



Eight Actions to Improve Defense Acquisition



Jacques S. Gansler
William Lucyshyn

University of Maryland

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Jacques S. Gansler

Professor and Roger C. Lipitz Chair
Center for Public Policy and Private Enterprise
School of Public Policy
University of Maryland

William Lucyshyn

Director of Research, Senior Research Scholar
Center for Public Policy and Private Enterprise
School of Public Policy
University of Maryland



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Foreword

On behalf of the IBM Center for The Business of Government, we are pleased to present this report, *Eight Actions to Improve Defense Acquisition*, by Jacques Gansler and William Lucyshyn, University of Maryland.

The authors present eight significant actions that the federal government can take to improve the federal acquisition process. While the report centers on acquisition in the Department of Defense (DoD) because of its dominant size in the federal budget, the eight proposed actions—which build on previous acquisition reforms including increased competition, more use of best value contracts, expanding the supplier base, and better tailoring of contract types to contract goals—apply to civilian agencies as well. The authors emphasize the urgency of acquisition reform in DoD given budgetary constraints and security challenges, finding that “DoD will need to gain every possible efficiency, while resisting the temptation to buy defense on the cheap.”

This report continues the IBM Center's interest in better understanding and improving the federal government acquisition process. In 2013, The IBM Center released two reports in our Acquisition series. The first report, *Controlling Federal Spending by Managing the Long Tail of Procurement*, by David Wyld, provides the first quantitative analysis and recommendations about government “tail spend” (smaller, non-core expenditures that often receive less attention in cost control but can add up to a large overall amount).



Daniel J. Chenok



Deborah L. Kotulich

A second report, *A Guide for Agency Leaders on Federal Acquisition: Major Challenges Facing Government*, by Trevor Brown, addresses three challenges facing government executives in the area of acquisition. These challenges include navigating the regulatory and oversight landscape, mitigating acquisition risk through contract design, and improving the acquisition workforce. Like the Brown report, this report highlights the importance of strengthening the federal acquisition workforce.

Taken together, these three reports set forth a clear agenda for improving acquisition at DoD and across the government. Current fiscal constraints call for consideration of major changes in acquisition policy and procedures. These reports offer insight on how government leaders can build a roadmap to improve performance while saving costs. We hope that these reports will assist government executives in effectively addressing acquisition challenges.



Daniel J. Chenok
Executive Director
IBM Center for The Business of Government
chenokd@us.ibm.com



Deborah L. Kotulich
Partner
IBM Global Business Services
kotulich@us.ibm.com

Executive Summary

The Challenge of Acquisition Reform

The U.S. Department of Defense (DoD) has made numerous attempts to reform its acquisition system over the last 50 years. These initiatives, combined with many in Congress, have produced only modest improvements. Although the wartime requirements of the global war on terror produced some significant acquisition initiatives—e.g., the mine resistant ambush protected vehicles (MRAPs), improvised explosive device (IED) defeat systems, the Joint Direct Attack Munition (JDAM) precision guided missile, and others—DoD's overall acquisition system has experienced little noteworthy improvement. This generally mediocre performance (in terms of cost and schedule) was masked by the ever-increasing DoD budgets in the post-9/11 era. Additionally, during the last decade, DoD's acquisitions also experienced a major shift. Of approximately \$400 billion spent on contracts for goods and services in FY 2011, over half was spent on services (Defense Science Board, 2011). Yet the rules, policies, and practices are based solely on buying goods; and there are differences in optimizing the procurement of a tank and an engineer.

In light of the current financial climate in Washington (with reduced defense dollars), it is likely that there will be increased pressure to find innovative strategies to maximize the effectiveness and efficiency of DoD's investments in order to affordably meet all operational requirements and modernization needs in sufficient quantities. And, as DoD seeks to transform itself for the 21st century, it can anticipate an extended period of downward budgetary pressure. Moreover, growing costs will require difficult choices for DoD just to maintain the status quo. Consequently, DoD must spend every dollar with the objective of getting the best value for the department.

In an effort to curb or reduce the cost of DoD's acquisitions, while continuing to maintain required capabilities in an environment of shrinking budgets, the Obama administration has emphasized a series of acquisition initiatives. But, as DoD's many organizations and agencies attempt to implement these initiatives, they often lose sight of the real intent—to improve performance with the dollars available—and instead focus on achieving zero deviation from the detailed acquisition guidance. This results in the development of perverse incentives, which often do not produce the desired effects.

The following eight actions will improve the results of acquisition programs, and, at the same time, strengthen the industrial base.

Action One: Use Appropriate Forms of Competition During All Phases of Acquisition

Competition provides incentives to not only reduce costs, but equally important, to produce higher performance and higher quality products faster, while focusing more attention on customer needs. Using appropriate forms of competition throughout the acquisition cycle will help ensure that its significant benefits are realized. The administration has emphasized the use of

competitive contracting, and within DoD, the initial Better Buying Power initiative mandated that all service contracts be recompeteted every three years (independent of performance and costs achieved). This, however, creates a disincentive for firms to make investments that will improve the program's performance. As a result, this mandatory recompetition would constrain innovation and, ultimately, unnecessarily increase program costs. Competition should not be for its own sake, but should be used as an incentive for higher performance at lower costs. In the above case, it could result in the winner getting a follow-on award (i.e., reward) after three years, if they actually got higher performance at lower-and-lower costs.

Action Two: Improve the Effectiveness of Indefinite Delivery/Indefinite-Quantity Contracts

Another increasingly popular strategy in the past decade has been the expanded use of Indefinite Delivery/Indefinite Quantity (IDIQ) umbrella contracts. When structured and used effectively, these contracts offer several advantages. However, today agencies often award a large number of duplicative contracts, and many of the contracts qualify large numbers of firms (e.g., the Army's STOC-II contract qualified some 142 offerors, while the Navy's SeaPort initial contracts cover 2200 contractors for possible future tasks), and some require each contractor to submit a proposal for every task order. As a result, a great deal of inefficiency is often introduced. The following steps should be taken to improve the effectiveness of IDIQ contracts.

- First, organizations should strive to provide a real two-step process for services, selecting no more than five (and preferably only two or three) well-qualified providers for a narrowly scoped requirement area.
- Second, government agencies, DoD in particular, should work to reduce the number and scope of IDIQ contracts—a smaller number of the contracts could be used more frequently, with more rigorous oversight.
- Third, organizations should ensure there are adequate timetables for proposal preparation. If there are more than two or three firms, the government should not require all contractors to bid on every task order.

Currently, firms spending money on unsuccessful proposals raise their overhead costs to the government, making them less competitive and more expensive overall.

Action Three: Use a Best Value Tradeoff Selection Strategy for Complex and Most High-Knowledge-Content Work

The FAR identifies the "lowest price technically acceptable" (LPTA) process as suitable when the government is expected to receive the best value by selecting the technically acceptable proposal with the lowest evaluated price (FAR, 2011). As a result, LPTA has successfully been used for the purchase of items that are commodities, where there is little performance or quality difference among competing offerings.

Many organizations within DoD, however, have responded to the budgetary pressure by emphasizing the use of LPTA for source selections on differentiated goods and services. Since there is often mission value in providing solutions above the minimum prescribed, when contracting for complex goods and professional services (e.g., industry-developed innovations, more qualified personnel, and long-term cost reductions) for these acquisitions, the cost/performance tradeoff source selection is the better choice.

Action Four: Use Cost-Reimbursable Contracts for System Development

DoD periodically embraces fixed-price development contracts in its effort to control cost growth and shift more of the responsibility and risk to the contractor. Contrary to popular belief, the use of fixed-price contracts during development of major defense acquisition programs (MDAPs) may not eliminate, or even reduce, cost overruns. In fact, fixed-price development contracts have often resulted in significant cost growth.

DoD MDAPs are often associated with a high level of uncertainty that may stem from a variety of sources, including the use of immature technologies or budgetary challenges (e.g., stretch-outs of funding), and the need to make changes (to meet changing mission requirements) as the design matures. Consequently, DoD should rely on cost-reimbursement contracts for system development.

Action Five: Remove Barriers to Buying Commercial Products and to Dual-Use Industrial Operations

Combining civil and military industrial activities (from engineering through production and support) has the potential for very large economies of scale, along with more rapid technology transfer of both product and process technologies between the sectors. The U.S., however, has explicit acquisition policies that greatly discourage dual-use industrial operations (e.g., specialized cost accounting requirements) that result in added costs to products and services.

As a result, this policy forces most firms to separate their government and commercial operations. Similarly, export controls discourage commercial firms from doing defense work. Because of such legislative and regulatory barriers, the U.S. loses the economic and security benefits of dual-use operations. DoD should work to reduce these barriers and leverage the benefits of buying commercial products and services.

Action Six: Where Possible, Reduce the Government Monopoly through Public/Private Competitions (On Non-Inherently Governmental Work)

Congress has effectively directed an end to all public/private competitions, although an extensive history, with thousands of cases, demonstrates that these competitions produce average savings of over 30 percent—regardless of which sector wins. During President Obama's first term, both the White House and the Pentagon took the opposite approach, and began aggressively pushing for bringing work in house (a process known as insourcing). DoD proposed to insource over 33,000 positions, with the belief that this initiative would save up to \$44 billion annually (based on the incorrect comparison of the hourly pay of government employees to the fully loaded prices of industry workers).

When the insourcing was not producing the anticipated cost savings, it was cancelled by then-Secretary of Defense Robert Gates. The critical issue with regard to whether the work should be done in the public or private sector, however, is the presence or absence of the cost and performance incentives introduced by competition—whether this is private vs. private, or public vs. private competition—and only applied when the work to be accomplished is not inherently governmental (i.e., commercial).

Action Seven: DoD Should Work to Realize the Benefits of Globalization, Both Economic and Security

Today, technology, industry, and labor are globalized; and in many areas, the U.S. no longer is the technological leader. In order for the 21st-century defense industrial base to remain cognizant of all emerging technologies, defense firms must have the ability to openly interact with U.S. allies and trading partners. This globalized defense market will not only aid the U.S. in

the development of advanced military capabilities, but it will also contribute to the expansion of domestic commercial technologies, strengthening political and military ties, and providing significant economic benefits. The U.S. must gain the benefits from globalization, but today there are laws, policies, and practices that are barriers to these economic and security benefits.

Action Eight: Recruit and Retain a World-Class Acquisition Workforce

DoD's civilian acquisition workforce is not currently adequate to the needs of the 21st century. Moreover, a majority of the personnel are approaching or have already reached retirement age, and the new hires are not adequate in number nor sufficiently experienced to replace outgoing workers. Nor are there mentors available to guide them. As DoD's weapons systems, and their support structure, become more complex, the need for highly skilled acquisition personnel becomes even more vital. Consequently, DoD requires an acquisition workforce with the needed skillset. This skillset includes cutting-edge technical, analytical, and management knowledge and experience, as well as a full understanding of industry operations and incentives.

Acquisition Challenges Facing the Department of Defense

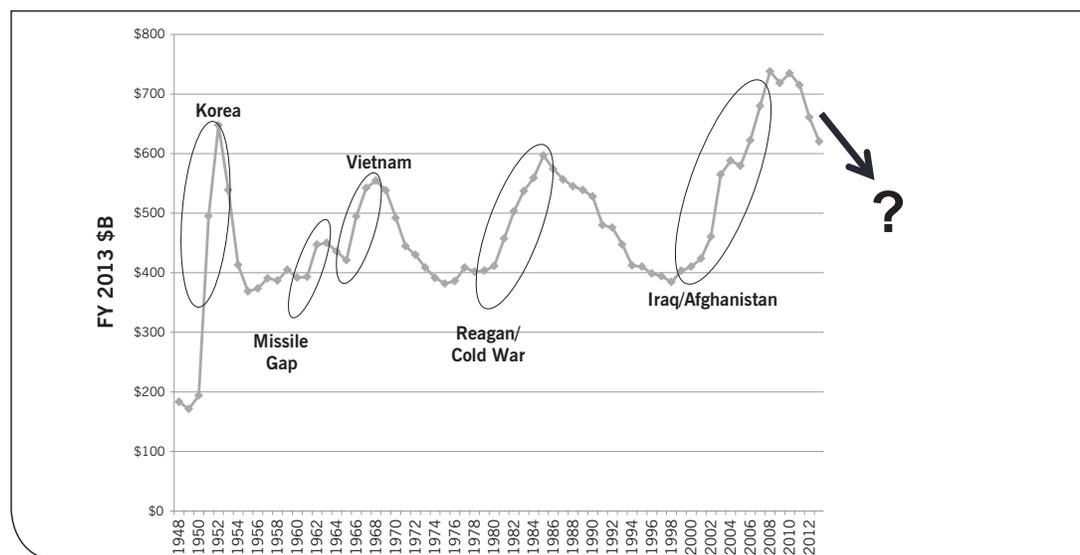
The rising cost of new weapons systems has long been a concern for the Department of Defense (DoD). In an effort to constrain this, there have been numerous attempts to reform DoD's acquisition system.

During the post-9/11 period, the wartime requirements of the "global war on terror" produced some significant successes (e.g., the mine resistant ambush protected vehicles (MRAPs), improvised explosive device (IED) defeat systems, the JDAM precision-guided missile). However, DoD's overall acquisition system has continued to show little improvement. This generally mediocre performance (in terms of cost and schedule) was masked by the ever-increasing DoD budgets during this period.

The nation's future economic situation, however, will greatly constrain DoD funding. Mandatory federal budget expenditures—particularly Social Security, Medicare, and Medicaid—will continue to increase, thus reducing resources available for the nation's discretionary spending (of which DoD's budget is, by far, the largest).

From a historical perspective, DoD's budget has traditionally been cyclical, increasing during times of conflict or tension to defend the nation's interests, then decreasing dramatically (Figure 1). During times of crisis, the nation increased DoD's spending. These defense build-

Figure 1: Trends in Defense Appropriations



Source: DoD Comptroller National Defense Budget Estimates for FY 2013: The Green Book. Note: 2013 includes \$88.5 billion supplemental appropriations request.

ups peaked at (in constant FY 2013 dollars): \$623B in FY 1952 for the Korean War, \$547B in FY 1968 for the Vietnam War, \$586B in FY 1986 for the Cold War buildup, and \$719B in FY 2009 for the wars in Iraq and Afghanistan. However, the average DoD appropriated budget (plus supplementals) during that six-decade period was only \$478 billion.

Clearly, as U.S. involvement in Afghanistan ends (assuming no new, extended operations), a significant decrease in DoD's budget can be expected. If the required force structure is to be modernized and maintained, hard decisions and a reengineering of processes will be required to ensure the most efficient and effective use of available resources. Growing costs (e.g., of energy, medical care, salaries, and inflation) will require difficult choices just to maintain the status quo of the U.S. security posture.

As DoD adjusts to these reduced budgets, it will operate within a global security environment that continues to present a wide range of threats that have increased significantly since the start of the 21st century. Not only must DoD continue with its operational commitments (e.g., in Afghanistan), but there are other instabilities caused by the continued evolution of transnational terrorism, the proliferation of weapons of mass destruction, the growing cyber threat, and potential regional threats such as those in Africa, the Middle East, and the Far East.

In addition, other influences will impact DoD's acquisition environment. Most prominent is the nation's defense industrial base. Following DoD's post-Cold War budget cuts, DoD strongly encouraged the defense industry to consolidate, in some cases even reimbursing firms for the costs of merger and acquisition activities. Consolidation has reduced the number of major defense contractors from approximately 50 to just six major prime contractors. Thus, during the current period of high defense spending, DoD has been reliant on this handful of firms. Furthermore, vertical integration, by these remaining firms, has also consolidated the industry in the lower tiers.

Additionally, DoD's own acquisition workforce was sharply reduced (approximately 60 percent between fiscal years 1990 and 2006) in the post-Cold War period (Commission Report, 2007). These reductions were made without a strategic vision of what would be needed in the future and relied on voluntary turnover, retirements, freezes on hiring authority, and mandated congressional cuts. As of February 2011, approximately 16 percent of acquisition workforce civilians were eligible for full retirement, and 18 percent would become eligible within five years. These retirees were being replaced by new hires and interns. In 2013, 55 percent of DoD's acquisition workforce had less than five years of experience. By 2021, approximately 50 percent of the acquisition workforce will be eligible to retire (DAWDF 2011). Moreover, increases in post-9/11 military expenditures were not matched by an increase in DoD acquisition personnel. So the workload greatly expanded as the acquisition workforce continued to decline.

Prior Attempts at DoD Acquisition Reform

There have been various efforts to improve DoD's acquisition performance. These notably include:

- Carlucci Initiatives (1981)
- Grace Commission (1983)
- Packard Commission (1986)
- Defense Management Review (1989)
- National Performance Review (1993)
- Defense Reform Initiative (late 1990s)
- Defense Acquisition Performance Assessment (2006)

As a result of these reviews, there have been many improvements to acquisition processes, as well as improved training and professionalization of the acquisition workforce. However, the performance of individual programs has still been plagued by cost growth and schedule slips, which have remained remarkably consistent.

In 1982, the Congressional Budget Office reported that average weapon systems cost growth, taking inflation into account, was five to six percent per year during the 1970s (Singer, 1982). The GAO reported in 1987 that the total Selective Acquisition Report systems cost estimates grew by more than 40 percent over the base year estimates (GAO 1988). In 1993, RAND found that since the 1960s, there was no substantial reduction in the rate of cost growth, despite numerous initiatives to address cost growth (Drezner, et al. 1993). A more recent RAND report examined 46 completed weapons systems programs over the course of three decades, between 1970 and 2000, and compared the costs at major acquisition decision milestones with their initial cost estimates (Arena, et al. 2006). The report concluded that the average adjusted total cost for a completed program grew by approximately 46 percent and further concluded that among completed and ongoing programs, each decade saw similar increases in program costs.

One of President Obama's 2008 campaign themes was fixing government contracting. He wrote that:

Federal spending on contracts more than doubled under the Bush administration, from \$203 billion in 2000 to \$412 billion in 2006. Agencies such as the Department of Defense and the Department of Energy spend more than half of their budgets on contracted products. But the GAO has found that agencies often get bad results, including overcharges and underperformance, in part because of bad contract procedures and a lack of oversight. Moreover, federal agencies are increasingly seeking to contract out functions that should be done by the government. The privatization of IRS collection functions, military training and the administration of the GI Bill for veterans are examples of this.

He then pledged to reform federal contracting and reduce the number of contractors, and to cut spending on contractors by at least 10 percent (Obama 2008).

Early Obama Administration Acquisition Guidance

Early in his administration, President Obama released a *Memorandum on Government Contracting* to address these concerns. The *Memo* directed federal agencies to improve the effectiveness and efficiency of the federal acquisition system by focusing on the following priorities:

- Strengthen the management of contracts to achieve program goals, while cutting wasteful spending
- Build the skills of the acquisition workforce, to ensure that it can develop, manage, and oversee acquisitions appropriately
- Maximize the use of “full and open,” and other competitive procurement processes
- Clarify the role of outsourcing, particularly when it is inappropriate
- Improve how contracts are structured, with a preference for fixed-price type contracts (Obama 2009)

This *Memo* was followed in July 2009 by a more detailed memorandum from the director of the Office of Management and Budget. This memorandum expanded the guidelines, but also mandated savings of seven percent of contract spending by the end of FY 2011, and a reduction of 10 percent of the dollars obligated in FY 2010 under new contract actions awarded with “high-risk”¹ contracting authorities (Orszag 2009).

The Obama administration, in its efforts to address the outsourcing which was perceived as excessive, gave the insourcing initiative a new prominence and made it a top priority. There was a concern, expressed in the president’s *Memo*, that the scale and scope of the contracted support was too great, so as to preclude effective oversight by government personnel (Obama 2009). Within DoD, this guidance was promulgated by a deputy secretary of defense memorandum that outlined the authorities and criteria for insourcing decisions, and established a process for prioritizing and implementing insourcing actions (Lynn 2009). The FY 2010 appropriation bill included \$5 billion for insourcing in DoD; this included a mandate to insource inherently governmental jobs. Congress estimated that moving those jobs in-house would save \$44,000 per year for each position insourced (Cornin 2010).

Of course, a key issue here is to define what is inherently governmental. In the past (e.g., in the Bush administration), it was found that thousands of jobs that were not inherently governmental (e.g., 50 percent of all weapons maintenance work) were being performed by government employees (sole-source), and when this work was competitively sourced (via public/private competitions, using OMB Circular A-76 as guidance), there were large savings (over 30 percent, on average, no matter which sector won) and significant performance improvements (Gansler 2003).

Congress subsequently (in 2009) legislated against continuing these public/private competitions—in spite of the fact that then-Secretary of Defense Robert Gates said that the expected savings from insourcing were not being realized.

1. These contracts were identified as noncompetitive, cost-reimbursement, and time-and-materials contracts.

Better Buying Power Initiative

In the spring of 2010, there was a recognition by the secretary of defense that the current fiscal environment would not support the continued budgetary growth that DoD had experienced in the previous decade. To continue funding the necessary force modernization initiatives, DoD would need to reduce inefficiencies in its acquisition of its goods and services. To that end, the under secretary of defense (for acquisition, technology, and logistics) introduced the Better Buying Power initiative, which contained 23 actions, grouped into five areas, aimed at improving efficiency and “doing more without more” (Carter 2010a, 2010b). Notably, one of the areas focused on competition. The guidelines required the consideration of competition at each program milestone, and required more frequent recompetes—limiting single-award service contracts to three years. This has the unintended consequence of removing the incentive on the current contractor to limit their prices (since they can simply buy-in at the next competition). Rather, it would create the desired incentive if the guideline were to require competition in three years, *unless* the current contractor achieved higher and higher performance, with lower and lower costs—in which case, as a “reward for results achieved,” they would receive a three-year contract extension, containing the same clause.

One unintended consequence of the increased focus on reducing cost was the trend to use the lowest price technically acceptable (LPTA) source selection strategy, where the acquiring organization sets a technical standard, then selects the lowest-priced bid that meets the standard. While this selection methodology is appropriate for interchangeable products or services (i.e., commodities) it is inappropriate (vs. best value) for most differentiated products or services.

This initiative was refined two years later with the introduction of Better Buying Power 2.0. This new version increased the number of acquisition initiatives to 35 in seven focus areas. Even as there was an effort to address a concern with the overuse of LPTA—by stating that when used, the department needs to define technically acceptable in such a way as to ensure adequate quality—it is something very difficult for inexperienced buyers to do (Kendall, 2012), particularly in the case of professional services.

DoD acquires a wide variety of goods and services, and although there are many similarities between requirements and programs, there are also many differences. To achieve the best results, each acquisition strategy should be tailored to the specific circumstances. This requires a great deal of judgment and the appropriate degree of latitude. But, as DoD’s many organizations and agencies attempt to implement these initiatives, they have often lost sight of the real intent—to improve performance, while reducing costs—and instead have focused on achieving zero deviation from the guidance. This focus on compliance then creates perverse incentives for industry, and fails to achieve the desired results.

Eight actions can be taken to improve the results of acquisition programs, and, at the same time, strengthen the industrial base.

Eight Actions to Improve Defense Acquisition and the Defense Industrial Base

Action One: Use Appropriate Forms of Competition During All Phases of Acquisition

Introduction to the Competition Challenge

Competition, built in from the beginning of acquisition planning, is critical to ensure that its incentivizing benefits can be harnessed throughout the process. Because of the current, phased design and development requirements for systems acquisition, natural cutoff points exist for competition to be introduced into the process. Competition is largely accepted for the initial design award and even for the prototype phase; and increasingly at the initiation of development and for initiation of production. Competition during production, however, is often resisted; even though it is the key to ensuring a real incentive is given for contractors to ensure they meet cost, schedule, and performance requirements. Cost savings that can be achieved with competition during production can be significant, and it should be encouraged in all its various forms and options. In those special cases where dual-source production may not be practical, as long as the single source continues to improve performance and lower costs, then they should be rewarded with the follow-on contract. However, the option for competition should, if possible, be maintained; it may be used if the desired results are not achieved.

When competition is used during sustainment (using performance-based logistics), there is the potential to significantly improve performance, while lowering the total ownership costs of DoD's systems. Within the approximately \$190 billion annual logistics budget, performance improvements are required and potential savings are significant. This can free-up needed funds for force modernization.

Competition for services is different from other types of competition (e.g., for programs or goods). However, mandated competition (e.g., "compete all services after three years") is a disincentive (vs. award of follow-on if performance improves and costs fall). Again, the important factor is to provide an incentive, for those providing the services, to be efficient and effective.

The Problem: Improper Use of Competition

Competition is a critical component of efficiency and improved performance in both the public and private sectors. When used appropriately, competition provides incentives to produce better products faster, and to improve services—all at lower costs, while focusing more attention on customer needs. Over the years, many American industries have risen to their most productive and profitable levels when they were subject to the greatest amount of competitive force. Even though there are significant differences between traditional commercial markets and the defense industry, competition creates the same incentives and can have the same beneficial effects in defense acquisitions. Recognizing these benefits, Congress passed the Competition in Contracting Act of 1984. The law's mandate is clear—competition is very beneficial, so maximize its use; it is, generally, extensively used. In FY 2012, DoD competed over 85 percent of all contract actions, based on data from the Federal Procurement Data System.

However, competition for defense weapon systems is very different than that experienced in most civilian markets. For example, in the civilian automobile market, when one car manufacturer increases the price of their vehicles, there are substitutes; consumers can buy other, similar, vehicles from other firms. By contrast, if a defense supplier significantly raises the price of a specific weapon system, in most cases DoD has little choice except to attempt to negotiate the price down.

One other unique feature of DoD's weapons acquisition process is the long program duration, broken down into several distinct phases. Consequently, there are a large number of sequential decisions and contract negotiations that take place between DoD and the sole prime contractor, resulting, in part, from the government's institutional preference for short-term sequential decisions (including funding decisions). These long-term programs generally also have many changes to product requirements and specifications over time as threats change, technology changes, geopolitics change, etc. Commercial markets, on the other hand, typically have more simplified and continuous transaction processes.

Types of Competition

Because competition is (or often should be) used during the various phases of weapon system acquisitions, it is important to understand these differences. The best-known type, of course, is competition for an initial award, such as for a weapon's development. The different types of competition are discussed below.

Competition for Development

Competition for development occurs when multiple contractors compete to take advanced technology and match it to a military mission. There is often a vigorous competition for this design stage, which can take three to eight years—depending on how much new technology has to be demonstrated. Development contracts are generally awarded to the contractor who promises to develop the most capable system at the lowest price. This stage ends with the selection of a preferred design or designs, and a decision to build a prototype of the weapon (Gansler 1989). During this phase, the competitive environment fosters the development of innovative approaches to meet DoD's mission requirements. Once the development contract is awarded (unless there is a prototype competition during development) the program transitions to a sole-source environment; so there is little incentive for the winner to strive to improve performance, reduce cost, and maintain the program schedules.

Competition During Development

There is an opportunity to maintain continuous competition during the development/prototype phase. However, based on the expense, when it is implemented, the number of competitive contractors for advanced weapon systems is normally limited to two. This stage typically takes from two to seven years (Gansler 1989). For example, two contractor teams (Northrop/McDonnell-Douglas and Lockheed/Boeing/General Dynamics) were selected for the initial demonstration/validation phase fly-off between the YF-22 and YF-23, the original designations of the eventual winner of the F-22. By sponsoring the concurrent development of two or more competing weapon systems, or key subsystems, which represent potential substitutes for filling a presumed military need, the government can hedge against uncertainties.

Using this approach reduces the risk of being committed to an unsatisfactory approach with no alternative, and increases the probability of obtaining an acceptable end product (Scherer 1964). More important, competitive pressure during development results in less expensive, more technologically innovative, and better-integrated systems; this leads to significant lifecycle cost savings. In another example, two prime contractors (Martin Marietta and McDonnell Douglas) competed against each other during development of the Joint Direct Attack Munition

(JDAM). The impact was significant; development time was reduced by 33 percent, development cost by 42 percent, and the average per-unit cost was reduced by more than 50 percent (Meyers 2002).

Competition for Production

After weapon system development is complete, DoD can move to production. When there is only a single contractor in the development phase, the production contract must be negotiated in a sole-source environment. When two alternate systems are developed, DoD can compete the two contractors for the production effort—assuming both designs meet the mission requirements. From that point on, the production can essentially be viewed as the award of a sole-source contract.

Competition During Production

Continuous competition aimed at achieving best value, not just lowest cost, is the demonstrated model in the commercial world. There are times when competition can be maintained during production, in the defense case. This produces a natural tension between reaping the benefits of learning and experience and the economies of scale with a single-source award, versus the significant benefits gained from competition. When learning curves² are employed to project the cost of DoD sole-sourced produced systems, the projected learning is rarely achieved. Without the presence of a competitive market, there is little incentive for the contractor to continuously work to gain greater efficiencies. In fact, the then-monopolist has a perverse incentive (i.e., to raise costs on an item or service required by DoD).

With competition during production, firms compete in phases for the award of additional production (or a share thereof) during the production process. This eliminates the monopolistic tendencies that occur from a sole-source, award-winning producer. Ultimately, competition during production results in higher performance at lower costs, and steeper learning curves achieved by both suppliers. Numerous historical studies have demonstrated cost savings benefits, ranging from 12 percent to 52 percent, of including competition during production (Defense Science Board, 1996). These results have been reaffirmed in a more recent study that concluded that dual-sourcing during production produced net savings on the order of 20 percent even after considering the added costs of two sources and the reduced quantities of both suppliers. (Lyon 2006).

An example of the benefits of continuous competition during production (for a share of the total buys) is “the Great Engine War,” for the engines of the F-16 and F-15 aircraft. Here, both engine suppliers achieved higher and higher performance, with lower and lower costs. The Air Force estimated a net lifecycle cost savings of \$4 billion, all as a result of the continuous competition (Kennedy 1985).

Finally, it should be noted that pricing for sole-source production contracts is often based on historical costs; this creates (as noted above) a perverse incentive for the contractor to increase, rather than to reduce costs. This problem is easily avoided with competitive, dual-source production. For this reason, in the defense environment, sole-source learning curves are usually flatter than projected. In many cases, the total program costs have shown significant increases.

2. Learning curve theory expresses the relationship between experience and efficiency, and is often used as a measure of efficiency in manufacturing. The underlying premise is that as individuals and/or organizations become more experienced at a task, they usually become more efficient as well. Learning curve theory demonstrates the relationship that links experience doing (learning) a task, and increased levels of efficiency in performance of that task. However, this theory is based on the presence of incentives (such as competition) to encourage moving down the learning curve.

The benefits of competition during system development and production are well recognized; and competition at each program milestone is recognized in the Better Buying Power initiative:

Since it is not practical to develop two of everything the Department needs, competition must be found in other forms. Program managers should have a competitive strategy for their program even if they do not have classic head-to-head competition. This might take the form of a related program that could serve as partial substitute for the program in question, a plan to re-gain competition in an unproductive sole source situation, breakout of subcontracted work, adapting commercial products, or other strategies (Carter, 2010b).

However, the Air Force has recently resisted competition during production on two of its biggest procurements: the second engine for the F-35 fighter aircraft (in spite of the lessons learned in the Great Engine War) and the replacement for the refueling tanker aircraft.

There apparently was a belief that “this time, the government will get it right” and DoD would be able to limit the program changes driven by new technology, new threats, and new mission needs; and they would be able to constrain costs. But history has shown repeatedly that, in a monopolistic environment, such cost control is unlikely to happen. The GAO recently reported that more than half of all aircraft programs are known to experience design problems and cost growth (GAO, 2011). On the other hand, cost control is very likely to happen in a continuously competitive environment, in which industry is given incentives to reach goals in performance and cost. This was clearly demonstrated (as noted above) with the engines for the F-16 and F-15. As noted, both contractors achieved higher performance and higher reliability at lower costs, with an acknowledged net savings to the Air Force of billions of dollars. The GAO concluded that competing the second engine for the F-35 has the potential for savings that exceed the cost for developing the alternate engine, much like in the Great Engine War (GAO, 2007). In retrospect, the decision to abandon the second engine may have been an expensive one, since the selected engine continues to suffer with reliability issues (Shalal-Esa, 2013)

With the Air Force tanker program, both proposed aircraft were based on existing commercial airframes that would have been suitable replacement tankers (and both aircraft had already been modified and qualified as tankers, and have been bought by several countries). Consequently, this case was different from most Air Force aircraft development programs, since the Air Force can leverage the extant commercial production. Maintaining two production sources for the replacement tanker was a feasible alternative that would have not only generated cost savings and reduced operational risk, but also incentivized innovation, improved the industrial base and the product quality, and provided a better overall value to the government.

Competition for Services

DoD contracts for services to support a wide variety of mission requirements, ranging from routine services, to maintaining facilities and equipment, to highly skilled engineering and even direct support to battlefield operations. As a result, almost every defense function that is not inherently governmental is performed to some degree by contracted services—while still, of course, managed by the government. Contracting for services provides agility not available with the government’s organic workforce—since contractors can surge or recede in response to changing requirements or funding. Contracting can also provide access to knowledge and experience with specific technical expertise, often found exclusively in the commercial sector. Although contracting for services has long been essential to the military mission (55% of the FY10 DoD contract spend was on the acquisition of services), most of the policies and historic practices are based on buying goods (Kennedy 2012). Yet using competition for services appropriately can have a significant effect on improving performance and reducing costs.

A dramatic example of the impact possible is the competitive sourcing program. Competitive sourcing is when a government agency has both government and private sector providers compete to perform a “commercial activity.” The Office of Management and Budget (OMB) Circular A-76 defines a commercial activity as a service provided by the federal government that could be provided by a private-sector source. Both the Clinton and Bush administrations actively encouraged competitive sourcing; and many independent studies have been undertaken to document the results. They have all reached a consistent conclusion: these competitions have consistently generated net cost savings—anywhere from 10 to 40 percent on average, regardless of whether the competition is won by a private contractor or the government (CNA 2001, RAND 2002, Gansler 2003, GAO 2003, Gansler 2004). In spite of these dramatic performance improvements and cost savings, Congress eliminated the practice of competitive sourcing with a government-wide moratorium on the practice in 2009.

Mandated Competition vs. Maintaining the Option

Contracting for services has long been essential to the military mission. As noted above, defense services accounted for approximately 55 percent of the 2010 defense acquisition budget. Mandating recompetition every three years for all service contracts, as in the Better Buying Power initiative (Carter 2010b), creates perverse incentives in many cases, since frequent recompetition will discourage high-performing incumbents from implementing and investing in continuous improvement programs. When contracts are frequently competed, incentives to existing contractors for high performance at lower cost do not exist, and costs will remain high. In the private sector, for example, increased performance with improved efficiency over time is expected and is written into contracting agreements, and the contracts tend to be written for longer periods.

Requiring frequent competitions can especially limit the benefit of performance-based logistics (PBL) contracts, since the objective is for the contractor to make process and product improvements that lead to improved performance and result in reduced costs. Short-term contracts limit the incentives for contractors to make these improvements. Although the Better Buying Power guidelines indicate that there is some latitude, clearly longer contracts are discouraged. As a result, most PBL contracts in the United States have been restricted to a range of three to five years. The United Kingdom (UK), on the other hand, has committed to longer-term contracts. For example, they are currently more than six years into a 34-year PBL contract for their Chinook helicopters. The contract has price breakpoints every five years. The results, to date, have been impressive: costs have declined 13 percent, availability has increased more than 12 percent, flying hours have increased by 50 percent, and major maintenance cycle time has decreased by 58 percent (Bacon, 2013).

All this has led the U.K. to purchase another 14 Chinooks without a sales pitch, according to Jim O'Neill, Boeing's president of global services and support. While he does not expect the U.S. Congress to enter into a 34-year contract anytime soon, O'Neill believes that bumping up to an eight-year contract would be optimal, with annual options after the initial five-year contract period, if the performance continues to improve and the price continues to fall.

Similarly, efforts to compete every contract to the fullest extent have discouraged unsolicited proposals, because innovative ideas submitted are frequently put up for competitive bid.

In general, competition for its own sake is wrong, but smart competition has huge benefits.

Key Steps in Implementing Action One

- Use competition during all phases of a defense acquisition, with specific focus on various forms (and options) of added competition during production of weapons systems.
- Maintain effective competition at both the prime-tier and sub-tier levels.
- Monitor vertical and horizontal integration, and control where appropriate to maintain the potential for competition.
- Use competition intelligently—e.g., not when incumbent contractors continue to improve performance and reduce cost.
- Agencies should *not* recompetete their contracts just for the sake of competition (but should maintain the option, if needed).

Action Two: Improve the Effectiveness of Indefinite-Delivery/Indefinite-Quantity Contracts

Introduction to IDIQ Contracts

Indefinite-Delivery/Indefinite-Quantity (IDIQ) contracts were introduced primarily to make contracting more efficient by reducing and simplifying the government's contracting workload. When used appropriately, they have proven to be a very effective way to streamline the acquisition process for the government and contractors, and can result in benefits for both the government and the firms. These include:

- **Reduced administrative burden.** With a signed IDIQ contract, with its standardized terms and conditions, the ordering process is simplified and task orders are quicker and easier to bid on. Additionally, when contracting personnel award task/delivery orders, there will generally be fewer proposals to evaluate. As a result, acquisitions that once took months can now be accomplished in days. Finally, with the diminished business proposal burden, firms can apply more resources to the development of innovative technical approaches.
- **Enhanced competition by the upfront selection of qualified bidders.** Since one of the prequalified firms will win the award for the task order, there is a greater incentive to put forth the best effort possible.
- **Greater predictability.** A signed IDIQ contract provides firms with an anticipated scope of work, with stable rates and fees. Further, the longer-term relationship will foster greater familiarity with the agency mission and requirements.

These good intentions, however, have led to their overuse, and several unintended consequences including contracts that are too large in scope and have too many contractors.

The Problem: Abuse of IDIQ Contracts

A strategy that has become increasingly popular over the past decade is the expanded use of IDIQ "umbrella" contracts. These contracts are structured to allow for a vendor to be selected as a potential bidder in a preliminary competition. The agencies then hold another competition for each released task order. These contracts are most often used for purchase of supplies, or for service contracts when the government does not know in advance the precise quantities of supplies or services that will be needed during the contract period. These contracts can provide flexibility and quick response.

The Federal Acquisition Streamlining Act (FASA) provided the statutory authority for IDIQ contracts to help improve the efficiency and effectiveness of the federal acquisition process. The guidance for their use is outlined in the Federal Acquisition Regulation (FAR), subpart 16.5.

Unlike traditional contracts, IDIQ contracts require that vendors “prequalify” as potential bidders. In this way, the number of bidders for specific tasks or delivery orders is theoretically limited to those that are best qualified, thereby reducing the administrative burden of examining numerous bids (often from marginally qualified or unqualified firms) in detail. IDIQ contracts are generally awarded for an extended period (a base period and option years), and also specify minimum and maximum quantity limits. They are increasingly being used by DoD for the purchase of both goods and services. When a requirement arises, the procuring organization can request proposals for delivery orders (for supplies) or task orders (for services) from the IDIQ contract holders.

Although an IDIQ contract can be awarded to a single contractor, they are most often used with multiple awards. Using this approach, contracts are awarded to a number of vendors who are, in effect, competing for the contracting agency’s future business. Many of these contracts include technology or other “insertion clauses,” enabling vendors to submit innovative solutions to the contracting agency for consideration. The agency may then decide to add new requirements to the next iteration of the contract. Undoubtedly, then, the effective use of this contracting tool depends on the quality of an agency’s acquisition personnel and their control and management (Sander and Snyder, 2001).

As originally envisioned, IDIQ contracts would enhance competition by using a two-step process. The first step, competing for the contract award, would eliminate all but two or three firms that are highly qualified for the tasks being considered, thus eliminating the firms that are unqualified or poorly qualified but which have been allowed to compete during past “full and open” competitions. Even though they may have been marginally qualified to complete the work, contracting officials were still required to evaluate their proposals.

When developing a strategy for an IDIQ contract, however, organizations must strike a balance between gaining the potential efficiencies of IDIQ contracts while still maintaining effective competition. Moreover, in an effort to gain the perceived benefits, organizations have overused this contract type, which has led to several unintended consequences. These include contracts with a very broad scope of work (goods, services, or both), and qualifying large numbers of vendors (at times to minimize the potential for or respond to a protest) that often never receive a task order (see *Examples of Army IDIQ Contracts*). An extreme example of the large scope and many winners of an IDIQ contract is the Navy’s Seaport-e contract, which has over 2200 “winners” (many of whom are unlikely to ever receive any funded tasks).

Obviously, for interchangeable commodities, there is value in having a significant number of qualified firms available to bid; but on complex goods or services, the results are far better with only a small number of highly qualified bidders.

Although IDIQ contracts have been in use for almost two decades, their use has expanded dramatically, likely due to the need to overcome the recognized acquisition workforce shortages. Although this objective may be achieved, there are undesirable, unintended consequences.

With the proliferation of these large, omnibus IDIQ contracts, there is a growing tendency to use them for all tasks, even when they are not the best vehicle. When the “bidder base” is too large, firms are disincentivized from bidding on task orders (since their opportunity to win is reduced). Then, when a task requires unique, innovative, and leading-edge solutions or techniques, the existing IDIQ contract may not have the vendors that can deliver this to the

Examples of Army IDIQ Contracts

The Information Technology and Enterprise Solutions-2 Services Program (ITES-2S)

ITES-2S is a nine-year, \$20 billion program including numerous IT services that support the U.S. Army's enterprise infrastructure. This is structured as a performance-based service acquisition (PBSA), with an initial duration of three years, with three two-year follow-on options (*Defense Industry Daily*, 2007). ITES-2S is organized into nine broad and flexible task areas: business process reengineering; information systems security; information assurance; information technology services; enterprise design, integration and consolidation; education/training; program/project management; systems operation and maintenance; and network support.

In the fall of 2005, the U.S. Army released the request for proposals for ITES-2S. After the release of the RFP, the ITES-2S award encountered some challenges, including two rounds of Government Accountability Office (GAO) protests following the award, leading to a revised list of winners, which included all of the protesting firms, for a total of 16 awards (*Defense Industry Daily*, 2007).

The Simulation, Training, and Instrumentation Omnibus Contract II (STOC-II)

STOC-II is DoD's largest multiple-award IDIQ contract for training and simulation. The U.S. Army's Program Executive Office for Simulation, Training and Instrumentation (PEO-STRI) in Orlando, Florida, granted 142 awards for this, the second STRI Omnibus Contract, on January 27, 2009. This contract supports a key PEO-STRI initiative, advancing the shared effort of DoD and the Army to create interoperable live, virtual, and constructive strategies to enhance training and testing capabilities.

The contract has a ceiling of \$17.5 billion in the initial base-ordering period, with three option-ordering periods, totaling a potential ordering period of 10 years. The contract provides PEO-STRI with the capacity to procure a range of modeling and simulation (M and S) and instrumentation solutions in support of training and testing requirements, including procurement and/or services support of training and testing simulators, simulations, systems/devices, instrumentation systems, telecommunications systems, experimentation, targets, gaming, advanced simulation concepts, open architecture, and common part and component solutions (Raytheon, 2011).

Metrics reported by the PEO-STRI for this contract suggest that it is actively being used (PEO-STRI, 2013). The contract continues to issue new orders, with four issued in FY 2013 for a STOC-II total of 82 task orders issued (these totaled approximately \$1.01 billion) (ARMY PEO STRI, 2013).

government, because they were not on the qualifying award. Or, if they were, they chose not to bid against such poor odds; or they do not have the lowest price.

Organizations often fail to use IDIQ contracts that are already in place that would satisfy their requirements, and are available for their use. This leads to several inefficiencies:

- First, they spend time, sometimes years, preparing, evaluating, and awarding a new overall IDIQ contract when existing contracts would suffice.
- Second, firms are then compelled to propose and compete for redundant contracts, since they do not want to be locked out of possible business opportunities. This results in additional bid and proposal costs to industry, which results in higher indirect costs; these are ultimately passed on to the government and also make the firm less competitive.
- Third, these large IDIQ contracts require skilled and experienced government personnel to manage them. When they proliferate, the resulting IDIQ landscape has some contracts that are managed effectively and efficiently, and some that are not.

Key Steps in Implementing Action Two

- Strive to provide a real two-step process for services, selecting no more than five (and preferably two or three) well-qualified providers for a narrowly scoped requirement area.
- Work to reduce the number and scope of IDIQ contracts—a smaller number of the contracts could be used more frequently with more rigorous oversight.
- Ensure there are adequate timetables for proposal preparation.
- Do not require contractors to bid on every task order with clearly defined statements of work, because firms spending funds on unsuccessful proposals often raise their overhead costs to the government, making them less competitive.

Action Three: Use a Best Value Tradeoff Source Selection Strategy for Complex and Most High-Knowledge-Content Work

Introduction to Best Value Tradeoff Source Selection

Government organizations should reduce inappropriate use of lowest price technically acceptable (LPTA) as a source selection strategy when procuring complex products and high-knowledge content professional services. When government asks for goods and services that are “technically acceptable,” what they receive is just that: a product that is minimally acceptable; it is often not the best value, and in no way superior.

The Federal Acquisition Regulation states that the use of LPTA as a source selection strategy should be limited to those cases where requirements are “clearly definable,” and “the risk of unsuccessful contract performance” is something other than “minimal.” Accordingly, LPTA is best used on interchangeable, commodity-type products and services. In spite of this, federal acquisitions officials are increasingly using LPTA for the acquisition of complex services to:

- Simplify source selections
- Make awards more quickly
- Reduce the costs of those acquisitions
- Minimize protest

When used for these acquisitions, it is difficult for acquisition personnel, especially those with low experience levels, to adequately define technically acceptable. Consequently, LPTA has forced contractors into a price competition as opposed to striving to provide the best value. This inappropriate use has several adverse effects: these include cutting salaries of current employees, hiring inexperienced or minimally qualified individuals to leverage their low salaries, and cutting back on the use of senior, highly qualified individuals.

Since complex professional services are rarely “clearly definable” or risk-free, there is often value in providing solutions above the minimum prescribed by contracting officers. These include industry-developed innovations, the use of more qualified personnel, long-term cost reductions, and (arguably most important) getting the best value for the taxpayer. Consequently, for these acquisitions, the tradeoff (of performance and cost) source selection is the better choice (i.e., the real best value for the government).

The Problem: Growing Use of LPTA as a Source Selection Strategy

DoD has responded to the budgetary pressure and shortages of acquisition personnel by emphasizing the use of LPTA for source selections. As a result, there is a growing and almost routine use of LPTA, even for the acquisition of complex technical services. In the past, these source selections would have used the cost-versus-technical tradeoff (best-value) approach. When used inappropriately, LPTA is another strategy that can create perverse incentives.

The Federal Acquisition Regulation (FAR), Part 15, outlines how an agency can obtain the best value for the government in negotiated acquisitions by using any one or a combination of source selection approaches. For example, the less definitive the requirement, the more development work required; or the greater the performance risk, the greater the role that more technical or past performance considerations may play in source selection. It may be appropriate to use a tradeoff process when the perceived benefits of the higher-priced proposal merit the additional trading off among cost (or price) and non-cost factors.

The FAR goes on to state that in acquisitions where the requirement is clearly definable and all bidders clearly meet it (e.g. in the case of a commodity), the risk of unsuccessful contract performance is minimal, so cost or price may play a dominant role in source selection. In these cases, where the best value is expected to result from selection of the technically acceptable proposal with the lowest evaluated price, the LPTA source selection process is appropriate.

As a result, since the LPTA process does not permit any tradeoffs between price and non-price factors, its use is appropriate when the government would not realize any value from exceeding the minimum technical or performance requirements—generally for acquisitions of commercial or non-complex services or supplies, which are clearly defined and expected to be low risk (Assad 2011). For these types of “commodity” acquisitions, LPTA offers several benefits. These include the use of objective criteria that require less judgment and can be more easily implemented with a less experienced staff, greater incentive to provide the best price, and lower probability of a protest based on the source selection process.

The government, however, is not well served by using the LPTA source selection process for knowledge-based professional services, such as systems engineering and technical support contracts in support of complex systems. The LPTA method is ill-suited for such acquisitions, since this type of support often does not have clearly definable requirements (so it is more difficult to precisely identify what is technically acceptable), and the risk of mission failure may be high. As a result of using less qualified support contractors, total program cost may, in fact, be higher, since when highly qualified these contractors frequently provide technical support that helps to control the costs of the prime contractor. Based on numerous demonstrated cases, in fact, spending more for first-rate systems engineering services (the government workforce generally doesn’t have enough experienced systems engineers) can pay significant performance and cost dividends when developing complex systems.

Rather than assemble the most talented and experienced team, the LPTA approach often forces firms to look for ways to reduce their cost. Research shows that for high-knowledge-content work, this cost pressure creates disincentives for the use of the most qualified and innovative people and firms (Martimort, 2010). Consequently, these firms are forced to recruit a lower-cost workforce, with minimally acceptable qualifications. Another consequence is forcing service firms (in order to be the lowest bidder) to cut the salaries of some of their most experienced people, or moving them to part-time employment. Industry has expressed growing concerns about the use of LPTA selection criteria, particularly for complex professional services that essentially default to the lowest bidder, independent of quality. Furthermore, firms offering innovative solutions, even if they have improved performance and lower costs when some requirements are altered, do not meet the solicited requirements and are punished.

The use of LPTA can also impact less technical services even when they provide the cheapest solution, but not the best value. While evaluating embassy security, the Commission on Wartime Contracting found that the use of LPTA created a “race to the bottom that drives security service providers to the lowest-cost solution” (Commission on Wartime Contracting, 2009). As a result, the report concluded, these low-cost contractors may put embassy security at risk.

This risk was vividly demonstrated on September 11, 2012, when terrorists attacked the U.S. Consulate in Benghazi, Libya, and contracted security proved inadequate. During her testimony, then-Secretary of State Hillary Clinton said:

Secondly, I think it's very important to change the laws about best value contracting versus lowest priced technically qualified. By statute, the State Department local guard contracts, in dangerous places like Libya and everywhere else, except Iraq and Afghanistan, must be awarded using a lowest price technically acceptable source selection process.³

The current budgetary environment will continue to pressure government agencies to spend less on services. The government needs affordable solutions. The nation, however, cannot afford to resort to “buying cheap” when it comes to critical services; the long-term costs to the nation are too high. Just as we do in our personal lives, when it comes to critical services we must strive to trade off cost and performance to ensure we truly get the best value.

Of course, the same applies to the purchase of complex, high-technology goods (cheap is far more expensive in the long run), so LPTA is equally inappropriate to apply in these cases. It fits best in the purchase of interchangeable commercial products and commodities.

Key Steps in Implementing Action Three

- When buying complex and high-knowledge-content work, use a best value tradeoff source selection strategy.
- Only use lowest price technically acceptable (LPTA) as a source selection criteria when “technically acceptable” can be fully defined and the risk is low.
- When using LPTA, incorporate past performance as an evaluation factor.

Action Four: Use Cost-Reimbursable Contracts for System Development

Introduction to Cost-Reimbursable Contracts

In its effort to control cost growth, DoD periodically embraces fixed-price contracts to shift more of the responsibility and risk to the contractor. Contrary to popular belief, the use of fixed-price contracts during development of major defense acquisition programs (MDAPs) may not eliminate, or even reduce, cost overruns. In fact, fixed-price development contracts can exacerbate them, especially when the technologies involved are immature or untested or when the requirements are likely to change. Unlike other DoD programs, MDAPs are often associated with a high level of uncertainty. This uncertainty may stem from a variety of sources,

3. Hillary Clinton, House Foreign Affairs Committee Hearing on Benghazi Attack, January 23, 2013.

including the use of immature technologies or budgetary challenges, or the need to make changes as the design matures or as the threat changes.

This is not to say that as a rule, fixed-price contracts should never be used in development programs, but that their use will not correct or compensate for these systemic defense acquisition challenges. However, the enduring problem of increasing costs suggests multiple, systemic failures occurring within the acquisition process. Unfortunately, the tendency to promote simplistic (and often ineffective) remedies over substantive reform often guides policy decisions.

Because many of DoD's systems are technologically advanced, complex, and, in some cases, unprecedented (i.e., there are no prior examples on which to base development), requirements, quality dimensions, and performance specifications often evolve over time. As one might expect, it can also be difficult to verify whether or not the contractor has fulfilled their obligations; given the lack of detailed specifications contained in the contract. In short, incomplete information results in higher risk. In these cases, DoD should rely on cost-reimbursement contracts, which have greater built-in flexibility with regard to costs, schedule, and performance, allowing cost-performance tradeoffs to be made as development progresses and ultimately avoiding the excessive transaction costs associated with contract renegotiations.

The Problem: Fixed-Price Contracts are Often Problematic

In its recent effort to reduce the costs of military acquisitions, the Better Buying Power initiative directed that DoD increase the use of firm fixed-price contracts. DoD already spends the vast majority of its acquisition funds on fixed-price contracts. In FY 2011, 65% of the dollars contracted were by fixed-price contracts for specified quantities of products and services, usually with good results (Ellman et al. 2012). These products and services are either commercially available or have low technical risk (often, they are follow-on production of proven weapon systems). When it comes to the development of major defense acquisition programs (MPAPs) however, there may be a good reason that DoD has come to rely more on cost-reimbursement (as opposed to fixed-price) contracts.

MDAP developments are often associated with a high level of uncertainty, which stems from a variety of sources. These often include the use of less mature technologies, budgetary uncertainty, and the need to make changes as the design develops. Moreover, many of DoD's systems are extremely complex and in some cases unprecedented (i.e., there are no prior examples on which to base development). In addition, technology, mission, and budget changes occur. As a result, detailed mission requirements, quality, and performance specifications often evolve over time. It can also be difficult to verify whether or not the contractor has fulfilled its obligations, since the contracts generally lack sufficiently detailed specifications. In short, incomplete information results in higher risk. Within this changing and uncertain environment, cost-reimbursement contracts are more appropriate, since developing accurate cost estimates with sufficient accuracy to allow for fixed-price contracts is a near-impossible task. In spite of the challenges, DoD, in its efforts to control cost growth, has periodically embraced fixed-price contracts for weapon system development, to shift more of the responsibility and risk to the contractor.

Not unlike today, in the 1950s and 1960s DoD experienced significant cost growth in its development of weapon systems while using cost-reimbursement contracts. In an effort to curb this growth and incentivize contractors to minimize program costs, Secretary of Defense Robert McNamara introduced a concept known as total package procurement (TPP) in the 1960s. With TPP, "all anticipated development, production, and as much support as is feasible throughout a system's anticipated life, is to be procured as one total package and incorporated into one contract containing price and performance commitments at the outset of the

acquisition phase of a system procurement” (Logistics Management Institute, 1967, p. 3). The contract type used was a fixed-price-incentive contract.

One initial attempt was with the development of the TFX (later known as the F-111), a multi-purpose, tactical fighter-bomber capable of supersonic speeds. Secretary McNamara believed that the development and production of a common aircraft for both the Air Force and the Navy would save DoD as much as a billion dollars. However, the development of the F-111 proved problematic, and program costs increased dramatically. By 1972, the development cost estimate more than tripled, to \$1.675 billion, while the production estimate more than doubled (it increased by more than \$3 billion, to \$5.334 billion). The final blow came when the F-111B did not meet the Navy’s expectations. That portion of the program was canceled, further reducing the total buy (GAO, 1970).

In another effort to reduce program costs, the Air Force also used TPP in the mid-1960s to develop and procure the C-5A, one of the largest military aircraft ever produced. The Air Force negotiated a \$1.9 billion, fixed-price incentive-fee TPP contract with Lockheed (Lockheed submitted the lowest bid) for the C-5A program. Once again, this contract was for development, production, and support. In addition, there were incentives for meeting price and performance expectations (Shults, 1976).

In 1968, the Air Force projected that the program could exceed their initial estimates by more than \$2 billion. In late 1968, the Air Force concluded that, based on the growth of the C-5A program, Lockheed was on the verge of bankruptcy. Realizing that it would have little recourse if things got worse, the Air Force took delivery of the first C-5A, leaving many acknowledged deficiencies unresolved. In 1971, the Air Force replaced the existing contract with a cost-minus-fixed-fee contract, under the condition that Lockheed absorb a \$200 million loss—more than half of the firm’s net worth.

These two programs are examples of the disappointing results achieved with the initiative to use fixed-price development contracts. The poor results were generally caused by overly optimistic technology assessments; these led contractors to chronically underbid the programs. Congress responded in 1988 by passing Section 8118 of the Defense Appropriations Act, which prohibited DoD from awarding fixed-price contracts in excess of \$10 million for development of major systems or subsystems.

Not to be deterred by prior examples, and prior to congressional legislation, in January 1988 the Navy awarded a team consisting of General Dynamics and McDonnell Douglas a \$4.8 billion fixed-price incentive-fee contract to develop the A-12 Avenger II—a long range, medium-attack aircraft incorporating advanced stealth technology. The Navy initially planned to buy 620 A-12s, and the Marine Corps planned to purchase an additional 238 planes (GAO, 1991a).

Right from the start, this program encountered serious technical and engineering challenges. The A-12 was to be carrier-based, which meant it would have to survive the stresses of carrier landings and shipboard environments, and at the same time maintain its stealth characteristics. Given the technology level at that time, these two requirements were in conflict. The harsh environment (hard landings, ocean spray, and sun) damaged the aircraft’s surface finish, deteriorating the stealth qualities (GAO, 1991b).

Then-Secretary of Defense Dick Cheney directed the secretary of the Navy “to show cause” by January 4, 1991, as to why DoD should not terminate the program. At this time, the first flight had been delayed two years, the estimated cost of each A-12 had grown from approximately \$87 million in December 1989 to more than \$100 million, and the requirements for

aircraft dropped from 858 to 620 (GAO, 1990). In January 1991, Secretary Cheney directed the Navy to terminate the A-12 program.

The early 2000s saw continued support for and use of cost-reimbursement contracts for development programs. Even the Defense Federal Acquisition Regulation Supplement (DFARS, 2012) was amended to restrict DoD's use of fixed-price contracts for development programs unless:

- The level of program risk permits realistic pricing
- The use of a fixed-price contract permits an equitable and sensible allocation of program risk between the government and the contractor

The DFARS also states that for development efforts, cost-reimbursement contracts are preferred.

In its effort to control cost growth, DoD periodically embraces fixed-price contracts in order to shift more of the responsibility and risk to the contractor. However, as the above cases demonstrate, fixed-price contracts are not well-suited to major development programs, and may, in fact, produce poorer results (since these programs are often characterized by technological unknowns, changing requirements, design instability, excessive optimism, and production immaturity). This is not to say that, as a rule, fixed-price contracts should never be used in development programs, but that their use will not correct, or compensate, for these systemic defense acquisition challenges.

Key Steps in Implementing Action Four

- Use cost-reimbursable contracts for system development and take advantage of the greater flexibility of this type of contract, which minimizes the excessive transaction costs associated with contract renegotiation.
- Monitor the requirements carefully to avoid gold-plating, or contractors' attempts to deliver higher-grade products than the customer needs.
- Change the contract type to a fixed-price structure when the system transitions to production.

Action Five: Remove the Barriers to Buying Commercial and to Dual-Use Industrial Operations

Introduction to Dual-Use Industrial Operations

There are many areas where commercial firms (used here to mean firms that focus primarily on non-DoD products and services) have more advanced technology, higher performance, and lower-cost equipment than traditionally used firms have. DoD needs to do a much better job of leveraging these commercial capabilities. However, there are many hurdles and often organizational resistance to doing so. This prevents non-traditional firms from entering the defense business sector, and traditional defense firms from combining (in the same facilities) commercial and defense work.

DoD should consider these commercial suppliers of goods and services as part of their industrial base, and (working with Congress) take a leadership role to remove these many hurdles. This effort should be aimed at accepted rules, regulations (e.g., specialized cost accounting requirements), import and export controls, and other practices within the defense market that often create barriers to entry to non-traditional firms as well as new firms. They also prevent

existing firms from combining their commercial and defense work in the same facility. Reducing these barriers will allow DoD to increase competition by reaching beyond the traditional defense companies, gain better access to transformational technologies and services, achieve the cost and performance benefits of large-volume economies-of-scale, and realize the potential of technology transfer (both ways).

The overall objective should be to integrate commercial and military industrial operations (i.e., dual-use). These operations would provide increased production volume while lowering costs. A corollary benefit is the creation of a potential surge capability for products and services that could be leveraged during contingencies or wartime. These combined dual-use industrial operations have a great potential for higher performance at lower cost, and are certainly worth pursuing.

The Problem: Government Policies Discourage Dual-Use Industrial Operations

In recent years, the commercial world has become extremely high-tech (e.g., information systems, cell phones, GPS navigation, iPads) and much of this technology, as well as the next generation of technology (e.g., nano-technology, biotechnology, 3D printing) is equally applicable to the defense world (both in hardware and software) and the commercial world. When civil and military industrial activities (from engineering, through production and support) can be combined, there is a potential for very large economies-of-scale, as well as more rapid technology transfer (of both product and process technologies). This is especially true at the parts, software, and materials level, where an increasing share of these items is dual-use, i.e., they are being used in both the commercial and military world. As a result, DoD gains the advantage of the higher volumes, with the associated lower costs.

Electronics and software are playing an increasingly large role in the development of military weapon systems (from both a performance and cost perspective). As a result, microelectronic circuits, microprocessors, and software are often manufactured by the same companies that produce components for commercial products, such as personal computers, cell phones, and other electronic devices now ubiquitous in virtually every high-tech consumer product.

Thus, it is not surprising that when other countries (e.g., Japan, France, Russia, and now China) issue their defense industrial strategies, they emphasize and implement a dual-use industrial policy. In the same industrial facilities, they are doing both civil and defense work, thus gaining the economic and security benefits of the economies-of-scale and the rapid technology transfer.

Congress has increasingly mandated far greater use of commercial items. Included in the Federal Acquisition Streamlining Act of 1994, for example, is a “preference for acquisition of commercial items.” Further, the National Defense Authorization Act, FY 1999, calls for the development of a civil-military integration policy. Regrettably, these are honored more in their breach than in their compliance. Other barriers include:

- Rights to technical data, which commercial firms consider their crown jewels, but which DoD believes they should be entitled to
- Government’s wish for access to trade secrets, so (in both cases) they can develop a second source
- Flow-down of Federal Acquisition Regulations (FAR) clauses to the lower tiers, precluding these firms from operating in a commercial fashion (Gansler 2011)

In contrast with other countries, the U.S. has explicit acquisition policies that greatly discourage dual-use industrial operations. For instance, there are the specialized cost accounting

requirements (and other unique requirements for doing government business) that add costs to products and services, in effect, forcing firms to separate their government and commercial operations. Boeing, for example, moved the production of commercial and military transport aircraft into separate facilities to comply with cost accounting rules that required allocation of their independent research investments (on defense) by the ratio of the total commercial and military sales, thus raising the costs of their commercial transport aircraft (of course, this lowered volume of work in the defense faculty raises the overhead costs and lowers the economies-of-scale savings on the military systems.)

Combining commercial and defense firms are also discouraged from using commercial items by current export control legislation. For example, Boeing had to pay \$15 million to export a commercial aircraft because its avionics systems contained a chip that was used in the guidance system of a Maverick missile; even though buying a \$60 million passenger plane and disassembling its flight systems to gain access to a \$2000 chip seems extreme (Associated Press, 2006). In another case, DoD initially objected to the export of the Roomba, a household robotic vacuum cleaner, because it used a navigation software package to avoid repeatedly hitting furniture when vacuuming. Navigation software is on the export control list.

Clearly, while other countries facilitate dual-use industrial operations, the U.S. is losing its economic and security benefits through numerous legislative and regulatory barriers. Needless to say, in a period of declining defense budgets and increasing international competitiveness, this is an area offering great opportunities for improvement.

Key Steps in Implementing Action Five

- Identify priority industries (such as machine tools, software, electronics, and new materials) for which strong linkages are possible between the military and civilian economies.
- Initiate a series of dual-use demonstration programs in order to identify the many obstacles and barriers likely to be encountered.
- Review and revise those dual-use inhibiting processes that include specialized cost-accounting rules, intellectual property rights, and government-unique “flow down” requirements to lower-tier suppliers.
- Simplify and combine the lists of export control items so that they are easier to navigate by exporting firms.
- Review and revise export controls so as not to impose controls on commercial variants of defense-related goods for which the U.S. is not the sole supplier.
- Continue to emphasize and encourage the use of commercial components in military systems.

Action Six: Reduce the Government Monopoly through Public/Private Competitions When Possible (On Non-Inherently Governmental Work)

Introduction to Inherently Governmental Functions

The goal of federal acquisition policy should be to create a government that looks a lot more like a dynamic, restructured, reengineered, world-class enterprise. To that end, federal agencies should focus on inherently governmental functions, such as policy, fiscal management,

oversight, and warfighting. For all other activities, the public sector should leverage competition to get the best value from either the private or the public sector, attaining higher performance at the lowest cost. In the federal government, this type of public/private competition is governed by OMB Circular A-76. Introducing competition into government service incentivizes government managers and organizations to become more effective and efficient. The ultimate goal is to make government as effective and efficient as possible.

For non-inherently governmental functions, however, government should shift from being “the provider of goods and services” to becoming manager of the provider of goods and services, unless government employees can be more efficient and effective than their private-sector counterparts as demonstrated through public-private competitions (Gansler, 2003). The current administration, however, has stated that they could achieve greater efficiency by bringing commercial activities back in house (creating a monopoly government provider), a strategy that came to be known as insourcing.

DoD should reintroduce competition into commercial activities performed by civilian employees or military service members, i.e., all those functions that are not inherently governmental. There are many years of experience with competitive sourcing, and literally thousands of examples that demonstrate a sustained 30-percent reduction in cost (no matter who wins), and either the same, or improved, level of performance (Table 1). The key is shifting from a monopoly to a competitive environment. The goal must always be to get better performance at a lower cost. Even in light of this track record, government employee unions and their congressional supporters have continued to resist A-76 competitions (Skelton, 2009, Brodsky, 2009).

Table 1: Average Expected Savings from DoD Competitive Sourcing Studies (Gansler 2003)

Time Period	Agency	Number of Competitions	Average Percent Savings
1995–1998	DoD total	53	42%
1994–1998	Air Force	44	42%
1994–1998	Navy	3	37%
1995–2000	DFAS	9 (2,929 FTEs)	32%
1975–2001	DoD total	2,287 (98,348 FTEs)	33%
1997–2001	Army	105 (10,791 FTEs)	39%
1998	DoD	5 (1,840 FTEs)	47%

Sources: GAO 2000, Clark and Scafidi 1998, DFAS Presentation 2000, Frances Clark et al 2001, D. Charles Allen 2001, Gates and Robbert 2000 (see References for more information).

The Problem: Imbalance between Insourcing and Outsourcing

As the defense budgets began to decline toward the end of President Obama’s first term, both the White House and the Pentagon began aggressively pushing for bringing additional work in house (i.e., converting contractor positions into government jobs, a process known as insourcing). Specifically, DoD proposed to insource over 33,000 positions with the rationale that this move would save up to \$44 billion annually (Department of Defense Appropriations Act, 2010). This would, however, increase the monopoly performance of functions available in the private sector.

When DoD was assembling their 2011 budget, they assumed a 30 to 40 percent savings for each insourced position (Soloway, 2009). The basis for this estimate was a comparison of the

direct labor cost of a government employee to the fully burdened rate charged for a private sector employee. This, however, is an incorrect comparison, since it ignores the indirect costs of the government employee. In contrast, indirect costs are included in the selling price of the private sector employee. Based on these projected savings, DoD made significant changes to its workforce composition. For example, the Air Force insourced responsibility for C-17 program logistics integration, a service that was being provided by various contractors. It also decided to end its long-standing contract with Lockheed Martin for F-22 support services (Gouré, 2010b).

One year after President Obama launched this initiative, then-Defense Secretary Robert Gates asserted that insourcing was not producing the anticipated cost savings (Brodsky, 2010). The cost of the contracts being replaced did not offset the cost of the government hires. Importantly, there is definitely work that is inherently governmental, and must be done by government workers (e.g., budgeting, source selection, decision-making, management/oversight, etc.). Insourcing of any decisional work that contractors are performing should continue. It should be noted, however, that expert support to the government in these areas is often of great value to the government decision makers.

Significantly, the CBO analyzed the benefits of using a mix of active-duty and reserve military personnel to perform the functions performed by contractor personnel under The Logistics Civil Augmentation Program (LOGCAP), and included both the wartime and peacetime costs. Their conclusion was that the Army's total cost for insourcing this work would be about 90 percent *higher* than the contractor's cost (CBO, 2005). A similar savings of 90 percent from doing non-inherently governmental work in the private sector was also reported by the GAO in an analysis of providing security guards for government facilities. And, of course, in both cases (services support and security guards) the government is still responsible for the overall management, oversight, and source selection of the private sector work (since performing these functions is not inherently governmental, but managing their work still is an inherently governmental function).

Finally, it should be emphasized that the critical issue with regard to whether this non-inherently governmental work should be done in the public or private sector is the presence or absence of the cost and performance incentives introduced by competition—whether this is private vs. private, or public vs. private competition. When Congress allows public/private competitions, the public sector has often (over 50 percent of the time) been the winner (because of their extensive, relevant experience); and the savings (regardless of which sector wins) have been over 30 percent—with the average savings being even greater when the public sector wins—with their proposed, greatly reduced, but highly skilled “most efficient organization” workforce.

Importantly, even with a savings of over 30% from the competition, no matter who wins, the involuntary government workforce reductions (RIFs) have been only about five percent (other positions are found for them, they chose to retire and/or they chose to join the winning industry firm) (Gansler and Lucyshyn, 2004).

Although insourcing has lost much of its initial momentum, the ideological challenge over what constitutes the ideal division of work between contractors and government employees has yet to be resolved. As the administration has recently learned, it is not merely a matter of arithmetic, whereby an increase in government hires prompts a corresponding reduction in the number of contractors; often, there is not a one-to-one relationship (due to efficiency differences).

Key Steps in Implementing Action Six

- Develop clear definitions of inherently governmental functions.
- Identify all positions performing inherently governmental functions, and ensure those functions are being performed by government personnel.
- Use public-private competitions to improve the quality and efficiency of the non-inherently governmental functions that are being performed in non-competitive environments.

Action Seven: DoD Should Work to Realize the Benefits of Globalization, Both Economic and Security

Introduction to Understanding Globalization

DoD must recognize the benefits derived from embracing globalization. First, the distinction of country of origin is, in large part, artificial. At the parts-supplier level, essentially *all* U.S. weapon systems are already increasingly dependent upon parts from offshore (semiconductors from Japan, precision glass from Germany, etc.). This is being driven primarily by the higher performance of these foreign sources. Second, consistent with the commercial industry's globalization trend, as well as the rapid global spread of technology in the information age, the major defense industrial firms (on both sides of the Atlantic) have aggressively entered each other's market—often in transatlantic partnerships and frequently through acquisitions. Most notable is BAE Systems' (the dominant U.K. defense firm) determined acquisition program for U.S. firms—first buying Tracor, then Sanders, and most recently United Defense. These specialized firms were former crown jewels of the U.S. defense industrial base. BAE (a U.K.-headquartered firm with a separate board of directors for U.S. operations) is now one of the six remaining U.S.-based major U.S. defense contractors.

By leveraging globalization in this way, the U.S. will be able to gain access to the most advanced military capabilities, helping to ensure markets for U.S.-based firms and providing improved economies of scale. Although skeptics worry about “Trojan horses” and “back doors” built into foreign-supplied systems, particularly in the case of software, this potential threat can be addressed through extensive and rigorous testing and reverse engineering, just as currently required in the financial and medical communities.

In addition, by sharing technology with allies (and, again, using proper security procedures) the combined forces, when operating together, are interoperable and have maximum combined capability.

The Problem: Current Policies Discourage Globalization

Today, technology, industry, and labor are globalized, and in many areas, the U.S. no longer is the technological leader. For example, when the U.S. refused to allow exports of night-vision devices, the French took over the world market, using the resources derived to invest in improving their devices, and consequently developing superior technology. And, as another example, when the U.S. needed to rapidly harden its Army land vehicles against IEDs, it acquired the MRAP armor from an Israeli design (built in the U.S.), the shock absorbers from a German design, the tires from a French design, and some of the electronics from Asia.

Since the U.S. cannot prevent the globalization of technology and industry, it must learn to embrace the benefits of globalization for both the nation's security and its economy. In order for the 21st-century defense industrial base to remain cognizant of all emerging technologies, the defense firms must have the ability to openly interact with U.S. allies and trading partners. This globalized defense market will not only aid the U.S. in development of advanced military capabilities, but will also contribute to the expansion of domestic commercial technologies, strengthen political ties, and provide significant economic benefits.

In addition, there are few (if any) likely future security scenarios that can be addressed by a nation acting alone. Terrorism, cybersecurity, proliferation of weapons of mass destruction, regional instabilities, and more will all best be handled by multinational coalitions. As a result, the modern battlefield will be made up of an interconnected network of sensors and shooters from multiple countries. Thus, it would be in the U.S.'s best interest to ensure that each of the coalition partners shares the best possible technology and that it is designed and tested to be interoperable. Second, as defense budgets decline, the globalized defense market can be used to gain efficiencies by sharing development costs and production lines (for economies of scale). To fully realize the advantages of globalization, DoD will need to advocate and promote changes in the many restrictive and protectionist laws and regulations, such as the ITAR, Export Controls, Berry Amendment, and specialty metals restrictions.

The new global environment will require a combination of hard and soft power (DoD and the State Department), as well as multinational planning, training, and technological sharing. As it becomes necessary to engage new allies and create new relationships for the sharing of intelligence and technology, maintaining an isolationist policy will severely limit the strength of our international relationships and the benefits which can be reaped through multinational cooperation. While the U.S. has not yet reached a crisis point, careful examination of the barriers should begin.

The U.S. must gain the benefits from globalization, but today we have laws, policies, and practices that are barriers to these economic and security benefits.

Key Steps in Implementing Action Seven

- Review and adjust policies and regulations (e.g., the ITAR, export controls, Berry Amendment, restriction on specialty metals, etc.) that hinder DoD's ability to procure world-class capabilities from the rapidly evolving global technology and security market.
- Encourage firms in both Europe and the U.S. to fully compete for contracts awarded by governments on both sides of the Atlantic, to facilitate interoperability and take full advantage of the benefits that derive from competition.
- Develop the capability to monitor commercial and foreign technical development, and leverage them when appropriate.
- Continue to fund research of disruptive technologies so that U.S. military forces can continue to maintain their technological lead.
- Develop necessary tools and techniques to ensure security of foreign hardware and software.

Action Eight: Recruit and Retain a World Class Acquisition Workforce

Introduction to the Acquisition Workforce

The shortage in the acquisition workforce has resulted in the hiring of entry-level personnel, and with the shortage of experienced mentors, they are basically learning on the job via experimentation. The current situation (government-wide) is that 50 percent of the federal government's acquisition personnel have less than five years of experience, and few mentors available to guide them.

Filling these requirements demands a focus on recruitment of both entry-level and mid-level acquisition personnel. One approach that should be fully developed and expanded upon is an acquisition workforce development program. This could include scholarships for appropriate degree programs coupled with an internship, and ultimately employment. Furthermore, additional recruitment incentives and specialized internship programs could be created for those students who excel in high-demand functional areas, such as information technology, systems engineering, and the hard sciences.

In addition to internships, efforts must be made to recruit experienced personnel from the private sector to fill mid-level leadership roles, and to act as mentor for the entry-level new hires. One approach would be to bring in mid-level and senior-level industry people (with the needed critical skills) for term assignments (e.g., a three-year rotation outside of the career civil service system). This approach has been very successful in limited numbers for selected positions (e.g., positions in the Defense Advanced Research Projects Agency [DARPA]). Conflicts of interest can be explicitly avoided, and it can be a win-win-win situation—benefiting the government, with experienced people; the company, when the employee returns with an understanding of how government works; and the employee, with a greatly broadening experience.

Finally, in DoD's effort to modernize and grow the acquisition workforce, it must seek to ensure it is creating a quality workforce, instead of merely seeking to meet quantity goals. Quality, in this case, can be defined as recruiting those individuals with in-demand skills, unique and relevant experiences, and interdisciplinary expertise. Key fields requiring high-quality personnel include the sciences, engineering, information technology, and business. Since many of the top students in these areas, particularly graduate students, are not U.S. citizens (but would like to be), the barriers to their immigration must be reduced.

The Problem: Acquisition Workforce Not Being Strengthened

For the government to acquire the best equipment and services, at the most attractive prices, it is necessary to have the highest quality, most experienced workers in the government's acquisition workforce, as well as in the supplier industry. Unfortunately, in its present state, DoD's civilian acquisition workforce is inadequate to meet the needs of the 21st century. First, with the current workforce's demographic structure, a majority of the personnel are approaching, or have already reached, retirement age. In addition, DoD's new acquisition hires are not adequate in number, or sufficiently experienced, to replace the flow of outgoing workers. As of 2012, 17 percent of DoD's acquisition workforce was eligible for full retirement, another 19 percent would become eligible within five years (Clark 2012) and 70 percent would be eligible within 10 years. This uneven distribution creates a significant problem due to the loss of institutional and cultural knowledge shared by outgoing employees. It also highlights the gap that exists between the experience of existing personnel and current acquisition demands, which are often focused on modern, transformational technologies. And, these new employees could greatly benefit from experienced mentors—if they were still around.

Moreover, as DoD's weapon systems and their support structure have become more complex, the need to have highly skilled personnel in place to deliver goods and services becomes vital. As a result, DoD now requires an acquisition workforce with a new skillset. This new skillset includes cutting-edge technical, analytical, and management experience. The relatively slow entrance of U.S. students into advanced, technical fields, such as science and engineering, has contributed to a diminished pool of qualified potential employees, and those who do exist are in great demand in the private sector.

The problem begins in the lower schools, where students are turning away from science, technology, engineering, and math (the so-called STEM programs). The result is that, in the top U.S. universities, a majority of the STEM students (and some of the best, especially at the graduate level) are not U.S. citizens and there are clear, current barriers to their working in the national security area. In many cases, these students should be encouraged to stay and become U.S. citizens. For example, today when they come to the U.S. on student visas, they must commit to return to their home country when they complete their degree program. In spite of the fact that five percent of the U.S. military are non-U.S. citizens, foreign nationals cannot get approval to work in a U.S. defense plant (even after appropriate security checks).

It is important to remember that most of the Silicon Valley firms were formed by non-U.S. citizens and that Enrico Fermi was not a U.S. citizen when he was conducting nuclear research in Chicago that was critical to the development of the nation's first nuclear weapons.

On the government acquisition workforce side, undervaluing of the high-quality, experienced staff is even more critical and obvious. For example, in 1990, the U.S. Army had five general officers with a contracting background, while in 2010 they had none. Similarly, in the same time period, the Defense Contract Management Agency went from four general officers to none, and from 25,000 employees to 10,000. And yet, in the time period after 09/11, DoD's budget effectively doubled.

This shortcoming of the government's acquisition workforce was belatedly recognized by Congress, the GAO, and the various government agencies; but they addressed it by hiring entry-level interns. In fact, today's acquisition workforce averages less than five years of experience. And, this inexperience is, unfortunately, reflected in many of the current (highly undesirable) acquisition practices described above.

The defense enterprise will require a more adaptive, experienced, and broadly educated acquisition workforce, capable of responding to the wide-ranging spectrum of demands in the 21st century national security environment. This workforce will ultimately allow DoD to be successful in its efforts to modernize and transform the defense industrial base; therefore DoD must be given the ability to recruit and retain the best and brightest for the job.

Key Steps in Implementing Action Eight

- Strive for the achievement of a high-quality, not merely a high-quantity, acquisition workforce.
- Accelerate efforts to streamline and improve DoD's hiring processes.
- Enhance recruitment by focusing on employing entry-level/mid-level acquisition personnel through expanding internships and collaborative educational programs.
- Revise compensation packages to ensure current employees and potential hires are paid salaries competitive with those in the private sector.
- Expand the use of rotational programs between the federal government, academia, and industry.
- Provide employees added incentives for additional training and education.

Conclusion

As the U.S. economy, still reeling from the 2008 recession, continues along the path to recovery, lawmakers are searching for ways to cut spending and reduce the country's \$16 trillion debt. DoD, which consumes the second largest portion of government revenue, after entitlements, will likely see significant cuts in coming years. Indeed, cuts are already being made. The budget deal reached in August 2011 cuts \$350 billion in defense spending over the next 10 years. Sequestration, if it remains in effect, will cut \$600 billion more. At the same time, DoD must continue to support global operations and modernize the military's forces in order to support national security.

In the second decade of the 21st century, the United States will face a diverse set of challenges, including a prolonged economic recession, significant budget deficits, global warming, escalating health care costs, the need for education reform, and threats to homeland security (from long-range missiles and regional instabilities to cyberattacks). With the interconnected global environment, new challenges will continue to emerge suddenly and unexpectedly.

In light of these budgetary constraints and security challenges, DoD will need to gain every possible efficiency, while resisting the temptation to buy defense on the cheap. To be successful, DoD must incentivize and partner with the private sector and find ways to emulate the private sector's overall accomplishment, i.e., improving performance while reducing costs.

Implementation of the eight recommended actions detailed here will take the Department of Defense and the nation a long way along the needed path.

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About the Authors

The Honorable Jacques S. Gansler, former Under Secretary of Defense for Acquisition, Technology, and Logistics, is a professor and holds the Roger C. Lipitz Chair in Public Policy and Private Enterprise in the School of Public Policy, University of Maryland; he is also the Director of the Center for Public Policy and Private Enterprise. As the third-ranking civilian at the Pentagon from 1997–2001, Dr. Gansler was responsible for all research and development, acquisition reform, logistics, advanced technology, environmental security, defense industry, and numerous other security programs. Before joining the Clinton administration, Dr. Gansler held a variety of positions in government and the private sector, including Deputy Assistant Secretary of Defense (Material Acquisition), Assistant Director of Defense Research and Engineering (Electronics), Senior Vice President at TASC, Vice President of ITT, and engineering and management positions with Singer and Raytheon Corporations. Throughout his career, Dr. Gansler has written, published, testified, and taught on subjects related to his work. He is the author of five books and over 100 articles. His most recent book is *Democracy's Arsenal: Creating a 21st Century Defense Industry* (MIT Press, 2011).



William Lucyshyn is the Director of Research and a senior research scholar at the Center for Public Policy and Private Enterprise in the School of Public Policy at the University of Maryland. In this position, he directs research on critical policy issues related to the increasingly complex problems associated with improving public-sector management and operations, and with how government works with private enterprise. His current projects include modernizing government supply-chain management, identifying government sourcing and acquisition best practices, and analyzing Department of Defense business modernization and transformation. Previously, Mr. Lucyshyn served as a program manager and the Principal Technical Advisor to the Director of the Defense Advanced Research Projects Agency (DARPA) on the identification, selection, research, development, and prototype production of advanced technology projects.



Prior to joining DARPA, Mr. Lucyshyn completed a 25-year career in the U.S. Air Force. Mr. Lucyshyn received his bachelor's degree in engineering science from the City University of New York and earned his master's degree in nuclear engineering from the Air Force Institute of Technology.

Key Contact Information

To contact the authors:

Jacques S. Gansler

Professor and Roger C. Lipitz Chair in Public
Policy and Private Enterprise
Center of Public Policy and Private Enterprise
School of Public Policy
University of Maryland
2101 Van Munching Hall
College Park, MD 20742
301-405-8754

e-mail: jgansler@umd.edu

William Lucyshyn

Director of Research and Senior Research Scholar
Center of Public Policy and Private Enterprise
School of Public Policy
University of Maryland
2101 Van Munching Hall
College Park, MD 20742
301-405-8257

e-mail: lucyshyn@umd.edu



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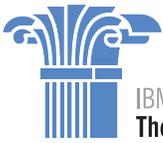
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For more information:

Daniel J. Chenok

Executive Director

IBM Center for The Business of Government

600 14th Street NW

Second Floor

Washington, DC 20005

202-551-9342

website: www.businessofgovernment.org

e-mail: businessofgovernment@us.ibm.com

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