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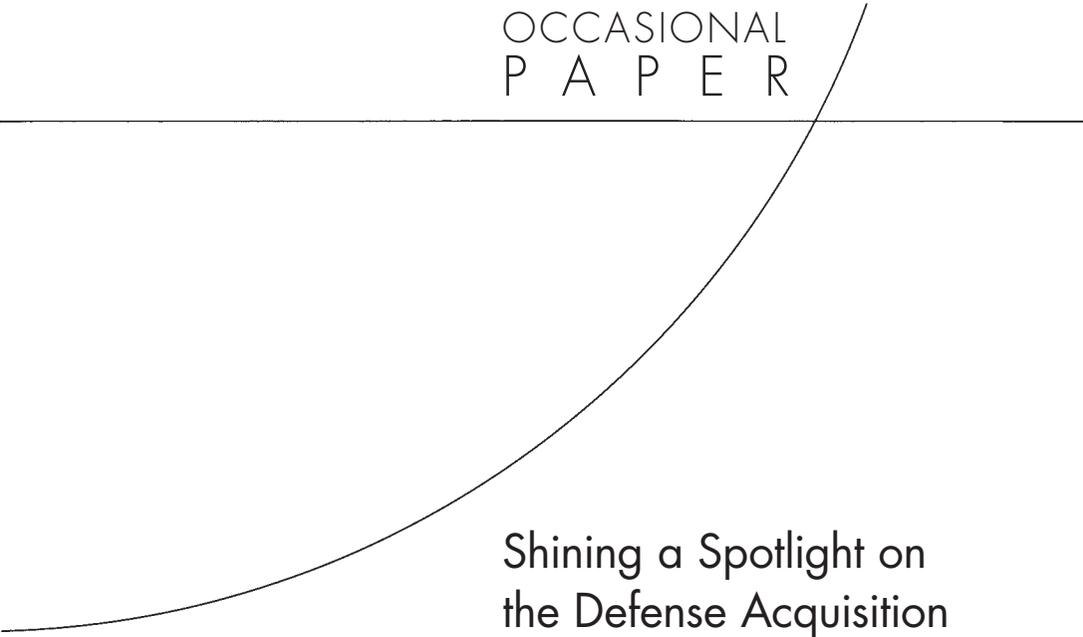
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## Shining a Spotlight on the Defense Acquisition Workforce—Again

Susan M. Gates

Prepared for the Office of the Secretary of Defense  
Approved for public release; distribution unlimited



NATIONAL DEFENSE RESEARCH INSTITUTE

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## Preface

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Today's defense environment is placing growing pressure on defense policymakers to be nimble and adaptive, particularly with respect to acquisition systems and processes. This occasional paper is one in a series drawing upon the expertise of core RAND Corporation staff to explore issues and offer suggestions on topics that are likely to be of critical importance to the new leadership: the use of competition, development of novel systems, prototyping, risk management, organizational and management issues, and the acquisition workforce. The papers are designed to inform new initiatives for markedly improving the cost, timeliness, and innovativeness of weapons systems that the Department of Defense (DoD) intends to acquire.

This paper assesses the evidence regarding whether and to what extent specific workforce issues contribute to poor acquisition outcomes in DoD. It describes key concerns about the size, mix, and quality of the defense acquisition workforce, and provides an overview of the workforce and the policy environment influencing its management. It also assesses the strength of the evidence supporting these key concerns, arguing that the information available on workforce size, mix, and quality is insufficient to assess whether more workers, more highly skilled workers, or a different mix of workers would improve acquisition outcomes. We highlight areas where better evidence is needed to understand the linkage between workforce attributes and acquisition outcomes, and recommend steps for assembling the information needed to make, refine or dismiss the case for major new hiring or training initiatives.

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# Shining a Spotlight on the Defense Acquisition Workforce—Again

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## Introduction

As we approach the end of the first decade after the turn of the century, concerns about defense acquisition outcomes—cost escalation, reports of improper payments to contractors, appeals filed over source-selection outcomes, schedule delays—pervade the popular press as well as DoD audits and internal reports. Although the term “defense acquisition” refers to all activities that are related to the procurement of goods and services from the private sector by DoD, two specific types of acquisition activities are the source of greatest concern today: Major Defense Acquisition Programs (MDAPs) and contracting efforts to support immediate needs in a contingency or combat operation (often referred to as “expeditionary contracting”). The U.S. Government Accountability Office (GAO) has designated defense contract management and defense weapon system acquisition as “high risk” areas.<sup>1</sup> Another recent prominent assessment, the Report of the Acquisition Advisory Panel (Section 1423 Report) criticized government acquisition efforts for awarding a substantial number of contracts (nearly one-third) through noncompetitive approaches, and the Report of the Commission on Army Acquisition and Program Management in Expeditionary Operations (Gansler Commission Report) concluded that “The

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<sup>1</sup> See the U.S. Government Accountability Office’s Web site at [http://www.gao.gov/docsearch/featured/highrisk\\_march2008.pdf](http://www.gao.gov/docsearch/featured/highrisk_march2008.pdf) for a list of all GAO high-risk areas and the year in which they were designated as such; see also <http://www.gao.gov/new.items/d07310.pdf> on defense contract management, p. 71.

acquisition failures in expeditionary operations require a systemic fix of the Army acquisition system” (p. 1).

The cacophony of criticism is not new, echoing stories from the 1980s about the government spending inordinate amounts of money on everyday items such as toilet seats or hammers (Fairhall, 1987). Now, as then, critics have shined a spotlight on the acquisition workforce (AW)—its size, quality, and effectiveness—as a key contributing factor to the observed problems.<sup>2</sup> Indeed, a recent review conducted by DoD of “almost every acquisition improvement study . . . concluded in some fashion or another that more attention needs to be paid to acquisition workforce quantity and quality” (Lumb, 2008, p. 20). The following three workforce-related claims feature most prominently in the current debates:

**(1) The current workforce is too small to meet current workload.** The Gansler Commission Report attributes poor contracting outcomes, including recent contracting scandals, to insufficient growth in the size of the contracting workforce and exploding growth in the acquisition workload (Gansler Commission Report, 2007, p. 30). This perspective is consistent with more general arguments that have been made about the federal AW overall, most recently in the Section 1423 Report, which stresses that the demands on the federal AW have grown both more numerous and more complex since the mid-1990s. Key drivers of the increasing demands include the complexity of service contracting, which is a growing share of all government contracting; the fact that the number of transactions is no longer a good measure of workload; and the fact that best-value procurement approaches are substantially more complex than lowest-price contracting approaches. The Section 1423 Report (2007, p. 19) concludes that

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<sup>2</sup> The sources calling for AW improvement acknowledge that workforce issues are only part of the problem. For example, in discussing the barriers to effective requirements determination, the Section 1423 Report (2007, p.7) not only points toward a strained workforce that lacks the requisite market expertise, but also to other factors that contribute to poor outcomes, such as a culture that emphasizes “getting to award,” budgetary pressures, time pressures, and unclear roles and responsibilities—particularly in the use of interagency or government-wide contracts.

the demands placed on the acquisition workforce have outstripped its capacity. And while the current workforce has remained stable in the new millennium, there were substantial reductions in the 1990s accompanied with a lack of attention to providing the training necessary to those remaining to effectively operate the more complex buying climate.

**(2) DoD overuses or inappropriately uses contractors to perform acquisition functions.** The dramatic increase in the federal government's use of contractors to provide services has received significant attention in recent years. Concerns relate not only to the number of contractors performing government functions, but also to the role they are playing—in particular, whether they are performing inherently governmental functions. Rostker (2008) argues that it is time for the federal government to rein in and rationalize the use of contractors.

Similar points have been made with respect to the defense AW. There is broad recognition in DoD that the contractor workforce has grown (Rostker, 2008; Section 814 Report, 2007), and congressional actions have prompted the Department of Homeland Security and DoD to review and reassess the way they are using service contractors (Rostker, 2008, p. 13).

**(3) The workforce lacks the skills to accomplish the workload.** Another common refrain in discussions about the state of the defense AW is that the nature of the work has become substantially more complex, while the workforce has lost some of the skills or training needed to perform this work. This point is made in each of the reports discussed above. Increased workload complexity is attributed primarily to increased use of best-value procurement methods and the complexity of service contracts, which comprise a growing share of the workload. Evidence that the workforce lacks the skills necessary to fulfill its mission is largely anecdotal, and the arguments are far less specific than those related to workforce size.

DoD has announced plans to increase the defense AW by 20,000 (or 16 percent) over the next five years. The workforce plan has been

described as a “bold step” toward addressing cost growth and schedule delays with major weapon systems (Hedgpeth, 2009). The proposed growth would include the conversion of 11,000 contractor support personnel to full-time government positions as well as 9,000 new federal hires.

It is unclear whether this step will, in fact, deliver on its promise of improving acquisition outcomes. Unfortunately, for all the information we have on acquisition outcomes and the AW, there is a dearth of evidence regarding whether and to what extent specific workforce issues are actually contributing to these outcomes. This paper assesses the evidence regarding the relationship between the issues described above and acquisition outcomes, and it discusses efforts that could inform future policy decisions related to the defense AW.

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**It is unclear that increasing the size of the acquisition workforce will improve acquisition outcomes.**

In the next section of this paper, we provide an overview of the defense AW and the policy environment influencing its management. In the third section, we assess the strength of the evidence supporting the key concerns that have emerged related to the AW. The final section offers conclusions and recommendations.

## **The Defense Acquisition Workforce: Policy Context, Size, and Composition**

This section provides some critical background needed to understand the context for AW management and to assess the extent to which workforce issues may be affecting acquisition outcomes.<sup>3</sup> The management of federal government employees is subject to myriad external pressures and extensive oversight at various levels. The defense AW has received substantial additional attention over the years, mak-

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<sup>3</sup> This chapter draws heavily on material contained in Gates et al., 2008.

ing it, arguably, the most heavily scrutinized workforce in the federal government.

The federal AW includes men and women across all federal agencies who are responsible for acquiring the goods and services that their organizations need. The DoD portion of the federal AW, as defined by the official DoD AW count, consists of over 130,000 military and civilian employees, as well as a large number of contractors. The defense AW includes individuals

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**Defense acquisition personnel work across a wide variety of functional areas and organizations within the military services and defense agencies.**

responsible for planning, design, development, testing, contracting, production, introduction, acquisition logistics support, and disposal of systems, equipment, facilities, supplies, or services that are intended for use in, or support of, military missions. (DoD Instruction 5000.55, 2005)

Because of the breadth of the work carried out, the AW spans organizational boundaries within the Department of Defense to include the Army, Navy, Marine, Air Force, Defense Logistics Agency, and other entities within the Office of the Secretary of Defense (DoD Instruction 5000.55, 1991).

### **Defense Acquisition Workforce and Improvement Act**

The policy environment for the management of the defense AW is dominated by the Defense Acquisition Workforce and Improvement Act (DAWIA) of 1990. DAWIA had its roots in DoD acquisition scandals of the mid-1980s<sup>4</sup> that led to internal and external pressures for reviews of defense acquisition processes, including President Reagan's Packard Commission. The consensus that emerged from these reviews was that the defense AW underperformed and was too large. DAWIA attempted to address these size and quality concerns by requiring that DoD count

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<sup>4</sup> See Fairhall, 1987.

and track the size of the AW and by imposing requirements on the training of acquisition workers, both military and civilian, employed by DoD.

DoD Instructions 5000.55 and 5000.66 are the key policy documents issued in response to DAWIA. Among other things, these instructions established twelve AW career fields;<sup>5</sup> provided guidance for managing the selection, placement, and career development of those filling positions within the AW; and defined workforce reporting requirements.

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**The military acquisition workforce is substantially smaller than the civilian acquisition workforce—but they have followed similar trends in terms of increases and decreases over time.**

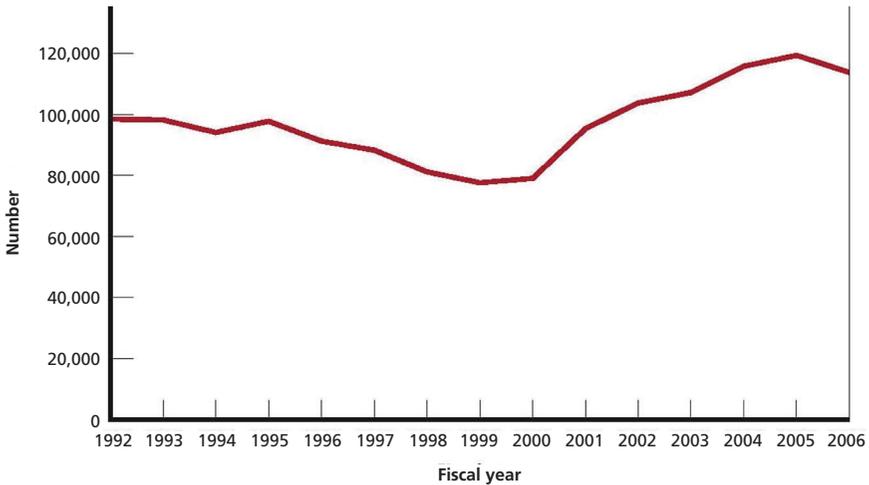
Since 1992, DoD has, consistent with DoD Instruction 5000.55, reported the number of military and civilian workers it employs who are part of the official AW (referred to as the “DAWIA count”). Figure 1 displays the civilian AW end-of-fiscal-year totals according to this DAWIA count. The figure shows that the civilian AW declined through the 1990s, reaching a low of 77,504 as of September 30, 1999. It then climbed steadily to 119,251 as of September 30, 2005, and then was reduced slightly to 113,605 by September 30, 2006.

The military AW is substantially smaller than the civilian workforce, but the trends have been consistent with those observed on the civilian side. The military AW stood at just over 16,500 in 1992; declined to 9,311 in 2000; and had increased to 14,976 by 2006. As discussed in Gates et al. (2008, pp. 44–45), the services vary dramatically in terms of the size and composition of their organic AW;

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<sup>5</sup> The career fields are: Program Management; Communications-computer systems; Contracting; Purchasing; Industrial Property Management; Business, Cost Estimating, and Financial Management; Auditing; Quality Assurance; Manufacturing and Production; Acquisition Logistics; Systems Planning, Research, Development, and Engineering (SPRDE); Test and Evaluation Engineering. The Manufacturing and Production career field was eliminated in 2007 and a new career field, SPRDE Program Systems Engineer, was added in 2008.

**Figure 1**  
**Civilians in the Acquisition Workforce, September 30 Annual Snapshots**



SOURCE: Gates et al., 2008, Figure 3.1.

the Air Force employs the largest number and proportion of military personnel.

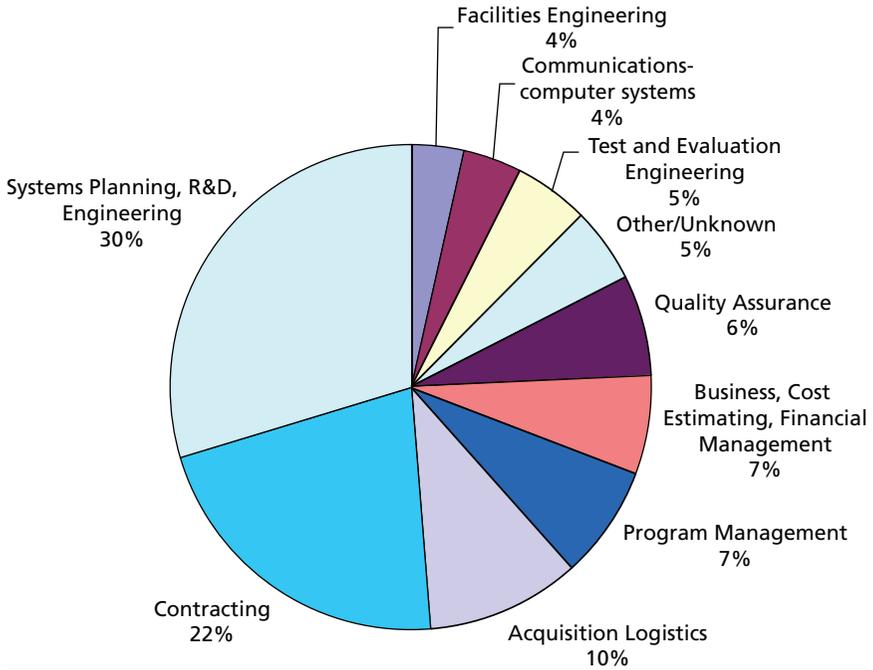
Figure 2 presents the career field distribution for the civilian AW. The majority of DoD civilian acquisition workers are employed in one of two career fields: (1) systems planning, research and development and engineering (SPRDE; 30 percent) or (2) contracting (22 percent). Only 7 percent of civilians are in program management. Figure 3 reveals a dramatically different career field distribution for military personnel.

Although contracting and SPRDE are important career fields for the military AW, the largest share of military acquisition workers

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**Military personnel make up one-third of the program management community—but there are few military personnel in auditing, science and technology, and the manufacturing and production communities.**

**Figure 2**  
**Career Field Distribution for the Civilian Acquisition Workforce, FY 2006**



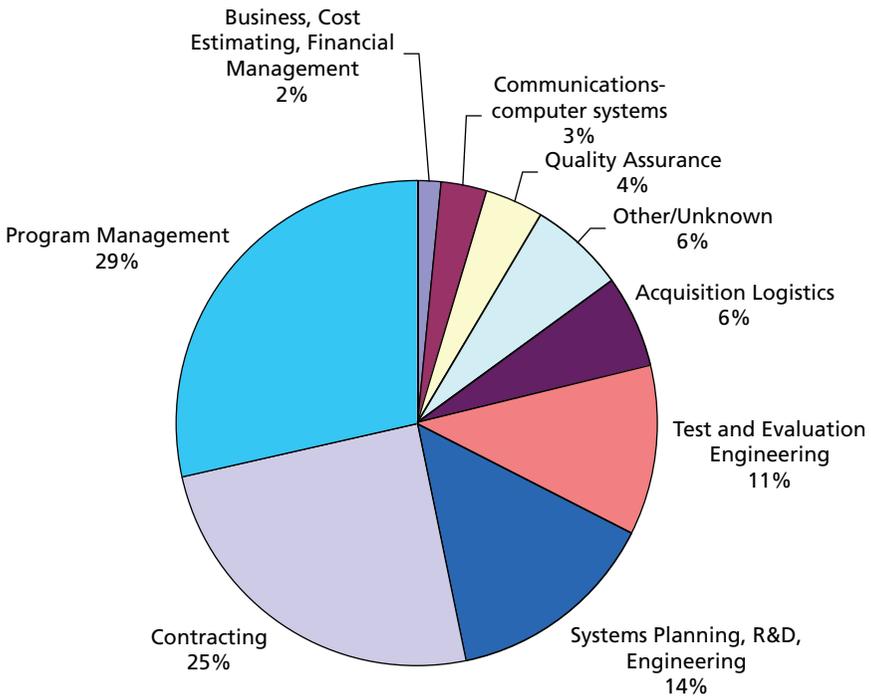
SOURCE: Gates et al., 2008, Figure 3.5.

is in the program management career field (29 percent of the total). Military personnel rarely fill positions in a number of fields, such as auditing, science and technology, manufacturing and production, purchasing and procurement, and industrial property management.

### **Civilian Personnel Management in DoD: The National Security Personnel System**

As illustrated in the previous section, civilian personnel dominate the organic AW. In 2003, Congress approved DoD's request to create a

**Figure 3**  
**Career Field Distribution for the Military Acquisition Workforce, FY 2006**



SOURCE: Gates et al., 2008, Figure 6.6.

new human-resource management system for DoD's civilian workforce to replace the more traditional personnel management system. The National Security Personnel System (NSPS) is based on personnel demonstration projects that had been approved and implemented since 1980 on a limited basis across the federal government. NSPS is intended to increase management flexibility in hiring, compensation and labor relations and to better motivate effective work. Importantly, NSPS allows DoD to link salary adjustments more directly with

individual and organizational performance (Congressional Budget Office [CBO], 2008, pp. 22–23). DoD views flexibilities embodied in NSPS as critical to the effective recruitment and utilization of civilian personnel within DoD (CBO 2008, pp.1–2). The department began converting personnel to the NSPS system in 2006 and by the end of FY 2008, 26 percent of DoD’s civilian workforce was part of NSPS.<sup>6</sup> Further expansion of NSPS has been put on temporary hold, pending a review of its implementation (DoD, 2009).

The AW had substantially more experience with the demonstration projects that inspired NSPS than has DoD’s workforce as a whole. As of the end of FY 2005, 24 percent of DoD’s AW was part of a demonstration project pay plan, compared with 7 percent of the overall DoD workforce.<sup>7</sup> The Acquisition Workforce Personnel Demonstration Project, as its name would suggest, focused specifically on the AW, and others, such as the demonstration project at the Naval Weapons Center in China Lake, California, focused on locations with a large share of acquisition workers. This suggests that the AW and its managers may be better prepared to implement NSPS and to reap the hoped-for benefits of the new system.<sup>8</sup>

### **Strategic Human Capital Planning for the Acquisition Workforce**

The Department of Defense generates a DoD-wide strategic human capital plan for its entire civilian workforce.<sup>9</sup> The Under Secretary of Defense for Acquisition, Technology, and Logistics (USD (AT&L))

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<sup>6</sup> Author’s calculations based on FY 2008 DoD Civilian Master File.

<sup>7</sup> Author’s calculations based on FY 2005 DoD Civilian Master File and Acquisition Workforce File data.

<sup>8</sup> Evaluations of the demonstration projects provide a basis for encouragement, but no definitive evidence that the management flexibilities improve outcomes. For example, Schay et al. (2002) found that the demonstration project shifted employee expectations, albeit slowly, about the relationship between pay and performance.

<sup>9</sup> The President’s Management Agenda of 2001 emphasized the importance of improved management and performance of the federal government; a key initiative in the agenda is the effective strategic management of human capital within the government agencies.

issued a strategic human capital plan for the AW for the first time in 2006, which is currently in its third revision (see United States Department of Defense, Acquisition, Technology, and Logistics, 2007). This plan emphasizes the importance of a “total workforce” perspective that includes military, civilians and contractors. Subsequently, Section 851 of the National Defense Authorization Act of 2008 required DoD to have a separate section in its Civilian Human Capital Strategic Plan (HCSP) on the AW. The AW is the only workforce that has been singled out for special focus with a stand-alone, DoD-wide HCSP.

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**The acquisition workforce is the only workforce for which DoD has developed a stand-alone human capital strategic plan.**

Although USD (AT&L) is the senior official providing overall supervision of the defense acquisition system, the office does not have direct authority over the many issues affecting AW management.<sup>10</sup> That authority falls to the services and agencies, which have “considerable influence over the shaping of their respective acquisition arms—prioritizing and approving operational requirements; building their [s]ervice program objective memorandums; and, in most cases, staffing and equipping program management offices” (Lumb, 2008, p. 19, summarizing findings from the Section 814 Report). USD (AT&L) is responsible for developing the AW plan and improving the AW; but ultimately, its role is to provide leadership and guidance on workforce issues.

The current emphasis on strategic human capital management is one of many workforce-related perspectives that have captured the attention of Congress and other federal policymakers over the years. We have already mentioned the pressures that emerged from the Packard Commission in the late 1980s to trim the size of the federal AW—the same workforce that is now criticized for being too small and for relying overmuch on contractors. These calls were buttressed by a more general movement to reinvent and downsize the federal government

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<sup>10</sup> See the Section 814 Report, 2007, pp. 2–5.

that began in 1993 with the National Performance Review. Following closely on the heels of that downsizing push was an emphasis on outsourcing or “contracting out” for goods and services in the mid-1990s. Managers may have shifted work from civilian and military personnel to contractor personnel in direct response. We cannot examine whether such a shift actually occurred because, as we discuss in the next section of this paper, we lack data on the use of contractors. In addition to these broader pressures to increase or decrease the use of certain types of personnel, special attention has also been paid at times to the staffing of particular types of organizations (such as DoD Headquarters organizations) or special types of personnel (such as senior executives or flag officers). Although strategic human capital management argues for organizing work and managing people in a strategic and effective way from a total workforce perspective, the current emphasis on this approach is just one of many pressures to which government managers are subject.

## **Basis of Main Concerns About the Defense Acquisition Workforce**

In this section we describe the evidence in support of three critical issues that have been raised about the AW: that it is too small to meet current workload, that it lacks the skills needed to effectively accomplish the workload, and that the workforce mix is out of line in terms of the number of contractors being used to perform acquisition functions. We argue that the information available on workforce requirements, size, quality, and mix is insufficient to assess whether more workers, more highly skilled workers, or a different mix of workers would improve acquisition outcomes.

### **Is the Defense Acquisition Workforce Really Too Small?**

To answer this question, one needs information about how many people are needed to accomplish the work (workforce demand) and how many people are currently part of the AW (workforce supply). No systematic data are currently available or referenced in workforce

critiques on defense acquisition workforce demand. This is a key barrier to answering the question posed above since a characterization of the required workforce must anchor any assessment of whether the current workforce is too small or too large. Data on workforce supply exist, but they have serious limitations for accurately depicting trends in the size of the defense AW. Two limitations are of particular importance: (1) varying definitions of the organic (military and civilian) defense AW and (2) the absence of DoD-wide information on the number of contractors in the defense AW.

DoD recognizes that workforce management efforts must take a “total force perspective” that includes all military, civilian, and contractor personnel. A key barrier to the total force perspective for AW management is a lack of systematic data available on the contractor workforce (GAO, 2009a). Because information on the contractor workforce is completely lacking and because the military portion of the workforce is so small, discussions of AW size tend to focus on the organic, civilian workforce. Even there, data availability poses serious barriers to an analysis of the workforce.

For all the attention that has been focused on the defense AW over the past three decades, one would think there would be a clear and consistent definition of what the defense AW is, but this is not so. DoD has identified and gathered data on civilian and military members designated as part of the defense acquisition workforce (AW) since 1992. However, the definition used to identify these individuals has changed substantially over time—so much so that the Section 1423 Panel concluded that the data cannot be used to provide meaningful evidence of any personnel trends.<sup>11</sup>

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**DoD data are based on definitions of the acquisition workforce that vary over time; we drew on data about DoD’s overall civilian workforce for a more consistent view.**

<sup>11</sup> The Section 1423 Report provides a detailed discussion of the AW counting methods employed by DoD and by the federal government as a whole (p. 346–350).

Because DoD data are based on a definition of the AW that is not consistent over time, we performed an analysis of DoD-wide data to provide a new perspective on how changes in the size of the civilian defense workforce may be related to acquisition issues and compared our result to the official count of the defense AW.<sup>12</sup> Rather than focus

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**Whereas the official DAWIA workforce has increased since 1992, we found that the number of DoD civilians in acquisition-related occupations had declined.**

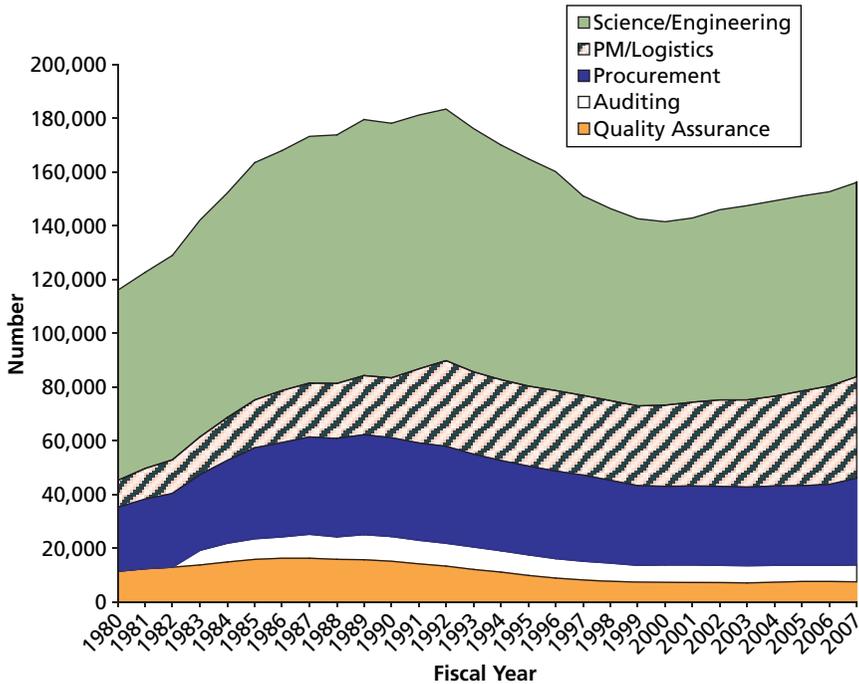
on official defense AW data, we first looked at *DoD-wide civilian personnel* data, focusing on the number of DoD civilians in occupational series that are closely related to the acquisition activities described above. We also examined the number of DoD civilians in those occupational series who were counted as part of the official defense AW from 1992 to 2007.

Our analysis of DoD Civilian Personnel Master File data from the Defense Manpower Data Center, presented in Figure 4, shows that the total number of DoD civilians in key acquisition-related occupational groupings had increased through the 1980s, reached a peak in 1992, reached a low point in 2000, and has increased since then, but has not returned to 1992 levels (the 2007 level is 14 percent lower than in 1992). In contrast, between 1992 and 2007, the number of DoD AW civilians (as measured by the *official workforce count* in these same occupations) *increased* by 14 percent (see Figure 5). Thus, whereas trends based on the official AW count (depicted in Figure 1) reflect modest workforce growth since 1992, an analysis that is less tied to the arbitrary DAWIA (Defense Acquisition Workforce Improvement Act) workforce definition suggests a slight decline in the workforce over the same period of time.

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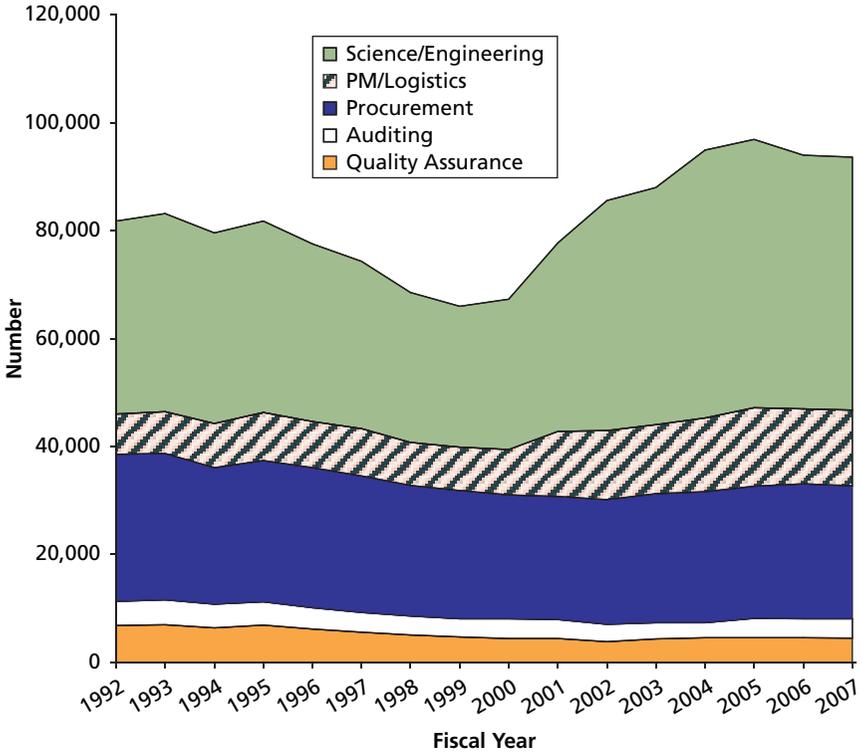
<sup>12</sup> To perform this analysis, we used data that RAND assembled to support AW analysis in DoD. These data are described in detail in Gates et al., 2008. In identifying the occupational groupings for this analysis, we were guided by the Section 1423 Panel recommendations regarding which types of personnel should be considered part of the AW (Section 1423 Report, p. 344). We were also guided by FY 2007 DoD AW data. We attempted to identify occupational series for which designated members of the defense AW represent a large share of the overall DoD workforce. Details on the specific occupational series included in each grouping are described in the Appendix.

**Figure 4**  
**Number of DoD Civilians in Acquisition-Related Occupational Series (1980–2007), Drawn from Overall DoD Civilian Personnel Data**



The dichotomy between trends based on the data we analyzed and trends based on official AW counts can be explained by shifts in the AW definition—in particular, an increased emphasis on including scientists and engineers in the DAWIA workforce count. Whereas in 1992, 38 percent of DoD personnel in acquisition-related engineering occupational series were counted as part of the AW, that figure was 65 percent by 2007. The implications are summarized in Figure 6, which depicts the number of all DoD civilians in science and engineering (“AW-related Occser Science/Engineering”) versus the number of these who were counted as part of the official acquisition workforce (“AW Science/Engineering”); it also depicts the number of all DoD civilian in areas “other” than science and engineering (“AW-related Occser other”) versus the number of these who were counted as part of

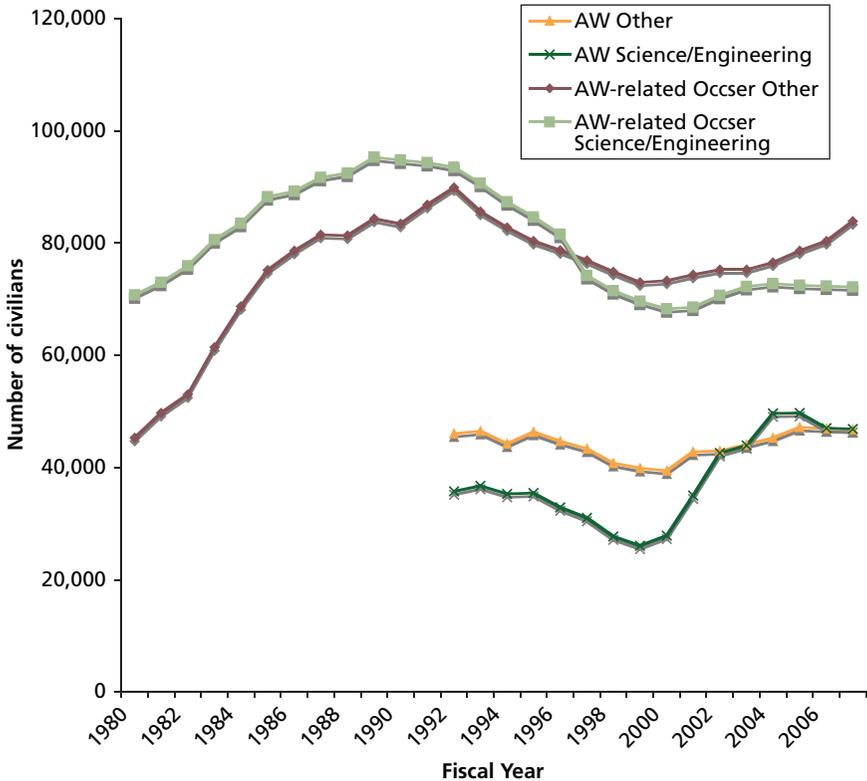
**Figure 5**  
**Number of DoD Civilians in Acquisition-Related Occupational Series Classified as Part of the Official Acquisition Workforce Count (1992–2007)**



the official acquisition workforce (“AW Other”). Figure 6 illustrates that the number of DoD civilians in acquisition-related occupations increased dramatically between 1980 and 1992, began to decline until about 2001, and then experienced slight growth through 2007. In contrast, the number of individuals in these occupational series who were counted as part of the AW declined between 1992 and 2001 for scientists and engineers and then increased substantially after 2001. For other acquisition-related occupational series, the number counted as part of the AW was relatively stable between 1992 and 2007.

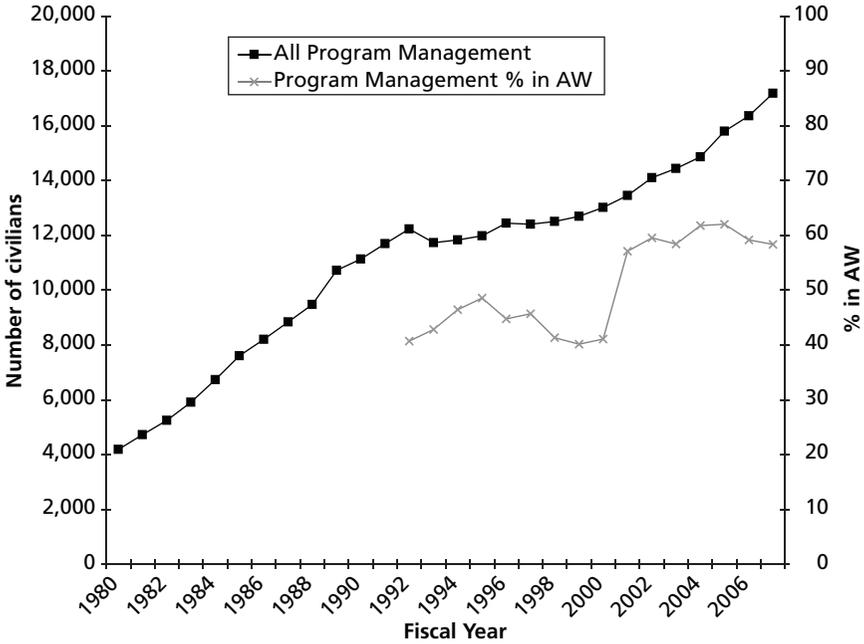
The modest growth in the official AW count also masks divergent trends by occupational series, which can be seen when the DoD-wide

**Figure 6**  
**Number of DoD Civilians in Science and Engineering and Other AW-Related Occupational Series (Occser), Overall and in the Official Acquisition Workforce Count (1980–2007)**



civilian workforce data are disaggregated. For example, the number of DoD civilians in the program management and logistics occupational series has increased substantially and consistently since 1980. In addition, the share of the DoD workforce in these occupational groupings counted as part of the official AW has increased from 1992 to 2007 (see Figure 7). In contrast, the total number of DoD civilians in the contracting, quality assurance, and auditing areas has declined steadily since the late 1980s. Figure 8 depicts the data for quality assurance. The share of the DoD civilian workforce counted as part of the official

**Figure 7**  
**Number of All DoD Program Management Civilians and Percentage Included in Official Acquisition Workforce Count**



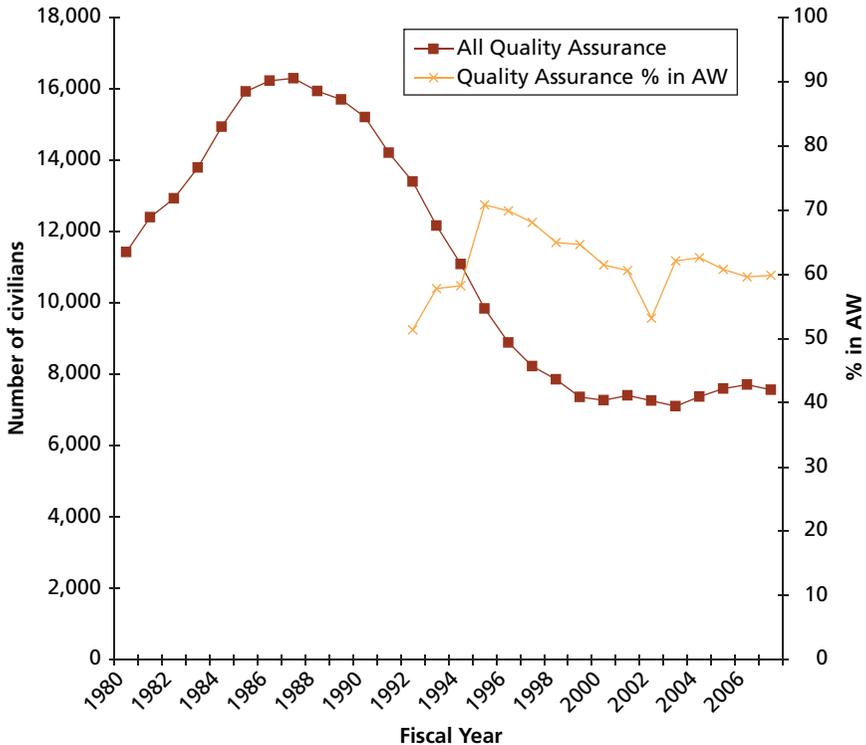
AW has been relatively stable since the official AW count began in 1992, but the *total* number of DoD civilians in these occupational

**Contracting, quality assurance, and auditing—areas most likely to be affected by increased workload from procurement reforms—have experienced significant decreases in size.**

areas has declined since then. The decline is most striking in quality assurance (44 percent) but is also substantial for auditing (26 percent) and for the more narrow contracting grouping (23 percent). The decline is 10 percent for the broader contracting grouping.

This analysis suggests that trend analysis based on the official (DAWIA) AW count is misstating trends since 1992. Whereas official statistics suggest growth, there has likely been a slight decline in the size of the workforce. It also suggests that the contracting,

**Figure 8**  
**Number of All DoD Quality Assurance Civilians and Percentage**  
**Included in Official Acquisition Workforce Count**



quality assurance, and auditing occupational groups—groups that would likely have been most affected by increased workload stemming from procurement reforms and increases in service contracts described above—have experienced the most significant declines in workforce size over time.

It is important to note that these data cover only the organic DoD civilian workforce; we do not know what role contractors are playing in these areas and cannot conclude anything about the growth or declines in *total* workforce size in these areas. As such, our analysis should be viewed as suggesting areas worthy of further examination rather than direct evidence that the workforce is too small in these areas.

## Overuse or Inappropriate Use of Contractors

Due to lack of data, we are simply unable to characterize when, where, and why contractors are being used to provide acquisition-related services across DoD; the characteristics of those contractors; and how their use and characteristics may have changed over time. The information that we do have comes from targeted, in-depth, point-in-time examinations of specific programs or specific organizations. The major take-away from these studies is that DoD makes substantial use of contractors in performing acquisition-related functions and that this use varies dramatically across functions, occupations, programs, and organizations.

### Where Are Contractors Being Used?

Targeted studies of the use of contractors to perform acquisition functions suggest that contractors are being used by most DoD acquisition

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**Information on contractors is based on point-in-time studies of specific organizations—we cannot characterize when, where, and why contractors are being used to provide acquisition-related services across DoD.**

organizations, but that organizational reliance on contractors is highly variable. Vernez et al. (2007) examined FY 2004 workforce data for individual business units within the Air Force Materiel Command (AFMC), which is the key acquisition command in the Air Force. Their analysis shows that the share of contractor manpower by organizational unit within AFMC varies dramatically, from 9 percent (Oklahoma Air Logistics Center) to as high as 89 percent (Arnold Engineering Development Center). Contractors represent 31 percent of the workforce at acquisition centers, 23 percent of the workforce at laboratory directorates, and 47 percent of the workforce at test and evaluation centers within AFMC. Other business units within AFMC, including logistics centers, have a lower reliance on contractors (Vernez et al., 2007, Table 2.2, p. 14). The authors also found substantial variation in the use of contractors across occupational areas; for example, 8 percent

of engineers and scientists in the Aeronautical Systems Center were contractors, 55 percent in the Air Armament Center were contractors, and 78 percent in the Electronic Systems Center were contractors (Vernez et al., 2007, p. 13).

GAO's analysis of program office staffing for 61 major weapons programs showed that 41 percent of program office staff consisted of contractors. The largest number of contractors was found among engineering and technical staff, where 53 percent were not government employees. Twenty-six percent of staff in program management, 17 percent in contracting, and 47 percent in other business functions were contractors or other nongovernment staff. The fractions were substantially higher for administrative support and other areas (GAO, 2009b, p. 24).

Vernez and Massey (forthcoming), in research on the Air Force cost-estimating workforce, conducted a comprehensive point-in-time survey of all individuals working on cost-estimating tasks for the Air Force in spring of 2008. Their work reveals that about half of the individuals performing such tasks are contractors and that the proportion of contractors in the workforce varies across the product and logistics centers examined. Contractors did not appear to be any less qualified; they were about as likely to have certification in the area of cost estimation (about one-third of the workforce had such certification) and tended to have as much or more experience in cost estimation compared with the organic workforce. The study also found that the Air Force was relying on contractors to do the actual cost-estimating work, whereas the organic staff tended to be financial management generalists or cost managers in charge of managing the cost-estimating work and integrating that work with other financial management functions (Vernez and Massey, forthcoming)

In a 2006 DoD Inspector General (DoD IG) audit of the AW at six AW locations, one location (Naval Sea Systems Command) was unable to provide any data on contractors performing acquisition functions. At the other locations, contractors as a portion of the total AW ranged from 16 percent (Defense Supply Center Columbus) to 64 percent (Air Force Space and Missile Systems Center) (U.S. Department of Defense, Office of the Inspector General 2006, p. 12).

### Why Are Contractors Being Used?

The targeted studies described previously suggest that the use of contractors to perform acquisition functions is not based on a comprehensive strategic assessment of the long-run costs and benefits of their use. The studies also provide evidence that acquisition organizations are not able to fill all of their requirements with in-house personnel for a range of reasons, including resource constraints and process barriers.

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**It is not clear that DoD's use of contractors to perform acquisition functions is based on a strategic assessment.**

In its review of staffing for major weapons programs, GAO found that 46 out of 59 programs that responded to questions about staffing had received authorizations for all required positions, but that only 42 percent of the programs were able to fill all of their authorized positions (GAO, 2009b, pp. 23–4). Thirty-one of these programs provided information to

GAO about the reasons for using contractor personnel (GAO, 2009a, pp. 8–9). Only one cited cost considerations. Over three-quarters of DoD acquisition programs reported that they used contractors as a way to get around critical constraints: personnel ceiling, civilian pay budget constraints, limitations with the federal government hiring process, or a lack of in-house capability in a particular area. These findings echoed those from a prior study conducted by the DoD Inspector General (DoD IG, 2006, p. 13).

GAO attributes DoD's reliance on contractor support to a "critical shortage of certain acquisition professionals with technical skills as it [DoD] has downsized its workforce over the last decade" (GAO, 2008, p. 30). GAO's report also noted that some of the program offices interviewed for its study expressed concerns about inadequate manpower. GAO found that DoD has given contractors increased responsibility for "key aspects of setting and executing a program's business case," including requirements development and product design (GAO, 2008, p. 29).

Vernez et al. (2007, p. 13) found varying perspectives on the pros and cons of using contractors to perform acquisition functions:

When line managers in the AAC were asked what the optimum share of contractors would be, their answers ranged broadly, from a low of 20 to a high of 80 percent. The low figure reflected respondents' concerns for continuity and institutional memory. The high figure reflected the view that contractors could do most of the functions of an SPO [system program office] with the exceptions of the director and key financial, security, and contracting positions.

The authors suggest that there was no way to assess the efficiency of the use of contractors in the organizations they studied.

Vernez and Massey (2009) found that the actual workforce in the cost-estimating area was about 75 percent of stated requirements. Those interviewed for the study pointed to challenges in filling positions as well as a failure to obtain hiring authorizations for all the requirements as reasons why the actual workforce fell short of requirements.

## **The Workforce Lacks the Skills to Accomplish the Workload**

Another common refrain in discussions about the state of the defense AW is that the nature of the work has become substantially more complex, while the workforce has lost some of the skills or training needed to perform this work. The drivers of increased complexity were discussed earlier and are primarily attributed to increased use of best-value procurement methods and the complexity of service contracts.

Evidence that the workforce lacks the skills necessary is largely anecdotal, and the arguments are far less specific than those related to workforce size. A key barrier to assessing this perspective is a lack of systematic data on the skill level of the workforce, not to mention the skills that are required to perform the work (GAO, 2009a, p. 9). The only data available on the AW that are remotely related to workforce quality are certification levels and education levels. This information is available only for the organic workforce.

On the basis of available information, the situation looks pretty good. According to the Section 814 Report (p. 3-2), the AW is more experienced and more highly educated than the defense workforce overall, and certification rates are high:

66 percent of the AT&L civilian workforce is certified, and 50 percent meet or exceed the required position certification level. However, for critical acquisition positions, the certification rate increases to 75 percent, with 65 percent meeting or exceeding the position.

But it is not clear how well certification standards—and the training provided to achieve those standards—are aligned to actual skill requirements. Moreover, concerns have been expressed that even the certification standards may be outdated or that the training provided to meet the standards does not reflect current skill needs (Vernez and Massey, forthcoming).

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**DoD lacks systematic data on the skill level of the workforce—and it is not clear how existing data, such as certification standards, are aligned to actual skill requirements.**

USD (AT&L) is leading an effort to define workforce competencies for critical segments of the AW (GAO, 2009a, pp. 10–11). This effort should lay the groundwork for a more systematic analysis of the question of whether the workforce actually has the skills needed to do the work. A big question that must be addressed in any analysis of this issue

is whether observed deficits in skills stem from a lack of training, from an inappropriate workforce mix, or from a combination of both.

## Conclusions

The AW has been the subject of numerous investigations and specific policy guidance over the past three decades. There have been pressures to increase and decrease the size of this workforce, to improve its quality (usually in terms of training and certification requirements), and

to both outsource its workload and bring its workload in-house. Yet few would argue that defense acquisition outcomes have dramatically improved in response to these varied policy initiatives.

The FY 2010 defense budget proposal includes the latest installment in a series of policy initiatives targeting the defense AW—with recommendations to grow the workforce and rein in reliance on contractors. But should we expect that a larger federal defense AW will lead to improved acquisition outcomes? Workforce initiatives are unlikely to be the silver bullet that will improve acquisition outcomes, but given present data constraints, we would not be able to answer that question anyway. As we have demonstrated in this paper, the information needed to assess the success of workforce initiatives and their contribution to overall acquisition outcomes is sorely lacking.

Efforts should be directed toward assembling the information needed to track the effectiveness of these new initiatives and to make, refine, or dismiss the case for further workforce adjustments. Below, we identify the steps DoD should take to acquire this information.

**Establish Key Process Standards That Are Plausibly Influenced by the Workforce, and Consistently Monitor Those Processes.** An infinitely large and supremely qualified AW will not generate on-time, on-budget systems with no problems or appeals 100 percent of the time. The AW acts within the confines of a process, and if the process itself is not operating effectively, then improvements to the workforce can only do so much. Attention must be paid to the acquisition process itself, including the incentives for effective work embodied in that process.

The AW must be viewed as an input to a process operation, and thought should be given to concrete outcomes that the workforce could be expected to influence. These would not be the high-level outputs of on-time, on-budget systems, but they could include important process-oriented outcomes that reflect top-flight systems engineering practices and could ultimately lead to improvements in the key outcomes of interest. It is also critical to acknowledge that the AW is engaged in a

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**Workforce initiatives are unlikely to be the silver bullet that will improve acquisition outcomes.**

wide range of procurement-related activities and that different types of activities are likely to require separate and distinct outcome measures.

**Map Workforce Characteristics to Acquisition Activities and Their Outcomes.** To identify the impact of workforce size and quality on acquisition outcomes, one needs to assess acquisition outcomes and relate those outcomes back to the workforce. For traditional defense acquisition systems, it may be sensible to track data at the acquisition program level using data on the workforce that are mapped to acquisition programs. An ability to map the AW to outcome data for the programs or organizations in which they work would support systematic analyses of the relationship between workforce attributes and outcomes. Currently, such a mapping of the defense AW is not possible

Accomplishing this goal would require managers to develop metrics appropriate to the program, organization, or activity in question that plausibly inform the quality of the work being done; that is, they should develop metrics based on the things that the workforce could influence and that would ultimately be expected to affect outcomes. An improved ability to link the workforce with organizational outcomes is consistent with strategic human capital management and with an effective implementation of NSPS. For example, if managers agree that providing timely systems engineering to support investment decisionmaking is a critical process indicator, they could track whether such activities are occurring and possibly assess the quality of those activities. That information could then be linked with data on that program's workforce to assess the relationship between workforce characteristics and these outcomes. Similarly, the tenure of program managers has been highlighted as a plausible factor influencing outcomes (GAO, 2008, p. 29). This workforce characteristic could be tracked at the program level and related to program outcomes to determine whether there exists a relationship between tenure and outcomes.

**Assess the Appropriateness of the Current Workforce Mix.** As illustrated in this paper, the data required to provide a convincing argument

that the defense AW mix is inadequate or inappropriate to meet current needs are lacking. Our analysis reveals declines in the number of DoD employees in auditing, contracting, and quality assurance occupations. Contractors may have been used to fill some of this gap. Our analysis also suggests that the AW focused on science and engineering has remained relatively stable and that program managers and logistics professionals (generalists) have grown. But current data cannot shed light on whether the workforce mix is appropriate and adequate to workforce needs.

The ideal workforce mix is likely to vary by acquisition activity and to change over time as acquisition processes and priorities change. Assessing whether the workforce mix is on target requires data that relates workforce measures to outcomes using a consistent unit of analysis such as the acquisition program. Because it will take time to assemble such data and identify the critical process and outcome data, it may be worthwhile for DoD to conduct a rough assessment of the appropriateness of the workforce mix through a systematic, program-by-program survey of program managers. Such information could be rolled up to provide a rough, high-level sense of some critical areas where the workforce mix is out of balance and to suggest more short-term actions that might be taken to correct some imbalances.

**Include the Contractor Workforce in Strategic Workforce Planning.** Currently, contractors are effectively ignored in strategic human capital efforts, yet we know they are playing a nontrivial role. The bottom line is that it is not possible to effectively manage human capital while ignoring an important segment of the workforce. In order to better understand the use of contractors in acquisitions, two things are needed: (1) better data on the contractor workforce as discussed above, and (2) a better understanding of the environment in which acquisition-related staffing and resource decisions are made.

**Assess How Staffing and Resourcing Decisions Related to Acquisition Functions Are Made.** Policymakers must keep in mind that specific characteristics of the workforce and its training and development are

only partial contributors to acquisition outcomes. Even policies that are targeted specifically at the AW are influenced by budgeting and management decisions that take place within the services and agencies. A realistic assessment of how staffing and resource decisions relate to the acquisition functions—the decisions that determine how many and what type of people are brought onboard to do the work, how their workload is managed, and how they are mentored and trained—is necessary to understand the effect that specific policies are likely to have on the AW and ultimately on acquisition outcomes. Such an understanding is especially critical in a time of workforce growth because the hiring that takes place today will influence the AW for decades to come.

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## **Appendix A: Occupational Grouping Definitions Used in This Report**

To identify occupational groupings for this analysis, we were guided by the recommendations contained in the Section 1423 Report as to who should be considered part of the AW. We were also guided by FY 2007 DoD AW data. We attempted to identify occupational series for which designated members of the defense acquisition workforce (AW) represent a large share of the DoD workforce as a whole.

We considered the following occupational groupings:

- Quality Assurance
- Auditing
- Program Management and Logistics
- Procurement
- Science and Engineering

### **Quality Assurance and Auditing**

In analyzing trends for quality assurance and auditing, we look at occupational series with 1910 (Quality Assurance) and 511 (Auditing).

### **Program Management and Logistics**

In the program management and logistics area we provide two different slices on the data. A comprehensive program management and logistics category includes all the following occupational series: 340 (Program Management), 343 (Management and Program Analysis), and 346 (Logistics Management). The more narrow program management category includes 340 and 343. Note that we exclude occupational series 301 (Miscellaneous Administrative and Program) from both analyses. Although this occupational series represents a substantial share (21 percent) of civilians in the DoD AW Program Management career field, the AW represents only 13 percent of all DoD civilians in that occupational series in FY 2007. Trends are similar for the two groupings.

“Series 301, covers positions the duties of which are to perform, supervise, or manage two-grade interval administrative or program work for which no other series is appropriate. The work requires analytical ability, judgment, discretion, and knowledge of a substantial body of administrative or program principles, concepts, policies, and objectives.” (U.S. Office of Personnel Management, 2008)

### **Procurement**

In the procurement area, we also present two slices of the data. A more comprehensive grouping includes the following occupational series: 1101 (General Business and Industry), 1102 (Contracting), 1103 (Industrial Property Management), 1104 (Property Disposal), 1105 (Purchasing), and 1150 (Industrial Specialist).<sup>13</sup>

A more restricted grouping (Contracting 2) includes the following occupational series: 1102, 1103, 1105, 1150. The second grouping emphasizes those occupational series for which the AW is a 90 percent + share of the AW. Note that there are a large number of individuals in the 1101 series who are part of the AW, (3,816 in FY 2007), but they

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<sup>13</sup> Note that some FAI analyses have included occupational series 1106, but there were fewer than 100 such individuals in the AW in 2007, and we have excluded them from the analysis.

represent only 37 percent of the total DoD 1101 workforce. The overall trends are similar for both definitions.

### **Science and Engineering**

To determine the acquisition-related Science and Engineering positions, we looked at the percentage of the DoD workforce that is counted as part of the AW by occupational series for the 800, 1300, 1500 series. We included all occupational series where the AW share was more than one-third in FY 2007. These are as follows:

- 801 General Engineering
- 803 Safety Engineering
- 804 Fire Protection Engineering
- 806 Materials Engineering
- 810 Civil Engineering
- 819 Environmental Engineering
- 830 Mechanical Engineering
- 850 Electrical Engineering
- 854 Computer Engineering
- 855 Electronics Engineering
- 858 Biomedical Engineering
- 861 Aerospace Engineering
- 871 Naval Architecture
- 890 Architectural Engineering
- 893 Chemical Engineering
- 896 Industrial Engineering
- 1301 General Physical Sciences
- 1310 Physics
- 1315 Hydrology
- 1320 Chemistry
- 1321 Metallurgy
- 1350 Geology
- 1370 Cartography
- 1382 Food Technology
- 1384 Textile Technology

1515 Operations Research  
1520 Mathematics  
1529 Mathematical Statistics  
1550 Computer Science

The largest occupational series included in this analysis are: 801 (8,013 AW members; 70 percent), 810 (4,126 AW members; 65 percent), 830 (6,287 AW members; 69 percent), 854 (2,421 AW members; 81 percent), 855 (11,132 AW members; 67 percent), 861 (2,995 AW members; 82 percent), 1550 (2,564 AW members; 60 percent).

Although, as we report below, the share of DoD's science and engineering workforce that is counted as part of the AW has grown over time, we did not observe shifts in the specific occupational series that were included in the defense AW.

Generally speaking, those occupational series in the 800, 1300, and 1500 series that were excluded on the basis of this cutoff had 25 or fewer DoD AW members in FY 2007. The three exceptions are occupational series 802 (Engineering Technical), which had 1045 AW members representing 9 percent of the DoD workforce; occupational series 808 (Architecture), which had 255 AW members representing 32 percent of the AW; and occupational series 856 (Electronics Technical), which had 351 AW members representing 6 percent of the DoD workforce.

### **Sensitivity Checks**

To validate that the occupational series considered part of the AW had not changed much between 1992 and 2007, we reviewed data on the percentage of the DoD workforce counted as part of the AW by occupational series for FY 1992. With a few exceptions (809, 856, 895, 1340, 1386, 1521, 1531), the share of the occupational series classified as part of the AW rose between 1992 and 2007. Among those occupational series where the share declined between 1992 and 2007, the share of all occupational series members in the AW was well below the one-third threshold in both years except in the case of occupational series 1386 (Photographic Technology), where it was 34 percent in

FY 1992. However, this is a small career field (with only 26 members DoD-wide in FY 1992 and seven in FY 2007) that does not seem to be directly related to the acquisition; hence, we decided not to include it in the analysis.