deliberate decisions in the acquisition process. Starting with a holistic view of the environment (warfighting or business) provides a more comprehensive discussion on how the end item being considered (weapon system or business system) fits into the larger picture.

What is your view of Configuration Steering Boards? What steps would you recommend to make Configuration Steering Boards more effective in controlling the growth of requirements?

Establishing and maintaining an Enterprise perspective of the "mission area" (warfighting or business) by an accountable governing body (JROC or the DBC (Defense Business Council) above the configuration Steering Boards could assist with requirements growth – Higher level approvals required for changes in scope.

DR. DAVID L. McNICOL
Research Staff Member
Institute for Defense Analyses

David McNicol served in the Office of Program Analysis and Evaluation (PA&E) of the Office of the Secretary of Defense from 1982 until his retirement from the civil service in 2002. From early 1988 until his retirement, Dr. McNicol was Deputy Director of PA&E for Resource Analysis and chairman of the Cost Analysis Improvement Group. Before joining DOD, he held positions in the Department of Energy, the Department of the Treasury, and the President's Council of Economic Advisors. Earlier in his career, Dr. McNicol taught at the University of Pennsylvania and the California Institute of Technology. He holds a B.A. in economics from Harvard, and an M.S. (management) and Ph.D. (economics and finance) from the Massachusetts Institute of Technology.

Dr. McNicol has been employed at the Institute for Defense Analyses (IDA) since his retirement from DOD, initially as a Division Senior Fellow and then as a Research Staff Member. Dr. McNicol became director of the Cost Analysis and Research Division in March 2006. Upon stepping down as division director in March 2012, Dr. McNicol returned to his previous status at IDA as a Research Staff Member.

Dr. McNicol's awards include the Distinguished Presidential Rank Award (1996, 2001), Meritorious Presidential Rank Award (1988, 1993), and the Department of Defense Distinguished Civilian Service Award (1989, 1993, 1997, 2001, 2002).

Views from Dr. David L. McNicol

Cost Growth, Acquisition Policy, and Budget Climate[39]

Discussions of acquisition reform over the past twenty-five years have usually put the Department of Defense (DOD) Program Manager (PM) and personnel in the program office in the foreground. These people oversee the contractors and do myriad things that must be done by the government for a major acquisition program to move forward—contracting, financial management, and test planning, among many others. In the background are the contractors who typically do the development and manufacturing. A good program will not occur if the government personnel and contractors do not do their jobs well. It is equally true that if these individuals and organizations do their jobs well, a good outcome for the program is more likely.

What this focus on the DOD PM, the program office personnel, and the contractors' PMs and workers leaves out are factors they must accept as "givens." These givens are subject to changes—sometimes large and fairly sudden—that presumably have substantial consequences for program outcomes. One of the givens is DOD acquisition policy and process. A second is the DOD budget, which does not determine, but generally has a marked influence on, the funding for individual programs.

This paper summarizes the results of research done at the Institute for Defense Analyses[40] on whether, taking account of funding climate, changes in DOD acquisition policy and process had a discernible effect on growth of Program Acquisition Unit Cost (PAUC) of major defense acquisition programs (MDAPs). The paper attempts to shed some light on—and as it turns out, to challenge—three assumptions that often are implicit in discussions of acquisition reform:

- Cost growth and other problems of program outcome primarily reflect what does and perhaps does not take place in the acquisition realm.
- Changes in acquisition policy and process can be expected to have substantial effects on the cost, schedule, and performance results of MDAPs.
- The ingrained cultures of DOD acquisition organizations are a substantial obstacle to steps that might reduce cost growth.

While not organized around these topics, the paper provides results that bear directly on them.

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[39] Research Staff Member, Institute for Defense Analyses. Valuable comments reflected in the paper were provided by David Sparrow, Brian Rieksts, and Prashant Patel. Sarah Burns provided advice and assistance on the statistical analysis. Linda Wu managed data acquisition and the database.

[40] David L. McNicol and Linda Wu, "Evidence on the Effect of DoD Acquisition Policy and Process on Cost Growth of Major Defense Acquisition Programs," IDA Paper P-5126. Alexandria, VA: Institute for Defense Analyses, September 2014. This paper was sponsored by the Director, Performance Assessments and Root Cause Analyses of the Office of the Under Secretary of Defense (Acquisition, Technology and Logistics.)

Acquisition Regime and PAUC Growth

DOD acquisition policy and process over the period 1970–2007 can be grouped into five successive regimes:

1. The Defense Systems Acquisition Review Council (DSARC), 1970–1982
2. The Post-Carlucci Initiatives DSARC, 1983–1989
3. The Defense Acquisition Board (DAB), 1990–1993
4. Acquisition Reform (AR), 1994–2000
5. The DAB – Post Acquisition Reform, 2001–2007

Table 1 displays the average PAUC growth for MDAPs that passed Milestone (MS) B or (pre-2001) MS II or filed a first Selected Acquisition Report (SAR) in each of these regimes. The PAUC growth figures all are measured from the MS II/B baseline and normalized to the MS II/B total inventory objective. There are a number of interesting aspects to these data; for example, the high PAUC growth during the AR period and the lower PAUC growth for 2001–2007. Granting that, the single most notable feature of these data is the absence of any trend in PAUC growth. If changes in acquisition policy and process have had a sustained influence on PAUC growth, it does not show up in this table.

Table 1. Average PAUC Growth in Successive Acquisition Regimes

Acquisition Regime	Time Period	Average PAUC Growth	No. of Observations
DSARC	1970–1982	32%	48
Post Carlucci Initiatives DSARC	1983–1989	19%	40
DAB	1990–1993	36%	11
Acquisition Reform (AR)	1994–2000	66%	27
DAB post AR	2001–2007	19%	25

Broadly, there are two ways to explain the absence of sustained effects of acquisition policy and process on the PAUC growth data. First, they may in fact not have a strong or consistent effect on PAUC growth. Second, acquisition policy and process may have substantial effects that are masked by some other factor or factors.

Funding Climate and PAUC Growth

Thinking along the lines of the second of these possibilities led to consideration of whether changes in the DOD funding climate might be associated with PAUC growth. The period 1970–2007 includes two sub-periods during which the DOD budget was Relatively Constrained: FY 1970–FY 1980 and FY 1987–FY 2002. It also includes two sub-periods in which MDAP new starts found funding climate Relatively Accommodating: FY 1981–FY 1986 and FY 2003–FY 2007. Table 2 displays the average PAUC growth data for these four sub-periods.

Table 2. Average PAUC Growth in Different Funding Climates

Relatively Constrained		Relatively Accommodating	
Period (FY)	**PAUC Growth**	**Period (FY)**	**PAUC Growth**
1970–1980	35% (42)	1981–1986	12% (35)
1987–2002	53% (55)	2003–2007	7% (19)

Note: Numbers in parentheses are the number of observations available.

These data make it clear that the average PAUC growth in Relatively Constrained funding climates was far larger than it was in periods during Relatively Accommodating funding climates—by a factor of three in the first comparison and by a factor of more than seven in the second.

Acquisition Regime and Funding Climate

Table 3 expands Table 2 by replacing the funding climate sub-periods with the acquisition policy and process regimes. This table provides results for two sets of natural experiments. First, the PAUC growth columns give the effect of changes in the acquisition regime for a given funding climate. Second, the rows show the effect of funding climate for a given acquisition regime. For example, the first eleven years of the DSARC (FY 1970–FY 1980) were in a Relatively Constrained funding climate, while the next two (FY 1981–FY 1982) were in a period in which the DOD budget was Relatively Accommodating.

Table 3. Average PAUC Growth by Acquisition Regime and Topline Condition

	Relatively Constrained		Relatively Accommodating	
Acquisition Regime	**Period (FY)**	**PAUC Growth**	**Period (FY)**	**PAUC Growth**
DSARC	1970–1980	35% (42)	1981–1982	11% (6)
Post Carlucci DSARC	1987–1989	34% (11)	1983–1986	13% (29)
DAB	1990–1993	36% (11)	None	N/A
Acquisition Reform (AR)	1994–2000	61% (27)	None	N/A
DAB post AR	2001-2002	57% (6)	2003–2007	7% (19)

Note: Numbers in parentheses are the number of observations available.

Statistical analysis of the data behind the averages in this table leads to two conclusions. First, there is no statistically significant improvement or worsening of PAUC growth correlated with the different acquisition policy and process regimes. This result is not surprising for the Relatively Accommodating climate (column on the right). In contrast, in the Relatively Constrained periods (column on the left), average PAUC growth for AR and DAB post-AR is noticeably higher than the averages for previous periods, but the differences proved not to be statistically significant because of the large variance among programs in each period.

Second, average PAUC growth was substantially higher in a Relatively Constrained funding climate than in the Relatively Accommodating climate. We have only three natural experiments of changes in funding climate for a given acquisition regime, since two of the five acquisition regimes (DAB and AR) fall entirely within one funding climate. Each of these three natural experiments on the effect of funding climate had the same outcome—MDAPs that passed MS II/B in a Relatively Constrained funding climate on average had a much higher PAUC

growth rate than those that passed MS II/B in a Relatively Accommodating funding climate for a given acquisition regime. These differences are statistically significant at the 1 percent confidence level. The outcomes of the first two experiments are virtually identical—an average PAUC growth of 35 and 34 percent, respectively, in the two periods when funding was Relatively Constrained and average PAUC growth of 11 percent and 13 percent, respectively, in the two periods when the funding climate was Relatively Accommodating. The effect is even more pronounced in the third experiment (DAB post-AR)—57 percent in FY 2001–FY 2002 versus just 7 percent for FY 2003–FY 2007.

Does the Resource Allocation Process Play a Major Role in PAUC Growth?

These conclusions tend to challenge a fundamental assumption implicit in most discussions of acquisition reform: that the main causes of PAUC growth are to be found in the acquisition realm—the performance of the contractors, the effectiveness of the PM, the adequacy of the developmental test plan, and the completeness of the systems engineering plan, among others. This assumption is hard to maintain when the many changes in acquisition policy and process made in the past four decades have not had statistically significant effects on PAUC growth, but there is a significant association between PAUC growth and funding climate at the point when the MS II/B baseline was set.

The association between PAUC growth and funding climate suggests that the resource allocation process, particularly at the Service level, plays an important role in cost growth. This does not mean "budget instability." Budget instability is a term of art for changes in MDAP funding through the annual resourcing cycle and "taxes." Budget instability is a chronic condition, present to some degree in all periods. What this paper observed is a recurring pattern—that MDAPs that passed MS II/B during periods of Relatively Constrained funding, on average, had much higher PAUC growth than those that passed MS II/B when funding was Relatively Accommodating.

The conjecture that the resource allocation process plays an important role in cost growth gets some support from an unexpected direction—MDAPs with negative cost growth, of which there are twenty-nine in our sample. Negative PAUC growth is recorded if the actual cost of a program proves to be less than the cost in the MS II/B baseline. Assuming the program was funded to its MS II/B baseline, this implies that over time funds can be taken from the program in question and reallocated to other applications, including other acquisition programs. The program, then, effectively can be used as a "bank"—a way to hold reserves in relative safety until they are needed. A bank of this sort is more likely to be needed in a Relatively Accommodating funding climate, as it can then serve as a way to delay final decisions on allocation of the higher level of funding that has become available. We would therefore expect to find a higher proportion of MDAPs with negative PAUC growth in the Relatively Accommodating climates, and this is what we observe. About 30 percent of our MDAPS that passed MS II/B in Relatively Accommodating funding climates show negative PAUC growth, compared to about 10 percent across the periods of Relatively Constrained climate.

MDAPs with "high cost growth," which we define as quantity normalized PAUC growth of at least 50 percent, also suggest an influence from the resource allocation process. DOD

resource managers, particularly at the Service level, have only a few tools for responding to a Relatively Constrained funding climate. One of these is to impose top-down limits on the funding for particular MDAPs as they approach MS II/B. Plausibly, the result will be particularly optimistic programmatic and costing assumptions, which lead to an expectation that MDAPs started in periods of Relatively Constrained funding climate will have a larger proportion with high PAUC growth. This is again what is observed. During periods of Relatively Constrained funding climate, about 40 percent of MDAPs had very high PAUC growth. In contrast, during periods of Relatively Accommodating funding climate, only about 7 percent of MDAPs experienced high PAUC growth.

Taking both funding climates together, 85 percent of MDAPs with PAUC growth of at least 50 percent passed MS II/B during a Relatively Constrained funding climate. These MDAPs had an average PAUC growth of 93 percent and accounted for just over three-quarters of total PAUC growth. Excluding high cost growth MDAPs and MDAPs with negative PAUC growth, average PAUC growth across the two funding climates was just 18 percent. High PAUC growth is then predominantly a feature of programs with PAUC growth of at least 50 percent, and these programs mainly passed MS II/B in periods of Relatively Constrained funding climates. These points are important because they suggest that reforms directed to the average or typical MDAP may miss the real source of the problem.

Implications for Discussions of Acquisition Reform

This paper points to three implications for a discussion of acquisition reform. First, the relevant context for understanding PAUC growth is the interface between the acquisition process and the resource allocation process. The crucial evidence behind this point is the strong association between funding climate and PAUC growth. Resource managers must think in terms of a portfolio of programs at various stages of the acquisition life cycle, from efforts in the technology base through programs nearing the end of production. When a program is completed, it opens a resource "hole" that programs emerging from Engineering and Manufacturing Development can occupy. In turn, programs earlier in the acquisition cycle can move forward as well. When funding for acquisition turns down, these holes get smaller, or close entirely, or require cuts in funding for ongoing programs. The alternatives available in this circumstance are all undesirable—cancellations of programs, delays in new starts, stretches, and unrealistic pricing. The evidence summarized here suggests that it is in this context that high PAUC growth arises.

Second, it seems unlikely that further broad changes in the acquisition process would have a major effect on PAUC growth. The research found no evidence that the efforts to strengthen the acquisition process through the years have resulted in lower or higher PAUC growth. This does not mean that the DAB process does not provide a useful discipline on acquisition programs; moreover, further changes in acquisition policy or process might be warranted for reasons of good government. The evidence does, at a minimum, suggest that the effects of changes in the acquisition process since the early 1970s have not had a dominant effect on PAUC growth.

Third, it is difficult to see that the cultures of the DOD acquisition organizations are a crucial obstacle to improved performance on cost growth. The key point to note is that high PAUC growth is not persistent, but rather episodic, and correlated with environmental factors outside of the control of the acquisition process. There is remarkably little PAUC growth in periods when the funding climate is Relatively Accommodating. It seems fair to ask if it makes sense to assert that an entrenched culture sometimes results in high cost growth and other times in low cost growth. Just how is it that the A team takes the field so quickly and quietly when the budgetary sun comes out? And why even in bad budgetary weather do more than half of MDAPs exhibit comparatively modest PAUC growth?

THE HONORABLE DR. JAMIE MORIN

Assistant Secretary of the Air Force for Financial Management and Comptroller
U.S. Air Force

Jamie Morin is the Assistant Secretary of the Air Force for Financial Management and Comptroller. As the Air Force's comptroller and chief financial officer, he serves as the principal advisor to the Secretary and Chief of Staff of the Air Force on all financial matters. He is responsible for providing the financial management and analytical services necessary for the effective and efficient use of Air Force resources, to include nearly 700,000 military and civilian personnel and a budget of $110 billion. This includes directing the development of the Air Force budget, overseeing the Air Force Cost Analysis Agency's acquisition and operational cost analysis, and conducting Air Force accounting and finance operations.

From 2003 until his current appointment, Dr. Morin was a member of the professional staff of the U.S. Senate Committee on the Budget. In this capacity, he served as the committee's lead analyst for the defense, intelligence, and foreign affairs budgets, responsible for drafting the relevant sections of the congressional budget resolution and advising the Senate on enforcement of budget rules. Additionally, he advised the Chairman of the Budget Committee on the full range of national security issues.

Earlier in his career, Dr. Morin served in the Office of the Secretary of Defense and as an economic development strategist with the firm J.E. Austin Associates, where he worked on projects for the US Agency for International Development. His academic research focused on U.S. national security policy, particularly the role of Congress in defense budgeting and policy making. He held in-residence fellowships at the University of Virginia's Miller Center for Public Affairs and at the Center for Strategic and Budgetary Assessments, where he conducted research for the Pentagon's Office of Net Assessment. He also served as a policy advisor on President Obama's defense transition team.

Dr. Morin was confirmed as the 21st Assistant Secretary of the Air Force for Financial Management and Comptroller on June 19, 2009. Additionally, he was appointed by the President as Acting Under Secretary of the Air Force for the 10 months from July 3, 2012 until April 29, 2013, during which time he served as the Air Force's chief management officer, senior energy official, chair of the Air Force Space Board, and acting secretary of the Air Force during absences of the secretary. As acting under secretary, he led the Air Force's efforts to implement funding reductions under the Budget Control Act while protecting readiness and high priority modernization programs.

After Dr. Morin's submission was received, he was confirmed as the Director of Cost Assessment and Program Evaluation (CAPE).

Views from the Honorable Dr. Jamie Morin

"Acquisition Reform: A Comptroller's Perspective"

Defense acquisition – and hence acquisition reform – is about balancing valid but competing considerations. I would not call myself an acquisition expert, but as the Air Force comptroller for the past five years, I have had the opportunity to be a close participant in the acquisition process from multiple roles. This has allowed me to identify some deficiencies in the process, and, more immediately, to implement some new practices that appear to better balance the multiple competing considerations within the current process.

Due to both law and organizational structure choices, military department comptrollers now play multiple roles in the acquisition process. These include serving as a cost analysis advocate, a resource risk balancer through the entire programming, budgeting and execution process, and as a requirements generator or "capability champion." Actively performing these roles and striking an appropriate balance between them is important to the success of the overall acquisition enterprise, most notably by maximizing funding stability for acquisition programs.

Cost Analysis Advocate

Perhaps the single largest contribution that service comptrollers can make to improving acquisition is by strengthening the quality, relevance, and timeliness of cost estimation. The service cost analysis agencies report to their respective service comptrollers. This organizational alignment offers a level of independence between the acquisition and cost estimation communities that is valuable to the success of an acquisition program, similar to that provided through the organizational separation between the Director of Cost Assessment and Program Evaluation and the Under Secretary of Defense for Acquisition, Technology and Logistics does at the DOD-level.

Producing and utilizing reliable cost estimates is critical at the early stages of a program's life cycle. This helps the Department avoid vastly oversubscribing future budgets, all too common when optimistic assumptions about an acquisition program's life cycle cost form the basis of planning, programming, or budgeting inputs. From the mid-1990s through the mid-2000s, an effort to speed acquisition timelines and enable more responsive acquisition approaches drove a generation of acquisition reform initiatives that significantly reduced the emphasis on cost estimating. The excessive cost growth experienced by many major programs initiated during that era is, I believe, partially attributable to that shift in focus, a conscious decision to move away from reliable, independent government cost estimates. Many theorize the declining emphasis on rigorous cost estimates, combined with pressure to deliver maximum capability within limited budgets, creates incentives to understate likely program costs, the classic "camel's nose" phenomenon. While causality is difficult to assess, program anecdotes and top-level cost statistics seem to support this claim.

In response to declining Air Force acquisition program performance and Congressional direction to improve cost estimating and acquisition program performance across the Defense Department, including the Weapons Systems Acquisition Reform Act (WSARA) of 2009, the

Air Force significantly improved its cost and schedule estimates. Perhaps even more importantly, we are now more rigorously budgeting to these more reliable estimates. This comprehensive, Air Force-wide effort to improve cost estimating capability included an initiative to produce cost estimates during the early stages of a program's life cycle. Prior to 2008, the first robust independent cost estimate associated with a major acquisition program was generally only developed after the award of a major development contract (Milestone B). While there was still room to adjust system parameters at this point, by this time it is often too late to fundamentally alter the construct of a particular program. The Air Force Cost Analysis Agency (AFCAA) initiative to develop independent cost estimates much earlier in the life cycle stages of a program was a major step forward in correcting this problem.

Air Force initiatives to improve the quality and utility of cost estimates came into play during the pre-acquisition phase of the Space Fence program. Space Fence is a ground-based radar system to track satellites and space debris. Both program office and independent estimates were developed for this program prior to Milestone A, to support development of the FY2010 POM. Initially the Air Force was planning to purchase 3 radar systems, each having exceptional capabilities to detect and track small objects orbiting the earth. However, the Space Fence Program Office's configuration estimate of $1.9 billion and the AFCAA's estimate of $6.9 billion were an astonishing $5 billion apart. The significantly higher AFCAA estimate in the FY2010 POM drove the program office to reassess its estimate and eventually to move toward a more realistic concept for the program.

By the time this radar program was approaching system design review, the program office's estimate had reached $6.3 billion and the AFCAA estimate had increased to $8.3 billion. At this point, the Air Force deemed the program as configured to be unaffordable; efforts to find a more affordable solution began. After an intensive review of the initial requirements and considerable cost and capability trade-off analysis, the program was eventually scoped as a single site radar system, at an estimated cost of $1.8 billion. While this single site configuration offers less capability than the original three radar configuration, it has been determined to be sufficient to meet the Air Force's most critical needs (however, if future mission capability is required and it is deemed affordable, the DOD is preserving the option to expand Space Fence to a second increment that would add a second ground site). Given the fiscal environment at that time, it is very likely that a Space Fence program at its original scope would have been terminated, perhaps after considerable investment, leaving the United States (and the world) with a long gap in space situational awareness, and possibly without much to show for the money spent.

Success stories such as the AFCAA's efforts on Space Fence help to build support from the operational community for early consideration of affordability trades. Robust, reliable cost estimates, used to make informed cost-benefit tradeoffs in the early stages of a program, help the Department better prioritize competing requirements across different capability areas. Had the Air Force chosen to fund the original Space Fence concept, the necessary resources would have starved multiple other capability areas of funding for many years to come. The Space Fence case also illustrates how the Department can sometimes save billions in program costs by developing smaller, technically viable solutions that still meet warfighter requirements. Less technically complicated, lower cost acquisition efforts can often be delivered more rapidly, so while there

may be compromises in terms of what requirements are met, timely fielding can also help to reduce overall risk by narrowing gaps in military capability.

Getting beyond acquisition decisions on individual programs, the challenges of the current fiscal environment have further motivated the Air Force to improve overall program cost realism. Over-programming can lead to acquisition death spirals as cost overruns compel program restructurings that breed further overruns. Even the best cost estimates and rigorous reviews of requirements are of little use if the programs in question are not properly funded. This is especially true in today's challenging budget environment, where there can be a great temptation to underfund known bills in the hopes that the future resource picture will improve. Historical experience suggests that this sort of underfunding, whether deliberate or accidental is rarely successful.

Beginning in 2009, Air Force leadership sought to avoid repeating mistakes from past budget drawdowns by directing the AFCAA to conduct independent cost assessments on a significant number of major weapon systems programs. In the past, these programs would not have been analyzed because they were not approaching a major acquisition milestone. The goal of these analyses, which we call Non-advocate Cost Assessments (NACA), was to assess the risk of unmanageable cost growth across the total Air Force acquisition portfolio, the acquisition programs funded in the Future Years Defense Program (FYDP). The primary objective here was to achieve an executable acquisition FYDP, and reduce the likelihood of unexpected, excessive cost growth that could lead to a plethora of problems -- expensive program stretches and delays, unaffordable requirements in program baselines, cancelled programs (after spending billions), and delays in delivering essential warfighting capability. To this end, the Air Force established a well-documented, repeatable metric, "programmatic cost risk," defined as the dollar difference between the independent cost estimates for programs we intend to carry out and the funding available to execute them. New Air Force policy, guidance and procedures have been adopted that now require annual, non-advocate cost estimates on all major acquisition programs. These estimates form the basis of the programmatic cost risk metric reported to Air Force leadership.

These processes have paid off. The assessments conducted provide an independent view of the program and inform the decision making bodies responsible for Air Force programming and budgeting. This "ground truth" helps the Air Force better prepare for budgetary top-line pressure, better understand programmatic options, and build a more realistic Air Force budget and FYDP. Analysis of the Air Force investment programs have increased from covering 33% of the acquisition portfolio in PB2011 to 60% in PB2015. Furthermore, cost risk has been reduced by more than 90 percent from $12 billion in the PB2011 FYDP to $1B in PB2015. Achieving these programmatic cost risk reductions required the Air Force to confront strategic choices head-on, but has helped to set the service on a more stable course toward fielding a ready and capable force for 2023 and beyond.

Balancing Risk in Planning Programming, Budgeting and Execution (PPBE)

Military department comptrollers also play a major role in balancing financial and warfighting risk within their service throughout the last three steps of the Department's resource allocation process, the Planning, Programming, Budgeting and Execution (PPBE) system. The

Department's resource allocation process is in principal designed to maximize alignment to strategy and support long term risk-based tradeoffs. Unfortunately, the PPBE process, and particularly its programming, budgeting and execution components, has been under enormous pressure due to the lack of external and internal budget stability over the past few years, as well as the intense pressures of wartime demands over the last decade. The abrupt reductions under the Budget Control Act and subsequent sequestration have impaired the stability of nearly every program and caused the Department to make decisions damaging many programs both in the short and long term. The Department cannot simply bemoan this challenge, however. Instability appears to be part of the "new normal" of today's fiscal environment and therefore DOD leadership must work to develop acquisition and resource management approaches that incorporate a level of fiscal resiliency.

The first step to build this resiliency is to focus on strategy and planning, ensuring DOD aligns with the directions set by the President and Congress for our nation's defense. Major strategic realignments take time to implement and tend to incur "transition costs" for the Department and the nation as priorities shift, so they should not be undertaken lightly. As either an alternative or a complement to strategic realignments, the Department needs to regularly reconsider the plans it would resource and employ to carry out the strategy. Throughout the programming and budgeting phases, programmers and financial managers need to assess the alignment of resources to support the strategy and plans.

During the initial stages of the programming phase, the Air Force has recently relied on a process that charges Core Function Lead Integrators (most of whom are 4-star officers serving in major commands) with building balanced portfolios for their core function. Core functions represent broad capability portfolios like air superiority, space superiority, or rapid global mobility. Air Force headquarters leadership then evaluates the balance of risk across the various core function portfolios, as well as the executability of the programs within those portfolios. Without clear and consistent guiding principles, these regular reviews could introduce uncertainty and programmatic instability, so they are counterbalanced with longer-term Air Force strategy and planning efforts that seek to set a sustainable 30-year vision for the force. Importantly, while the programming process concentrates on the 5-year Future Years Defense Plan period, the leadership engaged in the effort also reviews assessments of the impact of decisions on longer term budgets.

One of the critical challenges for acquisition professionals and comptrollers working the financial execution of major acquisition programs is to balance short and long term priorities. Particularly when budget toplines come under pressure within the year of execution (as was the case with the FY13 sequestration), comptrollers could be forced to find significant resources from investment programs to support short-term "must-pay" bills across the service. In such an environment, programs that are experiencing delayed financial and programmatic execution will be particularly vulnerable. The compounding effects of budgetary uncertainty and exceptionally long continuing resolutions have seriously compromised the ability of acquisition program managers to achieve the traditional standards for financial execution of multi-year funds like the procurement appropriations. Program Executive Officers, headquarters financial managers and the Congress all scrutinize financial execution, leaving underexecuting programs susceptible to double- and triple-hitting over a multiyear period. If a program is not sufficiently resilient, these

kinds of repeated reductions can transform a one-year blip to a death-spiral. Even when programs do not face multiple reductions for underexecution, the process complexity involved in ensuring that an execution year re-phasing of a program is coordinated with appropriate pay-backs in the program and budget year can create risk and turmoil.

In the complicated fiscal environment of the last few years, Air Force financial and programming leaders have relied on a range of metrics and regular feedback from acquisition and operational stakeholders to assess the risk associated with various programmatic cuts. During the crisis year of FY2013, the Air Force convened a Sequestration Task Force that received almost daily reports to head off the worst of the avoidable impacts from the execution year turmoil. Avoiding repetition of the 2013 sequester is the most effective way to avoid unintentional damage to the kinds of long-term investments of taxpayer dollars that the Department makes in pursuit of military advantage. Maintaining regular, transparent dialogue between program and financial leadership is the best available alternative to address today's complex fiscal environment.

Capability Champion

The acquisition process must have strong capability champions to set the requirements for major acquisition projects and who are empowered to make the necessary requirement changes through the life of a project. These champions need to focus on the end goal, ensuring that as the acquisition of any project matures, proper trades are made to remain in the "sweet spot" of the cost-schedule-capability trade curves. While requirements discipline is important, insisting on invariant requirements in the face of information to the contrary is a recipe for acquisition failure, especially in a dynamic technological and budgetary environment.

The law vests service comptrollers with responsibility as capability champions for financial systems in US Code Title 10, Section 8022. While the original requirements were set long before my arrival, the importance of being an engaged capability champion was reinforced through my work launching the Air Force's new financial system, the Defense Enterprise Accounting and Management System (DEAMS).

The Air Force deployed its current accounting system, the General Accounting and Finance System (GAFS) in 1968, more than 20 years before the passage of the Chief Financial Officers Act of 1990 and the Federal Financial Managers Improvement Act. These two laws, along with subsequent legislation, shaped most of the modern federal financial accounting requirements. They also require federal agencies to produce auditable financial statements. In part due to reliance on multiple, poorly integrated and outdated financial management systems, the Air Force cannot produce reliable financial statements, and the institution lacks key information useful for managers seeking to maximize every taxpayer dollar. This shortfall led to the initial requirement for the Air Force and USTRANSCOM to acquire a new Enterprise Resource Planning (ERP) system, DEAMS.

After fielding a DEAMS pilot capability at Scott AFB in 2009, the Air Force had an Operational Assessment performed on the system in 2011. The analysis found that DEAMS fell short of requirements. The initial plan to address shortfalls was to upgrade the Oracle software,

which would have required extensive reconfiguration of the system. This effort would have cost $120 million and added about 18 months to the program schedule.

Fortunately, when Air Force financial leadership reviewed options, a clearer understanding of the capabilities of the system, the capabilities of the users, and the required capabilities needed to meet the end goal of auditable statements emerged. Further assessment made clear that an upgrade of the system was not the only feasible solution. The fixation on a software upgrade solution came from an incomplete understanding of the end to end process (which was admittedly very complex) and of Air Force and DOD-wide accounting processes. In fact, some additional configuration of the current system, combined with process changes, resulted in sufficient improvement to support a positive assessment from the Air Force Test and Evaluation Center and eventually an accelerated roll-out to additional bases.

Success in this case depended on a team of capability champions who worked to understand the real capabilities of their system. This team soon realized that changes in the concept for employing the system could meet requirements faster and cheaper than could further modifications to the system. While DEAMS is a financial IT system, the lesson applies more widely across the acquisition enterprise. The fact that service comptrollers play a role as capability champions for financial systems in addition to their cost estimating and resource management roles opens the door to learning that crosses silos.

Final Thoughts

There is undoubtedly room for improvement in the law, regulation and policy governing defense acquisition. However, while there are plenty of examples of where bad choices have resulted in flawed programs; defense acquisition is primarily about balancing priorities by weighing multiple valid considerations. For instance, consistently funding to rigorous cost estimates provides greater funding stability and thereby increases the likelihood that funded capabilities will be delivered on time and on cost, but it also reduces the number of programs that the department can squeeze into constrained budgets, meaning decision makers will have to accept the fact that some valid requirements will go unaddressed or be deferred. Getting acquisition right is not simply just the responsibility of our acquisition professionals; it is the responsibility of all those entrusted with the management of the Department's resources – including financial managers serving as cost analysis advocates, risk balancers, and capability champions.

THE HONORABLE DAVID OLIVER
Vice Admiral, USN (Ret.)

Mr. Oliver's diverse career has included extensive experience in government, industry – both commercial and defense – and the military. Most recently he served as CEO of the Defense Company of EADS North America and the Chief Operating Officer of what has subsequently become Airbus, North America. A decade ago, Mr. Oliver was in Iraq as the Director of Management and Budget for the Coalition Forces. Previously he served in the Clinton Administration as Principal Undersecretary of Defense for Acquisition, Technology and Logistics, a position assumed after working as an Executive at Northrop Grumman Corporation and Westinghouse.

Before entering industry, Mr. Oliver completed a distinguished career in the U.S. Navy, retiring in 1995 as a Rear Admiral, (Upper Half). His specialty was nuclear submarines and he served at sea aboard diesel and nuclear ships, commanding a submarine group in Japan and another group in San Diego in addition to an individual submarine.

Mr. Oliver is the published author of *Making it in Washington*, as well as two leadership books, *Lead On*, and *Against the Tide*, the story of Admiral Rickover's insistence on culture change in the Navy. This latter book will be published in November 2014.

Views from the Honorable David Oliver

The current defense acquisition system does not work and cannot be repaired. It does not implement the findings of the Packard Commission nor common sense. There is nothing Congress can do to fix the defense acquisition process until the civilian oversight in the Department of Defense and the military in the Services accept the need for change. John Kotter at Harvard maintains that cultural change is the way you discriminate managers from leaders. Defense Acquisition is looking for a leader.

America's Defense does not rely only on sheer numbers of soldiers, marines, airplanes or ships. We instead lean on advanced technology. There is a good reason. America does not have nearly the largest population in the world. Even if we did, the principles of freedom and capitalism are incompatible with large standing armies. Therefore, America's security is anchored upon the power of ever-advancing technology.

America's technology is intended to shield our soldiers, sailors and airmen.

But that technology is acquired through a process based upon assumption that have long since irrevocably altered! While that defense industrial base was once robust enough to tolerate many failures, that circumstance no longer exists. Our defense industry is no longer based upon the entire vibrant American commercial industry, as it was in World War II. Instead, during the Cold War, the defense industry grew into an isolated one. While the pragmatic impact of this change may not have been noticeable when federal research dollars were large, that situation had begun to shift as early as the 1950's. America is now the only Western nation with an isolated (by regulation and practice) defense industry. The rest of the Western world has adopted different approaches which seek to better access the technologies being developed in the commercial industries and is accelerating ever faster away from the American defense acquisition model.

As more and more American research dollars chased commercially interesting ideas after World War II, talent followed the dollars and soon technology breakthroughs were primarily occurring in the commercial world. Unfortunately, and concurrently, technology migration across the commercial/military membrane became increasingly difficult with every successive change to the complex policy infrastructure (e.g. Defense Directives, Defense Instructions, Defense Federal Acquisition Regulations System).

While many insiders and outsiders recognize the problems in the defense industry milieu as well as in the acquisition process, and while there have been hundreds of studies seeking to improve the situation, the underlying dilemma, like an old dusty aircraft parked off the edge of an airport apron, has not shifted in its chocks for years. I have participated in several of these studies. I have watched knowledgeable people make excellent recommendations and good-meaning officials reject each and every change. Managers love the status quo, supervisors abhor change and there are a paucity of leaders. Instead there are busses packed with acquisition

officials and officers who have been doing round trips between Washington and "Abilene[41]" for years.

The situation continues to deteriorate. Making new rules and throwing money at the problem does not and will not address the issues. A cultural change is necessary.

I am convinced improvement cannot be achieved through incremental adjustments. Begin with a true cultural change involving management and talent:

First, implement the Goldwater-Nichols Act in a manner consistent with the intent of the Packard Commission, and second, hold the Service Chiefs accountable for the culture and quality in the acquisition force officer corps.

Let us do a quick review of the Goldwater-Nichols Act as it was intended to apply to acquisition. The Packard Commission study predated the Act and sought to solve the "$800 toilet seat problem." The intention was to restore public confidence in the Pentagon acquisition system. One of the Commission's key recommendations was to take acquisition responsibility away from the uniformed chiefs and appoint business people who would bring along with them the best practices from industry. These recommendations were implemented, along with larger "Joint" issues, by the Goldwater- Nichols Act in 1986.

However, there was a management problem with the acquisition aspects of the Act, and time has disclosed a significant practical flaw which has proved impossible to manage around. The management issue was that the manner in which the Services independently implemented the Act separated responsibility for the assessment and promotion of people in the acquisition system (which remained with the uniformed Chief of Service) from the responsibilities of acquisition (which passed to a civilian Undersecretary).

Separating these two functions was, of course, worse than quixotic, as any organization's success depends on the quality of the people. Without acquisition responsibility, the Service Chiefs, who are responsible to maintain, train and equip combat-ready forces capable of winning wars, naturally tended to lose focus on acquisition. Thirty years and two wars later, guess where Chiefs have funneled officer talent? Have they devoted talent towards the areas for which the Chiefs are personally responsible, or towards the one spot for which they are specifically not held accountable? The question is rhetorical.

In addition to the management flaw, there was a practical flaw in the Goldwater-Nichols Act. The inherent practical flaw in the process has nothing to do with the violation of basic organizational tenets, but rather is driven by the stresses of the political process. Examine the five key civilian political acquisition billets in the Department of Defense (the three Service Acquisition Executives, the Undersecretary for Acquisition and Logistics and his Deputy). I would wager that over the years since the Packard Commission, those five billets have been empty at least 30% of the time.

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[41] An ancient leadership case study where everyone makes the tiring, dusty trip to a location no one wishes to visit because each member of the group thinks the rest of the group wants to go.

It is difficult for an empty chair to even manage poorly.

Still worse, if a job were only considered "filled" when the appointed person met the intent of the Packard Commission ("top executive personnel with industrial and acquisition experience"), I believe objective observers would assess the fill rate as much, much lower than the Senate-confirmed rate. Not surprisingly, if you don't have knowledgeable leadership, the situation doesn't improve. It has not.

It is past time to face facts. While the Packard Commission had some grand ideas, this one has fallen flat. Republican and Democrat Administrations have had thirty years to make the Packard Commission concepts effective. They haven't. The construct, as implemented, simply doesn't work.

Fortunately, the current situation can be tweaked without unnecessarily disturbing the concepts of Goldwater-Nichols. The solution involves two steps, and neither involves rewriting DOD Instruction 5000.1 or 5000.2 again (the documents which guide the acquisition process). There is one way to do this which involves minimal change, will accomplish the intent of the Packard Commission, will maximize results and will introduce the cultural change now necessary.

The Service Acquisition Executive in each Service, currently a political billet, should instead become a senior (3 or 4-Star with proved acquisition experience) uniformed assignment. The individual assigned to this job would report to the Chief of his Service, the Secretary of the Service and the AT&L (and his assignment would be approved by all three) (note that many senior flags in the Services routinely report to several individuals). The AT&L and his Deputy would remain political appointees (reporting to the Secretary of Defense) with their current responsibilities so that the Secretary of Defense retains overall guidance control.

This again makes the Chief of each Service responsible for the acquisition process and the acquisition corps and leads into a second major change which is necessary. Every Service needs a culture change is necessary to obtain more officer talent for the acquisition corps.

The reason is simple. No one can predict the new problems that will arise as technologies, IT, transportation and other key industrial factors change – but we know change is inevitable. Good organizations adapt to change not by continually rewriting the rules, but by having good people think through the new facts. The acquisition system does not need new rules or more funds. Continually relying on new laws and rules is, to borrow a Midwestern expression, always shooting behind the rabbit. Our acquisition system needs more talent available to solve the inevitable challenges. We need to begin to lead the problems.

Leadership and talent drive accomplishments in all organizations. We should not treat acquisition differently. We need to give the acquisition corps members all the help we can. Their job is difficult. They are struggling with a 900 pound tar baby consisting of 800 pounds made up of people who don't understand technology but do know they don't like change, 90 pounds of people who well understand they are in the buggy whip business but enjoy the fruits of a currently protected industry and 10 pounds of niche-protected social programs.

This American tar baby has not gone away over the past decades and we should not expect him to magically disappear. Instead, we need men and women who are able to adapt and shape the American tar baby to the international environment. Therefore, the solution should be to focus on increasing the talent being applied to the acquisition process.

How to maximize people talent typically invokes two key questions -- what are the cultural barriers precluding talent development and how do we retain the talent. In other words, how do we attract and retain the people we need?

Attracting Talent

The cultural barriers in each Service are different. In looking at the difficulties experienced by Army procurement officers in Iraq, in 2007 the Gansler Commission identified a critical culture barrier in the Army as the fact that the Army did not permit officers to become acquisition officers until their seventh year of service after service in two different branches. To phrase this more clearly, to be considered for acquisition, an officer had to do poorly in two different Army branches and also have used more than a third of his professional career before he/she would be assigned.

This was a significant cultural detriment to attracting talent. Despite the Commission's identification of this challenge to the highest levels in the Army, its vestiges still remain today. A failure to correct this cultural problem is much more important than a thousand Congressional laws which attempt to fix some different aspect of defense acquisition.

Each of the Services has similar cultural barriers. These cultural barriers are more effective than any concertina wire in directing superior talent to Service roles other than acquisition; erection or disestablishment of these self-same barriers are completely within the purview of the uniformed officers of the Service.

Retaining Talent

Once the cultural barriers to accessing good talent are removed, there needs to be an impetus to change the environment in order to retain that talent. In the military there are many methods by which senior leaders show a change in emphasis, including publicity, the assignment of more flag and general officers, an increase in medals and awards, and bonuses.
The Army, Navy and Air Force Chiefs should use the same measures they currently use in their highest profile areas when they desire talent to voluntarily move. Establish retention bonuses for acquisition officers and/or establish an additional monthly payment for those individuals who have the qualifications desired. Money says "we care" much more than three dozen more hundred-page "reform reports" which will again not be adopted.

Last year the Air Force was currently paying $225K for pilots to reup for nine years, and the Navy has a similar program for pilots and submariners. What do we think is the most important job for the Navy and Air Force for the future – maintaining and improving flying skills, or bringing the F-35 into production and keeping the costs controlled in order to have funds to make the purchase of future air wings possible?

I close with the same sentiments that I opened. The current defense acquisition system does not work and cannot be repaired. It does not implement the findings of the Packard Commission nor common sense. There is nothing Congress can do to fix the defense acquisition process until the civilian oversight in the Department of Defense and the military in the services accept the need for change. John Kotter at Harvard maintains that cultural change is how you discriminate managers from leaders. Defense Acquisition is looking for a leader.

ADMIRAL GARY ROUGHEAD, USN (Ret.)
Annenberg Distinguished Visiting Fellow
Hoover Institution

Admiral Gary Roughead (USN Ret.), the Annenberg Distinguished Visiting Fellow at the Hoover Institution, graduated from the US Naval Academy in 1973. In September 2007, Admiral Roughead became the twenty-ninth chief of naval operations after holding six operational commands and is one of only two officers in the navy's history to have commanded both the Atlantic and Pacific Fleets.

Ashore he served as the commandant at the US Naval Academy, during which time he led the strategic planning effort that underpinned that institution's first capital campaign. He was also the navy's chief of legislative affairs, responsible for the Department of the Navy's interaction with Congress, and the deputy commander of the US Pacific Command during the massive relief effort following the 2004 tsunami in Southeast Asia and the Indian Ocean.

As chief of naval operations, Admiral Roughead successfully guided the navy through a challenging period of transition in fiscal, security, and personnel matters. He stabilized and accelerated ship and aircraft procurement plans, accelerated the navy's capability and capacity in ballistic missile defense and unmanned air and underwater systems, and directed the service's investigation of climate change and alternative energy. He reestablished the Fourth and Tenth Fleets to better focus on the Western Hemisphere and cyber operations, respectively. Admiral Roughead introduced bold programs to prepare for the primacy of information in warfare and the use of social media within the navy. He also led the navy through changes in law and personnel policy to draw more inclusively than ever on the navy's greatest strength, its sailors.

Admiral Roughead is the recipient of the Defense Distinguished Service Medal, Navy Distinguished Service Medal, Defense Superior Service Medal, Legion of Merit, Meritorious Service Medal, Navy Commendation Medal, Navy Achievement Medal, and various unit and service awards. He has also received awards from several foreign governments.

Views from Admiral Gary Roughead, USN (Ret.)

Thank you for the opportunity to offer my thoughts on defense acquisition reform. My relatively short time in retirement and recent involvement in the private sector (most not in the defense industry) have afforded an opportunity to reflect on and compare acquisition practices. I have long believed defining and buying that which we provide our young men and women to go into harm's way is very hard, and those who do the defining and buying are thoughtful, serious and committed people navigating an ever increasing bureaucratic and frustrating environment and process. In other words, good people doing the best they can in an increasingly bad process. Numerous studies, initiatives and reports over past decades have recommended changes and adjustments to the acquisition process. I am hopeful the results of your current work leads, not to adjustments, but rather to new fundamentals that will deliver the equipment and systems into the hands of those in uniform more rapidly, efficiently, and effectively.

Coming of age during the 1960's I was inspired and shaped by the spirit and commitment captured in President Kennedy's challenge of " landing a man on the moon and returning him safely to the earth" by the end of the decade. My conclusion today is that we are no longer a government of that bent because we have been neutered by process and generally blind to outcome. I say government and not country because it has been my good fortune to have spent most of my post retirement time in Silicon Valley where I have seen the spirit of innovation, acceptance of risk and the flexibility to achieve great things unleashed. It should not be inferred that I recommend lack of appropriate oversight and discipline, but the first principle of acquisition should be accountability, not process. Process and requirements are not a substitute for accountability and oversight. In our efforts to provide better, faster and cheaper systems we have continued to layer more layers of requirements on an already smothering pile. Adding more people to the acquisition bureaucracy is not a solution as that will add more process and requirements adding to the frustrations and inefficiency of procurement.

As most of my experience is in the requirements area I will begin there. The speed of technological development is affecting acquisition doubly. The rate of change in complexity and lethality is accelerating making it more challenging to outpace threats. At the same time, our ability to compile vast amounts of information gives us a false sense of oversight because we now "know more" and that information is more broadly available to more checkers. We have disproportionate oversight staff (uniformed, government civilian and contractor) as we continue to shrink our operational forces. In our effort to ensure joint compatibility we have increased the layers (and time) of process. As a Service Chief, my greatest frustration was to be briefed on an exquisite acquisition timeline (fully compliant with acquisition requirements) that delivered an initial operating capability more than a decade hence when the need was immediate. Or, seeing overmatching capabilities moving rapidly in our R&D organization knowing that when put into the acquisition system they would bog down in the process, that the intellectual catalyst of the principal investigator would have to be cast aside as the initiative was passed to a well-meaning program manager who would be held to account on process (not outcome), and when the time came to produce a first article it would then enter the byzantine testing process and community that was not connected to the requirement, risk or budget dynamic.

Requirements Process

JROC/JCIDS

The JROC and the JCIDS process do not deliver systems efficiently or effectively. They are not capable of delivering urgent needs, and the initiation to approval time of the JCIDS process for "routine" requirements was excessive to the point that we were falling further behind our potential adversaries in delivering systems. I recall the JCIDS process taking months and in one instance nearly two years for a C4I system. That represents a generation of innovation in that space. I recommend the Committee audit the past 3 years of JCIDS activity for processing time, numbers of checkers and the number and significance of changes to the initial document. I recommend the JCIDS process be rebuilt with time as a factor. That the JROC and the JCIDS have two time sensitive paths for urgent and routine needs. There also should be acceptance that all systems do not require a full joint review. Some do, and require a thorough (and prompt vetting), but more service specific programs should simply undergo a compatibility check.

Requirements Creep

I will address this more fully in the acquisition section, but Service Chiefs must have more formal authority in acquisition activity. Requirements, acquisition and budgeting are inextricably linked, yet the Service Chief, who is responsible for the requirement and budgeting, is not officially part of the changes that routinely take place in the acquisition process. Changes have effects on requirements and cost. More than informed, Service Chiefs must be part of that change process and have the authority to approve or reject changes for requirement or budget reasons. Accordingly, Service Chiefs must be held to account for changes to requirements. As part of the Congressional oversight process this could be a classified addendum to the posture statements that are submitted annually to the Armed Services and Defense Appropriation Sub-Committees.

Combatant Commanders

Combatant Commanders should identify needs that the Chairman and the Service Chiefs assess and deliver consistent with global utility and cost. I recommend giving SOCOM, STRATCOM and TRANSCOM more review insight for interoperability/compatibility reasons, but increasing the role of Combatant Commanders, who are not accountable for procurement budgets, will overdrive procurement budgets.

Rapid Acquisition

This is related to the need to recast the JCIDS process and to provide for fast tracking urgent needs. A particular service should be assigned the responsibility for producing the system or equipment that is needed urgently and held accountable for its delivery. The designation of the service could be the service that is most akin to the needed solution or the executive agent for the respective COCOM. A factor in going forward must be future maintainability and associated costs or the stipulation to sundown the program after a specified period of time. In such cases, it

will be easy to use proliferation and maintenance difficulty as a reason to not go forward. This can be adjudicated between the service and the Undersecretary for Acquisition.

Market Research and Small Business

There should be a common view within the Department of Defense of the health of the small business aspect of the industrial base. The Department should be proactive in addressing the need to maintain a robust cadre of second and third tier suppliers. At the same time, there should be a less onerous and time-consuming process for expediting small business innovations into trial use. At present, the process is so bureaucratically constraining and limiting that small, innovative companies are discouraged from participating in defense and government opportunities.

Configuration Steering Boards

Configuration steering boards need not be further regulated or directed. The services simply need to add discipline to focused, rigorous and timely reviews. Service Chiefs must be the ones accountable as they have determined the requirements and must be the final arbiter on the requirement/cost equation that is sure to be pressurized over time.

Managing Acquisition Trade Space

Empower and hold Service Chiefs accountable for end-to-end performance and discipline. The process begins with the Service Chief articulating the requirement, having to deal with requirement/cost tradeoffs and placing the capability in service. No other position spans that continuum. In support of that effort, the testing process and associated authority for adjustments and approval should reside with the DOD acquisition executive.

Acquisition Policy

Changes to statute, regulation and policy

Start over, and only issue general guidelines. The Defense Federal Acquisition Regulations Supplement is now well over 1,400 pages. Title 10, the Federal Acquisition Regulations and DOD Instruction 5000.02 are equally dense. The acquisition system created by these statutes, regulations and policies rivals the tax code in volume and complexity. We must not lose sight of the cumulative effect of this mass of regulations on the Department and industry. So much regulation and micromanagement has created a risk-averse culture more focused on complying with rules rather than delivering capability. Program managers are more likely to be criticized for procedural errors and delays than for shortcomings in a product. The amount of people in the process is proportional to the amount of regulation and related activity driven by those regulations. If we considered the cost of the acquisition force in the fully burdened cost of the product we would very likely find the acquisition workforce the most costly aspect of procurement. Moreover, this level of regulation is a barrier to doing business with the private sector. Innovative small businesses find it more practical to walk away from DOD than bear the costs to comply with these regulations and the excessive time to work through such a

lengthy obstacle course. Because of this self-created deterrent, DOD can't leverage the tremendous commercial investment in R&D and significant advances in dual use technology proliferating outside the defense sector. As a recent example, I am aware of new, more accurate, less costly medical technology being introduced in California and Arizona (and very relevant to DOD and VA health care needs) that is estimated to take years of DOD trial before being considered for procurement.

Chain of Command

Service Chiefs should participate formally in the acquisition process. Acquisition decisions should be co-signed by the Service Chief, again, to vest the Service Chief in the requirements/cost balancing and decision dynamic. Service Chiefs should sign off on the assignment of program managers and program managers should be accountable to the Service Chief. Service Chiefs should develop a career management and promotion strategy for program managers that allows for career progression with longer tenures with rotations based on appropriate program milestones, not current accepted tour length expectations.

Testing

Testing must be more integrated with the requirements, cost and fielding process and less adversarial. Less adversarial does not mean compromise. The testing process should innovate and streamline in the interest of rapidly delivering capability rather than always conforming to the established template. It must be more accommodating in allowing new systems to be used in appropriate operational environments to allow operators to assess performance and begin earlier operational innovation and integration. Build a little, test a little, learn a lot should be how we develop systems. We should be more precise and discriminating in our characterization of system performance and not let terms such as "ineffective" for lesser aspects of performance characterize an entire system.

Concurrency Risk

One size will not fit all and this difficult dynamic is complicated by our inability to rapidly develop and deploy systems that outpace adversaries. If we cannot overcome the process driven lengthening delays in system development and deployment we will only add to the concurrency. The use of competitive prototypes, for select systems and platforms, should be pursued. It is doubtful for the foreseeable future the budget environment will allow this approach for expensive aircraft. However, prototyping the Littoral Combat Ship where different designs led to complimentary capabilities was advantageous. Open architecture and flexibility in contracts that allow for introduction of new technology (especially information technology and communication systems) must be pursued as the rate of change in these areas dramatically outpaces our acquisition process. Extensive use of modeling and simulation can greatly enhance our decision-making in this area and should be expanded and accepted. That said, guarding against too much change and uncertainty would be the fine line that must be walked.

Risk Mitigation/Time

I would add 'warfighting' to the risk list of technological, integration and manufacturing risks with the focus on operational shortcomings in capability and capacity vis-a-vis likely adversaries. That will inevitably drive the entire acquisition process to address time to deployment as a critical factor. Weapon system development is about competition with likely adversaries. Yet there is minimal ongoing discussion, at a classified level, within the complete acquisition and oversight process as to whether or not we are winning. Discussion tends to center on program milestones and the risk of marks against the program because of program performance.

Life-cycle costs

Life-cycle costs must be in the mix early on and they cannot be assessed in isolation. The services and overseers must assess best estimates of life-cycle costs in the context of likely operational patterns, future budgets and the totality of future service force design. As manpower costs dominate, that should be the first to be assessed, and not just uniformed manpower but contractor support in minimally manned concepts. Recent experience is replete with examples of minimal manning dependent on contractor support that masks real operating costs and which have the potential to grow with little control. Again, this is where the Service Chief must be the arbiter as it is the Service Chief alone who has the best view and is accountable for manning, training and equipping.

MS. KATHERINE SCHINASI
Independent Advisor

Ms. Schinasi retired as a Managing Director from the Government Accounting Office. Her portfolio included operations in the Departments of Defense, State, and Homeland Security, and government-wide acquisition issues. Her teams were responsible for recommendations that led to billions of dollars in savings and improved government operations. In 2009, Ms. Schinasi was appointed by the Senate Majority Leader as a Commissioner on the legislatively constituted Commission on Wartime Contracting where she led development of the Commission's interim and final reports. In both positions, she testified frequently before Congressional committees and lectured at the Defense Acquisition University, the Industrial College of the Armed Forces and the Naval Postgraduate School. As a senior advisor at The Conference Board in New York, she co-edited "The Linked World: How Information and Communications Technologies are Transforming Societies, Cultures, and Economies." Ms. Schinasi currently serves as a Board Member and Program Chair at the Rock Creek Conservancy in Washington, DC.

Views from Ms. Katherine Schinasi

The Department of Defense (DOD) develops and acquires weapon systems and many services under a system that is universally recognized to deliver less, late and at a higher cost than it should. Yet, despite such recognition, the billions of dollars of waste and continually broken promises to deliver capability to the warfighters continue to be accepted.

The acquisition system is nominally established in myriad laws, regulations, and policies. The defense acquisition culture is made up of hundreds of practices at all levels in the military services and Defense Department; aided and abetted by Congressional actions. The reality is that most decisions affecting acquisition outcomes occur outside of the formal, stated process; it is mostly the set of informal rules that actually drive decisions and enable costly practices. Hence, even after formal laws, regulations and policies are rewritten, nothing much seems to change.

Experts have studied the problems and recommended changes. Many, many times. Some changes have been put into law. They have improved the problems to which they were targeted with only some level of success. Other changes have been made through regulation. For the most part, those have been less successful. Changes attempted through policy pronouncements have rarely made a difference.

The problem is not how decisions get made—the Department is overburdened with systems and processes and policies and regulations. The problem is the decisions themselves. Incentives must be restructured to support the *delivery* of goods and services to the warfighter at *value* for the taxpayer.

Changing cultural incentives depends on recognizing, and addressing the underlying causes of costly decisions. These changes can and should be supported by the leadership in the acquisition system, including the Congress. But, just as importantly, changes can also come from those working in the system day-to-day.

Defining Success

The major public players in the acquisition system—the military services, the Department of Defense, and the Congress—use the same language but do not share the same goals nor the same definition of success for acquiring military goods and services. "Ensuring national security," "eliminating risk," and "meeting needs" are frequently used terms in the conversations that take place within the military services and Office of the Secretary in developing budget requests. And, as importantly, they also provide the stated basis for funding and oversight by Congressional committees. Annual hearings focus on whether programs enumerated in budgets submitted by an Administration are sufficient to protect national security, eliminate risk, and meet the needs of the military.

But these questions produce a false justification for funding because risk can never be eliminated nor national security totally protected no matter what the resource investment. And in deciding what constitutes meeting a need, the conversations rarely recognize the difference

between needs and wants, nor even that a difference exists. Because of incentives built into the acquisition system, which includes the way requirements are established and funds allocated in addition to the execution of individual programs, only a request that promises the gee whiz bang, often gold-plated, option is likely to get support. Not surprisingly, all programs are designed to promise the best-- delivering high performance at low cost on schedules based in hope, not knowledge. The system does not adequately prioritize needs from a joint, department-wide perspective, respond to changing warfighter demands, or constrain the number of programs to a level that is supportable by realistic estimates of overall resources. In fact, incremental, affordable improvements in warfighting capacity would yield better outcomes.[42]

These questions support a culture in which no amount of resources is ever enough. Rarely is the question asked "How much value are you getting for the money you spend?" a measure that focuses on the outcome. Establishing measurable outcomes is the first step in accountability and can be used as a basis for deciding between competing demands. Yet, accountability in the acquisition culture is measured by inputs, never by outcomes.

Underneath the stated conversation, the different players define success and failure differently. In Congress, the *business* of warfighting, i.e. where the dollars are spent, takes precedence as a measure of success. In the military, where warfighting takes precedence, the *business* of spending money is relegated to a marginal operation. In the Congress, failure is defined as the inability to maintain or increase district-based funding. In the military, failure is defined as losing out to competing programs or services in the fight for attracting funds. In neither case does capability delivered to the warfighter nor value for money—both outcome focused-- become the measure of success. Programs that are years late and starve other military priorities of resources are not seen as failures as demonstrated by the lack of real change in the acquisition system.

Unless and until the definition of success and recognition of failure is established and agreed to, leaders will not be able to establish metrics, align rewards and allocate management attention and resources to get more value for resource commitments.

Establish a measure of value for acquisition outcomes that can be used across programs and use that measure to condition resource investments.

The Politics of Acquisition

Fights over the military's acquisition budgets are rarely partisan, but are highly parochial. Staged within the context described above, realistic assessments are few and far between and national security becomes only the nominal justification for requests and subsequent appropriations. Battles take place on a continuous basis, within the Department as well as within the Congress.

The Army's pursuit of an artillery replacement illustrates the responsibility for poor outcomes played by (1) unrealistic expectations in a military department's requirements

[42] The U.S. Government Accountability Office has detailed the steps necessary for this approach to be successful (www.gao.gov) and defense authorization bills over the last decade have put some of these steps into law.

community, i.e. the difference between a wants and need, (2) the fighting between a military service and the Office of the Secretary of Defense, which lack a common goal, and (3) Congressional intervention when the distribution of dollars matters more than the value of dollars spent. Although this program resided in the Army, the general approach and outcome applies to several of the Navy's shipbuilding programs, many elements of missile defense, and key Air Force fighter aircraft programs, among others.

The Army artillery school is located in Ft. Sill Oklahoma. Requirements developed in the early 1990's for a new self-propelled artillery piece resulted in a design for a heavily armored vehicle, which was to be paired with an automatic loader, and known as the Crusader. These requirements were iron-clad, that is, all were needed and none of them could be traded off. The Army proposed building the production factory for the new system in Oklahoma. When the Army subsequently developed the Future Combat System concept it limited all weights for newly developed vehicles to 19 tons to allow them to be air transported and dropped into combat. Not surprisingly, in order to keep the Crusader program alive the previously iron clad artillery piece requirements dropped away and its weight was reduced. The Secretary of Defense finally cancelled the Crusader program due to its cost and other problems.

The Army next proposed to develop and produce a new howitzer, again in Oklahoma. In order to prevent a Crusader-like cancellation, the Congressional Oklahoma sponsors succeeded in giving the newly envisioned non-line-of-sight cannon a separate budget line. Neither the Army nor the Defense Secretary could make cuts to fund higher priority programs without significant scrutiny. But the cannon program was cancelled as well. Cost again was a factor.

Nearly two decades and tens of billions of dollars later, the Army still has not successfully executed this program. And some in the Congress are still pushing in the same direction. The national security imperative could not have been that important if a decade and a billion dollars on, the Army still has not modernized its equipment. In one sense, this program is a success. It was cancelled relatively early. Most programs currently under development have seen significant cost increases, schedule delays, and unproven technologies, which would have been anticipated under a more honest approval and allocation system.

Requirement process reforms that attempt to move from wants to needs to priorities have failed because they have not integrated resource constraints early enough. And, as programs try to make up from unrealistic beginnings in their execution, problems are compounded. The spillover is damaging as well-run programs are made to pay for others failures.

Numerous examples of allocating resources through debate by legislative district can be found in every budget cycle. And when new programs come with promises of new plant and equipment, the ever expanding industrial base becomes less and less productive.

Subject budget deliberations to greater transparency.

The Business of Acquisition

Any large, successful company understands that inputs are critical to successful product and service outcomes. Technology development, talent, and the supply chain are all tightly managed elements of good business. Disciplined adherence to strategic investment decisions and managing budgetary constraints ensure that adjustments are made when needed.

For defense acquisitions, few of the elements of good business practices are in place. Acquisition-related business operations are not an important mission within the Defense Department. And it shows.

Technology Development

An analysis of the research, development, test, and evaluation accounts shows that most money typically goes to a few large programs which, because they were poorly planned and poorly executed, have significant cost overruns in development. Little money is left to advance technologies. Technology advances are necessary and high risk. Failures in technology research programs are to be expected and are orders of magnitude cheaper than failures once programs have gone into development or even, as is often the case with DOD programs, into production. The highest risk efforts should be carried out in the lowest cost environments.

Establish stable baselines for research and develop accountability measures that include the certainty of failures.

Talent

The acquisition process depends on DOD's civilian and military employees. Although often performing the same functions, each group is trained differently, evaluated differently, and rewarded differently.

Because of its second class status, the acquisition function is poorly positioned to attract and develop talent. An operational commander does not make good business decisions. He was not trained to do so nor is he rewarded. Military advancement depends on frequent rotations; sound program management and accountability relies on continuity. A large civilian workforce is more stable but is trained to follow rules and regulations that can be an impediment to acquisition outcomes. Operational commanders typically override civilian professionals, especially in the field.[43] Frustration within the system is frequent and workarounds are standard operating practice.

A significant mismatch exists during the life cycle of a typical program with multiple leadership changes in program managers, program executive officers, service acquisition executives, defense acquisition executives, Chairmen of the Joint Chiefs of Staff, Secretaries of

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[43] See reports and hearings from the Commission on Wartime Contracting in Iraq and Afghanistan for a more detailed discussion of the interaction of military commanders, civilian acquisition professionals, and contractors at www.commissiononwartimecontracting.gov

Defense, and Presidents. Likewise, goals and objectives that change as leadership changes disrupt well run programs to pay for poor performers and pet projects.

In recent years, with expanded military operations, the Department has turned to a contractor workforce to perform many of its acquisition functions. These decisions have been driven by the desire for quicker hiring time frames and the ability to get around civilian staffing limits. However, hiring contractors without putting government management and oversight in place has had costly outcomes, especially in war zones.

Even when talent is present, military departments have cultures, goals and objectives that work against collaborative operations on DOD's business side. Efforts to give the Joint Chiefs more authority in reconciling competing and often conflicting objectives have been attempted through structural reorganizations but often arrive at the least common denominator—almost all proposals are approved-- and do not tie resources to decisions. Offices set up to focus on joint capabilities have not been adequately staffed or resourced as the individual military services retain most of the analytical capacity needed to develop requirements. The Office of the Secretary of Defense, the ostensible integrator, has neither the expertise nor the authority to do much except on the margin. Efforts to focus more attention on acquisition management issues in the Secretary's office have failed.

Reforms of the acquisition system are often focused on a narrowly defined acquisition workforce. Numerous efforts have been made to shore up the skills and accountability of these groups. Yet, DOD does not recognize the responsibility of the larger workforce in achieving key acquisition outcomes. It lacks key pieces of information that limit its ability to determine gaps including the skills of those of its in-house personnel. Not having this data skews analyses of workforce gaps, but also limits whether the total acquisition workforce—in-house and contractor personnel—is sufficient to accomplish its mission. In comparison with DOD's practices, leading organizations—where cost matters-- recognize the acquisition portion of their workforce as critical to achieving the mission of the organization and develop programs accordingly.

Changes proposed at the tactical level, which enhance talent inside programs must be accompanied by changes at the strategic level, that is in creating a support structure within which that talent can be used effectively. A critical mass of officers and executives needs to exist so that good decisions are to be recognized and rewarded and poor decisions are to be exposed and used for learning. If the military compensation and promotion system does not allow military officers to play the role of a business executive, and cannot be changed to accommodate measures to attract, reward, and retain talent, then the role, authority and responsibility for acquisition outcomes should be turned over to a civilian organization.

Make acquisition a joint function and raise its profile within the bureaucracy. Find those in the acquisition system who make good decisions and give them more authority.

Supply Chain

The impact of relegating acquisition to secondary mission status is also seen in its poor management of contractors, a condition that has become more and more costly as DOD has become more and more reliant on contractors.

Contracting out the development and production of major acquisitions and services can make sense. But, contracting out does not relieve the Department of the accountability and responsibility of ensuring that it retains critical functions, one of which is effectively managing its contractor base.

Government and contractor objectives do not always align, yet the Department has paid little attention to determining where common objectives exist and where they diverge. DOD's management structure tends to be reactive. Incentives and controls—and their enforcement--must be part of good management practice. Too few of DOD's leaders understand and are committed to this. A lack of sound business practices—poorly defined requirements, inadequate competition, inadequate monitoring of contractor performance, and inappropriate uses of other agencies' contracts and contracting services—exposes DOD to unnecessary risk and wastes resources.

The absence of well- defined requirements and clearly understood objectives are not translated into a contract's terms and conditions and complicate efforts to hold DOD and contractors accountable for poor service acquisition outcomes. Companies with contracts across multiple programs are better equipped to manage DOD than to be managed. Negotiating and monitoring contractor performance across programs would help ensure DOD receives the goods and services it pays for. Here, as is elsewhere in the acquisition system, the Department does not take advantage of the power it would get from knowledge and decision-making across programs and military departments.

Require all in DOD who work with contractors to learn what motivates company behaviors and negotiate accordingly. Establish a central facility to monitor company performance across all Department programs.

Investment decisions and budgetary constraints

Annual budgets stand in for investment strategies in the Department. Despite extensive study and analyses of threats and development of alternative military scenarios, top line budgets are allocated according to rough percentages for each military service. And failing programs are often rewarded with more funding as the spending is justified because so much has already been spent. No well-run business operates in this fashion.

The Congressional appropriations process is not apt to change. Well-reasoned proposals, for example creating capital accounts for long term weapon system development or moving toward biannual funding, have not gotten any serious hearing. It is important, however, to recognize the cost. Maintaining an annual appropriations process supports short-term competition with long term deleterious efforts. It ensures that proponents of one program or

another have the opportunity to forcefully make their case to the Congress every year. Such arguments, made in the context of the political environment discussed above, have little to do with supporting effective acquisition program management or meeting national security needs.

The term affordable also has no meaning in the lexicon of defense spending. When viewed individually and with so many unknowns always pushing cost to the future, it appears that everything can be afforded. Cost overruns in individual programs are predictable and accepted. Budgets only appear constrained, as is evidenced whenever the estimated cost of individual programs is added up and clearly exceeds the resources that will be available. Competition, which should be a healthy process, becomes destructive when incentives are not set to reward honest predictions. Many reform efforts, imposed on top of the existing system have failed because of the ability to "game the system." For example, multi-year procurements—a proven efficient funding process outside of DOD—have rightly come under attack because the Department has been fast and loose in trying to bring programs under multi-year processes that do not meet stated criteria.

It may be possible to install effective reforms in the Department that work within the annual cycle. The Comptroller does not now play a role in assessing resource needs. Maybe it could. Individual military services operate at too narrow a level to represent Department-wide acquisition priorities; the joint operational structure that was put in place with the Goldwater-Nichols legislation would work well on the resources side. More recent programs have shown more promising outcomes, in part because of an interest in getting new capability on the battlefield to support ongoing operations. Focusing on the outcome works its way back into the acquisition process and leads to more accurate assessments.

Support and fund only those programs which are developed in a joint context, present realistic resource estimates for development, production, and operations, supported by a balanced appropriations process.

Moving Forward

Loss of capability is a gradual process. The Department's failures in acquiring promised capability as promised are long-standing. The discipline that might have been imposed during the "peace dividend" years of reduced defense budgets did not bring much change. The opportunities to experiment with more cost effective approaches to achieving military capability during the years when defense budgets were flush did not bring much change. And the years of intense military conflict, in which equipment deliveries really mattered, did not result in the widespread and structural changes needed to carry the Department into the future.

The focus of reform has been on the Department's major system acquisitions because of the huge costs associated with them. But, changing the culture can start at any level. Supporting an effectively designed and managed program, no matter its size, can provide a beginning. But, to be effective, support must continue over a period of years, be allowed to fail when even best efforts are not enough, and be rewarded for success.

DOD leadership, with Congressional support, is critical for translating lessons learned into policy and, most importantly, effective frontline practices. It is the people and practices within the Department itself upon which change hinges. The changes necessary are not partisan but based in sound business practices. Political, but not parochial. The military system of advancement depends upon frequent rotations, which work against getting substantive changes embedded in decision making. Civilian leadership turns over with every election. Individual House members focus on the short term to optimize two-year agendas. And House committees' stability varies over time. The Senate Authorization committees development of an almost continual series of mandated reforms has shown some positive, incremental results. But, for those optimists among us, more dramatic change is also possible.

A strong military is one of the best guarantees against not having to use it. But, the measure of military capability is not the amount of resources put in, but the value and quality of what comes out of the defense acquisition process.

Frontline practices need to change that result in:

- an investment strategy that prioritizes warfighter derived requirements by budgets to answer the questions **what is the next best investment?**
- a case for each proposed program coming out of the technical base that matches jointly vetted requirements with available time, technology, talent and money to answer the question **is there a predictable outcome?**
- a program execution plan that is focused on product delivery to answer the question **when will we get capability to the warfighter?**
- supported by a robust technology process and talented individuals who are rewarded for success.

Micromanagement has not brought success and will not as long as advocacy is combined with the responsibility for execution. Goals must be agreed upon and failures accepted with the resulting learning taken back into the system.

GENERAL NORTON A. SCHWARTZ, USAF (Ret.)
President & Chief Executive Officer
Business Executives for National Security

General Norty Schwartz became President and CEO of BENS on July 22, 2013. Previously, General Schwartz served as the 19th Chief of Staff of the U.S. Air Force, retiring from military service in October 2012. As Chief, he served as the senior uniformed Air Force officer responsible for the organization, training and equipping of 680,000 active-duty, Guard, Reserve and civilian forces serving in the United States and overseas. As a member of the Joint Chiefs of Staff, the general and other service chiefs functioned as military advisers to the Secretary of Defense, National Security Council and the President.
General Schwartz has served as Commander of the Special Operations Command-Pacific, as well as Alaskan Command, Alaskan North American Aerospace Defense Command Region, and the 11th Air Force. Prior to assuming his position as Chief of Staff, General Schwartz was Commander, U.S. Transportation Command and served as the single manager for global air, land and sea transportation for the Department of Defense.

He is a command pilot with more than 4,400 flying hours in a variety of aircraft. He participated as a crewmember in the 1975 airlift evacuation of Saigon, and in 1991 served as Chief of Staff of the Joint Special Operations Task Force for Northern Iraq in operations Desert Shield and Desert Storm. In 1997, he led the Joint Task Force that prepared for the noncombatant evacuation of U.S. citizens in Cambodia. General Schwartz graduated from the U.S. Air Force Academy, Colorado Springs, CO in 1973 with a Bachelor's degree in political science and international affairs; and Central Michigan University, Mount Pleasant, MI with a Master's degree in Business Administration. He is an alumnus of the Armed Forces Staff College, Norfolk, VA and the National War College, Fort Lesley J. McNair, Washington, DC; a member of the Council on Foreign Relations; and a 1994 Fellow of Massachusetts Institute of Technology's Seminar XXI, Cambridge.

He and his wife Suzie reside in Arlington, VA.

Views from General Norton A. Schwartz, USAF (Ret.)

Culture and Accountability

SITUATION

Today, the government too often finds itself with minimally experienced and transient individuals leading major acquisition programs, able to attract new people only after long delays, unable to couple rewards to performance, and with many senior positions simply unoccupied. Talented and dedicated people can often overcome a poor organizational structure, but the opposite is never true. When qualified people are combined with sound organizations and practices, success is virtually assured. The workforce acquisition process, unlike most government pursuits, is a business function. It demands skills and talents that are far more common to the business world than to government and military operations.

The role and perception of talent acquisition in business is changing. Companies recognize that because technology, resources, capital and processes have become global, their only sustainable advantage is their people. As a result, the talent acquisition function has been elevated to a Board-level position that is viewed as central to a company's success.

Today's defense acquisition workforce is in many areas highly competent, but it is understaffed in comparison to its workload. It is also organizationally misaligned to permit it to feel appreciated as a professional component, and it faces an unprecedented loss of expertise due to aging and the pull of private sector opportunities. Thus, fixing workforce problems is a leadership issue far more than it is a process issue.

BACKGROUND

The Policy Guidance Council (PGC) operated under the auspices of the then Under Secretary for Defense for Acquisition in the late 1980's. The PGC reviewed what was being taught to the workforce and provided the Defense Systems Management College (DSMC) Commandant guidance and direction to change/update course content as necessary. PGC membership commanded the attention of DOD's highest acquisition enterprise leaders. Those legally charged with overseeing the DOD acquisition workforce—the Defense Acquisition Executive, Service Acquisition Executives and Service senior acquisition leaders—regularly engaged in this important activity.

When Congress passed the Defense Acquisition Workforce Improvement Act (DAWIA) in November 1990, the PGC was discontinued. DAWIA specified training and certification for certified acquisition workers, but not for the breadth of the workforce that today is considered as part of the overall acquisition workforce cohort.

The GAO contends that much of the authority agency leaders need to manage human capital strategically is already available under current laws and regulations. However, they point out that implementation requires sustained and inspired efforts by many parties, including the President, department and agency leaders, the Office of Management and Budget, the Office of

Personnel Management, Congress, and others. Engaged leadership is the overriding key to success, and that includes Congressional leadership. No small challenge.

DISCUSSION

Congress and the Defense Department need to collaborate to streamline the hiring and rewarding of key acquisition personnel, including providing appropriate compensation and other forms of incentives. Authority to quickly employ qualified individuals as well as to dismiss individuals who are not performing in their assigned responsibilities should be vested in the Secretary of Defense. While the intent of government ethics regulations is to be applauded, those aspects that unduly discourage individuals from accepting government employment (extensive paperwork, financial burdens, redundant security clearance processes) should be reevaluated as to their necessity.

With respect to conflict-of-interest and ethics rules that apply to potential appointees and senior officials, no fewer than 79 provisions in law limit, dissuade or otherwise constrain such workers from accepting or continuing service.[44] The Federal application for politically appointed positions currently runs to over 60 pages. Granted this illustrates the best of intentions, but this is absurd. It drives away significant numbers of talented, public-spirited people.

The challenge of removing disincentives to acquisition-workforce excellence also faces the whole of Federal government human-capital management. Indeed, over the years, the Government Accountability Office (GAO) has put a great deal of effort into assessing best practices in the field of human capital management. To create incentives in the working population to seek federal employment, the GAO urges that government managers adopt the same organizational concepts that private-sector managers use: become less hierarchical, process-oriented, stove-piped, and inwardly focused; and more flat, results-oriented, integrated, and externally focused. The major problem is not unmotivated Federal employees but rather the lack of a consistent strategic approach to marshaling, managing, and maintaining the human capital needed to maximize government performance and ensure its accountability.

Combining incremental legislative reforms to the hiring process with relief from the onerous disclosure, divestment and potential conflict-of-interest provisions that prevail, would improve the overall hiring climate for the Department.

Turning to the issue of program management itself, the Packard Commission, which presaged the Goldwater-Nichols reforms of 1986, envisioned streamlined chains of command and gave greater management control to program managers. The actual legislation, however, did not follow through on those principles. Instead, it stripped the Service Chiefs from the acquisition chain-of-responsibility by creating a Defense Acquisition Executive-Service Acquisition Executive-Program Executive Officer-Project Manager reporting line. While Goldwater-Nichols did embed the concept of "jointness" in the acquisition system—since

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[44] Compilation of Federal Ethics Laws, Office of Government Ethics, December 31, 2008. Available at http://www.usoge.gov/laws_regs/compilation.aspx

reinforced by the evolution of the JCIDS and JROC processes—it has had over time the deleterious effect of damping the career progression paths for officers in PEO and PM positions within their own services.

While 4 years is the regulatory requirement for time-in-position for Program Managers,[45] many seek to limit their tenure to minimum time-in-service using waivers and exceptions, averaging only some 17 months in position before moving back into operational jobs.[46] An additional consequence is that the acquisition career field is not viewed as a profession in the same sense as are operational billets.

Program Managers are the heart of the defense acquisition process and should be granted commensurate authority. They should be required to have corresponding training and experience. Career paths should be established that permit program managers and other key personnel to remain in their positions at least from one major milestone to the succeeding major milestone. Service in the acquisition process must not damage a military career.

One must also recognize the need and flexibility that a contract workforce offers the Defense Department and national security. Contractors have been a part of our national defense team from our founding, and with good reason. In addition to serious consideration of what skill sets and capabilities need to be brought in house to ensure inherently governmental work is being conducted by the government, it is equally imperative that the legitimate roles and capabilities of a contract workforce be preserved.

RECOMMENDATIONS

To reestablish the defense acquisition workforce to excellence above all, the right people are needed. There are many good people in the system, but that does not make them the right people. In optimizing the management of relevant skill sets, the flexible, innovative, cost-effective workforce needed for the 21st century can emerge. It cannot occur on the quick or the cheap, and could take a decade to restore. The bottom line for the acquisition enterprise is to recognize and reconstitute a professional acquisition workforce working side-by-side with its contractor support—and, most importantly, its operational counterparts.

Restoring vigor and flexibility to a recapitalized acquisition workforce requires Congress establish its expectations for the acquisition system and through legislation ensure that the Service Chiefs are assigned responsibility for establishing, managing and maintaining a highly competent acquisition workforce, including education, training, career path development and succession planning—the latter is rarely done today in any institutional fashion. Appropriate staffing standards should be created for all critical positions.

Further, once the defense acquisition workforce is properly delineated, the Secretary of Defense should resurrect, in concept, the Policy Guidance Council to review the training and certification provided by the defense Systems Management College to the acquisition community.

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[45] Title 10, USC, Sect. 1734, subject to certain waivers and exceptions.
[46] Defense Acquisitions: Assessments of Selected Weapon Programs, GAO-08-467SP, March 2008, p. 29.

Congress should consider revising the Goldwater-Nichols legislation so that the PEO and PMs revert to the reporting chain-of-responsibility under their respective Service Chief.[47] This move would reconsolidate the Service Chiefs' control over both resource allocation (which they already possess) and the acquisition processes, help to re-establish a more attractive career progression path for officers in the acquisition career field, and go a long way toward restoring the professionalism of the career field, putting it on par with the operational side of the Service.

Congress needs to work with all involved parties to identify comprehensive legislative reforms in the human capital area. These reforms should emphasize the assessment of skills, knowledge, and performance in connection with Federal employment and compensation decisions, rather than non-competitive General Schedule "step" increases and inflation adjustments, as is often the case today. Policymakers should pursue legislative reforms to give agencies additional flexibility to hire, manage, and retain the human capital they need, particularly in critical occupations.

Requirements Process: The Stakeholders' Roles in Cost, Schedule and Performance Trades

SITUATION

Today's requirements process is a highly formalized pursuit driven by the perceived needs of war fighters and accommodated by engineers in which the suppliers of financial resources are, at best, occasionally consulted. It needs to become an iterative process involving war fighters who understand the nature of combat, engineers who understand the limits of technology, and financial experts who can accurately estimate costs and assess consequences for future budget scenarios.

A more agile and efficient requirements-determination process would:

- Eliminate resources-requirements-producibility mismatches earlier than in today's system;
- Strengthen relationships between strategy and requirements determination;
- Clarify roles for all stakeholders in the requirements generation, acquisition and programming processes; and,
- Provide early validation of technical maturity and industrial base capability.

BACKGROUND

Today's acquisition process is largely divorced from the security strategy it should be designed to execute. A concurrent problem is that the strategy process itself, a White House-driven interagency effort by definition and law, is prone to overemphasize ends, while leaving ways and means to an entirely separate Defense Department process called the Planning, Programming, Budgeting and Execution System (PPBES).

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[47] The Beyond Goldwater-Nichols series of reports go further, also recommending that the SAEs report to the Service Secretaries vice the DAE (that is, the USD(AT&L)). See *Beyond Goldwater-Nichols: US Government & Defense Reform for a New Strategic Era*, Phase 2 Report, July 2005, pp. 96-7.

Similarly, the elements of strategic discourse, including the Congressionally-directed Quadrennial Defense Review (QDR) and the President's *National Security Strategy* (NSS), DOD's *National Defense Strategy* (NDS) and *National Military Strategy* (NMS), occur on a timetable that is out of sequence with the cycle of the PPBES process. This lack of order yields an incoherent method of aligning ends and means, and leads to an array of counterproductive consequences. If any major private corporation tried to run its affairs in such a manner, it would likely go broke.

The Defense Department needs the equivalent of a business plan that connects strategy to resources. The Defense Science Board echoes that conclusion[48], and a Center for Strategic and International Studies (CSIS) series of reports offers a guide to remedying the strategy/resources imbalance.[49] The reports suggest improving on capabilities-based planning approaches to properly link desired ends to ways and means. They also urge establishing a routine governance tempo inside the Pentagon "that makes use of some unchangeable elements of the American political landscape, namely quadrennial presidential elections and annual federal budgeting" as a way to achieve stakeholder consensus.

DISCUSSION

The roles of the major stakeholders in the requirements generation process are not clear. A better balance needs to be struck between determination of short-term requirements where the Combatant Commander's (COCOM's) views are preeminent and the long-term force-shaping developments, which can be done most responsibly by those with enduring institutional responsibilities: the Service Chiefs.

COCOM participation may contribute to accurate assessment of the threat cycle, contributions to joint warfare capabilities, and, to a lesser extent, bring strategy into account (although different COCOMs have different strategic imperatives). However, too many of the considerations needed to bridge disconnects in the requirements generation process, as it exists today, and the rest of the acquisition system are left unresolved if the only change is to give added weight to the COCOMs viewpoints.

It may be advisable to modify the 1986 Goldwater-Nichols legislation to qualify the current role of the COCOMs in determining requirements. The modification should assign responsibility for near-term needs to the COCOMs and for long-term, sustaining needs to the Service Chiefs (and Defense Agencies, as appropriate). In each case the "other" party should provide input but not have primary responsibility for the preparation of requirements. In either case, it should be the responsibility of the lead organization to assure operational compatibility among the Services for all joint items, working through the joint requirements organizations.

Many considerations—and resulting outcomes—are set in motion by the dictate of time from drawing board to field. For example, an urgent need would more likely be identified by the COCOMs in response to an existing threat. That may lead in turn to an analysis of alternatives that includes only existing off-the-shelf technologies, adaptations of current designs or even pre-

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[48] Creating a DOD Strategic Acquisition Platform, Defense Science Board, April 2009.
[49] "Invigorating Defense Governance," *A Beyond Goldwater-Nichols Phase 4 Report*, CSIS, March 2008.

militarized commercial solutions. By contrast, the threat-response cycle (defined as the time it would take a competitor to develop a future capability, us to recognize it, and then develop a suitable countermeasure) may be long enough to allow immature technologies to be brought along or even non-material solutions—changes to strategy or diplomatic solutions—to be considered.

The main obstacle to making realistic trade-offs on cost, schedule and performance as requirements emerge and are turned into programs is that the three parts of the DOD decision support system—JCIDS, the Defense Acquisition System, and PPBES—run along tangential paths. They touch, but are not linked in a way that enables informed determinations on what ought to be acquired, how many and when. These determinants include: resource availability, producibility, technical capacity, the threat-response cycle (agility), strategic relevance, and contribution to joint-warfare capabilities.

Failure to consider each of these determinants results in an incoherent and insufficient requirements-setting process that ultimately steers the course of the entire DOD acquisition process. Establishing closer formal linkages among stakeholders early in the cycle would enhance the system's ability to make trade-offs so that the Initial Capabilities Document (ICD) will be resource-constrained, within likely technical capabilities, and reasonably time-certain on its development schedule from the start.

Today's system is not geared to time velocity. Getting through the JROC process alone often takes twelve months, sometimes considerably longer. Consequently, many *ad hoc* processes, such as the Rapid Equipping Force and the Joint Improvised Explosive Device Defeat Office (JIEDDO) have evolved as workarounds.

RECOMMENDATIONS

The JCIDS process recognizes the COCOMs responsibility to lead or support "Senior Warfighting Forums" to identify capabilities, advocate and prioritize those needs through their Integrated Priority Lists (IPLs), i.e., their "want" lists, and act as advocates and advisors to the JROC.[50] Nonetheless, there has not been an institutional home in the Defense Department for today's war fighter. <u>The COCOMs should be given a statutory role in determining short-term requirements. The Service Vice Chiefs should remain voting members of the JROC and, at the same time, the Service Chiefs' and Defense Agencies' roles in force-shaping should be elevated, in law if necessary.</u>

To ensure that early consideration of resource availability, producibility, technical capacity, and the threat-response cycle (by which is meant agility) become part of the requirements determination process, the stewards of these determinants—namely the USD(AT&L)/DDRE, the Director of CAPE, and the Comptroller—must be involved in the establishment of requirements before the Milestone A (Material Solutions Analysis Phase) marker.

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[50] Chairman of the Joint Chiefs of Staff Instruction, CJCSI 3170.01G, Joint Capabilities Integration and Development System, 1 March 2009, C-3.

Another key to improving agility is to make explicit the consideration of time-value in fielding capabilities as a prelude to defining requirements. When the objective is to field capabilities quickly, meeting time constraints would seem most crucial to the post-technology development (Milestone A-B) phase of the acquisition process. However, to really improve agility the consideration of time as a key performance parameter must be considered much earlier—before a capability need enters into the requirements determination process.

If "need by" time considerations were realistic and made more specific, considering the threat-response cycle, at the very beginning of the requirements determination process, not only would more time-certain development targets be possible, but the bureaucracy itself would respond by moving the requirements generation process along more aggressively.

There is enough flexibility in the Pentagon's 5000-series acquisition documents to operate acquisition processes of varying threat-response cycles simultaneously. The deterrent to doing so is the culture and organizational arrangements that make the bureaucracy slaves to process. Regulatory bodies make for less time working and more time reporting. The oversight layers in the Defense Department need to be reduced and a truly complementary oversight role performed by the Congress and related entities.

THE HONORABLE SEAN J. STACKLEY

Assistant Secretary of the Navy (Research, Development and Acquisition)
United States Navy

Sean J. Stackley assumed the duties of assistant secretary of the Navy (ASN) (Research, Development & Acquisition (RDA)) following his confirmation by the Senate in July 2008. As the Navy's acquisition executive, Mr. Stackley is responsible for the research, development and acquisition of Navy and Marine Corps platforms and warfare systems which includes oversight of more than 100,000 people and an annual budget in excess of $50 billion.

Prior to his appointment to ASN (RDA), Mr. Stackley served as a professional staff member of the Senate Armed Services Committee. During his tenure with the Committee, he was responsible for overseeing Navy and Marine Corps programs, U.S. Transportation Command matters and related policy for the Seapower Subcommittee. He also advised on Navy and Marine Corps operations & maintenance, science & technology and acquisition policy.

Mr. Stackley began his career as a Navy surface warfare officer, serving in engineering and combat systems assignments aboard USS *John Young* (DD 973). Upon completing his warfare qualifications, he was designated as an engineering duty officer and served in a series of industrial, fleet, program office and headquarters assignments in ship design and construction, maintenance, logistics and acquisition policy.

From 2001 to 2005, Mr. Stackley served as the Navy's LPD 17 program manager, with responsibility for all aspects of procurement for this major ship program. Having served earlier in his career as production officer for the USS *Arleigh Burke* (DDG 51) and project Naval architect overseeing structural design for the Canadian Patrol Frigate, HMCS Halifax (FFH 330), he had the unique experience of having performed a principal role in the design, construction, test and delivery of three first-of-class warships.

Mr. Stackley was commissioned and graduated with distinction from the United States Naval Academy in 1979, with a Bachelor of Science in Mechanical Engineering. He holds the degrees of Ocean Engineer and Master of Science, Mechanical Engineering from the Massachusetts Institute of Technology. Mr. Stackley earned certification as professional engineer, Commonwealth of Virginia, in 1994.

Views from the Honorable Sean J. Stackley

Improvements to Defense Acquisition

I. Basic Principles

The acquisition process, as challenging as it is, produces the most capable military weapon systems in the world. This achievement is only made possible by the combined efforts of the Congress, the nation's industrial base, the Department of the Defense's (DOD's) acquisition workforce, and, of course, our men and women in uniform who test, train, deploy, and ultimately take these weapon systems to war. The great challenge before us all is to produce the needed capability at a more affordable cost, and too, at a pace that preserves the technological edge that our military has possessed for near three quarters of a century. The Department of the Navy (DoN) is committed to meeting that challenge and these comments are provided in that context.

In pushing the boundaries of science and technology to deliver leading edge capability; the risk, complexity and cost of our weapon systems have grown significantly. In response, decades of well-intended legislation, regulations, and policies designed to reverse the cost trends have added dense layers of prescriptive process and organization; the result being that program managers spend increasing amounts of their time meeting the reporting and documentation demands of an increasingly risk-averse oversight system and less of their time applying critical thinking skills and innovation to the management of their programs. In the end, the desired results — better cost outcomes and timely product deliveries to the warfighter — have proven elusive. Notably, the preponderance of recent independent studies warn that adding more legislation and regulation in a system already so complex will add cost to a program and add risk to a program manager's ability to execute. As highlighted by the Business Executives for National Security (BENS):

> *In earlier times we could arguably afford such flaws in [acquisition] efficiency, but we can afford them no longer. We simply do not have the discretion to accept the legal, regulatory, cultural, and organizational obstacles that plague the acquisition system.*[51]

In this regard, 'good government' is not likely to come from more oversight legislation or policy, but rather from more experienced, qualified professionals exercising the fundamentals of defense acquisition. The DOD, led by Under Secretary of Defense (Acquisition, Technology and Logistics) (USD(AT&L)), is presently drafting proposals to remove specific regulatory requirements that the Department believes can be addressed more effectively elsewhere or eliminated altogether. We would appeal to the Congress to consider no additional legislation without first contemplating a roll-back strategy, beginning with the USD(AT&L) proposals.

To consider what improvements could be made in acquisition today, it is important to understand the environment in which it operates. First, neither the DOD nor the defense industry

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[51] *Getting to Best: Reforming the Defense Acquisition Enterprise,* Business Executives for National Security, at iii (Jul. 2009).

operates as a natural actor in a free-enterprise system, even though their actions would indicate otherwise:

> *Government and Industry defense managers often go to great lengths to preserve the myth that large defense programs are developed and produced through the free enterprise system.*[52]

Second, the large government bureaucracy that envelops defense acquisition discourages risk and thwarts rapid or even timely delivery when, in fact, the very nature of weapon systems development is risky, and the very pace of technology and of the threat, demand a faster, appropriate response. Given this environment, which is not prone to change, primary emphasis must be placed on the need for experienced, knowledgeable acquisition professionals who know how to work in the unique defense marketplace, who understand the technical dimensions of extraordinarily complex systems, who can navigate the bureaucracy and produce excellent outcomes in spite of it all.

With the above in mind, successful defense acquisitions rely upon (a) an experienced Acquisition Workforce, (b) Program stability, (c) a healthy industrial base, and (d) good order & discipline (i.e., appropriate oversight and governance).

II. Recommendations

A. An Experienced Acquisition Workforce (AWF)

This is the most important fundamental in achieving repeatable strong performance in defense acquisition. "The principles and practices that programs embrace are determined not by policy, but by [program managers'] decisions."[53] The business of defense acquisition consists of tens of thousands of individual decisions made daily — requirements, technical, contracting, financial, etc., and the more experienced - in *technical* knowledge and *business* acumen, the more qualified the AWF, the better the decisions. As USD(AT&L), Frank Kendall, stated to the Senate Subcommittee on Contracting Oversight on April 30, 2014:

> *"Defense acquisition is a human endeavor, and my view is that we have focused too much on organizational structures, processes, and oversight mechanisms, and not enough on providing people with the skills and the incentives they need to be successful."*

The DOD AWF requires highly-educated and highly-skilled professionals in the following areas:

> Scientists & Engineers; Contracts Officers; Program Managers; Cost Estimators; Financial Managers; Logistics Managers; Auditors; Acquisition Attorneys; Information Technology Professionals; and Construction Engineers and Architects.

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[52] Fox, J. Ronald, David Allen, Walton Moody, and Philip Shiman. *Defense Acquisition Reform, 1960-2009: An Elusive Goal* at 209 (U.S. Government Printing Office, 2012). Dr. Fox is a Professor Emeritus of the Harvard Business School and is the former Senior Acquisition Executive for the Department of the Army, and Senior Acquit ion Advisor to the DOD.

[53] *Defense Acquisitions: Where Should Reform Aim Next*, GAO 14-45T, at 11 (Oct 29, 2013).

It requires highly talented and dedicated military and civilians who are the "Special Forces" of the federal civilian workforce. To recruit and retain the best and brightest for this work so that the DOD AWF becomes the premier technical and business workforce in the world, requires changes to human resource authorities, accommodations, and compensation. The idea of building and retaining a highly capable AWF as the cornerstone of improving the defense acquisition system is not new. Indeed, echoing similar findings of the *Blue Ribbon Defense Panel* in its report to the President in July 1970,[54] Dr. Fox states:

> *Were there a more attractive government career in DOD acquisition management, it would then be possible to minimize the conflicts associated with frequent turnover of military personnel and widespread military retirements to industry, while preserving the rights of individuals to careers in acquisition management. The basic goal of any legislative remedy must be achieving and maintaining outstanding competence and integrity to the defense acquisition system.*[55]

The same statement is true for the civilians who make up the AWF.

Congress has recognized the Department's need for a large, robust, highly-qualified AWF, and provided much-needed legislative relief with the passage of Section 852 in the 2008 NDAA and Section 219 in the 2009 NDAA. These two provisions, which have been amended several times, provide authorities for AWF hiring, training, and retention; as well as budget authority dedicated to rebuilding the Department's in-house Science and Engineering foundation. Building upon those two provisions, the following are offered for the Subcommittee to consider:

- Reduce or eliminate the annual exposure of the AWF to undistributed federal workforce budget or FTE reductions.
- Provide civilian personnel management legislation that will allow the Department to address critical acquisition skills more rapidly and effectively. Recently, Executive Order 13562 revoked the Federal Career Intern Program (FCIP). This was unexpected and a significant blow to DOD's ability to conduct targeted recruiting at college campuses throughout the United States, including deliberate hiring campaigns to under-represented groups in Science & Engineering at Historically Black Colleges and Universities (HBCUs) and other minority institutions. When FCIP was eliminated, it thwarted the Department's ability to hire new/next generation workforce because college applicants are *non-preference eligible.* We encourage the Subcommittee to work with the Administration to reinstall FCIP.
- Provide DOD with permanent Direct Hiring Authority (DHA) for targeted, critical skills in Science & Engineering, Contracting, IT, and Business. Lacking this authority, the DOD's ability to compete for the best talent in the nation is greatly handicapped.
- Establish a special pay category or incentive structure for a select number of post-Major Command acquisition officer billets associated with our most critical Major Programs.

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[54] *Report to the President and the Secretary of Defense on the Department of Defense,* Blue Ribbon Defense Panel. GPO at ¶¶ IV-9, IV-10, p. 229 (Jul. 1, 1970).
[55] Fox, *supra* at 204

Other actions for consideration to recruit and retain a highly capable AWF include legislation that:

- modernizes DOD's human resources authorities to establish greater accountability for performance by rewarding high performance and placing greater consequence on poor performance. As a first step, we encourage the Subcommittee to support the Department's effort to increase the number of AWF members performing under the Acquisition Demonstration Project (a.k.a. Acq-Demo). The Acq-Demo is ordered around a pay-for-contribution plan as well as improved hiring practices;
- provides for educational benefits similar to the Post 9/11 GI Bill;
- forgives student loans after serving for an extended period in the federal acquisition workforce; or
- provides for special pay benefits for both civilians and military personnel serving for an extended period in the AWF.

B. ***Program Stability***

Stable requirements, stable technical baselines, and stable budgets are hallmarks of successful acquisition programs. Alternatively, instability causes added cost in rework/time, and a chronic inability to accurately estimate program costs. Perpetual instability produces an historical record of higher-than-necessary cost estimates which, in turn, are used as baselines to estimate future programs which, in turn, are used to inform budget submissions — establishing a cycle of spiraling cost growth.

The Department is responsible for defining stable requirements and associated technical baselines and all of our processes are geared to this result. The DDG-51 destroyer, Virginia Class submarine, F/A-18E/F, P-8A Maritime Patrol Aircraft, the Mobile Landing Platform, and Next Generation Enterprise Network are all examples of successful programs that benefitted greatly by well-defined and stable requirements that allowed industry to deliver on cost-effective bids. Program stability also permits the use of additional cost-saving contracting measures not available where stability is absent, such as multi-year contracting and shorter construction cycles.

Budget stability, however, is problematic. The great uncertainty, delay (Continuing Resolutions), and frequent changes to budgets through the annual authorization and appropriations process counter our efforts to further our effectiveness and efficiency. Sequestration, alone, threatens to undo all of the Department's gains in productivity brought about by 'Better Buying Power' initiatives. A timely, predictable Defense Budget (ultimately, a multiple year budget) would directly increase the productivity of Defense Acquisition, it would provide needed stability to the industrial base, and it would improve both government's and industry's ability to manage outlay risk and invest in R&D, facilities, and people. It would also reduce government deadline pressures to meet artificial obligations or expenditure benchmarks that impact effective contract negotiations. Reducing these pressures would allow the time necessary to achieve the best deal for the Department.

Budget stability is also critical for managing through challenges in program execution. Budget scoring rules notwithstanding, there is a compelling need to establish a Management

Reserve (MR) account to address the execution risks inherent to every major program. Absent an MR account, each program is left to establish and protect its own MR, which, at best, results in inefficient resource allocation. At worst, those programs unable to provide for such reserve within the program's budget suffer program breakage as funding shortfalls emerge in the course of program execution. An MR account to be administered by the Services could be established with unobligated funds and be used by the Services to address individual program risks or urgent needs that have emerged in an execution year.

C. Healthy Industrial Base

A healthy industrial base, with a workforce capable of solving unique design and engineering problems is the key to sustaining long-term competition and cost control in defense acquisition. In order to maintain a healthy industrial base, defense contractors require experienced engineers, skilled tradesmen, capital to invest, and fair opportunities for stable production and repeatable profits over the long-term. As our industrial base continues to undergo reshaping as a natural result of U.S. and global economic conditions, it is vital that weight be given to these factors when considering any new legislation or policy affecting defense acquisition.

An emerging factor in defense acquisition has been an extensive reliance on sub-tier outsourcing by prime contractors for product assemblies, subassemblies, and subsystems. As a result, it is increasingly important for sub-tier vendors, typically small-business and medium sized companies, to gain access to capital for making investments in defense equipment and facility modernization. Establishing mechanisms to assist sub-tier vendors in making capital investments would lead to cost reductions in defense acquisitions while also stabilizing this critical element of the base. Further investigation is needed to identify the best tools to properly incentivize effective capital investment at the sub-tiers of our defense industrial base.

D. Good Order and Discipline (appropriate governance and oversight)

Oversight and governance is necessary in large, complex, interdependent systems-of-systems, but it is crucial to strike the right balance in order to achieve affordable outcomes. The penalty for *too much* oversight is ever-increasing costs and impediments to execution that have no ceiling; the penalty for *too little* oversight is the costs and risks of rework for unforced errors. Oversight and governance requirements have added multiple layers of prescriptive processes, authoritative organizations and extensive reporting and documentation requirements. In short, the sheer size and overlapping nature of the bureaucracy is not implementable.

Lessons learned from highly successful programs highlight that the right balance is attainable by applying the fundamental disciplines already known and available to each program manager, then exposing the products of that discipline to simplified oversight by an appropriate but limited number of highly experienced managers, engineers, and business executives who serve at the Service Secretariat and OSD levels in policy oversight capacities.

We recommend to the Subcommittee the following:

- Work with USD(AT&L) in the current effort to identify and roll-back legislation that has produced unnecessary, redundant, regulatory and reporting burdens on program managers.
- Express a sense of Congress that DOD acquisition reporting has been excessive and future reporting should be no more than necessary to concisely respond to identified issues.

III. Conclusion

The topic of defense acquisition reform is, of course, well-worn. As noted at the beginning, the particular challenge facing this generation of acquisition professionals is to produce *affordable* weapons systems without any loss of our ability to provide superior, dominant warfighting systems. To do that, a strong, focused emphasis on the fundamentals of acquisition is essential – beginning with the paramount need for a highly professional and experienced *acquisition workforce*, followed by practices that promote *program stability*, a *healthy industrial base*, and a deliberate effort to apply the necessary, but right amount of *governance and oversight*.

MR. MICHAEL J. SULLIVAN
Director, Acquisition and Sourcing Management Team
U.S. Government Accountability Office

Mr. Sullivan currently serves as Director, Acquisition and Sourcing Management, at the U.S. Government Accountability Office. This group has responsibility for examining the effectiveness of DOD's acquisition and procurement practices in meeting its mission performance objectives and requirements. In addition to directing reviews of major weapon system acquisitions such as the F-35 Joint Strike Fighter, F-22, Global Hawk, and various other major weapon acquisition programs, Mr. Sullivan has developed and directs a body of work examining how the Department of Defense can apply best practices to the nation's largest and most technically advanced weapon systems acquisition system. This work has spanned a broad range of issues critical to the successful delivery of systems, including technology development; product development; transition to production; software development; program management; requirement-setting; cost estimating; and strategic portfolio management. The findings and recommendations from this work have played a major role in the department's recent acquisition policy revisions. Most recently, he has directed the GAO's annual assessment of major weapon systems programs for the Congress and GAO's work with Congress in establishing acquisition policy reforms. His team also provides the Congress with early warning on technical and management challenges facing these investments.

Mr. Sullivan has been with GAO for 28 years. He received a bachelor's degree in Political Science from Indiana University and a Master's Degree in Public Administration from the School of Public and Environmental Affairs, Indiana University.

The views expressed in this essay are those of the author alone and do not necessarily represent those of the Government Accountability Office.

Views from Mr. Michael J. Sullivan

Over the past 50 years, the Congress and the Department of Defense have explored many different ways to improve the cost and schedule outcomes on major weapon system programs. There have been dozens of studies, all well done, by professionals from government and industry with experience in acquisitions, all championing sound management practices, such as realistic cost estimating, better systems engineering practices, more realistic requirement setting, and better budgeting. Most recently, the Weapon Systems Acquisition Reform Act of 2009 and the departments Better Buying Power Initiatives have put in place laws and policies to move more cost and engineering knowledge to the front of acquisition programs and create more realistic business cases at their outset.

Over the past 5 years, we have seen some improvements to outcomes, but not enough yet to declare a trend. The cost growth of DOD's 2013 portfolio of weapon systems is about $448 billion and the average program schedule delay is 2 years. The department must work to improve these numbers, and the way I believe that can be done is not to add or discard policy at this point, but to change the incentives that are now built into the system that do not work towards making the process more efficient.

With that background in mind, I am writing to provide my views to the Committee on Homeland Security and Governmental Affairs' Permanent Subcommittee on Investigations on deficiencies of the current process and steps that might be taken to improve it.

SUMMARY

Today's acquisition process has shown signs of improvement over the last 5 years, and some of this can be attributed to WSARA legislation and changes made to DOD's acquisition policies. Last year, the GAO found that 50 of the 80 major weapon system acquisition programs reduced their acquisition cost estimates and that individual programs saved almost $24 billion collectively by performing recently implemented "should cost analysis". Therefore, I do not believe that changes to laws or policies are needed at this time to improve acquisitions.

There are still problem areas for the process, generally centering around the interaction, or lack thereof, between the requirement setting community and the acquisition community; the management of DOD's science and technology base; the initial business case for a program; the relationship between the government and the defense industrial base; and the need to hold everyone accountable at all levels of the management process, from program manager to the Undersecretary of Defense. Needed improvements in these areas can be made without changing policies if the department, the services, and the industrial base can affect a culture change of sorts, that would allow a new look at incentives. If more knowledge is available upfront to reduce risk, the next step is to develop a culture that works together to provide (1) realistic capability requirements for weapon system programs, (2) more funding and organization for our science and technology programs to reduce risk before product development begins; (3) knowledge-based, incremental business cases for programs that will enable time-certain (5 year) product development periods; (4) empowerment of program managers with new, more rewarding career tracks and executable acquisition strategies; (5) accountability for the final product by

requiring program managers to stay with acquisition programs through development and longer tenures in leadership positions; and (6) new ways to incentivize the industrial base. Drawing on my experience of almost 30 years in weapon system acquisitions, I offer the following areas of focus for further improvement. These are not, by any means, all-encompassing, nor do they offer the magic formula for success. However, they may represent good places to focus on changing incentives.

Integrate the requirement and acquisition communities and hold them each accountable for realistic acquisition strategies

A key cause of poor acquisition outcomes is the gross mismatch between the validated capability requirements for a new weapon system that come from the requirement-setting community and the resources (technologies, money, people, and knowledge) that come from the acquisition community. This mismatch is so vast sometimes that one would never imagine that the two groups had even talked. This fragmentation between requirements setters, budgeters, and acquisitions makes it difficult to achieve a balanced mix of weapon systems that are affordable. Today, getting managers to make hard choices between "desires" and "needs", when necessary, and to say no to unrealistic or unaffordable plans is a challenge in DOD largely because the processes to acquire a new weapon system are separate, independent, unaccountable, and have different goals.

I have visited many private sector firms over the years to glean best practices for efficiently and quickly developing products to meet market needs. Most firms describe an integrated process for establishing market needs and product requirements, making trades between cost and product performance long before beginning product development, and ensuring that all decision makers agree to and are held accountable for the business case for product development. **The department must be open to examining best practices and implementing new ways to really integrate these critical processes into one and holding all stakeholders accountable for their decisions.**

Reduce risk in product development by better organizing and funding the S&T base to prioritize and manage technology risk before programs begin

The department's science and technology base, which funds the search for basic knowledge, explores potentially new technologies, and advances technologies past the point of concept and invention, is an untapped source of savings for the acquisition process. Last year, the department's science and technology base received about 8 percent of the department's $151 billion investment for acquisition programs, and that appears to be a typical proportion over the years. DOD could leverage this funding much more efficiently and effectively than it does now by systematically attacking organizational, cultural, and process impediments. For example, the department today has as many as 6 separate organizations, including each of the services, that operate their own technology development enterprises, with little or no communication across each enterprise or, for that matter, with the department. The overall result is that the department often sees weapon system acquisition programs started that require technologies that have not been fully matured or, in some cases, not even invented, but only a concept on paper. While in other cases, it finds gaps in technology where needs may exist. Again, answers may be available

from the private sector. Leading commercial firms save time and money by separating their technology development efforts with all the accompanying risks, from their product development processes, which are focused on integrating and demonstrating products. They also organize their technology enterprises to maintain relevant technologies, eliminate technologies that lose relevance or prove not to be feasible, and mature those relevant and feasible technologies to very high levels before introducing them into a product development. **The department should consider significant changes to the way it organizes and funds its science and technology base.**

Ensure that new acquisition programs are using knowledge-based, incremental strategies for product development that allow time-certain (5 year) development periods

There are more ways, as yet untried, to structure acquisition programs for better outcomes. These are knowledge-based acquisition, incremental strategies that limit the scope of a product development by eliminating the need for immature or unproven technologies, reduce the amount of integration and design risk by employing rigorous systems engineering analysis of preliminary designs prior to awarding a development contract, and focusing on achieving high quality through production by using process control techniques. With a more vibrant, well organized technology base to work technological risk and a well understood set of capability requirements (engineered to the system specification level), product development of a system that adds value for the warfighter could be quicker and that added value could be delivered to the warfighter sooner. As new, game changing technologies and funding opportunities present themselves, the next increment, or upgrade, can begin sooner and get to the field sooner. An approach like this is a winning proposition for all the stakeholders in the acquisition process. The warfighter gets quicker delivery of added capabilities, the department reduces risk and saves money, and industry is rewarded for producing and delivering products, not just developing them. **The department should study the entire range of costs and benefits of time certain development with an eye toward tailored application.**

Improve program management by attracting, training, and retaining professionals and providing them more rewarding career tracks

There have been many acquisition reform studies aimed at the need for improving the program management workforce to achieve improved acquisition outcomes. Some have highlighted the fact that DOD program managers often lack the training, experience, and incentives that their counterparts in the private sector have. Some studies have highlighted the need for a more professional cadre of program managers within each of the military services, and new incentives and career opportunities for them and all acquisition personnel. Right now, there appears to be a conflict between what military officers need to do to be promoted and their tenure and performance as program managers in the acquisition community. They often serve short—less than 2 year—tenures on acquisition programs, which limits both their experience and accountability for results before they move on in the military chain of command. **The department should consider a new paradigm for program management in DOD that allows the services to demand more of the right experience, change the reward opportunities, and align experience and tenure in an acquisition program as advantageous for promotion.**

Hold the entire acquisition and requirement setting chain of command responsible for better program outcomes

The GAO has reported in the past on the lack of continuity in the tenure of key acquisition leaders across the timeframe of individual programs. A major acquisition program can have multiple program managers, program executive officers, senior acquisition executives, and even Undersecretaries of Defense during product development. For example, the F-35 program has had 6 different program managers since it was approved to start development in 2001. The average tenure of the Under Secretary of Defense for Acquisition, Logistics, and Technology since the position was established in 1986 has been only about 22 months. These executives do not necessarily stay in their positions long enough to develop the long-term perspective or support to effectively manage and change long held, traditional incentives. **From the program manager position to the Under Secretary position, the department should take a hard look at the benefits of continuity and consistency of management principles and consider if changes should be made to change outcomes. This is important, not just to improve management, but to hold people accountable for their body of work.**

Find new ways to incentivize the defense industrial base to deliver products more efficiently

DOD has a unique relationship with the defense industrial base that differs from the commercial marketplace. While DOD is a single buyer with more than one large company in each segment of the industry, the special nature of weapon system development, the limited market opportunities, and the need to protect the public trust constitute a business place far different from the classic free market. There is less competition, more regulation, and the contractor holds significant power once a contract is awarded. Also, in the defense marketplace, the department is heavily invested in a product's development, especially in a sole source environment. New contracting concepts that allow more profit in return for cost reduction may be in order. Central to changing contracting concepts is the need to focus on requirements that are well understood and manageable. That enables new thinking about balancing risk between the government and the contractor with contracts that incentivize overall cost reduction for the government over putting limits on contractors' profits. A prime example of this is the current KC-46 Tanker development contract that has a fixed price, but includes incentives for the contractor to hold cost down. The potential for variations on this theme represents potential significant saving for DOD in the future. **The department should consider the potential for investigating new contracting concepts that focus more on reducing overall cost than on regulating profit as it structures and manages new programs moving forward.**

I end with a word of caution: many of the suggestions I have made in this essay have been made before. Unless the entire context of a weapon system's development is considered, and steps are taken to ensure that a new idea for reform is appropriate in a holistic sense, reform will fail. The best example of failed "reform" is the attempt made in the 1980's to mandate fixed-price development contracts. The department implemented a perfectly sound principle, when applied in proper context, on several development programs that simply were not appropriate. The concept failed miserably, as did several large acquisition programs, because the entire context was not considered. Fixed-price contracts work when the risk is low. Risk is

lowered when requirements are well understood. The department must be leery of implementing "one size fits all" policy, and should work to change the culture to be able to tailor good ideas to appropriate situations. The department must also raise the level of expertise it currently has across contracting, engineering, supply management, quality, and business in order to use these suggestions to improve its acquisition process.

VICE ADMIRAL DAVID J. VENLET, USN (Ret.)

Retired

VADM Venlet consults independently for clients in aerospace and defense. He led large complex organizations and programs at the executive management level for 10 years as a flag officer. His career in defense acquisition covered 22 years and he flew F-14 Tomcats in fleet operations. He was Program Executive Officer for a large investment program in DOD, the F-35 Joint Strike Fighter. Brought in by the Secretary of Defense in the face of possible cancellation, he stabilized program performance.

He previously served as commander Naval Air Systems Command, headquartered in Patuxent River, Md. Other flag tours include program executive officer, Tactical Air Programs and commander Naval Air Warfare Center, Weapons Division, with responsibility for Navy weapons and systems RDT&E and fleet support capabilities at China Lake and Point Mugu, Calif. He served as NAVAIR assistant commander for Test and Evaluation, and for Shore Installation Management.

Fleet tours include VF-41 as an F-14 Tomcat radar intercept officer embarked in USS Nimitz. He wears the distinguished Flying Cross for action in VF-41. After redesignation as a naval aviator he flew with VF-143 as an F-14 pilot embarked in USS Dwight D. Eisenhower and with VF-101 at NAS Oceana as a Tomcat instructor pilot and A-4 adversary pilot.

Tours in Naval Air Systems Command include Strike test pilot at Naval Air Test Center, Patuxent River, the F/A-18 program in various capacities including class desk officer and deputy program manager. He was executive assistant to the commander, Naval Air Systems Command and served as program manager for Air-to-Air Missiles involving AIM-9X development.

Venlet is from Pottstown, Penn., and graduated from the U.S. Naval Academy. He is a graduate of the Naval Postgraduate School and US Naval Test Pilot School and is a member of the Society of Experimental Test Pilots. He has a BS in Systems Engineering and MS in Aerospace Engineering.

Views from Vice Admiral David J. Venlet, USN (Ret.)

A basic need to address is attention to the support and sustainment of the knowledge worker in defense acquisition. I make no distinction between government and industry worker, from research to system fielding and sustainment. This is a plain notion and I will attempt to write plainly about it. There are innumerable writings addressing the complexities around acquisition disappointments — complex words and ideas that tend to leave a general feeling of hopelessness. This paper may not leave a different feeling, but offers some thoughts on another way. It is a long road.

When a generation of enlightened knowledge workers is raised, mentored and appears more broadly in leadership of programs and technical competencies, outcomes can improve.

So what does it mean? How is it done? Who does it?

Let me first define the enlightened knowledge worker, followed by broader definitions on how one is developed. Then a focus on who begins and sustains attention on these workers will be addressed.

The enlightened defense acquisition knowledge worker is one who values and practices a commitment to sound technical Fundamentals, Transparency and Realism (FTR: permit me a shorthand for this paper) in daily work life.

I include technical fundamentals found in the competencies of research, engineering, contracting, financial management, test and evaluation, and logistics. Is program management a technical competency? Probably yes, but it is not an entry-level career path for my discussion. I have a personal quirk that believes program management is a plane of leadership activity and a competence acquired after career development within one or more of the above technical competencies.

The enlightenment begins when the fundamentals learned for certification in each competency are repeatedly applied to one's career progression through team efforts that produce a required outcome inside the boundaries of time and resource limitations. Mankind has always—always —lived in a world of constrained resources. Optimization of constrained resources is what produces real outcomes that are useful and enduring. Please keep both government and industry knowledge workers in view here.

One primary principle found in the fundamentals of these technical competencies is independent review of planning and work. This fundamental brings transparency as well as realism to the planning and assessment of status in each effort. This is not an original oversight function. It is proper process integrity. You cannot chair your own design review. Still, it happens. Later, I will describe how and why.

I do not have to define transparency (I hope) and realism (possibly). The three FTR traits run a circular track of mutual support around the knowledge worker—traits learned by

observation in others, matured by mentoring in practice, then measured and expected in the career advancement process.

Practice and value of FTR do not consume excessive time and resources. Instead, they illuminate the right things to be done, the consequences of choices, and the truth about conditions. Practice and value of FTR minimize surprises in execution and allow performance to better align with resource expectations. Oversight can then be fulfilling and meaningfully accomplished because truth is apparent.

Decay of trust created the system of Legislation, Organization, Regulation and Process (LORP) that has evolved as if acquisition management is composed predominantly of suspicious people described by both Machiavelli and Nietzsche —people driven by ambition for control, by self will to power, and who prefer a vacuum of truth. The acquisition performance record shows trust is not fully warranted and the system has deservedly earned the LORP it presently bears.

To attack LORP as the root cause for wasted time and money avoids the heart of the matter, and this is a matter of the heart. The heart of the knowledge worker must be won early because it is the heart where values reside, emerging in the mind and later displayed via decisions and actions.

Sometimes attack of LORP as a root cause is a masked cry for freedom *from* fundamentals in the name of faster and cheaper. It becomes a puff pejorative attacking the practice of fundamentals and the workers who do so. Trust tumbles further into the abyss. False reform results because freedom *from* fundamentals obscures truth and hides reality. No one openly opposes FTR, but forces appear and are present that suppress it.

Freedom *to* value and exercise FTR begins with the leader. There are people who embrace FTR and people who do not. You can tell. Ask anyone around the leader which one they are. Evaluators of leaders have to be direct in addressing weakness where it exists and setting aside those unchangeable.

Congress should confirm nominated leaders who are known to practice FTR and reject those who do not. Secretaries should sign promotion board precepts instructing selection boards to promote qualified leaders who practice FTR and not promote those who do not. Program executives and program managers should be selected because they are qualified *and* known to practice FTR; those who are not should be turned back. Technical command commanders should promote and advance civilian and military leaders who are qualified and demonstrating FTR and set aside those who are not.

Industry executives and program leaders should be selected who are qualified and demonstrating FTR and those who are not should be set aside. This is a duty of directors as fundamental as fiduciary duty is to shareowners.

The body of government and industry knowledge workers needs to see leaders who practice FTR advanced in their careers and those who do not demonstrate FTR set aside. The value of FTR can be reinforced in people as their own careers progress by watching leadership

advance, or not. Knowledge workers will choose to embrace and practice FTR because they will have seen for themselves that it produces better results, is rewarded, and valued.

Let me return to independent review. Why would a person choose to violate a learned fundamental and chair his or her own design review?

Powerful forces suppressing FTR appear when pressure to do something ratchets up searches for new reform methods. Identification of present disappointments is likened to the phrase, "old ways do not usefully serve the new times." Anecdote-dripping messaging cries that LORP and FTR are causes of time and resource waste. Reform *from* FTR is implied to be a "newly enlightened" state. (Process fundamentals are the usual targets.) Unfortunately, it produces unenlightened attempts at creating shortcut process reform as a new way of achieving better outcomes. Program leaders react to the messaging pressure, regulation changes, etc. to find a modern way. Shortcuts proliferate and fundamentals become selectively abandoned in the name of faster and cheaper. Unintended consequences naturally surface. Polarized positions appear in very large organizations and more heat than light results from arguments about blind application of process rigor fighting against program progress. Material grows for the cry for freedom *from* FTR when it is poorly practiced.

A fundamental duty of the team and project leader is illuminating the consequences of choices available. There are choices everywhere: options to fix failures or accept them without a fix, to add or reduce resources, or whether to reach for desired performance or switch to alternatives. If consequences related to time, money, and performance are not fully illuminated, then decision makers are less effective. FTR, and those who embrace it, add greater illumination on consequences.

We have always lived in a world of constrained resources. The coveted skill is optimization of all constraints to achieve and continually pursue the best result possible at any point in time. This optimization is valued only if the task can be done and capability delivered with dependable time and cost.

So the enlightened knowledge worker is defined as a believer and practitioner of FTR. Their emergence and increasing numbers result from the training of fundamentals in their competency, observation of FTR's better results, and its reward in career advancement. Leadership at every level has the duty to reward FTR and not reward its absence. It is a long road.

Further consideration of fundamentals is appropriate. We may become somewhat less plain in language for a bit.

The fundamental of translating a stated requirement into a sound technical baseline is as important as the fundamental of an independent cost estimate. (My view is, it is very much more important.) For complex systems, one can only scientifically, and thus realistically, estimate the cost of a technical baseline. It is not possible to realistically estimate the cost of the user-generated statement of the requirement. This translation requires a body of people with profound knowledge about lots of non-trivial "things."

- Environment of the system operation (impact on the system operation and service longevity).

- Human interaction with the system (training, effectiveness limited by human mind and body, maintenance/deterioration of skills, and system safety and hazards for both manned and unmanned systems).

- Integration of a system with other systems (system boundary interfaces and effects for electronic signals, timing effects, optimization in midst of limitations, sensor integration, weapon integration, manned and unmanned system cohabitation and mutual support, and integration with other nations' systems in combined force operations).

- Knowledge of the realm of existing technology reality and emerging possibility in the science of materials, power sources, sensors, signals and circuits, processor speed and power, and chemistry of energetics.

- Sufficient historical data on what the human experience has previously designed, developed, tested, delivered and sustained. (One cannot precisely fix a cost or budget to achieve what no one else has ever done with success before—this is my defense of estimators. The "new" must be afforded a margin of time and money to account for discovery and failure. Before you despair of any improvement or change in trend used by estimators, acknowledge that the trend can change with a record of performance. But for the resource holder with the eternal constraints, the trend used by the estimator must be influenced by demonstrated data, and not so much one's wish. You can accept a good enough with a resource constraint. See consequence illumination above. The estimator's trend change in reality will be incremental. It is a long road.)

There is a core need for this knowledge to be sustained by the government customer. The items above are their own evidence as to why they are core for sustaining in the government a technical knowledge workforce. Government possesses the intelligence insights informing the capability required to sustain national security. Industry must also possess this knowledge when engaged in developing and producing security systems, but their ability to sustain it ebbs and flows with the supply of customer demand and investment.

It is the right body of knowledgeable people that transforms the requirement into a sound technical baseline that can then be cost estimated, planned, budgeted, contracted with realism, measured in performance and satisfactorily delivered.

There is a necessary and dreaded infrastructure that people require to learn, grow, and remain current and relevant in their knowledge domain. Whether it exists in the public or private domain, it has to exist somewhere (cost is borne somewhere in an economic system). It exists in effective education systems producing a supply of capable people, in laboratories for experimentation and testing, in a body of relevant work for people to build necessary experience and grow from intern to master—experiencing both failures and successes.

"Completing the circuit" requires people and infrastructure to effectively deliver a defense system for national security. Doing so on dependable cost and time is an optimization itself of who owns and manages both the people and the infrastructure. I do not include sufficient financial resources as necessary to complete the circuit because the point has been made that we always live in a world of constrained resources. Optimization and consequence management are kin.

The dynamics of large organizations and their control has bedeviled modern defense acquisition more than technology, sciences, cost estimating and economic conditions of any given time period. I wanted to say this, but will leave further discussion of it for elsewhere as I am running out of page count.

So, what about the near term while beginning this long road? What about the tension between process integrity, and time and constrained resources? What about the balance between large complex systems and rapid capability development?

FTR, Consequence Illumination (CI), and Optimization of Constrained Resources (OCR) for the greater good of the whole are called for by leaders paying attention to the development and sustainment of enlightened knowledge workers and their population into leadership positions at all levels. Systems do not produce sufficient national security outcomes, people do.

So, attention to people—*people*.

Struggles with balance in the tension between “done right” and calls for faster/cheaper abound. Striving for balance can be a state of constant dissatisfaction with both. Ability to develop large high-end systems and coveted rapid capabilities together is available with people leading the TEAM with FTR, CI and OCR.

Trust may rise and LORP may recede. It is a long road.

Lt. Col. DANIEL WARD
Dismount Detection Radar Program Manager, Hanscom AFB MA
U.S. Air Force

Lt Col Ward is a military technologist specializing in rapid, low-cost innovation, primarily in IT and cybersecurity systems. He has three engineering degrees and over two decades of experience developing, designing, testing and fielding military systems.

Ward wears the Master Acquisition Badge and the Command Space Badge, and is a Senior Associate Fellow at the British Institute for Statecraft. His previous assignments include the Air Force Research Lab, the Air Force Institute of Technology, the National Geospatial Intelligence Agency, the Pentagon and International Security Assistance Force Headquarters in Kabul, Afghanistan. In 2012, he received the Bronze Star Medal for his service in Afghanistan.

Ward's writings have appeared in a wide range of outlets, including The Boston Globe, Forbes, Fast Company, Armed Forces Journal, Small Wars Journal, Time Magazine's Battleland blog and the 2012 British Army Yearbook. His book F.I.R.E.: How Fast, Inexpensive, Restrained and Elegant Methods Ignite Innovation was published by HarperCollins in April 2014.

The views expressed in this essay are those of the author alone and do not necessarily represent those of the United States Air Force.

Views from Lt. Col. Daniel Ward

The winning entry in the Air Force Research Laboratory's 2013 Design Challenge was the Break-Apart Mobile Bridging and Infiltration device, aka BAMBI, created by a team from Utah State University. Aside from the fact that it beat entries from 18 other universities, there are two things to know about BAMBI. First, it was developed for half the cost of all the other entries, because USU fielded two teams who split the budget between them. Second, it was a study in simplicity. One participant explained that while the team began their design efforts with extremely complicated ideas, the more they simplified the design, "the better it became."

This correlation between thrift, simplicity and best-in-class capabilities is neither new nor unusual. In fact, the history of defense acquisition reveals a striking pattern of what defense analyst Pierre Sprey calls "cheap winners and expensive losers." In case after case, actual combat data reveals that simpler, less expensive systems consistently outperform their more expensive and more complex counterparts.

One of Sprey's examples pits the radar-guided AIM-7D/E Sparrow missile against the heat-seeking AIM-9D Sidewinder. The complex Sparrow costs $44K and has an 8% probability of kill, while the simpler Sidewinder costs only $14K and has a 24% probability of kill. Sidewinders therefore are one third the price of Sparrows and have three times the lethality, a 9 to 1 advantage. Cheap winners and expensive losers indeed!

Far from an anecdotal fluke, this pattern is repeated across the spectrum of military technology, from tanks to satellites, IT systems to munitions. How is this possible? How do some acquisition programs produce "cheap winners," that deliver dominant capabilities without breaking the bank? My research over the past decade suggests that when a team produces cheap winners, it is inevitably because they place a high value on attributes like speed and thrift. They deliberately set out to establish and maintain constraints on time, money and complexity, because such constraints are seen as desirable and productive. They spend less because they want to spend less. Propagating this culture just might be the key to meaningful acquisition reform.

Unfortunately, a culture that takes pride in doing the most with the least is far from universal within the acquisition community. The more common culture is one that views large budgets as a mark of prestige and treats complexity as a sign of sophistication.

In the culture of profligation, under-runs are anathema and returning funds to the treasury is regarded as a failure, while working on mega-projects with mega-budgets is the surest path to promotion. That expansive environment rewards acquisition professionals for keeping their expenditure rates high and insists they demonstrate their professional growth by managing larger and larger quantities of funding, preferably on projects with delivery dates in the distant future. This culture is largely responsible for the fact that defense acquisition programs tend to "take longer, cost more, and deliver fewer… capabilities than originally planned," to echo the Packard Commission's assessment.

The expansive culture may be dominant, but the more effective restrained culture already exists in scattered pockets across the Department, in rapid acquisition teams like the Army's Rapid Equipping Force, the Air Force's Rapid Capabilities Office, SOCOM, and any number of similar Skunk Works-style teams. In each case, these high-speed organizations enthusiastically embrace the challenge of delivering world-class capabilities with a skeleton crew, a shoestring budget, and a cannonball schedule. Doing more with less is a proud part of their identity and heritage, and they generally disdain any efforts to spend large quantities of money or time, in part because they know such largess does not enhance quality and in part because spending large quantities is contrary to their professional identity and professional values.

The DOD would do well to spread this culture across the acquisition enterprise and reward those who embrace it. One way leadership can help spread this culture is to publicly embrace the FIST (Fast, Inexpensive, Simple, Tiny) approach to acquisitions.

The FIST approach involves establishing a set of preferences and priorities which orient acquisition practitioners towards speed, thrift, and simplicity. These factors influence the way people make decisions and what they reward, countering the perverse incentives which so often lead to overruns, delays, and sub-par performance. This is where FIST differs from most reform approaches or flavor-of-the-month management fads, because it is not a narrow methodology or policy initiative. In an echo of Robert Sutton's recent book *Scaling Up Excellence,* FIST is about "spreading a mindset" rather than instituting a process.

In addition to the cultural aspect, FIST also points to a wide range of powerful tools, practices and principles that can be applied across a wide spectrum of activities. These tools equip practitioners for activities ranging from technical design to teambuilding. While a tour of the whole toolbox is beyond the scope of this paper, the fundamental principle behind it all can be expressed in one word: *restraint*.

Restraint means self-control. The FIST approach involves actively resisting unnecessary growth in the areas of budget, schedule, requirements, and team size. This focus on restraint fosters a dedication to simplicity over complexity, and orients groups in the direction of good-enough solutions instead of needlessly over-engineered products.

In practical terms, it means building small teams with short schedules and tight budgets, giving them tightly focused missions and insisting on close connections with users. This formula strongly correlates with top quality, high-performance systems, and does so without increasing the cost or difficulty of maintenance. It also increases the likelihood of success. As the 2013 CHAOS Report by research firm The Standish Group explains, "…size of a project trumps methodology… Small projects have a better success rate than Agile or Waterfall projects."

The definitions of "small project," "short schedule" and "tight budget" will vary depending on the specific acquisition category. If we're talking about an ACAT I program, such as nuclear submarines, we might say the $4.4 billion Seawolf Class is big and expensive, while the $2 billion Virginia Class is small and thrifty in comparison, since it is less than half the cost of a Seawolf. It is worth noting that in addition to having a lower price tag overall, the Virginia Class USS Mississippi delivered a year early and $60 million under budget. Chalk up another

cheap winner, produced by a relatively small team that viewed budget constraints as a desirable element of success.

In the area of space acquisition, Lt Gen Pawlikowski's recently announced that the Air Force's Space and Missile Center will adopt Operationally Responsive Space (ORS) principles "more broadly within space acquisition." ORS aims to quickly build small, simple, inexpensive satellites that provide fewer capabilities individually but provide greater flexibility and functionality in aggregate. ORS is essentially "FIST in space," and Lt Gen Pawlikowski's push to adopt ORS is precisely the type of leadership that is needed across the entire acquisition enterprise.

Other categories will have different thresholds for fast and inexpensive, and World War II's bazooka just might hold the record, since it delivered thousands of $19 weapons just thirty days after the effort was launched, then went on to be listed by General Eisenhower as one of the Allies' most important weapons.

Another example may help explain what FIST looks like in practice and how culture can drive outcomes. In the early 1970's, the US Air Force developed two fighter jets: the F-15 Eagle and the F-16 Falcon. Both are highly successful and have served well in operations around the world, but the Falcon was fielded in half the time and half the cost of the Eagle. The roots of the Falcon's thrifty, speedy success were visible early, as when the Air Force detailed its need for a Light Weight Fighter in a 25 page Statement of Work and limited industry's responses to 50 pages.

The F-15 team could have followed a similar path, but reviewing the data reveals no evidence that the Eagle's acquisition team showed any interest in speed, thrift or simplicity. There is no indication the Eagle team even considered writing a 25-page statement of work. Instead, they wrote 250 pages and received proposals that were upwards of 2,000 pages. The resulting aircraft was widely described as complex and expensive, and not only by its critics. In fact, the price tag and complexity were seen by some as signs of quality rather than potential indicators of waste.

The difference between these two highly successful aircraft ultimately came down to the way program leaders embraced or rejected restraint, and whether they viewed speed, thrift and simplicity as desirable or not. At every opportunity, the F-16 team exercised restraint, but not because the Air Force policy, process or organizational structure insisted on it. This was strictly the result of the team's culture. The F-15 team, in contrast, exhibited a more expansive culture and spent twice as much time and money.

The FIST approach conveys many benefits, both tactically and strategically. At the program level, shorter schedules reduce the program's exposure to change. This keeps the program aligned with state-of-the-art technology and relevant to real-world operational needs and reduces the likelihood of a system that is operationally irrelevant, technologically obsolete, or both. Smaller budgets also minimize a program's exposure to loss, since a low-cost failure is easier to absorb than a high-cost failure.

A portfolio of iterative FIST-style programs provides a diverse and flexible set of capabilities, increasing the organization's agility and its ability to manage volatility, uncertainty, complexity, and ambiguity. The bottom line: when acquisition leaders foster a culture built on a preference for restraint, they tend to deliver world-class capabilities ahead of schedule and under budget.

Large scale culture change is difficult, but it is also possible. The key is to flow the change through multiple influence channels. I identified four such channels in a paper for the Center for National Policy titled *Acquisition Culture Change: What and How*, proposing a specific strategy that leverages Leadership, Peer Networks, Literature and Education. When these channels provide a consistent message to the workforce, they reinforce each other and accelerate the desired change.

Adopting FIST across the acquisition community begins with recognizing that the FIST culture already exists. Leaders in particular can help shine a light on the acquisition practitioners who currently embody the desired culture on high-speed, low-cost, well-disciplined programs. Exemplars include the award-winning MC-12W Project Liberty aircraft, which flew its first combat mission a mere 8 months after the contract was signed, or the Air Force Research Lab's Condor Cluster supercomputer, which delivered the fastest supercomputer in the entire DOD in 2010 for one-tenth the cost of a comparable system by stringing together 1,760 PlayStation 3's. As they tell these stories, leaders encourage the rest of the community to join the best and brightest.

In today's military, political, and financial environment, a restrained approach is more important than ever. The good news is that spending less time and money on military technology is not only in the taxpayer's best interest, it also serves the warfighters needs. Industry also wins, because the timely delivery of systems that are effective and affordable is much better for business than delivering systems that are late to need, over budget and out of synch with operational demands. The key to achieving such outcomes is to begin with culture, addressing people's preferences and priorities as well as the institutional rewards and incentives, and pointing everything in the direction of speed, thrift, and simplicity.

The Better Buying Power 2.0 memo calls for leaders to "continue to increase the cost consciousness of the acquisition workforce – change the culture." FIST offers a specific framework for leading that precise change. The seeds of this change are already present, from the Navy's submarine program to the Air Force's Operational Responsive Space initiative. The mechanisms of culture change are well established and the influence channels are in place. The decision-making tools are ready. All that remains is for someone to give the order.

THE HONORABLE DR. DOV ZAKHEIM
Senior Advisor
Center for Strategic and International Studies

Dov S. Zakheim is Senior Advisor at the Center for Strategic and International Studies and Senior Fellow at the CNA Corporation. Previously he was Senior Vice President of Booz Allen Hamilton. From 2001 to April 2004 he was Under Secretary of Defense (Comptroller) and Chief Financial Officer for the Department of Defense; in addition, from 2002-2004 Dr. Zakheim was DOD's coordinator of civilian programs in Afghanistan. From 1987 to 2001 he was both corporate vice president of System Planning Corporation, a technology and analysis firm, and chief executive officer of its subsidiary, SPC International Corp. From 1985 until 1987, Dr. Zakheim was Deputy Under Secretary of Defense for Planning and Resources, playing an active role in the Department's system acquisition, strategic planning, programming and budget processes.

Dr. Zakheim has served on numerous government, corporate, non-profit and charitable boards. His membership of government panels includes the Task Force on Defense Reform (1997); Defense Science Board task forces on "The Impact of DOD Acquisition Policies on the Health of the Defense Industry" (2000) and "Urgent Operational Needs" (2009); and the Commission on Wartime Contracting in Iraq and Afghanistan (2008-2011). He currently is a member of the Commission on Military Compensation and Retirement Modernization, the Chief of Naval Operations Executive Panel, and the Defense Business Board, which he helped establish. A 1970 graduate of Columbia University with a B.A., summa cum laude, he holds a doctorate in economics and politics at St. Antony's College, University of Oxford. The author of a dozen books or monographs, and of numerous articles, Dr. Zakheim lectures and provides media commentary on national security policy issues domestically and internationally. He is the recipient of the Defense Department's highest civilian award in 1986, 1987 and 2004.

Views from the Honorable Dr. Dov Zakheim

There is a widespread consensus that, despite constant attempts to reform the acquisition system, the latest of which is the series of memoranda called "Better Buying Power," the system remains as broken as it ever was. Cost overruns and schedule delays abound and programs continue to soak up billions before they are cancelled. The acquisition process is so convoluted and lengthy that the Department of Defense (DOD) has had to create a "rapid acquisition process" to get around its own system.

These challenges date back to the Eisenhower era, leading President Eisenhower to rail against the "military-industrial complex." In the intervening years, it has become clear that the Congress has its own hand in sustaining this complex, approving weapons and programs that the Department of Defense cannot justify, cannot manage, or does not need. The failure of the system is due to a host of factors, including the manner in which acquisition programs are budgeted and funded. The DOD's resource allocation system suffers from the following ten shortcomings:

1) a disconnect between the Planning, Programming, Budgeting and Execution (PPBE) and the defense acquisition processes;
2) annual fluctuations in funding that drive up costs;
3) excessively high turnover rates among program management personnel;
4) the need for a more robust rapid acquisition process;
5) the need for the military to lock in requirements from program initiation through its completion;
6) the absence of life-cycle sustainment cost implications in budget requests for major weapons acquisitions;
7) the need for truly independent research and development programs;
8) the need for high-level oversight of the acquisition of major information technology-driven management support systems, in addition to that for major weapons systems;
9) the failure of the Defense Contracts Management Agency (DCMA) to provide adequate oversight of ongoing contracts;
10) a tendency on the part of top DOD personnel to initiate new reforms rather than sustain those of their predecessors, leading to business-as-usual cynicism on the part of acquisition personnel.

This paper will address each of these factors in turn.

Improving the Linkage Between the Acquisition and PPBE Processes

Analysts have long lamented the fact that programs are approved in the PPBE process without a clear view of their prospects as they move through the acquisition process. Moreover, programs are often cancelled after, sometimes shortly after, funds were budgeted for their continuation, with the result that other programs that could have been fully funded were either under-funded or not funded at all. The Department does conduct a mid-year budget review that does adjust the allocation of funds in light of program modifications. Once that review has been completed, however, there are no further adjustments to a given program until the next budget is approved, even if that program has undergone major test failures or other complications during the intervening period. To minimize the mismatch of funding between what is made available

through the PPBE process and the realities of acquisition, the Congress should mandate that the Department should conduct two execution reviews, in the fourth and eighth month of a given fiscal year. Having an additional execution review would allow the Department to get a clear focus on the actual, as opposed to projected or nominal, funding requirements of a given acquisition program, to adjust budgets accordingly, and have those adjustments approved as Congressional reprogramming actions.

Stabilizing Funding from Year to Year

Although DOD nominally plans, programs and budgets on a two-year basis, in practice, its program and budget reviews result in annual adjustments, causing fluctuations in development and procurement funding for major weapons systems. Moreover, because acquisition budgets are often hostage to other defense appropriations accounts, top line defense budget reductions from one year to the next will often result in program stretch-outs, which ultimately drive up costs. For its part, Congress approves budgets for the development and procurement of weapons systems on an annual basis, often at variance with DOD's budget requests. In so doing, Congress likewise virtually invites sharp fluctuations in funding for major defense program acquisitions. Program stability could be improved considerably if DOD would be required to provide not only two year budget estimates—together with its longer term out-year projections—but also fixed two year budgets that could only be adjusted either as a result of the mid-year budget execution review (or preferably, as outlined above, two annual execution reviews). Congress should authorize and appropriate development and procurement funds on a two year basis, with the second year of the two year cycle subject only to adjustment as a result of the DOD's execution reviews and resulting reprogramming actions. Multi-year procurement contracts generally can enhance program stability and result in lower program costs. They should only be entered into once a weapons system has completed low rate initial production, however, to prevent disruptions due to development uncertainties, which would result in higher, rather than lower, costs for a multi-year buy.

Reducing Excessive Turnover of Acquisition Management Personnel

The Department would also provide for more stability to major weapons system programs if it were to ensure that program managers and their deputies remain on the job long enough to understand the nature of their programs, so as to enable them to determine whether program changes—which drive up costs—are really necessary. The Better Buying Power program has taken a step in this direction. DOD must go further. Longevity promotes accountability, for success or failure, and as a result, incentivizes managers to strive for success. Hyman Rickover's lengthy stay as director of the nuclear reactor program, and the ten year tenure of his successors as directors of that program, testify to the importance of longevity as a key to successful program management. Accordingly, the Congress should mandate that DOD program managers, whether civilian or military, should serve a minimum of five years in their positions, and that, particularly with respect to the military, successful program management should lead to promotion, rather than retirement.

Enhancing Budget Flexibility by Strengthening the Rapid Acquisition Process

DOD has made major strides in meeting combatant commanders' requirements for urgent operational needs. More needs to be done, however. Rapid acquisition must rely on proven technology and robust manufacturing processes. That will often mean acquiring available off-the-shelf systems, even from foreign manufacturers. Program managers historically have applied excessive modifications to off-the-shelf technologies and systems, frequently resulting in program delays and cost overruns. Such outcomes are especially harmful when systems are urgently needed by commanders in the field. To minimize change, DOD should make it more difficult to approve engineering change proposals (ECPs), which invariably result in schedule delays and budget overruns, particularly if applied to fixed-price contracts. Too often as well, many of these changes are questionable, especially if being applied to systems that are supposedly commercial off-the-shelf purchases. The DOD should mandate that no major engineering changes that could affect program schedules, should be approved without the written approval of a service vice-chief, or of an agency director. This requirement should also be applied to longer-term weapons system programs, since historically they too have been plagued by ECPs that resulted in delays and overruns.

Improving and Adhering to Requirements

The current vice chairman of the Joint Chiefs of Staff, Admiral Sandy Winnefeld, has rightly focused on the need to provide clear requirements definitions prior to the initiation of new system acquisitions and has insisted that the requirements process not end with the initial statement of need, but continue throughout the development of the system in question. This approach should be extended to services as well as hardware, and should therefore also be applied to the procurement activities of the Defense Agencies, which collectively consume about one-fourth of the defense budget. As with ECPs, the DOD should mandate that no change in requirements that could affect program schedules, should be approved without the written approval of a service vice-chief, or of an agency director. Moreover, this policy should be applied both to major weapons system and information technology acquisitions, since, as in so many other respects, mandated reforms tend to overlook all but major hardware programs.

Budget Submissions Should Include Life Cycle Costs and Force Structure Implications

For over twenty years the Department has recognized that readiness and sustainment costs must be part of any evaluation of the cost of developing and acquiring a major weapons system. It is not clear that DOD has, as a matter of course, determined whether a program should proceed to its next milestone based on projections of these life-cycle costs. Their impact on future force readiness will be substantial, however, and requires Congressional attention and scrutiny. Accordingly, these costs should accompany budget requests to the Congress for system development and procurement. Moreover, if costs rise during the development cycle, the DOD should be required to demonstrate why life cycle sustainment costs will not rise as well; the Congress will then be able to determine whether the weapons system in question is compatible with long term budget projections. Budget submissions for major weapons systems should also include information regarding the impact of acquiring these systems on force levels and structure. While Augustine's Law is an exaggeration, its message is not: increasing costs of

individual weapons systems forces a reduction in overall force levels which in turn prompts changes in force structure. Congress needs to be aware of the larger implications of acquiring any major weapons system. DOD should therefore present the force level and structure implications of moving ahead with a given weapons system program, stretching out its development and/or production, or cancelling it outright.

Independent Research and Development is Not Independent

The DOD independent research and development program (IR&D) has for decades been meant to encourage firms to develop innovative ideas that could then be translated into state-of-the-art systems. For at least the past twenty years, however, the "I" in IR&D has been silent. Program managers have directed contractors toward the development of systems that they prefer, rather than have the contractors explore new development on their own. As a result, major defense firms tend to avoid experimentation; it is the smaller companies that are the most innovative, and, if their designs succeed, the large firms acquire them. It comes as no surprise, therefore, that innovation in the private sector far outpaces that in DOD. Moreover, because program managers tend to point firms toward developing variants of current systems, the prospects for cost savings arising from revolutionary new technologies are far from promising. DOD should restore IR&D to its original state; program managers and their staffs should be explicitly prohibited from interfering with IR&D, and should be penalized if they do.

Focus on Acquisition of IT-Driven Service and Management Support Systems

The DOD spends more money acquiring services than it does goods, particularly hardware. Yet the Department has only begun to treat services with anything like the rigor it applies to major systems acquisition. The DOD has far too many management systems that are not interoperable and provide no meaningful metrics on the basis of which top-level officials can make informed decisions. At the same time, however, the Department has a history of botching efforts to modernize and rationalize its business and management systems. The Department must completely overhaul the way it oversees the acquisition of information-technology based systems, which are consuming ever-larger portions of DOD's development budgets and, given constrained budgets, are resulting in fewer funds being available for the acquisition of major weapons systems. The Department should manage the development of support programs for human, financial and logistics management in much the same way as it does critical hardware. It should devote the same degree of attention to services-acquisition milestone reviews as it does to hardware, and schedule go/no-go decisions far earlier in the service acquisition process than is currently the case. Program managers for major Enterprise Resource Planning (ERP) and other management support systems should be required to obtain the same levels of continuing education and technical proficiency as their counterparts in hardware acquisition. The DOD cannot afford to waste billions on support programs that offer much promise, but cannot be implemented and must ultimately be cancelled.

Tightening Congressional Oversight of the Defense Contracts Management Agency

DOD has long been plagued by inadequate contract management and oversight. Robert McNamara established the Defense Contract Administration Services (DCAS) in the 1960s to

oversee supply support and other logistical services. The process was fully centralized in 1990 as a joint command, the Defense Contract Management Command (DCMC) within the Defense Logistics Agency to ensure consistent standards and processes for contract management. A decade later, the DCMC was established as an independent agency, the Defense Contract Management Agency (DCMA), reporting to the Under Secretary of Defense for Acquisition. Regardless of its name and place in the Department's organization chart, DCMA simply has not adequately overseen contract performance. In the absence of more rigorous DCMA oversight, the military services and DOD agencies grant award fees too easily, approve option years for contracts virtually automatically and continue to accept engineering change proposals far too frequently. DCMA should be far more vigorous in its management and oversight of contracts. To that end, DOD should re-examine DCMA's staffing requirements, and, if necessary, re-assign personnel to DCMA's rolls. In addition, the Congress should hold at least annual hearings devoted to a review of DCMA's performance, and to recommend changes to personnel, structure and operations as it deems necessary in order to improve the agency's ability to carry out its critical mission.

Sustaining Reform to Prevent Cynicism and Reversion to Bad Acquisition Habits

All too often, incoming Secretaries, Deputy Secretaries and Under Secretaries of Defense for Acquisition will jettison whatever reforms their immediate predecessors and introduce reforms of their own. They invariably implement new practices, and new "buzz words" and/or organization charts that supplant those of their predecessors before those older innovations have had a real chance to prove their effectiveness. The practice of reversing a predecessor's innovations confounds industry, making it more difficult to plan coherently. It also creates cynicism on the part of the entrenched bureaucracy, which nominally adopts the new leader's preferences, but does not change its practices, knowing that within a few years, yet another leader will arrive on the scene with new approaches to improving acquisition management. As a result, few reforms ever last, while the acquisition process continues to flounder. It is critical that any given DOD leadership team sustain the reforms of its predecessor. Accordingly, when holding confirmation hearings, the Senate Armed Services Committee should stress this need to all senior DOD appointees who will have a role in managing the acquisition system, and obtain their commitment to sustain their predecessors' reforms until it can be determined whether or not such reforms will succeed. More generally, the Congress should emphasize the need to sustain previously introduced reforms when it receives testimony from senior acquisition officials.

Conclusion

The foregoing recommendations hardly exhaust the very long list of undertakings both by the Congress and the DOD leadership to improve the acquisition system. It is widely acknowledged that the system remains broken. The current era of constrained budgets is a major forcing function for reform. Given the priority given to personnel-related costs and benefits, it is doubtful that the currently projected weapons systems acquisitions (as well IT related acquisitions) can possibly be sustained. The Congress should therefore seize upon the current budget reality to enforce changes in the acquisition system that have been overdue for far too long.

APPENDIX A:
Sample Letter Sent to Contributors

THOMAS R. CARPER, DELAWARE, CHAIRMAN

CARL LEVIN, MICHIGAN
MARK L. PRYOR, ARKANSAS
MARY L. LANDRIEU, LOUISIANA
CLAIRE McCASKILL, MISSOURI
JON TESTER, MONTANA
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TOM COBURN, OKLAHOMA
JOHN McCAIN, ARIZONA
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ROB PORTMAN, OHIO
RAND PAUL, KENTUCKY
MICHAEL B. ENZI, WYOMING
KELLY AYOTTE, NEW HAMPSHIRE

RICHARD J. KESSLER, STAFF DIRECTOR
KEITH B. ASHDOWN, MINORITY STAFF DIRECTOR

United States Senate

COMMITTEE ON
HOMELAND SECURITY AND GOVERNMENTAL AFFAIRS
WASHINGTON, DC 20510-6250

April 16, 2014

[redacted]

Dear [redacted]:

Every year, the Department of Defense (DOD) spends billions of dollars to acquire major weapons systems. Over the last twenty or so years, much has been said about how the DOD must reform how it procures major weapon systems and associated products and services. Despite the significant improvements made in the Weapon Systems Acquisition Reform Act and other recent acquisition reform legislation, inefficient, outdated, and (at times) imprudent practices continue to result in unnecessary waste. With the continuing likelihood of shrinking defense budgets requiring that DOD find a way to do more with less, there is more need than ever for the savings that would result from further acquisition improvements.

Against this backdrop, the Senate Permanent Subcommittee on Investigations intends to publish a compendium of views and insights of our country's leading experts on defense acquisition reform, in a print entitled *Defense Acquisition Reform: Where Do We Go From Here? A Compendium of Views by Leading Defense Experts*. The print will consist of five primary areas including: (1) Culture & Accountability; (2) Acquisition Policy; (3) Procurement Policy; (4) Budgeting & Resource Allocation; and (5) Requirements Process.

We invite you to provide us with your views as to the deficiencies in the defense acquisition process, the steps that should be taken to improve the efficiency and effectiveness of this process, and the extent to which recent legislative and policy reforms may have resulted in improvement to the system. To enable us to compile and understand the answers we receive, we are providing a list of more specific questions to guide your consideration of these issues. We ask that you submit an essay in response to the attached questions of five pages maximum-length (12pt font, single-spaced) to be included in the publication and request that your submission address some or all of the attached questions.

Please submit your contribution by **May 27, 2014** via e-mail to Brad Patout at [redacted]. Should you have any questions, please feel free to contact Mr. Patout or Moshe Schwartz, who will be supporting the Subcommittee's efforts, at [redacted].

We look forward to your contribution and thank you in advance for your time.

Sincerely,

John McCain
Ranking Minority Member
Permanent Subcommittee on Investigations

Carl Levin
Chairman
Permanent Subcommittee on Investigations

Attachment

APPENDIX B:
Sample Policy Questions Provided to Contributors

United States Senate

PERMANENT SUBCOMMITTEE ON INVESTIGATIONS

Committee on Homeland Security and Governmental Affairs

4/3/14

DEFENSE ACQUISITION REFORM COMPENDIUM

Culture & Accountability

1. What steps would you recommend to change the culture within the acquisition workforce to increase cost consciousness and pursue affordability as an operational requirement?

2. What steps would you recommend to develop the core competencies of the acquisition workforce and make it more capable of obtaining better value for the taxpayer—becoming as skilled a buyer as private industry is a seller?

3. What is your assessment of the Defense Acquisition Workforce Development Fund (DAWDF)? Do you believe that the DAWDF should be continued? Would you recommend any changes to the structure or function of the DAWDF?

4. How can the DOD better empower PMs and PEOs to make sound program management decisions and ensure accountability? Should the DOD restructure how PMs and PEOs are transitioned in and out of programs in relation to key decision points?

5. Do you believe that the qualification requirements established by the Defense Acquisition Workforce Improvement Act (DAWIA) are working, or would you recommend additional requirements or better enforcement of existing requirements enhance the performance of the acquisition workforce? What steps would you recommend to improve the qualifications of acquisition personnel holding key leadership positions or otherwise ensure that members of the acquisition workforce are fully qualified to meet their responsibilities?

6. What steps would you recommend to help ensure that top performers within the acquisition workforce are rewarded for their performance and empowered to manage programs with success?

7. What steps would you recommend to improve the recruitment, hiring, and retention of talented and capable mid- and senior-level executives to fill the growing number of high-level vacancies within the DOD acquisition workforce?

Please feel free to provide insight on any other related policy areas that are not expressly covered by the foregoing questions.

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United States Senate

PERMANENT SUBCOMMITTEE ON INVESTIGATIONS

Committee on Homeland Security and Governmental Affairs

4/3/14

DEFENSE ACQUISITION REFORM COMPENDIUM

Acquisition Policy

1. What changes would you recommend to the statutes, regulations, and policies governing DOD acquisition of major weapon systems to ensure that major weapon systems are delivered on time, at a reasonable cost, and provide the needed capability? For any recommended changes, please specify the statute, regulation, or policy and the precise change that you would recommend.

2. Do you see the need for any change to the current acquisition chain of command for our largest major defense acquisition programs, under which program managers report to program executive officers, who report to service acquisition executives, who report to the Under Secretary of Defense for Acquisition, Technology, and Logistics? What changes if any would you recommend to the role of the service chiefs in this process, as outlined in section 2547 of title 10, United States Code?

3. What changes if any would you recommend to how DOD tests major weapon systems to ensure that they will be delivered to combatant commanders on time, at a reasonable cost, and with the required capability? Do you support the concept of "fly before you buy" for major defense acquisition programs?

4. What changes would you recommend to ensure that DOD better addresses concurrency risk in the design, development, test, and production of major weapons systems to help ensure that they are not being procured while important design and/or testing activities are still ongoing? What is your view of the use of the requirement for prototypes, and where appropriate, competitive prototypes? What steps would you recommend to improve the transition of new technologies into major weapon systems?

5. What changes would you recommend to the process by which DOD identifies and mitigates risk (including but not limited to technological-, integration-, and manufacturing-risk) early in the lifecycle of major weapon systems? Is the Department making appropriate use of technology readiness levels and similar measures in the acquisition process?

6. What changes would you recommend to ensure that better accounts for full life-cycle costs, including the operation and sustainment costs, in the acquisition of major weapon systems?

7. To what extent should the DOD encourage the use of "time-certain development," "spiral development" and "incremental acquisition" strategies to procure major weapons systems? Should the acquisition process itself be shortened to reduce the decision-making cycle time and overhead costs associated with the acquisition of major weapons systems? If yes, how?

Please feel free to provide insight on any other related policy areas that are not expressly covered by the foregoing questions.

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United States Senate

PERMANENT SUBCOMMITTEE ON INVESTIGATIONS

Committee on Homeland Security and Governmental Affairs

4/3/14

DEFENSE ACQUISITION REFORM COMPENDIUM

Procurement Policy

1. What changes would you recommend to the statutes, regulations, and policies governing DOD procurement of major weapon systems to reduce the cost of contracts for major weapon systems and associated products and services? What additional changes would you recommend to ensure that non-traditional contractors are willing to enter the defense market? For any recommended changes, please specify the statute, regulation, or policy and the precise change that you would recommend.

2. What changes would you recommend to how DOD negotiates contracts for major weapon systems and associated products and services to ensure that the Department gets the benefit of reasonable prices for such contracts? What changes would you recommend to DOD's implementation of "should cost"-based management approaches to control costs associated with major defense acquisition programs and associated products and services?

3. What changes would you recommend to how DOD manages and oversees the performance of contracts for major weapon systems and associated products and services to ensure the efficient execution of such contracts at a reasonable cost?

4. What changes would you recommend to ensure that contractors' profits on major weapons programs align sufficiently with a contractor's performance?

5. Is the Department making appropriate use of fee-types and contract geometry? Aside from deciding on fee-type and contract geometry, what changes would you recommend to more effectively incentivize contractors to deliver these major weapons systems on time, at a reasonable cost, and with the needed capability?

6. What improvements would you recommend to DOD's use of Performance Based Logistics (PBL) contracts for the sustainment of major weapon systems?

Please feel free to provide insight on any other related policy areas that are not expressly covered by the foregoing questions.

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APPENDIX B:
Sample Policy Questions Provided to Contributors

United States Senate

PERMANENT SUBCOMMITTEE ON INVESTIGATIONS

Committee on Homeland Security and Governmental Affairs

4/3/14

DEFENSE ACQUISITION REFORM COMPENDIUM

Budgeting & Resource Allocation

1. What steps would you recommend to improve the resource allocation process that supports the DOD's acquisition of major weapons systems? What additional processes or mechanisms if any are needed to ensure coordination between the budget, acquisition, and requirements systems of the Department of Defense and ensure that appropriate trade-offs are made between cost, schedule, and performance requirements early in the acquisition process?

2. What steps would you recommend to maximize funding stability conducive to the DOD's planning, programming and budgeting for the acquisition of major weapon systems? What is your view of multi-year contracts, and when they should appropriately be used?

3. What steps would you recommend to ensure that DOD has the budget flexibility it needs to respond to emerging requirements and changed circumstances?

4. What changes to the resource allocation process would you recommend to improve the prioritization of requirements and ensure that DOD budgets are more effectively aligned with increasingly diminishing resources?

5. What changes would you recommend to the manner in which DOD presents information in its annual budget submissions, including the Future Years Defense Program (FYDP), including information on force structure, end-strength, modernization, and readiness levels, to enhance oversight of major weapons systems costs?

6. Do you believe that the DOD's current budget strategy for the acquisition of major weapons systems is affordable given historic cost growth in major weapons systems, costs of current operations, the continuing need for asset recapitalization, and pressure for unrelated "legacy" costs, including healthcare?

Please feel free to provide insight on any other related policy areas that are not expressly covered by the foregoing questions.

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United States Senate

PERMANENT SUBCOMMITTEE ON INVESTIGATIONS

Committee on Homeland Security and Governmental Affairs

4/3/14

DEFENSE ACQUISITION REFORM COMPENDIUM

Requirements Process

1. What changes if any would you recommend to the Joint Capabilities and Integration Development System (JCIDS) process and the role of the Joint Requirements Oversight Council (JROC) in the requirements process to ensure that major weapons systems are affordable, reliable, and responsive to the operational needs of the combatant commanders?

2. What changes to the acquisition process would you recommend to reduce the risk of requirements creep, or "gold-plating", in connection with the acquisition of major weapons systems?

3. To what extent should the combatant commanders play more of a role than they do today in the requirements process? What changes if any would you recommend to the role played by combatant commanders?

4. What changes to the requirements process would you recommend to ensure that operational requirements that are needed rapidly by combatant commander within their area of responsibility are satisfied in a timely manner? What changes would you recommend to address the risk that rapid acquisition could result in the proliferation of systems that will be difficult to maintain?

5. What improvements can be made in the DOD's use of market research in the requirements process to maximize small business participation in the acquisition of major weapons systems and associated products and services? How can we assure that small business innovations are effectively incorporated into major weapon systems?

6. What changes would you recommend to ensure the appropriate consideration of open-system architecture and the proper management of intellectual property rights in the acquisition of major weapon systems and associated technologies?

7. What is your view of Configuration Steering Boards? What steps would you recommend to make Configuration Steering Boards more effective in controlling the growth of requirements?

8. In connection with how the DOD generates and reassesses requirements throughout the lifecycle of a major weapons system, what improvements, if any, can be made to how the DOD manages the trade space among the cost, schedule, and performance parameters of those systems to ensure its overall affordability?

Please feel free to provide insight on any other related policy areas that are not expressly covered by the foregoing questions.

# # #

APPENDIX C: Contributor Topic Matrix

	Contributor	Additional workforce training needed	Align personnel tenure with key decision points	Attain realistic cost estimates early in the process	Attract and retain quality workforce	Culture change	Define and stabilize requirements early in the process	Encourage Innovation	Improve budget process	Improve leadership & accountability	Incentivize cost control	Prototyping / concurrency risk	Refine Goldwater-Nichols	Reintegrate Service Chiefs	Testing / "Fly Before You Buy"
1	Anderson, Frank	X	X		X	X									
2	Augustine, Norman		X		X	X	X			X	X	X	X	X	
3	Berteau, David	X	X		X		X	X			X		X		X
4	Blickstein, Irv	X	X		X			X	X	X			X	X	
5	Cartwright, James	X			X		X	X							X
6	Christie, Thomas	X		X		X	X		X	X		X	X		X
7	Etherton, Jonathan	X			X	X	X	X	X	X	X			X	
8	Fox, Christine	X	X	X	X	X	X		X		X				
9	Fox, J. Ronald	X	X	X	X	X					X	X			X
10	Francis, Paul	X	X	X	X	X				X	X	X			X
11	Gansler, Jacques	X		X	X				X	X	X				
12	Gilmore, J. Michael	X		X			X		X	X	X	X			X
13	Gordon, Daniel	X			X	X	X	X		X	X				
14	Greenwalt, William	X			X			X		X	X	X			X
15	Harrison, Todd							X			X				
16	Jonas, Tina			X	X				X						
17	Kaminski, Paul	X			X		X	X			X	X		X	X
18	Kendall, Frank	X			X			X			X				
19	Lehman, John					X				X	X				
20	McGrath, Elizabeth	X	X						X		X				
21	McNicol, David			X		X			X						
22	Morin, Jamie			X			X		X	X	X				
23	Oliver, David	X			X	X				X	X		X	X	
24	Roughead, Gary						X	X	X	X		X		X	X
25	Schinasi, Katherine	X			X	X	X			X	X				
26	Schwartz, Norton		X		X	X	X	X	X	X	X		X	X	
27	Stackley, Sean	X		X	X		X	X	X	X	X		X		
28	Sullivan, Michael	X	X	X	X		X		X	X	X	X			
29	Venlet, David	X		X	X										X
30	Ward, Daniel					X				X	X				
31	Zakheim, Dov	X	X		X			X	X	X				X	
		22 70.97%	11 35.48%	12 38.71%	22 70.97%	14 45.16%	15 48.39%	13 41.94%	15 48.39%	19 61.29%	22 70.97%	9 29.03%	7 22.58%	8 25.81%	10 32.26%

Note: While contributors were given specifc sets of topic questions based on their expertise, it was at the contributor's discretion to choose what issue areas to discuss. Those question sets are provided in Appendix B.

APPENDIX C: Contributor Topic Matrix

CULTURE & ACCOUNTABILITY

	Contributor	Additional workforce training needed	Align personnel tenure with key decision points	Attain realistic cost estimates early in the process	Attract and retain quality workforce	Culture change	Define and stabilize requirements early in the process	Encourage Innovation	Improve budget process	Improve leadership & accountability	Incentivize cost control	Prototyping / concurrency risk	Refine Goldwater-Nichols	Reintegrate Service Chiefs	Testing / "Fly Before You Buy"
1	Anderson, Frank	X	X		X	X									
2	Augustine, Norman		X		X	X	X			X	X	X	X	X	
3	Christie, Thomas	X		X		X	X		X	X		X	X		X
4	Etherton, Jonathan	X			X	X	X	X	X	X	X			X	
5	Fox, Christine	X	X	X	X	X	X		X		X				
6	Fox, J. Ronald	X	X	X	X	X					X	X			X
7	Francis, Paul	X	X	X	X	X				X	X	X			X
8	Gordon, Daniel	X			X	X	X	X		X	X				
9	Kendall, Frank	X			X			X			X				
10	McGrath, Elizabeth	X	X						X		X				
11	Oliver, David	X			X	X				X	X		X	X	
12	Schinasi, Katherine	X			X	X	X			X	X				
13	Schwartz, Norton		X		X	X	X	X	X	X	X		X	X	
14	Sullivan, Michael	X	X	X	X		X		X	X	X	X			
15	Venlet, David	X		X	X										X
		13 86.67%	8 53.33%	6 40.00%	13 86.67%	11 73.33%	8 53.33%	4 26.67%	6 40.00%	9 60.00%	12 80.00%	5 33.33%	4 26.67%	4 26.67%	4 26.67%

Note:
While contributors were given specifc sets of topic questions based on their expertise, it was at the contributor's discretion to choose what issue areas to discuss. The contributors listed above were provided the Culture & Accountability question set, which are provided in Appendix B.

APPENDIX C: Contributor Topic Matrix

ACQUISITION POLICY

	Contributor	Additional workforce training needed	Align personnel tenure with key decision points	Attain realistic cost estimates early in the process	Attract and retain quality workforce	Culture change	Define and stabilize requirements early in the process	Encourage Innovation	Improve budget process	Improve leadership & accountability	Incentivize cost control	Prototyping / concurrency risk	Refine Goldwater-Nichols	Reintegrate Service Chiefs	Testing / "Fly Before You Buy"
1	Augustine, Norman		X		X	X	X			X	X	X	X	X	
2	Blickstein, Irv	X	X		X			X	X	X			X	X	
3	Christie, Thomas	X		X		X	X		X	X		X	X		X
4	Fox, Christine	X	X	X	X	X	X		X		X				
5	Fox, J. Ronald	X	X	X	X	X					X	X			X
6	Francis, Paul	X	X	X	X	X				X	X	X			X
7	Gansler, Jacques	X		X	X				X	X	X				
8	Gilmore, J. Michael	X		X			X		X	X	X	X			X
9	Greenwalt, William	X			X			X		X	X	X			X
10	Kaminski, Paul	X			X		X	X			X	X		X	X
11	Kendall, Frank	X			X			X			X				
12	Lehman, John					X				X	X				
13	McGrath, Elizabeth	X	X						X		X				
14	McNicol, David			X		X			X						
15	Oliver, David	X			X	X				X	X		X	X	
16	Roughead, Gary						X	X	X	X		X		X	X
17	Schwartz, Norton		X		X	X	X	X	X	X	X		X	X	
18	Stackley, Sean	X		X	X		X	X	X	X	X		X		
19	Sullivan, Michael	X	X	X	X		X		X	X	X	X			
20	Ward, Daniel					X				X	X				
		14 70.00%	8 40.00%	9 45.00%	13 65.00%	10 50.00%	9 45.00%	7 35.00%	11 55.00%	14 70.00%	16 80.00%	9 45.00%	6 30.00%	6 30.00%	7 35.00%

Note:
While contributors were given specifc sets of topic questions based on their expertise, it was at the contributor's discretion to choose what issue areas to discuss. The contributors listed above were provided the Acquisition Policy question set, which are provided in Appendix B.

APPENDIX C: Contributor Topic Matrix

PROCUREMENT POLICY

	Contributor	Additional workforce training needed	Align personnel tenure with key decision points	Attain realistic cost estimates early in the process	Attract and retain quality workforce	Culture change	Define and stabilize requirements early in the process	Encourage Innovation	Improve budget process	Improve leadership & accountability	Incentivize cost control	Prototyping / concurrency risk	Refine Goldwater-Nichols	Reintegrate Service Chiefs	Testing / "Fly Before You Buy"
1	Anderson, Frank	X	X		X	X									
2	Etherton, Jonathan	X			X	X	X	X	X	X	X			X	
3	Gansler, Jacques	X		X	X				X	X	X				
4	Gordon, Daniel	X			X	X	X	X		X	X				
5	Greenwalt, William	X			X			X		X	X	X			X
6	Kendall, Frank	X			X			X			X				
7	Stackley, Sean	X		X	X		X	X	X	X	X		X		
		7	1	2	7	3	3	5	3	5	6	1	1	1	1
		100.00%	14.29%	28.57%	100.00%	42.86%	42.86%	71.43%	42.86%	71.43%	85.71%	14.29%	14.29%	14.29%	14.29%

Note:
While contributors were given specifc sets of topic questions based on their expertise, it was at the contributor's discretion to choose what issue areas to discuss. The contributors listed above were provided the Procurement Policy question set, which are provided in Appendix B.

APPENDIX C: Contributor Topic Matrix

BUDGETING & RESOURCE ALLOCATION

	Contributor	Additional workforce training needed	Align personnel tenure with key decision points	Attain realistic cost estimates early in the process	Attract and retain quality workforce	Culture change	Define and stabilize requirements early in the process	Encourage Innovation	Improve budget process	Improve leadership & accountability	Incentivize cost control	Prototyping / concurrency risk	Refine Goldwater-Nichols	Reintegrate Service Chiefs	Testing / "Fly Before You Buy"
1	Berteau, David	X	X		X		X	X			X		X		X
2	Fox, Christine	X	X	X	X	X	X		X		X				
3	Harrison, Todd							X			X				
4	Jonas, Tina			X	X				X						
5	Kendall, Frank	X			X			X			X				
6	Lehman, John					X				X	X				
7	McNicol, David			X		X			X						
8	Morin, Jamie			X			X		X	X	X				
9	Oliver, David	X			X	X				X	X		X	X	
10	Stackley, Sean	X		X	X		X	X	X	X	X		X		
11	Zakheim, Dov	X	X		X			X	X	X				X	
		6 54.55%	3 27.27%	5 45.45%	7 63.64%	4 36.36%	4 36.36%	5 45.45%	6 54.55%	5 45.45%	8 72.73%	0 0.00%	3 27.27%	2 18.18%	1 9.09%

Note:
While contributors were given specifc sets of topic questions based on their expertise, it was at the contributor's discretion to choose what issue areas to discuss. The contributors listed above were provided the Budgeting & Resource Allocation question set, which are provided in Appendix B.

APPENDIX C: Contributor Topic Matrix

REQUIREMENTS PROCESS

	Contributor	Additional workforce training needed	Align personnel tenure with key decision points	Attain realistic cost estimates early in the process	Attract and retain quality workforce	Culture change	Define and stabilize requirements early in the process	Encourage Innovation	Improve budget process	Improve leadership & accountability	Incentivize cost control	Prototyping / concurrency risk	Refine Goldwater-Nichols	Reintegrate Service Chiefs	Testing / "Fly Before You Buy"
1	Berteau, David	X	X		X		X	X			X		X		X
2	Blickstein, Irv	X	X		X			X	X	X			X	X	
3	Cartwright, James	X			X		X	X							X
4	Kaminski, Paul	X			X		X	X			X	X		X	X
5	McGrath, Elizabeth	X	X						X		X				
6	Roughead, Gary						X	X	X	X		X		X	X
7	Schwartz, Norton		X		X	X	X	X	X	X	X		X	X	
8	Sullivan, Michael	X	X	X	X		X		X	X	X	X			
9	Venlet, David	X		X	X										X
10	Ward, Daniel					X				X	X				
		7 70.00%	5 50.00%	2 20.00%	7 70.00%	2 20.00%	6 60.00%	6 60.00%	5 50.00%	5 50.00%	6 60.00%	3 30.00%	3 30.00%	4 40.00%	5 50.00%

Note:
While contributors were given specifc sets of topic questions based on their expertise, it was at the contributor's discretion to choose what issue areas to discuss. The contributors listed above were provided the Requirements Process question set, which are provided in Appendix B.