

Department of Defense Acquisition Workforce Analyses

Update Through Fiscal Year 2021

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About This Report

The defense acquisition workforce (AW), which included over 180,000 military and civilian personnel as of the end of fiscal year (FY) 2021, is responsible for providing a wide range of acquisition, technology, and logistics support for products and services to U.S. warfighters and support elements. For decades, the AW has received attention from policymakers seeking to improve the defense acquisition process to ensure that it delivers high-quality, technologically superior goods and services to the military on schedule and at a fair price to taxpayers.

The Under Secretary of Defense for Acquisition and Sustainment (USD[A&S]) is responsible for U.S. Department of Defense (DoD)–wide strategic human capital management for the AW. USD(A&S)’s Office of Human Capital Initiatives, part of Defense Acquisition University, supports DoD human capital strategies and has directed the deployment of a comprehensive workforce analysis capability to facilitate enterprise-wide and component assessments of the AW. The RAND Corporation aids in this effort by providing ongoing updates on workforce gains and losses, as well as targeted analyses of specific topics of interest.

This report updates information presented in three previous RAND reports stemming from this stream of work—Gates et al., 2008; Gates et al., 2013; and Gates et al., 2018—with data through the end of FY 2021. Some background material, description of data and methods, and summaries of prior results reported here are drawn from earlier reports with updates as appropriate. As DoD embarks upon the rollout of the Back-to-Basics (BtB) initiative—the most significant change to the defense AW management infrastructure since its inception in the early 1990s—this report provides a baseline characterization of the pre-BtB workforce. We present a descriptive overview of the AW as of the end of FY 2021, discuss changes to the AW over time, and describe the characteristics of recent cohorts of civilian AW personnel. We also describe the implications of BtB for workforce analysis and make recommendations about the collection of new data. The data sources and underlying methods are described in our prior published reports.

This report will be of interest to officials in DoD and elsewhere who are responsible for AW planning, management, and oversight.

RAND National Security Research Division

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The research reported here was completed in May 2022 and underwent security review with the sponsor and the Defense Office of Prepublication and Security Review before public release.

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The authors alone are responsible for any remaining errors in the report.

Summary

The defense acquisition workforce (AW) is charged with providing the U.S. Department of Defense (DoD) with the management, technical, and business capabilities needed to execute defense acquisition programs and activities from start to finish. This workforce is composed of military personnel, civilian DoD employees, and contractors who perform functions related to the acquisition of goods and services for DoD.

In 2006, the RAND National Defense Research Institute began to collaborate with DoD—particularly the Office of Human Capital Initiatives (HCI), within what was then the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics and is currently the Office of the Under Secretary of Defense for Acquisition and Sustainment—to develop data-based tools that would support analysis of the “organic” defense AW, which includes military and DoD civilian personnel but not contractors. The methods and key findings from past analyses are documented in a series of reports (Gates et al., 2008; Gates et al., 2013; and Gates et al., 2018).

This report summarizes our methods, which are described more fully in the prior reports, and provides a final characterization of how the AW evolved from FY 2006 up to its state at the end of fiscal year (FY) 2021, before the implementation of significant changes to the oversight structures and training requirements for the AW in February 2022 as part of the Back-to-Basics (BtB) initiative. Therefore, this end-of-FY 2021 overview provides a key reference point against which to contrast future workforce changes stemming from the rollout of BtB changes and other factors.

The Acquisition Workforce Has Grown Since FY 2006, Driven by Civilians

Between FY 2006 and FY 2021, the DoD AW grew by 57,677, from 128,187 people in FY 2006 to 185,864 people in FY 2021. Nearly all of the increase (57,153 of 57,677) was in the civilian AW. Between FYs 2006 and 2021, the civilian AW grew by 52 percent and increased as a share of the total DoD civilian workforce from 16.7 percent to 21.6 percent. Most service branches and DoD agencies that compose the “Fourth Estate” (i.e., DoD agencies other than the military services) added to their civilian AWs over this period, and the Navy experienced especially strong growth in its AW. The Army was a notable exception; its civilian AW shrank by more than 15 percent (more than 7,000 people) between FY 2006 and FY 2017.

In contrast, the size of the military AW has remained stable, varying between 14,000 and 15,600 people since FY 2006—an order of magnitude smaller than the civilian AW. At the end of FY 2021, the military AW numbered 15,106 people. The majority of the military AW is in the Air Force (57 percent as of FY 2021), and the remainder is distributed among the Navy (24 percent), Army (12 percent), Marine Corps (5 percent), and other DoD organizations (2 percent).

DoD Has Improved the Balance of the Generational Profile of the Civilian Acquisition Workforce, but the Workforce Remains Predominantly White and Male

The age distribution of the workforce shifted, with 29 percent under age 40 in FY 2011 and 35 percent in FY 2021. Not surprisingly, today’s civilians have longer careers ahead of them before they reach retirement eligibility than civilians in the past did. In FY 2021, 42 percent of the AW was more than 15 years from retirement eligibility, versus only 28 percent in FY 2008.

Despite the improvements in the generational profile of the civilian AW, the workforce remains predominantly white and predominantly male. As of the end of FY 2021, 69 percent of the AW was male and 73 percent was white; little has changed since FY 2011.

Any shifts to the workforce demographics are driven in part by changes to the profile of individuals entering the AW. FY 2021 civilian new hires are just as likely as FY 2011 new hires to be male but less likely to be white and substantially more likely to be under 40 years old. This suggests that the gender imbalance in the AW is likely to persist in the near term.

Civilian Acquisition Workforce Attrition Rate Has Remained Low

Members of the AW have a greater attachment to the DoD civilian workforce than DoD civilians do overall. Because the civilian AW represents about 90 percent of the total AW and military AW losses tend to be rotations out of the AW to other military positions, the stability of the AW is closely related to civilian AW retention. Over the past decade, the DoD civilian AW attrition rate has held steady in the 5- to 6-percent range—lower than the attrition rate for the civilian DoD workforce overall, which is above 8 percent; this difference is primarily due to lower rates of voluntary and involuntary separation for the DoD civilian workforce overall than for the civilian AW (Gates et al., 2018, p. 37).

As we have established in prior work (Gates et al., 2008; Gates et al., 2013; and Gates et al., 2018), retirement accounts for the majority of AW attrition, and retirement eligibility is a significant driver of workforce losses. For both the overall DoD civilian workforce and the civilian AW, the attrition rate is relatively low in the years prior to workers reaching retirement eligibility, increases dramatically in the year that workers reach retirement eligibility, and remains high for those who remain in the workforce after reaching eligibility. For example, in FY 2021, the attrition rate for civilian AW members who were a year away from eligibility was 3.2 percent; for those who reached eligibility in FY 2021, the loss rate was 15.5 percent. On both sides of the retirement eligibility threshold, the loss rate for the AW is about 2 percentage points lower than the loss rate for the civilian workforce as a whole.

The Most-Recent Cohorts of Civilian Acquisition Workforce Gains Have Been Larger, with New Hires from Diverse Professional Backgrounds

The size of incoming cohorts—which includes not only new hires (i.e., those hires from outside DoD) but transfers into the AW from non-AW positions in DoD—rose from about 8,000 in FY 2006 to 18,224 in FY 2019. Recent cohorts have included larger numbers of new hires than cohorts from many prior years. In these larger cohorts, the overall number of new hires with some DoD experience in the past has increased somewhat, but the percentage with such experience has declined.

The new hires that fueled the AW growth initiative (and that contributed to the recent larger cohorts) came from increases in hires from outside DoD. These individuals have a diversity of backgrounds. The majority have never had prior DoD experience, and, of those who have, the majority have not been part of the military or civilian AW. Altogether, this reflects a dynamic workforce with diversity of experience and backgrounds—one that no longer reflects a workforce dominated by retired personnel from the military AW.

The Acquisition Workforce Is Largely Meeting Certification Requirements

The vast majority of members of the AW meet or exceed the certification requirements associated with the positions they fill or are within the 24-month window for meeting those requirements after appointment. At the end of FY 2021, 70.5 percent of the AW met or exceeded certification requirements—up from 60.4 percent in FY 2011. The rise in the percentage of the AW (and especially the civilian AW) meeting certification requirements is notable in view of the dramatic growth in this workforce over the past decade, suggesting that DoD was successful in hiring qualified individuals to fill the positions or providing new hires with the training needed to meet the certification requirements.

Conclusions and Recommendations

As DoD embarks upon the most significant change to the talent management structure for the AW since the Defense Acquisition Workforce Improvement Act, through the rollout of the BtB initiative, the workforce is robust and, by some available metrics, quite healthy. The workforce has grown dramatically in the past decade because of significant increases in the size of the civilian AW and a decline in the share of the workforce that is eligible to retire. The overall workforce is well balanced in terms of proximity to retirement. Available indicators suggest that this growth has not come at the expense of workforce quality over the past decade. Workforce growth was possible in part because of strong retention, as well as hiring efforts that attracted individuals with a diversity of professional experience and backgrounds, including individuals from outside DoD.

The civilian AW has realized little change in gender and racial diversity over time. DoD may have missed an opportunity to shift the workforce demographics during the recent period of workforce growth; our analysis reveals that the characteristics of new hires largely mirrored those of the existing workforce. Greater diversity among new hires would be needed to shift the demographic profile of the overall workforce.

The BtB initiative consolidates the career fields from 14 to six and develops cross-cutting knowledge areas and associated certification structures. These changes hold the potential for creating a more targeted set of job requirements and more-nimble learning opportunities to support the workforce in meeting those requirements. That said, because BtB reduces the learning hours required for certification and increases the amount of time that workers have to achieve certification requirements (i.e., the “grace period”), certification data for FY 2022 and beyond will not be comparable with certification data from FY 2021 and earlier. It will be critical for DoD to closely monitor certification going forward and clearly specify the definition to be used in determining whether a member of the AW is in the grace period.

The BtB framework provides a structure for implementing role-relevant defense acquisition credentials that AW members can pursue based on their current needs and future aspirations. A key limitation of the BtB rollout plans, in our view, is the lack of reporting requirements and systems focused on these credentials. Such requirements and systems would allow DoD to conduct more-robust gap analysis, better monitor workforce readiness, and effectively support the AW and, ultimately, the warfighter.

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Introduction

The U.S. Department of Defense (DoD) acquires goods and services totaling more than \$350 billion each year, more than all other federal agencies combined (Data Lab, 2018).¹ DoD awards contracts for a wide array of goods and services, from major weapon systems to computer software to food service. Defense acquisition professionals are responsible for ensuring that the military is an effective fighting force, supporting DoD's business operations and other activities, and promoting public policy priorities, all while being good stewards of taxpayer dollars.

For decades, though, policymakers have expressed concerns that the defense acquisition process falls short of meeting the needs of the warfighter, delivering capabilities in a timely fashion, and doing so at a fair price to taxpayers. It has been more than 30 years since the infamous “\$435 hammer” and defense acquisition scandals of the 1980s that led President Reagan to establish a Blue Ribbon Commission on Defense Management (the “Packard Commission”; Fairhall, 1987). DoD weapon system acquisition has been on the U.S. Government Accountability Office's (GAO's) “high-risk” list of “government operations with greater vulnerabilities to fraud, waste, abuse, and mismanagement” ever since the list was first compiled in 1990 (GAO, 2021, p. 1). While it acknowledges progress, GAO's 2021 report states that, in spite of an ongoing commitment on the part of Congress and DoD to improving weapon system acquisition, “many programs continue to fall short of cost, schedule, and performance goals” (p. 135).

Despite these overall conclusions, the 2021 report does acknowledge that DoD has made improvements in hiring and training for the acquisition workforce (AW), stating that “DOD has significantly rebuilt its acquisition workforce as measured by the number of personnel in acquisition career fields, their experience level, education level, and training certification” (GAO, 2021, p. 25). Nevertheless, hiring remains difficult for DoD in such acquisition-related specialties as software development, data analytics, and cybersecurity test and evaluation, where vacancies and, therefore, gaps in expertise remain.

In 2006, the RAND National Defense Research Institute (NDRI) began a collaboration with DoD to develop data-based tools to support analysis of the “organic” defense AW, which includes military and DoD civilian personnel but not contractors. NDRI published reports in 2008 and 2013 (Gates et al., 2008; Gates et al., 2013) that document the construction of the data set and the analytical methods used to examine the data. The reports provide descriptive analyses of the AW based on data through fiscal years (FYs) 2006 and 2011, respectively. They also include a more extensive discussion of the underlying policy motivation for an analysis of the AW than is included in this report. A report published in 2018 documents ongoing improvements to the methodology and describes new methods used to analyze cohorts of new civilian AW hires (Gates et al., 2018).

This report provides an updated overview of the policy context and presents findings based on data through the end of FY 2021. It also provides an overview of the state of the AW on the eve of the Back-to-Basics (BtB) rollout (reviewed later in this chapter). We discuss the potential implications of the transition for the workforce and workforce analysis and identify opportunities for the collection of new data that could

¹ This chapter reuses some material from Gates et al., 2018, Chapter One.

support decisionmaking. As of this writing, in spring 2022, we continue to work collaboratively with DoD to improve the data and methodologies to make them more useful to AW managers, to update the analyses as new data become available, and to accommodate and support the BtB transition.

Overview of the Acquisition Workforce

As required by the Defense Acquisition Workforce Improvement Act (DAWIA) of 1990 (Pub. L. 101-510, 1990), DoD has been tracking and reporting on the AW since 1992. The AW is responsible for executing and overseeing the acquisition process, including

the conceptualization, initiation, design, development, test, contracting, production, deployment, logistics support (IPS), modification, and disposal of weapons and other systems, supplies, or services (including construction) to satisfy DoD needs, intended for use in, or in support of, military missions. (DoD, 2017b, p. 1)

Military and DoD civilian personnel are identified as part of the AW if the positions they fill are designated as acquisition positions. DoD is required by statute to formally designate acquisition-related positions in certain areas as acquisition positions. All branches of the military and a number of other DoD agencies that compose the “Fourth Estate” (i.e., DoD agencies other than the military services) have such positions and employ members of the AW.

Prior to February 2022, members of the AW were grouped into career fields. The number and titles of these career fields changed over time. In FY 2021, the AW spanned 14 main career fields:²

- auditing
- business—cost estimating
- business—financial management³
- contracting
- engineering⁴
- facilities engineering
- industrial and contract property management
- information technology
- life-cycle logistics
- production, quality, and manufacturing
- program management
- purchasing

² The small business career field was established in FY 2015 (see Under Secretary of Defense for Acquisition, Technology and Logistics, 2014) but was not fully implemented, and career-field indicators were not available for this workforce for use in our analysis.

³ The two business career fields are sometimes combined into one field: *business—cost estimating and financial management* (BCEFM). In reports for DoD, RAND provides both separate and combined analyses for these fields. Past RAND reports combined the two career fields when providing a descriptive overview of the AW. This report breaks out the two fields to better align with analyses produced by DoD.

⁴ The engineering career field was previously known as *systems planning, research, development, and engineering* (SPRDE) and split into two separate career fields: *SPRDE—systems engineering* and *SPRDE—program systems engineer*. As of FY 2014, the *SPRDE—program systems engineer* field was eliminated, and members of both career fields transitioned to a general “engineering” field (see Under Secretary of Defense for Acquisition, Technology and Logistics, 2013).

- science and technology management
- test and evaluation.

The policy environment related to the AW has changed over time, but a consistent theme has been a high level of congressional attention. In the first decade after DAWIA, attention was directed toward limiting or decreasing the size of the AW. Schwartz et al., 2016, points to congressionally mandated AW reductions in FYs 1996 through 1999, stemming from a view that “the acquisition workforce size was not properly aligned with the acquisition budget and the size of the uniformed force” (p. 7). In that era, the term *misalignment* meant that the workforce was too large. The number of civilians in the AW declined from a starting point of about 100,000 in FY 1992 to a low of 77,504 in FY 1999 (see Gates et al., 2013, Figure 3.1). By 2000, congressional attention shifted toward stabilization and eventually growth of the AW. Notably, with the support of Congress, DoD pursued an explicit growth initiative to increase the size and expand the capabilities of the AW starting in 2009. The AW growth initiative responded to the concern at the time that the size of the workforce was insufficient to meet DoD procurement demands for major defense acquisition programs, major automated information systems, and programs in other acquisition categories, as well as the concern that DoD was using contractors to support core functions.⁵

In spite of DoD budgetary constraints and hiring freezes targeting the rest of the defense workforce, DoD quickly met and exceeded its stated goal of increasing the size of the AW by 20,000 between FY 2008 and FY 2015, through a mix of new hiring and insourcing of contractor functions (DoD, 2010).⁶ The growth initiative prioritized such career fields as contracting and engineering, which were viewed as critical to improving acquisition outcomes (DoD, 2010, pp. 1–5), and was structured to enhance the quality of the AW in terms of education and credentialing. The initiative also sought to sustain the workforce in the face of an anticipated retirement wave.

Congress supported the AW growth initiative by establishing the Defense Acquisition Workforce Development Fund (DAWDF) through Section 852 of the National Defense Authorization Act (NDAA) for FY 2008 (Pub. L. 110-181, 2008). In addition, Section 833 of the FY 2009 NDAA (Pub. L. 110-417, 2008) created an Expedited Hiring Authority for certain civilian AW positions with critical hiring needs or severe shortages of candidates.⁷ Congress also continued to support the DoD Civilian Acquisition Workforce Personnel Demonstration Project (AcqDemo), initially created in the 1990s “to provide a personnel management system that increases [DoD’s] ability to attract, retain, and motivate” the AW (AcqDemo, undated).⁸ DAWDF was espe-

⁵ In addition to the GAO “high-risk” list (GAO, 2017a), several other reports found fault with DoD acquisitions and the AW in particular. The Section 1423 Report (Acquisition Advisory Panel, 2007) criticized government acquisition efforts for excessive use of noncompetitive approaches, and the Gansler Commission Report (Commission on Army Acquisition and Program Management in Expeditionary Operations, 2007) concluded that major changes were needed in acquisition functions that support expeditionary operations. There is no clear consensus about demand drivers for the AW. For example, AW size trends do not track with trends in defense contract obligations. As described by Schwartz et al., 2016, between FY 2001 and FY 2015, both the size of the AW and the number of defense contract obligations grew (by 21 percent and 43 percent, respectively). But between FY 2001 and FY 2008, the workforce shrank while obligations grew. The opposite was true between FY 2009 and FY 2015. Between FY 2015 and FY 2020, defense contract obligations grew by 41 percent—largely because of increases for aircraft, ships, and construction (Sanders, Jang, and Holderness, 2021). During this time frame, the AW grew by 18 percent. Sanders, Jang, and Holderness, 2021, documents significant shifts in what DoD was spending its money on and the types of vendors who were receiving the money during this period—factors that also could have influenced the demands on the AW.

⁶ Initially, the additional 20,000 members of the AW were to be split between new hires and insourcing; however, a March 2011 revision to DoD’s insourcing policy “effectively curtailed” insourcing after about 3,400 positions had been insourced (GAO, 2015, p. 11).

⁷ Both DAWDF and the Expedited Hiring Authority were made permanent by the FY 2016 NDAA (Pub. L. 114-92, 2015).

⁸ Section 844 of the FY 2018 NDAA (Pub. L. 115-91, 2017) extended AcqDemo through 2023.

cially important for the AW because it provided DoD with targeted funds that could be used to recruit and hire acquisition personnel at a time of constrained resources and personnel cuts.

For example, when DoD announced a freeze on the number of civilian workers in March 2011, an exception was made for recruitment and hiring supported by DAWDF. The same was true for an Army hiring freeze implemented in 2013 (Department of the Army, Office of the Assistant Secretary, Manpower and Reserve Affairs, 2013). In its “Section 955” reports describing efforts to cut spending on the civilian and contractor workforces over the FY 2012–FY 2017 period, DoD excluded members of the civilian AW from the required reductions on the grounds that they were “core or critical to the mission” of DoD (GAO, 2016, p. 5; Under Secretary of Defense, 2014, p. 3). In response to pressures to reduce spending and personnel levels, the Army, in particular, initiated major cutbacks in its civilian workforce starting in FY 2011 (Nataraj, Hanser, et al., 2014), which continued through 2017 (Association of the United States Army, 2017).

DAWDF resources came with some strings attached, as Congress required DoD to submit annual reports on DAWDF’s efforts to recruit and retain members of the AW. Section 1108 of the FY 2010 NDAA required DoD to submit an annual strategic workforce plan (subsequently changed to every two years and eventually eliminated by the FY 2017 NDAA [Pub. L. 114-328, 2016]), to “include a separate chapter to specifically address the shaping and improvement of the defense acquisition workforce, including both military and civilian personnel” (Pub. L. 111-84, 2009). The AW was the only sub-workforce within DoD required to have its own strategic plan. Between 2012 and 2017, GAO reviews called upon DoD to improve the alignment between DAWDF-funded efforts and the overall AW plan and to develop outcome-oriented performance metrics for evaluating the effectiveness of the DAWDF efforts (GAO, 2012; GAO, 2015; GAO, 2017b). GAO also found that DoD had fallen short in obligating funds allocated to the DAWDF account. As of the beginning of FY 2016, DoD had \$875 million in DAWDF carryover funding (GAO, 2017b, p. 15). In that same review, GAO concluded that DoD’s management of DAWDF had improved and that the carryover balance would decline dramatically by FY 2018 to \$158 million. The FY 2016 NDAA (Pub. L. 114-92, 2015) mandated an independent study of defense AW improvement efforts.⁹ Section 843 of the FY 2018 NDAA (Pub. L. 115-91, 2017) called for additional reports on the effectiveness of hiring flexibilities for members of the AW (GAO, 2019).

Defense-Wide Review and Back-to-Basics Initiative

In 2019, DoD initiated a department-wide review intended to produce recommendations to align defense spending with priorities outlined in the National Defense Strategy. The first round of this effort, which focused on Fourth Estate agencies, resulted in a report published in January 2020 that identified “over \$5 billion in FY 2021 savings (5.7% of the Defense-Wide overall budget) for re-investment in lethality and readiness, and identified more than \$2 billion in activities and functions to transfer to the military departments” (Office of the Secretary of Defense, 2020, p. 2). Among those “re-investments” were DAWDF funds.

The recommendations were quickly implemented in the FYs 2021 and 2022 budget requests, dramatically reducing DAWDF funding from \$400 million in FY 2020 to \$88.2 million in FY 2021 and \$54.7 million in FY 2022. Estimated FY 2022 allocations for recruitment and hiring were reduced to just 1 percent of previous levels (from \$153.2 million to \$1.4 million). Estimated FY 2022 DAWDF allocations for AW training and development were reduced to 23 percent of FY 2020 levels (from \$230.6 million to \$51.9 million) and for recognition and retention down to 10 percent of prior levels (from \$16.2 million to \$1.4 million) (DoD, 2021a).

⁹ This study was conducted by CNA and published in December 2016 (see Porter et al., 2016).

In September 2020, the Under Secretary of Defense for Acquisition and Sustainment announced the BtB talent management framework for the AW. The framework called for a consolidation of the AW career-field structure into six functional areas: program management; contracting; life-cycle logistics; engineering; test and evaluation; and business financial management/cost estimating. The initial BtB plan called for the facilities engineering and auditing career fields to be dropped from the AW under BtB.¹⁰ The BtB initiative also called for “moderniz[ing] the DAWIA certification framework by reducing the amount of required certification training and empowering the employee to select job-centric, specialized training at the point-of-need” (Defense Acquisition University, 2022, p. 4).

The announcement designated leads for each functional area who were tasked with streamlining and revising certification requirements and fostering continuous learning.¹¹ Functional-area teams worked over the next year to create new certification structures and development frameworks for their areas. The requirement that AW members undertake professional development (80 continuous learning points every two years for all functional areas and levels) was retained, but the number of credit hours required to attain the highest levels of certification (Level 3 under the old system) was reduced across the board (Table 1.1). Currently, employees have a two-year grace period to complete certification, but this grace period can be extended to a varying degree for each functional-area and career-level combination. Policies for the grace periods are still under consideration (Defense Acquisition University, undated b).

Degree requirements for certification were dropped in most functional areas, except for the cost estimating track of the business functional area.¹² In this functional area, the requirement for a B.A. degree was replaced by a requirement for an operations research degree or 24 semester hours of operations research or related coursework.

The contracting and program management functional areas added an assessment as a requirement for certification at each tier. As of this writing, the implementation of the program management assessments has been postponed until October 2022. Under the BtB talent management framework, functional areas have two career levels (except for contracting, which has one level), compared with the original career-level structure, which, in most cases, had three levels for each area. The contracting career field refers to its certification as “Professional Certification” (Defense Acquisition University, undated b). The tier structures for the other functional areas are referred to as *foundational*, *practitioner*, or *advanced*, depending on the career field, as Table 1.1 indicates.

As part of the career-field consolidation, some of the AW career fields map into more than one of the functional areas. Information technology positions may be converted to engineering, program management, or another functional area.

Each functional area has a functional-area leader (FAL) who is responsible for establishing priorities for the continuous learning points on an annual basis. In addition, the BtB structure allows for the development of credentials that are associated with knowledge areas. Each knowledge area has a knowledge-area leader. Knowledge areas can be cross-functional, but each is assigned to one FAL who serves as the knowledge-area leader. Knowledge-area leaders work with all relevant FALs to craft the certification expectations for their knowledge areas.

¹⁰ As of this writing, auditing has been reinstated as an acquisition career field with two career levels—practitioner and advanced—but no information is yet available about the certification requirements for this career field (Defense Acquisition University, 2022).

¹¹ Department of Defense Instruction (DoDI) 5000.66, 2022, defines the ongoing responsibilities of functional-area leaders.

¹² 10 U.S.C. Section 1724 requires that individuals holding civilian positions classified in the 1102 federal occupation series or similar military positions have baccalaureate degrees.

TABLE 1.1
Changes in Required Course Hours Associated with Acquisition Workforce Certification Under the Back-to-Basics Initiative

Functional Area	Pre-BtB	BtB	
	Course Hours	Level	Course Hours
Program management	575	2 tiers: practitioner and advanced	231
Contracting			
Contracting	655		
Purchasing	55 ^a	1 tier: contracting professional	180
Industrial contract property management	254		
Life-cycle logistics	385	2 tiers: foundational and advanced	290
Engineering			
Engineering	226		
Science and technology manager	115		
Information technology	220	2 tiers: foundational and practitioner	93
Production, quality, and manufacturing	194		
Test and evaluation	264	2 tiers: foundational and practitioner	179
Business			
Business—financial management	295	2 tiers: practitioner and advanced	151
Business—cost estimating	396	2 tiers: practitioner and advanced	166

SOURCE: Functional-area certification crosswalks at Defense Acquisition University, undated c.

^a The course hours reported for purchasing reflect the requirements for Level 2 certification.

According to the Defense Acquisition University, “Defense Acquisition Credentials provide the knowledge and associated skills to perform job-centric, niche, and/or emerging functions in the Department of Defense (DoD) acquisition environment. They are intended to enhance specific skills and improve performance” (Defense Acquisition University, undated a). Examples of credentials that are already available include Data Analytics for DoD Acquisition Managers, Small Business Professional, and Integrated Product Support. Whereas certification requirements apply to all positions at a designated career level in a particular functional area, credentials are either optional or required only for specific positions. Under DAWIA, components (that is, military departments, defense agencies, or offices within the Office of the Secretary of Defense) are responsible for designating positions as part of a functional area within the AW and specifying the required certification level. Although they may establish credential requirements for acquisition positions as well, components are not required to report those requirements centrally to DoD.

Outline of This Report

In the next chapter, we describe our data and methodology. Chapter Three provides an overview of the DoD AW, both civilian and military personnel, describing trends in the size of the workforce, the distribution of the workforce across career fields, certifications, key demographics, and educational attainment. Chapter Four presents our approach to projecting the future workforce, including a description of some of the factors that are central to workforce projections—retirement eligibility, workforce gains and losses, and civilian acquisition trends. Chapter Five describes the characteristics of recent cohorts joining the civilian AW, including the sizes of the cohorts and how cohort size has changed over time, and where these individuals come from. Chapter Six provides conclusions and recommendations. Appendix A contains supplemental tables with details about certification for the overall military and civilian AW, and Appendix B contains figures that provide detailed information about demographic trends.

Overview of Workforce Analysis Data and Methodology

Understanding workforce trends is critical to ensuring that the AW has the people and skills needed to deliver high-quality goods and services to the warfighter at a fair price to the taxpayer.¹ As part of an ongoing collaboration, RAND provides a variety of information to DoD on a quarterly basis. This includes detailed data on gains and losses to the AW—by agency, by career field, and by career field within an agency—and information on the distribution of workers with regard to their proximity to retirement. RAND also provides DoD with a quarterly updated model that extrapolates from recent trends to project the size of the AW over the coming decade, as well as instructions for how DoD can manipulate the model to estimate the impacts of potential policy or economic changes. DoD has used RAND analysis to develop and implement its congressionally mandated AW strategic workforce plans, administer DAWDF, and produce a variety of publicly available materials on the Office of Human Capital Initiatives (HCI) website (HCI, undated a; HCI, undated b). This supply-side analysis should be paired with a demand-side analysis of the knowledge and skills needed now and in the future to conduct successful DoD acquisitions (Nataraj, Guo, et al., 2014).

In this chapter, we summarize our data and methods and provide some key definitions that are essential to understanding the information presented here. More-extensive descriptions of our data sources and methods and documentation of changes over time are included in Gates et al., 2008; Gates et al., 2013; and Gates et al., 2018. Appendixes A and B of Gates et al., 2018, provide details on the model that RAND researchers developed to project the size of the AW in the future and a detailed overview of the summary data that RAND provides to DoD on a quarterly basis.

Data Sources

NDRI has assembled a comprehensive data file that can support a DoD-wide analysis of the AW. The RAND data file is made up of information drawn from several files maintained by the Defense Manpower Data Center (DMDC):²

- **The AW person file and the AW position file (DAWIA files):** These files provide information on the positions that DoD has designated as acquisition positions and the individuals who are designated as part of the AW for FY 1992 onward. The person file contains a record for each individual (both mili-

¹ This chapter draws heavily from material included in Chapter Two of Gates et al., 2018.

² For more information on the data files described here, see the DoDIs that mandate the data reporting. Submission requirements for DoD civilian personnel are described in DoDI 1444.02, 2013. Submission requirements for active duty military personnel are described in DoDI 1336.05, 2015. DoDI 1336.05 defines the Active Component (see paragraph 2b) by referencing DoDI 1120.11, 2015. DoDI 5000.66, 2022, references two DoD guides (DoD, 2017a; DoD, 2017b) that include the definitions and reporting requirements for the AW covering the period of data used in this analysis.

tary and civilian) who was included in the service or agency submissions made in accordance with the *Defense Acquisition Workforce Data Reporting Standards Guide* (DoD, 2017a), referenced in DoD Instruction (DoDI) 5000.66, 2017. Each AW person record includes an AW position code and can thus be linked to the position data.³

- **DoD civilian personnel inventory file:** The DoD civilian personnel file provides quarterly snapshots for all appropriated fund civilians⁴—including grade, location, and education level, as well as other demographic variables. The snapshots are taken as of September 30 (the end of DoD’s fiscal year), December 31, March 31, and June 30. The data from this file also include information on each individual’s occupation, the organization they work in, their pay plan, and their years of service.
- **DoD civilian personnel transaction file:** The data from this file complement the inventory data by noting “transactions” that happen to workers between inventory snapshots. The transactions of central interest to us were indicators of and reasons for attrition (e.g., retirement, voluntary separation, involuntary separation) and codes indicating whether an individual transferred to or from another federal government agency. We have obtained civilian inventory and transaction data going back to FY 1980 for this work.
- **Active Duty Master File:** This file provides quarterly snapshots of the inventory of all active duty uniformed personnel from all of the military services, the Coast Guard,⁵ and the other uniformed services as of September 30, December 31, March 31, and June 30. The data contain many variables, including personal descriptors, such as education level and gender, and position information, such as occupation codes.⁶ We have obtained data going back to FY 1980 for this work.

Together, the DMDC files contain information on personnel, including their positions, assignments, ranks, pay, occupations, years of service, demographic characteristics, education, acquisition career fields, and acquisition certification levels. DMDC database records can be linked across files and over time in useful ways through a unique identifier (a scrambled social security number) that is used consistently across files and years for a given individual. By linking records across time and across files, we are able to examine movement into and out of the AW and movement between the DoD military and civilian workforces, as well as promotion and experience trajectories.

Resolving Discrepancies in Constructing the Acquisition Workforce Analysis File

To construct the AW data file that we use for analytic purposes, we merge data from the DAWIA files with the civilian and military personnel files described above. In the course of this file merging process, we occasionally observe discrepancies between the files. Gates et al., 2018, describes the likely reasons for such discrepancies. Here, we briefly summarize the discrepancies and how we resolve them:

³ As described in Gates et al., 2013, these DAWIA workforce data are available from 1992 to the present and are useful for analytical purposes. However, other methods of counting the AW have been used over time. Alignment among these approaches occurred in FY 2005. The DoD Inspector General has concluded that counts from FY 2004 and earlier are not verifiable (see DoD, Office of the Inspector General, 2006). Because of these limitations to the workforce count information, readers are urged to use caution in interpreting trends related to the AW prior to 2005.

⁴ *Appropriated fund civilians* are those civilians whose positions are paid for through congressional appropriations (including seasonal and part-time employees). The positions of nonappropriated fund civilians are funded through other sources, such as user fees.

⁵ Coast Guard personnel are included starting in 1989.

⁶ DoDI 1336.05, 2015, Enclosure 3. DoDI 1120.11, 2015, lists the information recorded on the active duty military and active duty Coast Guard personnel who are included in the data file.

- **An individual appears in the DAWIA person file but not in the active duty or civilian personnel files:** When an individual appears in the DAWIA file but not in a personnel file, we drop them from the AW analysis file for that period. We dropped 485 civilian AW records and 244 military AW records that were in the DAWIA file for this reason in the fourth quarter (Q4) of FY 2017.
- **An individual appears in the DAWIA person file as military but in the personnel files as civilian (or vice versa):** When an individual appears in the DAWIA file as a military employee but matches only to the civilian personnel file, we count them as part of the civilian AW. Conversely, when a person appears in the DAWIA file as a civilian employee but matches only to the military personnel file, we count them as part of the military AW. We recategorized 22 people from the military AW to the civilian AW and two people from the civilian AW to the military AW in Q4 of FY 2017.
- **An individual appears in the DAWIA person file as military or a civilian and appears in both military and civilian personnel files:** We count the individual as part of either the military AW or the civilian AW as reflected in the DAWIA file. In Q4 of FY 2017, six military AW members and 41 civilian AW members fell into this category.

Because of the adjustments described in this section, the workforce counts in the analysis file that RAND uses differ slightly from the counts in the DAWIA files, which cannot support the type of cross-year analysis that RAND conducts. The RAND AW analysis file also differs slightly from the HCI Data Mart, DoD's data repository, which is derived from the DAWIA files. In addition, in some years, there have been small unexplained discrepancies between the raw DAWIA data that DMDC provides to RAND and HCI Data Mart data. There were no such discrepancies in the data from the end of FY 2021.

Validation and Quality Assurance

When we receive data from DMDC, we first check that the number of records in the new files is consistent with the number of records we have received in the past. We then compute means and frequencies over time for each of the variables and compare those with what we have received in the past. These checks help confirm that we have an extract of the expected population and reveal when there have been changes in the coding of variables over time. We note the total number of observations in each file, and we track this carefully as we proceed with the next steps. We also compare the counts in the DAWIA files with those reported in Data Mart and address any discrepancies with DMDC and the individuals at DoD who maintain Data Mart.

All subsequent data work is checked carefully to ensure that code is running correctly and generating the intended output. We employ best programming practices, such as conducting process mapping (clearly labeling inputs and outputs), explicitly tracking control totals throughout the entire programming process, maintaining detailed in-line documentation of all code, checking code, and conducting validity checks of the tables and output that we generate.

Key Definitions

Our descriptive analyses and projection modeling rely on variables that we construct or define using information in the administrative data files. These variables are designed to capture information that will be useful to workforce managers. In this section, we summarize the definitions of several key variables.

Types of Gains and Losses to the Acquisition Workforce

When analyzing gains or losses to the military or civilian AW, we consider the two workforces separately. Any transfers between the military AW and the civilian AW represent gains to one and losses to the other.

To identify workforce gains and losses, we examine the workforce at two points: time t and time $t + 1$. The interval between the two periods could be a year or a quarter. When a worker appears in the workforce at time $t + 1$ but not at time t , the worker is considered to be a workforce gain between time t and $t + 1$. When a worker appears in the workforce at time t but not at time $t + 1$, the worker is considered to be a loss between time t and $t + 1$.

We define four categories based on whether the gain or loss reflects a person who is just moving between the AW and non-AW within their respective DoD workforce—military or civilian. The categories of gains are as follows for the civilian workforce, with parallel definitions for the military workforce:

- **New hire:** Individuals are considered to be new hires at time $t + 1$ if they do not appear in the DoD civilian data set at time t but do appear in that workforce at time $t + 1$, even if we observe them in the DoD workforce in a period prior to time t .⁷
- **Recategorization in:** Individuals are considered to be recategorizations into the civilian AW in period $t + 1$ if they appear in the DoD civilian (non-AW) workforce at time t and appear in the DoD civilian AW at time $t + 1$.
- **Separation:** Individuals are considered to be separations if they appear in the DoD civilian data set at time t but do not appear in it at time $t + 1$.
- **Recategorization out:** Individuals are considered to be recategorizations out in time $t + 1$ if they appear in the DoD civilian AW at time t and appear in the DoD civilian non-AW at time $t + 1$.

These definitions are specific to the military or civilian AW. This means that a person who transfers directly from the military AW into the civilian AW would be counted as a new civilian hire and a military separation.

For civilians only, we further distinguish between two types of recategorizations (both in and out):

- **Internal hire or loss:** Individuals are considered to be internal hires or losses into or out of the civilian AW in period $t + 1$ if they meet the definition of recategorization provided above and if one or more of the following trigger variables in an individual's personnel record changed in conjunction with the move between the non-AW and the AW:
 - agency (e.g., military service or “other DoD”)
 - agency sub-element (e.g., major command or organization within a military service or other DoD agency)
 - occupational series
 - pay plan into or out of the Senior Executive Service
 - pay grade within the same pay plan (promotion).⁸

⁷ An earlier approach made adjustments to these counts of new hires and separations to exclude reentrants to the workforce (i.e., people who return to the DoD civilian workforce after some break in service). Under our current approach, reentrants are treated as separations in the year when they leave and new hires when they reenter. (See Gates et al., 2013, p. 7, for more details.)

⁸ If pay grade changes concurrently with pay plan, or if there is a pay plan change that does not involve the Senior Executive Service, we do not consider the change to be substantive. This is because of the frequent changes in pay plan structure that are administrative in nature (see Gates et al., 2013, pp. 9–10).

- **Recode-gain or recode-loss:** Individuals are considered to be recode-gains or recode-losses in period $t + 1$ if they meet the definition of recategorization described previously and if none of the trigger variables in the personnel record mentioned above changed in conjunction with the move between the non-AW and the AW.

The definition of *internal hire or loss* is intended to capture those gains and losses that stem from a legitimate change to the nature of the work that a person is doing—for example, a DoD civilian employee who transfers into an open AW position is promoted into an AW position or is transferred into a new organization, filling an AW position. By contrast, a recode-gain or recode-loss would reflect an administrative decision by the employer organization or the Director of Acquisition Career Management that the nature of the work being done by a particular employee has changed in a way that newly meets or no longer meets DAWIA criteria. Defining gains in this way gives policymakers and managers the flexibility to explore the workforce dynamics of these types of gains separately or in combination.

Applying Gain and Loss Definitions to Subsets of the Acquisition Workforce

When analyzing subsets of the civilian AW—career fields, services or agencies, or career fields within services or agencies—an internal hire, loss, or recode is anyone who moves into or out of the population of interest but who remains employed as a civilian by DoD. For example, in the context of a career-field-specific analysis, a person who switches from the engineering career field to the program management career field is identified as an internal loss for the engineering career field and an internal hire for the program management career field.⁹ In an AW-wide analysis, this person would not have been identified as an internal hire or loss at all, because the employee is part of the civilian AW in both years.

We use the same criteria to distinguish between internal hires or losses and recodes in the career-field-level or service-level analyses as we do in the overall analysis. If a person switches career fields within the civilian AW but experiences no change in any of the trigger variables, then the change is classified as a recode. Otherwise, the change is classified as an internal hire or loss.

Years Relative to Retirement Eligibility

The age and proximity to retirement of workers is a key driver of workforce trends. Workers nearing retirement age are less likely than younger workers to leave for new jobs, but, once these workers reach the age at which they are eligible to retire, their attrition rates spike.

To support the analysis of the distribution of the civilian AW with regard to proximity to retirement, we created a variable called *years of retirement eligibility* or, more accurately, *years relative to retirement eligibility* (YORE). We did this by calculating the earliest age at which each individual could claim regular, full retirement benefits given the individual's current retirement plan, age, and years of service under the assumption that the individual works continuously until that future retirement eligibility date and remains covered under their current retirement plan. We then calculated the fiscal year in which the individual will reach this age.¹⁰ We calculated YORE for individuals who participate in one of two retirement plans: the Federal

⁹ For the purposes of this example, we assume that the person's occupation code changed when this switch occurred.

¹⁰ To calculate YORE, we used the full date of birth. When the month or year of birth was missing, we set the birth date to "missing" and did not include these individuals in any analysis that involves the YORE variable. Missing day of birth was imputed, so we could still compute YORE. In the September 2011 civilian data, we fixed 496 leap-year birth dates: DMDC delivered these cases with day of birth set to 0 instead of 29. In all other years, when day of birth was missing, we imputed a legitimate value. There are 2,482 individuals for whom we observe no birth date in any year between 1992 and 2009. Ninety-

Employees Retirement System (FERS) and the Civil Service Retirement System (CSRS).¹¹ The vast majority of civil servants employed by DoD are in FERS. We were not able to calculate YORE for the small number of DoD employees enrolled in “Other” (non-CSRS or -FERS) retirement plans.¹²

To calculate YORE for a given individual for a particular fiscal year, we took the fiscal year of interest and subtracted it from the fiscal year in which the individual reaches full retirement eligibility and added 1. For example, an individual who reaches full retirement eligibility in FY 2021 would have a YORE of -1 at the end of FY 2019, 0 at the end of FY 2020, and 1 at the end of FY 2021. Our YORE measure does not account for special retirement incentives that might result in optional retirement prior to reaching full, regular retirement eligibility or disability retirement. For this reason, we do observe some people in the data set who retire before having reached regular retirement eligibility.

To summarize, individuals with a YORE of 0 in a given year are those who become retirement-eligible for the first time in the next fiscal year. The people in the data set at the end of FY 2021 with a YORE of 0 were not yet retirement-eligible as of the end of FY 2021 but will become retirement-eligible in FY 2022. Those with a negative YORE at the end of FY 2021 will not reach retirement eligibility during FY 2022; those with a positive YORE attained retirement eligibility by the end of FY 2021. When we report on the turnover by YORE for a given year, we reference YORE as measured at the end of the prior fiscal year and report on the fraction of those people who leave before the end of the fiscal year of interest.

RAND’s Methodology and Reporting

We have developed a system to provide DoD with timely and useful information to support workforce managers. This section describes how we calculate quarterly updates and workforce projections and the methodology used to analyze cohorts.

Quarterly Updates

RAND obtains data on a quarterly basis and generates information about workforce gains and losses from a quarterly and annual perspective for the AW as a whole and then separately for individual AW career fields, agencies, or career fields within agencies.

When reporting annualized metrics, we measure workforce gains and losses over a one-year time frame based on end-of-quarter workforce snapshots. For example, at the end of Q1 of FY 2021, we compared the observed workforce with the workforce that was present at the end of Q1 of FY 2020 to identify gains and losses and to calculate gain and loss rates over that year. We then used those rates in the projection model described in the next section.

nine percent of the cases are prior to 2004. There are four individuals for whom we observe no birth date since 2009: two in 2015 and two in 2016.

¹¹ Individuals who are covered under FERS and achieve 30 years of service must also reach a minimum retirement age before they qualify for full retirement benefits. That minimum age depends on birth year. It was 55 for those born before 1948, 56 for those born between 1953 and 1964, and 57 for those born after 1969. Individuals born between 1948 and 1953 or 1965 and 1969 were part of a phase-in process to the higher years. Minimum retirement age depends on age in months (see U.S. Office of Personnel Management, undated).

¹² FERS was created in 1986; anyone hired into the federal civil service after January 1, 1987, is covered under FERS. Employees hired prior to that date were covered by CSRS when they were hired but had the option to switch into FERS. The number of CSRS employees in DoD declines each year. As of Q4 of FY 2021, there were 2,638 people remaining in the AW covered by CSRS and 474 people in “Other” plans.

When reporting quarterly gains and losses, we compare the workforce at the end of one quarter with the workforce at the end of the previous quarter. For example, to identify the number of gains during Q1 of FY 2021, we looked for individuals who were in the workforce at the end of Q1 of FY 2021 but who were not in the workforce at the end of Q4 of FY 2020. Although the time frame for counting workforce gains and losses is one quarter rather than one year, all other aspects of the approach are the same as described above.

An analysis of quarterly gains and losses provides more up-to-date information on workforce trends and allows decisionmakers to understand variations in gains and losses over the course of the fiscal year. Looking at quarterly changes may also provide useful information on the immediate impact on the workforce of economic or social changes, such as a pandemic lockdown, a stock market crash, or a spike in unemployment, or policy changes, such as a hiring freeze or new retirement incentives.

When we compare data on quarterly and annual gains and losses, the sum of quarterly gains and losses over the course of the year typically exceeds the number of gains and losses measured by comparing the workforce at two points in time one year apart. This is because individuals who enter and leave the workforce in less than one year could be captured as a quarterly gain and a quarterly loss but not appear at all in the analysis of annual gains and losses.¹³ Another reason why the sum of the quarterly counts might differ from an annual count is that workers might change which workforces they are in during the year.

Workforce Projection Model

RAND provides DoD with a projection model that can be used to estimate the size of the civilian AW in future years.¹⁴ The model, known as the RAND Inventory Model (RIM), is a stock-and-flow, or inventory, model designed to project the future supply of workers within a given population of interest based on current employee “stock” and projected worker flows, determined by either historical trends or user input. The model starts with the stock of employees in the baseline year. It then changes this stock in each subsequent year using projected flows of employees into the organization (new hires), out of the organization (separations), and between organizations (switches).

The RIM can be used to analyze the civilian AW as a whole or to analyze individual AW career fields, agencies, or career fields within agencies. For each version of the model (AW overall or by career field or agency), there are two model specifications. Model 1 projects future workforce size by projecting all worker flows (including new hires) based on average flows over the past five years. Model 2 projects the number of new hires or reductions needed to achieve specific workforce size targets specified by the user. We update the RIM quarterly to include the most-current data on year-over-year changes to the AW. As a result, it can be used to project from the end of one fiscal year to the end of the next fiscal year, or from the end of a particular quarter to the end of the same quarter in future years (e.g., March 31 to March 31).

The key inputs to the RIM are the baseline populations and information on historical gains and losses: separations, new hires, internal hires, and internal losses.¹⁵ For employees in the FERS and CSRS retirement plans, gains and losses are calculated separately by YORE to account for the different rates of gains and losses by proximity to retirement. For the small number of individuals in retirement plans other than FERS and CSRS, we calculate the gain and loss rates for the group as a whole. We use historical information about the

¹³ For example, if a worker joins the AW in December 2021 and leaves the AW in April 2022, a quarterly analysis would count that person as a gain for Q1 of FY 2022 and a loss for Q3 of FY 2022. An annual analysis based on end-of-FY data would not capture this person at all, since they were not in the workforce at either the end of FY 2021 or the end of FY 2022.

¹⁴ The RIM does not include the military AW.

¹⁵ The projection model does not account for historical patterns in recode-gains and -losses because recodes are not based on changes in the nature of the work being done and past recode rates might not have any predictive power over future recode rates.

flows of individual employees to calculate flow rates for cohorts, which are subsequently used in projecting future worker flows.

Each year within most workforce populations, a small but significant percentage of employees move from one retirement plan to another. We account for these plan transfers by assuming that historical average rates of transfer will continue into the future. We calculate historical average plan transfer rates similarly to how we calculate separation rates, using the most recent five-year period.

Workforce managers should use caution when interpreting the output of the RIM and carefully consider whether hiring and loss trends of the past five years are likely to continue over the next ten years. However, because the model can be manipulated by managers to project the effect of possible policy changes or to determine what hiring rate would be necessary to meet target workforce levels (such as holding the size of the workforce constant), it can be useful in helping managers answer a variety of questions, such as the following:

- What will be the size of the civilian AW in two, five, or ten years, assuming new hires, switches, and separations continue at the same rates as over the past five years?
- What will be the size of the Army's civilian AW belonging to the information technology career field in two, five, or ten years, assuming new hires and switches continue at the same rates as in the past but that separation rates double for retirement-eligible employees?
- What will be the size of the Missile Defense Agency's civilian AW in five years if there is a hiring freeze and no new hires are added to the workforce?
- How many employees will the Navy need to hire in each future year to maintain status quo workforce levels for its civilian AW for the next five years?
- How many employees will DoD need to hire, or how many employees might it need to involuntarily separate, in each year to reduce the size of the civilian AW by 25 percent in ten years relative to status quo workforce levels?

The RIM is contained in a set of Microsoft Excel workbooks that are provided to DoD on a quarterly basis. The model interface is described in detail in Appendix A of Gates et al., 2018. Gates et al., 2008, and Gates et al., 2013, have extensive discussions of the model, how it has evolved, and its uses and limitations.

Analysis of Cohorts of Acquisition Workforce Entrants

Using methods described in Gates et al., 2018, we analyze data on cohorts of AW entrants. This is referred to as a *cohort analysis*. Cohort analysis can be used to explore characteristics that are related to important workforce outcomes, such as retention, promotion, and performance ratings (see Guo, Hall-Partyka, and Gates, 2014; and Powell, 2017). It can also be used to help workforce managers understand how cohorts that entered the AW in a certain year (such as during the years of the growth initiative) differ from other cohorts and track their career progression over time.

Defining a *Cohort*

We define each fiscal year's *cohort* as including new hires and internal hires during that year.¹⁶ We do not consider recode-gains to be part of an entry cohort, with one key exception: We do include in our analysis those individuals who joined the DoD civilian workforce in one year (year t) and were recoded into the civil-

¹⁶ A merged data set consisting of annual (end-of-FY) DoD civilian personnel inventory files and DAWIA files is used to determine who enters the civilian AW and in which fiscal year they enter. The DoD civilian inventory files show which individuals are part of the DoD civilian workforce at the end of each fiscal year, and the DAWIA data indicate which individuals are in AW positions.

ian AW in the following year (year $t + 1$). We include these individuals as part of the AW cohort for year t . For these “lag” instances, we use information from the individuals’ DAWIA records in year $t + 1$ to code their AW career fields in year t .

Characterizing Past Work Experience

When people join the civilian AW, they bring with them a variety of prior work experiences. Those prior experiences may influence the types of positions they enter and possibly their retention and performance while on the job. The DMDC data sets that we use in our work allow us to determine whether individuals joining the AW have past DoD experience, either in the civilian DoD workforce or in the active duty military.

To examine the performance implications of prior experience, we characterize prior experience of personnel in the DoD civilian workforce as being in either (1a) the civilian AW or (1b) another DoD civilian position.¹⁷ An individual in the active duty military is in either (2a) the military AW or (2b) another active duty military position. If an individual is not observed in any of the data files prior to entering the AW, the individual is categorized as having no prior DoD experience.

We then combine categories 1a and 1b to analyze individuals with experience in the DoD civilian workforce and categories 2a and 2b to analyze active duty experience. One can also combine categories 1a and 2a to examine all individuals with experience in the AW or combine categories 1a, 1b, 2a, and 2b to analyze all individuals with DoD experience.

Gates et al., 2018, describes some of the technical limitations of our categorization scheme. Notably, our data do not allow us to identify when new entrants to the civilian AW have other relevant, non-DoD experience that allows them to make an immediate contribution to acquisition programs. For example, workers may have experience as DoD contractors, working closely with acquisition programs, or as engineers, cost analysts, or program managers in other industries. We have noted in our past work that insourcing of support contractors was one of the major goals of the AW growth initiative. It is likely that many of the new entrants to the AW over the growth initiative period have prior experience as DoD contractors, but data limitations impede our ability to track these individuals (Gates et al., 2013, p. 52). Better data on contractors would support a more comprehensive workforce analysis.

¹⁷ Our categorization of prior experience is also adjusted for instances of DAWIA-data lag, in parallel with the “lag” adjustment made when defining civilian AW cohorts. Therefore, an individual is marked as in the civilian AW in year t under one of two conditions: (1) the individual appears in the DoD civilian file and is recorded as in the AW and (2) the individual is recorded as joining the DoD civilian workforce in a non-AW position in year t and then being recoded into an AW position the following year (year $t + 1$).

The DoD Acquisition Workforce: A Descriptive Overview

For this report, we used the methods described in the previous chapter to update the descriptive analyses presented in Gates et al., 2018. In this chapter, we provide a snapshot of the state of the AW as of the end of FY 2021, prior to the launch of the BtB initiative, and describe how the AW has evolved since RAND began conducting workforce analysis for DoD in FY 2006. Workforce managers and policymakers can use the updated information in this chapter to assess the effectiveness of the AW growth initiative and gain insight into the implications of the coronavirus disease 2019 (COVID-19) pandemic and DAWDF for workforce trends.

In summary, our analysis shows that the size of the civilian AW has climbed steadily since the launch of the AW growth initiative, except for a small and brief workforce decline in FYs 2013 and 2014. Overall, between FY 2006 and FY 2021, the civilian AW grew by 52 percent, or 58,478 people. This growth was concentrated in FYs 2009 and 2010—the years immediately following the announcement of the growth initiative—and in FYs 2015 to 2020. Most service branches and Fourth Estate agencies added to their AWs over this period, although the Army was a notable exception; the Army civilian AW shrank by more than 15 percent (more than 7,000 people) between FY 2006 and FY 2017.

The Army civilian AW has been growing since 2017, but divergent trends have dramatically reshaped the service composition of the civilian AW over the past decade. The educational attainment of the civilian AW increased on balance, and the share of the workforce with advanced degrees rose especially dramatically. In general, career fields that were identified as priority fields for hiring grew rapidly during the growth initiative period; however, the contracting career field, in particular, has continued to experience attrition rates that are higher than are typical for the civilian AW as a whole. Our analysis shows that, although there remains a significant share of workers at or near retirement age, the distribution of the workforce in terms of years until retirement eligibility has shifted more toward earlier-career workers since FY 2006.

The military AW is an order of magnitude smaller than the civilian AW, although the proportion of the AW that is active duty military varies across the services. The military AW also breaks down differently across AW career fields; a much higher share of the military AW serves in program management roles. As they leave active duty and enter civilian life, individuals with experience in the military AW become an important source of new recruits to the civilian AW, but primarily to only specific career tracks, such as program management.

We explore these trends in greater detail in the remainder of this chapter.

Trends in the Size of the Acquisition Workforce

Figure 3.1 shows that the AW has grown by 57,677 people, from 128,187 people in FY 2006 to 185,864 people in FY 2021. The primary objective of the AW growth initiative was to increase the size of the organic AW by 20,000 people between FY 2008 and FY 2015. This goal was met quickly through growth in the civilian AW,

which expanded from a low of 111,495 people at the end of FY 2008 to 132,259 by the end of FY 2010 (see Figure 3.1). Rapid growth continued into FY 2011 before leveling off between FY 2011 and FY 2014 (the years most closely associated with fiscal austerity and sequestration). In the fiscal years following 2014, significant civilian AW gains returned; the civilian AW increased by nearly 15,000 people between FY 2014 and FY 2017 and consisted of 170,758 people at the end of FY 2021. In total, the civilian AW grew by 52 percent (57,153 people) between FY 2006 and FY 2021.

The military AW included 14,582 at the end of FY 2006 and 15,106 people at the end of FY 2021. As illustrated in Figure 3.1, the size of the military AW has remained relatively stable over time, varying between 14,000 and 15,600 since FY 2006, even while the civilian AW expanded dramatically.

The total DoD civilian workforce, including both the AW and non-AW civilian workers, did not grow as rapidly as the civilian AW over this time frame (see Figure 3.2). From FY 2006 to FY 2021, the total DoD civilian workforce grew by 17 percent (113,345 people). This growth was not steady, and there were periods of contraction—most notably in the FY 2011–FY 2014 period, as the non-AW civilian DoD workforce bore the brunt of fiscal austerity imposed in those years (shown in Figure 3.2). Because of these combined trends, the AW as a share of the total DoD civilian workforce increased, from 16.7 percent in FY 2006 to 21.6 percent in FY 2021.

FIGURE 3.1
DoD Acquisition Workforce Count, FYs 2006 to 2021

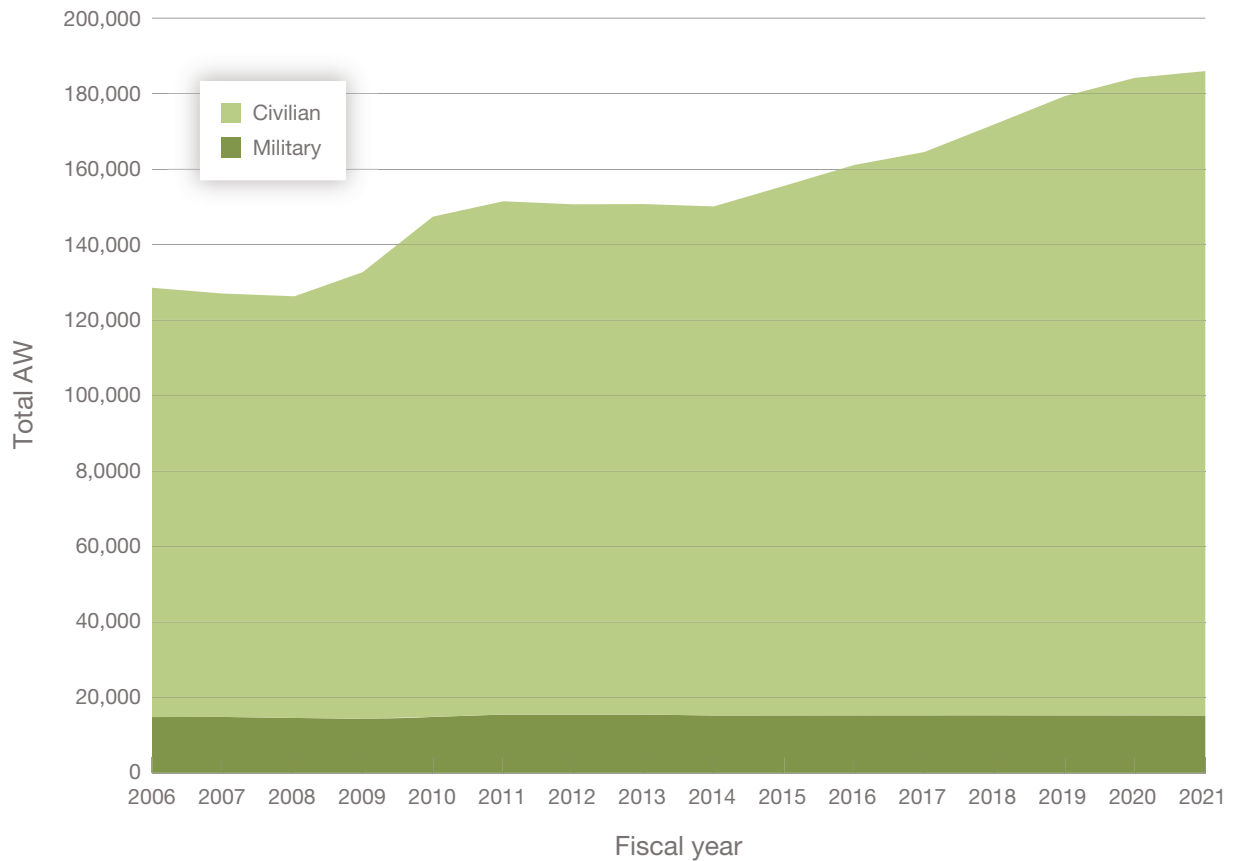
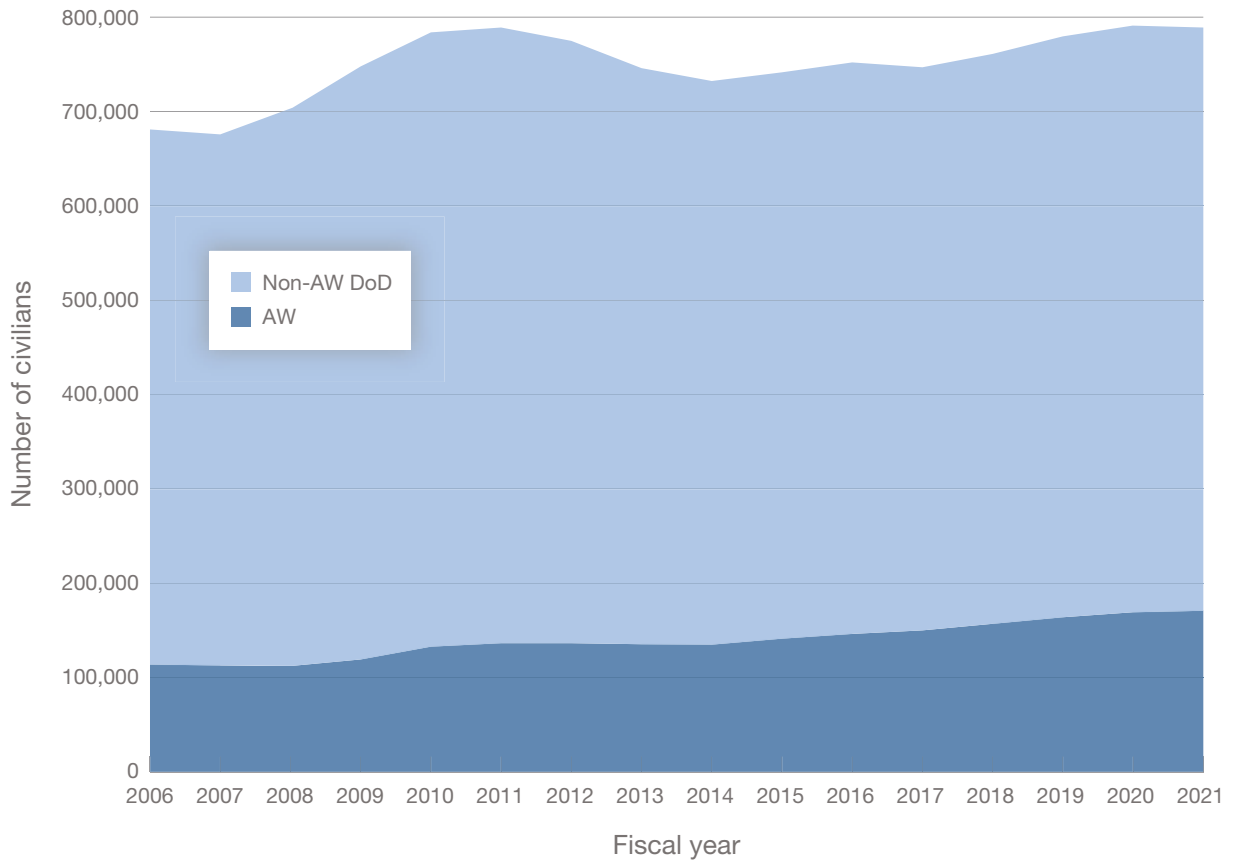


FIGURE 3.2
Number of Civilians in the DoD Workforce, FYs 2006 to 2021



Between FY 2006 and FY 2021, the civilian AW increased in Fourth Estate DoD agencies and in all service branches except the Army (see Figure 3.3). The growth of the Navy AW was especially strong during this period. In FY 2006, the Navy civilian AW consisted of 35,867 people and constituted 32 percent of the civilian AW. By FY 2021, these figures had increased to 64,439 individuals and 38 percent of the civilian AW. In contrast, the Army civilian AW decreased from 43,912 people in FY 2006 to a low of 34,454 in FY 2015 before rebounding to 41,950 in FY 2021—still below the FY 2006 count.

As we have noted in our past reports, the distribution of the military AW across services differs from that of civilians. A majority of the military AW is in the Air Force (56.6 percent as of FY 2021), with the remainder distributed between the Navy (23.9 percent), Army (12.4 percent), Marine Corps (5.2 percent), and other DoD organizations (1.9 percent) (see Figure 3.4). These shares have been stable over time. The Marine Corps and Air Force are much more reliant than other services on their military AWs. As a share of the total AW, active duty military make up 2 percent of the Marine Corps AW and 20 percent of the Air Force AW, compared with 4 percent of the Army AW, 5 percent of the Navy AW, and 2 percent of the AW in other DoD organizations.

FIGURE 3.3
Number of Civilians in the DoD Acquisition Workforce, by Agency, FYs 2006 to 2021

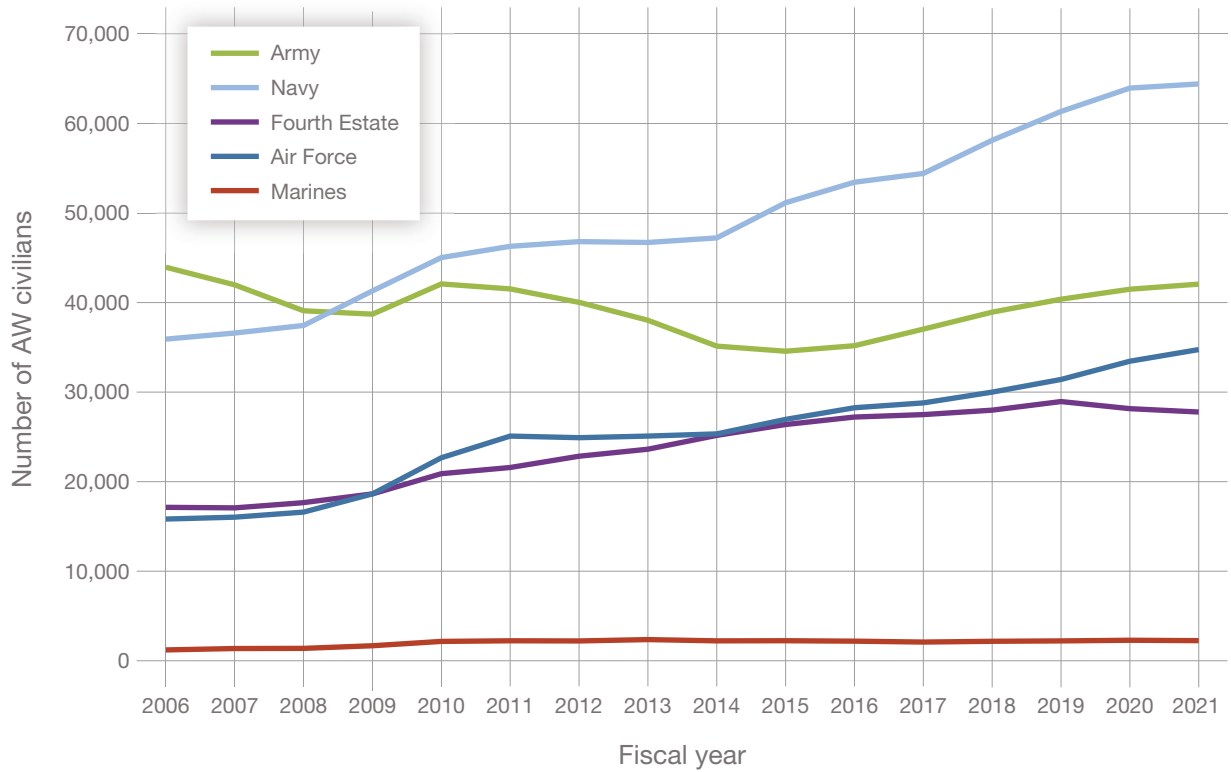
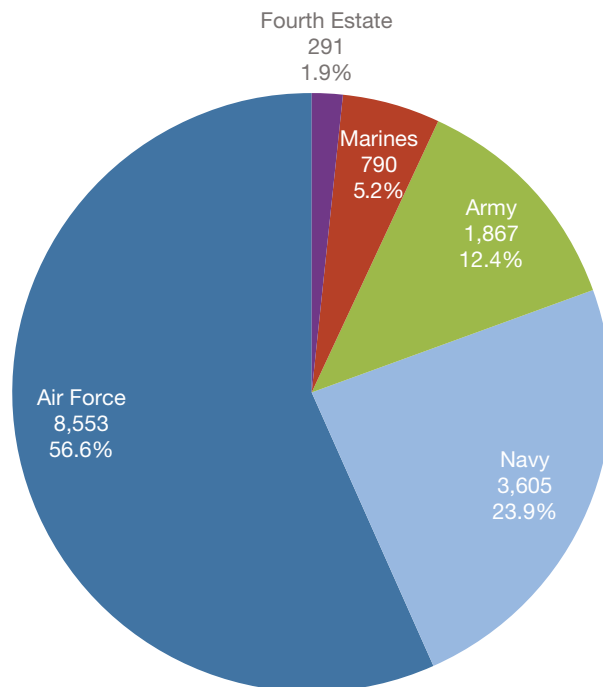


FIGURE 3.4
DoD Military Acquisition Workforce, by Service, FY 2021 (count and percentage of total)

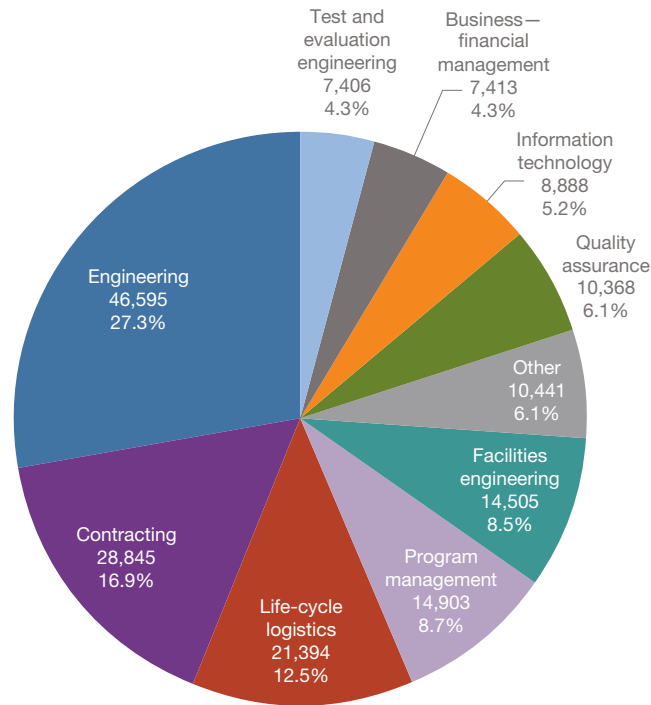


The Acquisition Workforce Across Career Fields

Figure 3.5 shows the distribution of the civilian AW as of the end of FY 2021 across career fields, focusing on those that will be central to the functional areas under BtB: engineering, contracting, life-cycle logistics, program management, test and evaluation engineering, business—cost estimating, and business—financial management. Engineering and contracting were the two largest career fields, together employing 44.2 percent of the civilian AW. The next-largest career fields at the end of FY 2021 were life-cycle logistics and program management, accounting for 12.5 percent and 8.7 percent of the civilian AW, respectively. There has been little change in the relative size of the major career fields over time.

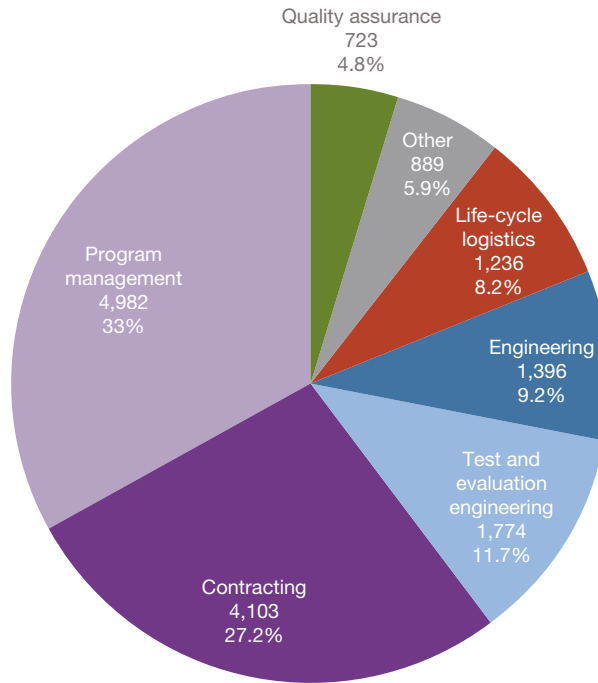
For the military AW, the career-field distribution is quite different, again with patterns that have been stable over time. Two career fields—program management and contracting—employ over 60 percent of the military AW (33.0 percent in program management and 27.2 percent in contracting; see Figure 3.6). And whereas 27.3 percent of the civilian AW is in the engineering career field, only 9.2 percent of the military AW is in that career field.

FIGURE 3.5
DoD Civilian Acquisition Workforce, by Career Field, FY 2021 (count and percentage of total)



NOTE: Percentages do not add up to 100 percent because of rounding.

FIGURE 3.6

DoD Military Acquisition Workforce, by Career Field, FY 2021 (count and percentage of total)

Certification of the Acquisition Workforce

DAWIA requires DoD components to identify acquisition positions, specify the career field and certification level associated with each position, and report on the career level achieved by the individual filling that position. The traditional certification structure included three career levels for each career field. When a worker was hired into a position, it was expected that they would be fully certified or able to achieve certification for that position within two years.

DoD compiles data regularly and reports on the percentage of the AW members who meet or exceed the certification requirements for their positions, the percentage who are within the 24-month window for achieving certification, and the percentage who do not meet the certification requirements but are outside the 24-month window. This reporting is based on Data Mart data collected by HCI from AW managers about an AW member's time in a position. That reporting has documented variation by career field, but a general, AW-wide trend from FY 2008 to FY 2019 is of better compliance with the expectations outlined above. There is some indication of slightly worse compliance in FYs 2020 and 2021, which could reflect challenges in accomplishing training requirements during the COVID-19 pandemic (U.S. Department of Defense, 2021b; U.S. Army Acquisition Support Center, 2020).

Although we lack data on time in position, we were able to undertake a similar analysis using the administrative data that we do have from the DAWIA position and person files. Our analysis categorized workers into the same three categories: (1) meets requirements, (2) does not meet requirements but is within the 24-month period, or (3) does not meet requirements and is outside the 24-month period to obtain certification.

To categorize AW members into the three categories, we first compared the career level required for a member's position with the member's current career level. If the member's current career level was equal to or greater than what was required for the position, they were categorized as "meets requirements." If not, we used two approaches to assess whether they were within the 24-month window:

1. If a person was not fully qualified, we checked to see whether their career field and career level were the same as they were two years prior.
2. If a person was not fully qualified, we checked to see whether their position was the same as it was two years prior.

If career field and career level (approach 1) or position (approach 2) did change in the past two years, then the person is in the 24-month grace period per approach 1 or approach 2.

Appendix A provides detailed tabulations for the past ten years—both for the overall AW and by career field, using both definitions—of the percentages of the total workforce that are classified as meeting requirements, not meeting requirements but within the 24-month period, and not meeting requirements and outside the 24-month period. Here, we discuss trends over time and similarities and differences across career fields and between the military and civilian workforces using our preferred definition, definition 1.¹

At the end of FY 2011, 9.5 percent of the AW was not qualified and not within the 24-month grace period. That figure declined to 2.4 percent by the end of FY 2019 but increased to 6.5 percent by the end of FY 2021.² It is likely that efforts by the Defense Acquisition University to shift training from an in-person to a virtual format (DoD, 2021b) limited the increase in AW certification shortfalls due to pandemic-driven suspension of in-person training. The Defense Acquisition University continues to emphasize virtual training options as more consistent with the continuous learning emphasis of BtB, even as it resumes some in-person training (DoD, 2021b).

Civilian AW members are slightly less likely than military AW members to be not qualified and not within the 24-month window (6.4 percent compared with 7.7 percent as of the end of FY 2021). However, civilian AW members are substantially more likely to be qualified (72.1 percent versus 51.9 percent) and substantially less likely to be within the 24-month window (21.5 percent versus 40.5 percent). This result is not surprising given the emphasis that the military personnel system places on the rotation of personnel. Differences between the military and civilian workforces in terms of certification are greatest in the career fields of business—financial management, business—cost estimating, test and evaluation, and life-cycle logistics.

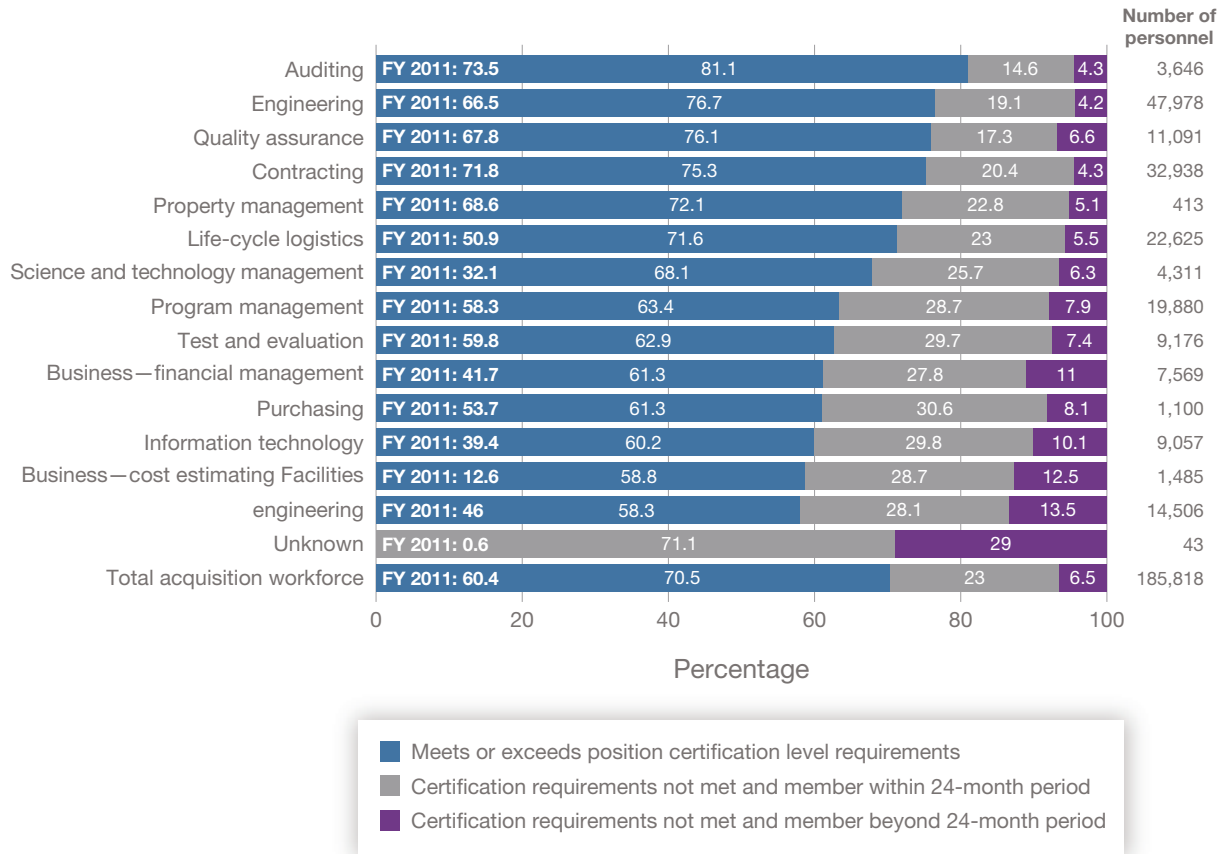
Figure 3.7 shows the percentage of the workforce in three categories used by DoD: “meets or exceeds position certification level requirements,” “certification requirements not met and member within 24-month period,” and “certification requirements not met and member beyond 24-month period.”

The rise in the percentage of the AW (especially the civilian AW) meeting certification requirements is notable in view of the dramatic growth in this workforce over the past decade and suggests that DoD was successful in hiring individuals with the qualifications, or capacity to meet the qualifications with professional development, to fill the positions. To shed additional light on this issue, we looked at civilian AW members who entered their career fields for the first time in FY 2014. These members could include civilian new hires, recategorizations into the AW, or individuals who were already in the AW but changed career fields. We looked at whether these civilian AW members were qualified at entry, were qualified within the two-year

¹ We prefer definition 1 because career-level and career-field data are the aspects of a position that are the drivers of certification requirements. It is possible that a position number would stay the same when the required career level for that position would be upgraded. It is also possible that a worker could switch positions but stay in the same career field and career level. In that case, under definition 2, the 24-month grace period would reset, giving the person additional time to meet the requirements for that career level.

² Definition 2 results in a higher percentage of the workforce being classified as within the 24-month grace period and a lower percentage being classified as not meeting requirements. The magnitude of the difference varies by year, by career field, and by workforce but is generally in the range of 2 to 6 percentage points. For example, using definition 2, we found that 3.3 percent of the AW did not meet certification requirements as of the end of FY 2021 and 26.3 percent of AW members were within the 24-month window.

FIGURE 3.7
Certification Level “Meets” or “Exceeds” Rates, by Acquisition Career Field, FY 2021, Q4



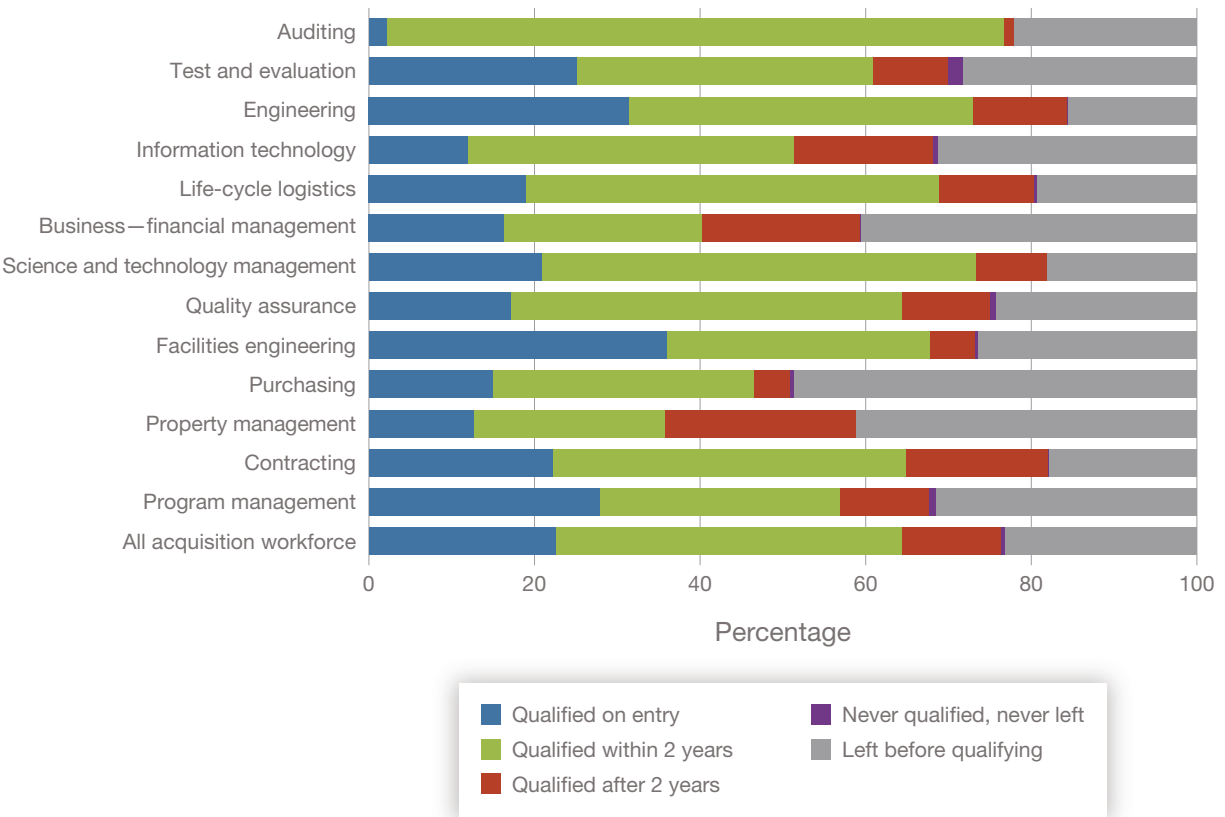
NOTE: Text in the left side of each bar reports the percentage of workers meeting or exceeding requirements in FY 2011.

window, were qualified after the two-year target, left the workforce before ever qualifying, or remained but are not yet qualified (as of the end of FY 2021). Figure 3.8 displays the results for civilian entrants. The patterns varied by career field, but, for the civilian AW overall, 64 percent of entrants across all career fields met the target of certification within two years. Another 12 percent took longer than the two-year window but achieved the certification by the end of FY 2021. Twenty-three percent left the career field before achieving the certification.

The BtB framework provides for longer grace periods—allowing AW members more time to attain the desired certification depending on the functional area and level. As a result, we should expect to see the point-in-time metric of the percentage of the workforce meeting or exceeding requirements to eventually fall. Because members will have longer periods to attain certification—and change positions during that time frame—we expect to see growth in the discrepancy that we identified between the methods previously described for assessing whether a member who is not meeting certification requirements for their position is within the grace period.

It will be important for DoD to specify a definition for the grace period and to ensure that there is access to accurate data about tenure in position to align with that definition. Our analysis of DAWIA data suggests that position numbers change frequently and that only about 15 percent of position changes are associated with a change in career level, career field, or both. If the intent of the grace period window is to allow workers an opportunity to fulfill certification obligations after they first assume a position at a particular level in

FIGURE 3.8
Career-Level Attainment for FY 2014 New Civilian Entrants to the Acquisition Workforce, by Career Field



a particular functional area, then the data tracking that metric should be readily available to DoD managers. DoD should bear in mind that, even with the much shorter grace period, a large share of civilian AW career-field entrants left their career fields before achieving the required certifications.

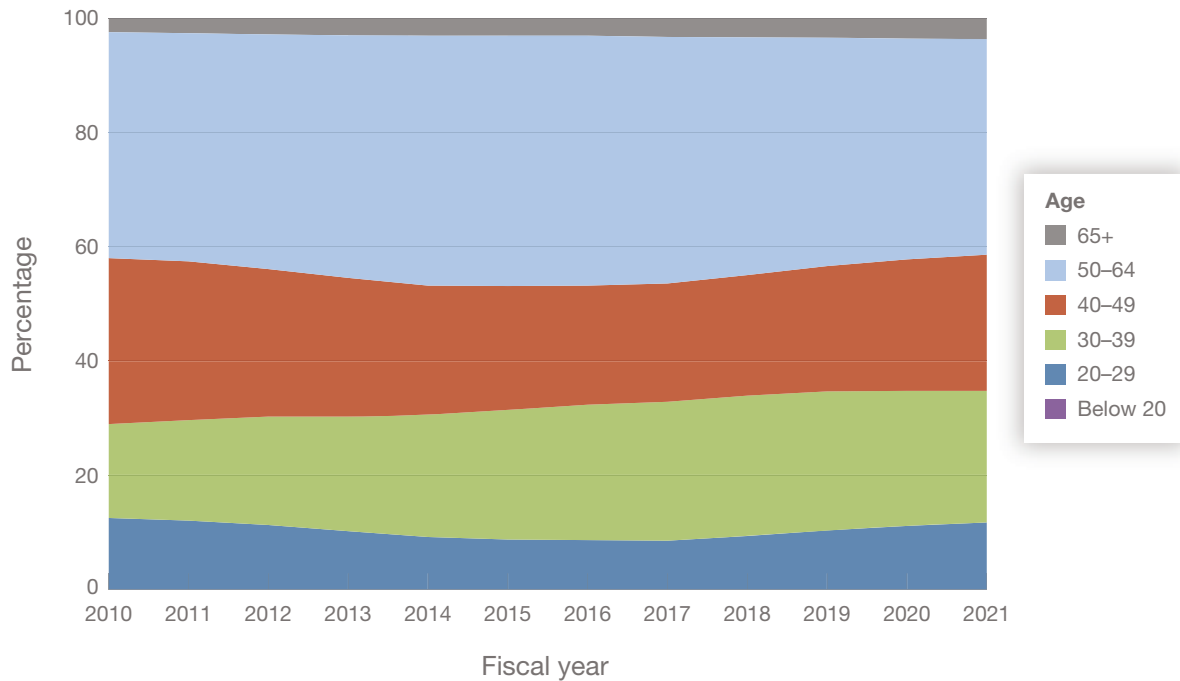
Demographics of the Acquisition Workforce

The civilian AW is predominantly white and predominantly male. As of the end of FY 2021, 69 percent of the civilian AW was male and 73 percent was white; 12 percent of this workforce was black, 7 percent was Asian American, 3 percent was Hispanic, and 5 percent was another race or ethnicity. There has been little change to the race and gender composition of the workforce since FY 2011, when the figures were 69 percent male and approximately 76 percent white, 11 percent black, 7 percent Asian American, 2 percent Hispanic, and 3 percent another race or ethnicity. In contrast, the age distribution of the workforce shifted during this period. Our calculations reveal that the portion of the workforce under age 40 grew from 29 percent in FY 2011 to 35 percent in FY 2021 (Figure 3.9).

Looking at demographics by career field, we see substantial variation. Investigation into differences across career fields could shed light on promising practices for enhancing workforce diversity.

We begin with gender. The following career fields have higher-than-average female representation: contracting, financial management, purchasing, and auditing. On the other hand, engineering, science and technology, quality assurance, and test and evaluation have lower-than-average female representation.

FIGURE 3.9
Age Distribution of the Civilian Acquisition Workforce, FYs 2010 to 2021



NOTE: The percentage of workers below age 20 is very small and, therefore, not visible in the figure.

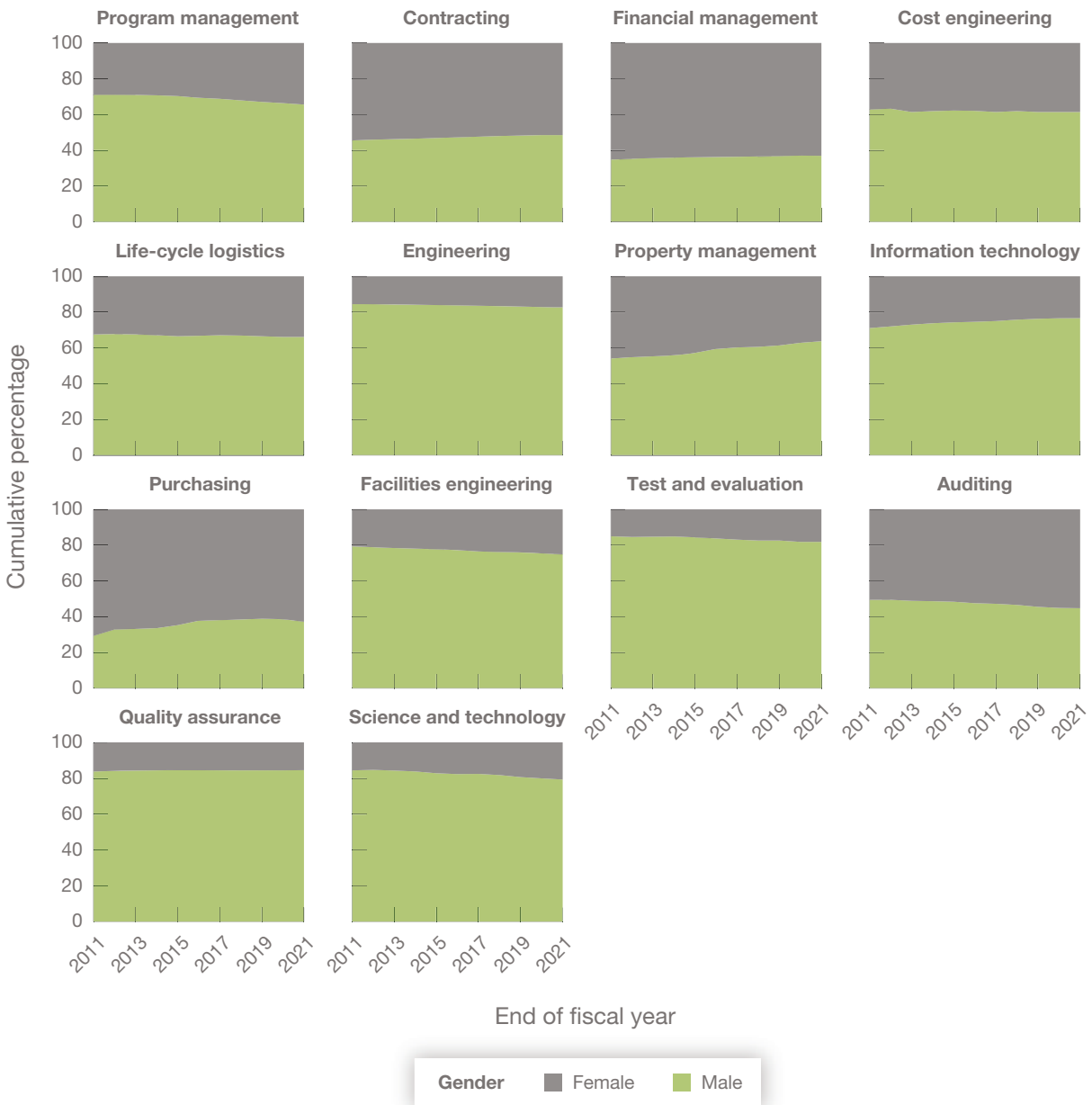
Some career fields—program management, contracting, life-cycle logistics, and facilities engineering—have increased the proportion of new hires who are female over the past ten years (from both relatively high and relatively low levels). Figure 3.10 illustrates these trends.

In terms of racial and ethnic diversity, contracting, purchasing, life-cycle logistics, and financial management have higher proportions of black workers than average, and engineering and facilities engineering have higher proportions of Asian American workers.

There are consistent differences in the age profiles of various career fields in the AW: Program management, life-cycle logistics, information technology, property management, and science and technology have fewer workers than average who are under age 40, while engineering, test and evaluation, and auditing have more. Some of these career fields have greater proportions of positions that require higher levels of experience. Over the past decade, engineering, contracting, and financial management have seen stronger increases in the percentage of the civilian workforce under age 40. Appendix B contains figures detailing these and other workforce demographic trends for the civilian and military AWs. These figures show that the military AW has a younger age profile and a higher percentage of male workers than the civilian AW, although the two workforces have a similar pattern of differences across career fields by race and ethnicity.

Shifts to the workforce demographics over time are driven in part by changes to the profile of the individuals entering the AW. Given the large increase in the number of civilian workforce gains, particularly civilian new hires, DoD had a tremendous opportunity to shift the workforce demographics by changing the profile of new hires. When we looked at the race and gender profile of new civilian hires, we saw little change in gender and modest change in race and ethnicity. There has been more change in the age profile of new hires over time. FY 2021 civilian new hires are slightly less likely to be male, less likely to be white, and substantially more likely to be under age 40 than FY 2011 new hires. Specifically, 67 percent of FY 2021 civilian

FIGURE 3.10
Gender Representation in the Civilian Acquisition Workforce, by Career Field, FYs 2011 to 2021



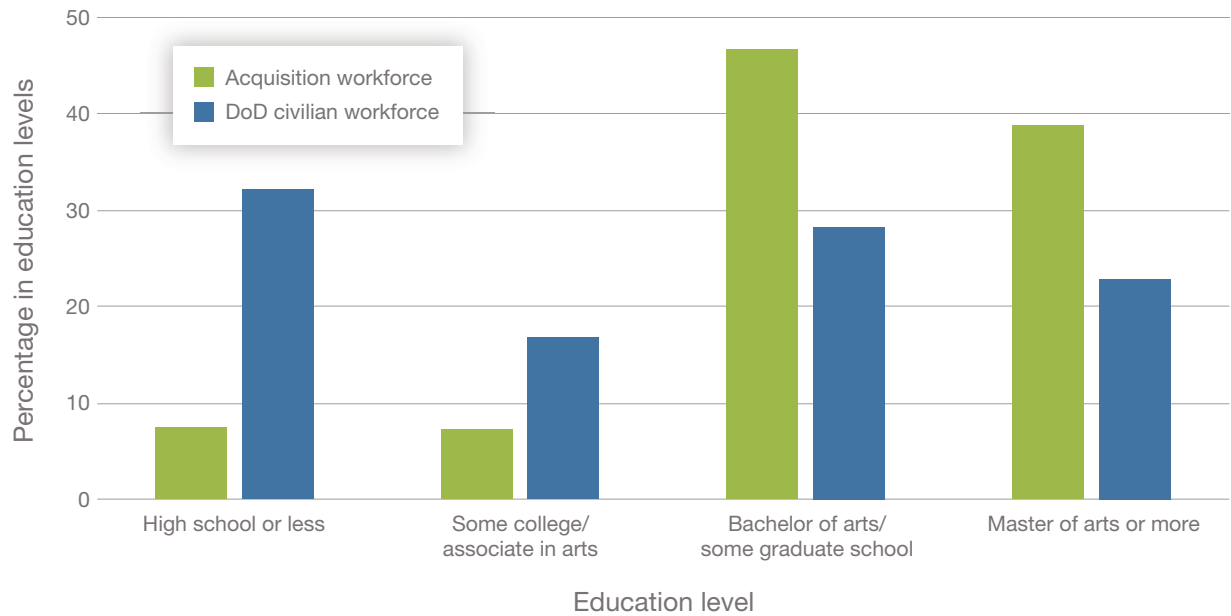
new hires into the AW were male, 71 percent were white, and 64 percent were under age 40. In FY 2011, those figures were 71 percent, 79 percent, and 47 percent, respectively.

Educational Attainment of the Acquisition Workforce

Our prior work has documented that the civilian AW has higher educational attainment than the DoD civilian workforce overall (Gates et al., 2008; Gates et al., 2013; Gates et al., 2018). In FY 2021, 85 percent of the

civilian AW had at least a bachelor’s degree, compared with just over half (51 percent) of the DoD-wide civilian workforce (see Figure 3.11). The difference in the share of workers with advanced degrees was just as sharp. In FY 2021, 39 percent of the civilian AW held a master’s degree or higher, compared with 23 percent of the DoD civilian workforce overall.

FIGURE 3.11
DoD Civilian Workforce Overall and DoD Civilian Acquisition Workforce, by Educational Attainment, FY 2021



Projecting the Future Workforce

In 2006, DoD, like many employers across the United States, was concerned about the pending wave of retirements of members of the baby boom generation. But for DoD, the concern was amplified because of the overall distribution of the workforce. Hiring freezes that had been imposed after the Cold War ended were occurring just as members of Generation X were joining the workforce. As hiring resumed after the terrorist attacks on September 11, 2001, younger generations joined the workforce. By the mid-2000s, DoD's workforce demographic profile was commonly referred to as a *bathtub distribution* because of the higher numbers of older and younger workers relative to mid-career workers. Recognizing the potentially significant impact of retirements on the AW, DoD designed the AW growth initiative in part to adjust the distribution of the AW to incorporate more early- and mid-career workers. In this chapter, we examine trends in retirement eligibility and workforce gains and losses and how these trends are factored into projecting the size of the future workforce.

Years Relative to Retirement Eligibility

YORE—defined as the number of years until full retirement eligibility given a worker's age, years of service, and retirement plan—is an important metric because, as our prior research shows, it is strongly related to retention for the civilian workforce.

In our 2008 report on the AW (Gates et al., 2008), which includes data through FY 2006, we highlighted a pending wave of workers reaching retirement eligibility starting in FY 2007 that would last for about a decade (pp. 14–15). In 2009, DoD embarked upon the AW growth initiative. As a result, DoD was actively growing the workforce at a time when it was also losing much of its workforce to retirement. How did these two concurrent dynamics affect the workforce? Figure 4.1 provides workforce counts by YORE category for FYs 2008 and 2021. Data for the FY 2008 workforce are reflected in the orange line, which shows a clear peak for the group six to ten years from retirement eligibility, indicating that the FY 2008 workforce was smaller overall and was heavily skewed toward the groups nearing retirement eligibility. In contrast, the FY 2021 workforce (blue line) is more evenly distributed across the categories. Notably, in FY 2008, only 28 percent of the AW was more than 15 years from retirement. By FY 2021, that figure had increased to 42 percent.

Gains and Losses to the Acquisition Workforce

Our quarterly reporting to DoD summarizes the changes in the overall number of workers in the AW and the flows of workers into and out of the AW over time. We analyze these flows separately for the military and civilian AWs. For both workforces, we disaggregate gains and losses to the AW into those that stemmed from new hires into or losses to the civilian or military workforce versus those that stemmed from switches into the AW from another DoD civilian or military position. For the civilian workforce only, we further categorize recategorization as either internal hires or recodes using the method described in Chapter 2.

FIGURE 4.1
DoD Civilian Acquisition Workforce, by YORE Category, FYs 2008 and 2021



Figure 4.2 displays the numbers of civilian gains and losses by type. We see that the numbers of recategorizations into and out of the AW tend to be more stable than the numbers of new hires and separations from DoD. Deconstructing the gains and losses into movement into and out of the DoD civilian workforce overall and movement between AW and non-AW positions within the DoD civilian workforce reveals that new hires exceeded recategorizations into the AW in most years over the past decade, while attrition out of DoD exceeded recategorizations out of the AW in all years beginning with FY 2010. As previously described, recategorizations in or out consist of individuals who transitioned into or out of the AW from non-AW civilian positions.

Prior to 2006, recodes normally exceeded internal hires or losses, especially when it came to recode-gains (see Gates et al., 2013, pp. 21–23). Since that time, the number of recode-gains and recode-losses has been less than the number of internal hires and internal losses. In FY 2021, 72 percent of recategorizations in were internal hires and 63 percent of recategorizations out were internal losses.

FIGURE 4.2
DoD Civilian Acquisition Workforce, Numbers and Types of Gains and Losses, FYs 2006 to 2021



In prior work, we report that military AW turnover is twice as high as the turnover seen in the civilian AW (Gates et al., 2018).¹ The higher turnover stems from the fact that military personnel typically rotate in and out of positions every two to three years while civilians typically do not. As illustrated in Figure 4.3, the vast majority of military AW gains are internal transfers from non-AW military positions, and more than half of the losses to the military AW are transfers from military AW positions to non-AW positions in the military—which reflects the military rotation policies.

Comparing Figures 4.2 and 4.3, we can see that whereas the losses to the military AW have been due primarily to internal transfers, the losses to the civilian AW stem from separations. Looking at loss rates for the civilian and military AWs by type for FY 2021, we found that the overall loss rate for the civilian AW was 8.3 percent, with an internal transfer rate of 2.6 percent and a separation rate of 5.8 percent.

¹ Total workforce losses as a share of the prior year baseline were about 20 to 25 percent for the military AW, compared with about 7 to 12 percent for the civilian AW during this time frame.

FIGURE 4.3
DoD Military Acquisition Workforce, Numbers and Types of Gains and Losses, FYs 2007 to 2021



Civilian Acquisition Workforce Attrition

Because the civilian AW represents about 90 percent of the total AW and military AW losses tend to be rotations out of the AW to other military positions, the stability of the AW is closely related to civilian AW retention. As illustrated in Figure 4.4, DoD civilian AW attrition has held steady in the 5- to 6-percent range over the past decade, with retirement accounting for the majority of workforce losses. Our prior work showed that the civilian AW has a lower attrition rate than the DoD civilian workforce as a whole (see Gates et al., 2018, Figure 3.17), which has an attrition rate of above 8 percent. We have confirmed that these attrition rates continued through FY 2021.

Despite the generally low attrition rate for the civilian AW, there are differences across career fields. Figure 4.5 presents the attrition rate by career field over time for those career fields that will endure after the BtB transition. The results suggest that there has been a convergence in the attrition rates across career fields over time. Notably, prior to FY 2018, the separation rate for engineering was consistently lower than the separation rate for contracting and business, and program management and life-cycle logistics were in between. However, the separation rate for engineering has ticked up since FY 2017. For example, attrition in the contracting career field has been 6.3 percent per year or higher (see Figure 4.5), while attrition in the engineering career field had historically been at or below 4.6 percent but inched above 5 percent in recent years (see Figure 4.6). As we discuss below, this increase is likely due to a short-term increase in the share of the workforce in this career field reaching retirement eligibility.

FIGURE 4.4
DoD Civilian Acquisition Workforce Attrition, by Type, FYs 2006 to 2021

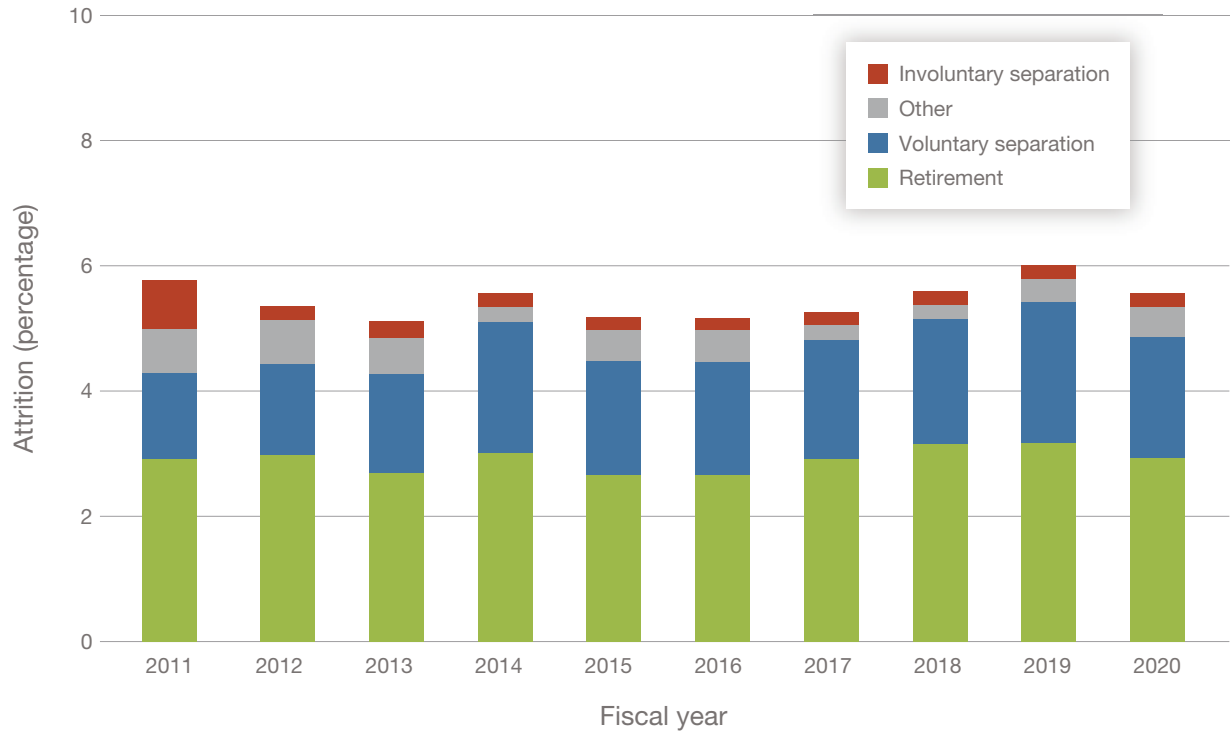


FIGURE 4.5
DoD Civilian Acquisition Workforce Attrition, by Career Field, FYs 2006 to 2021

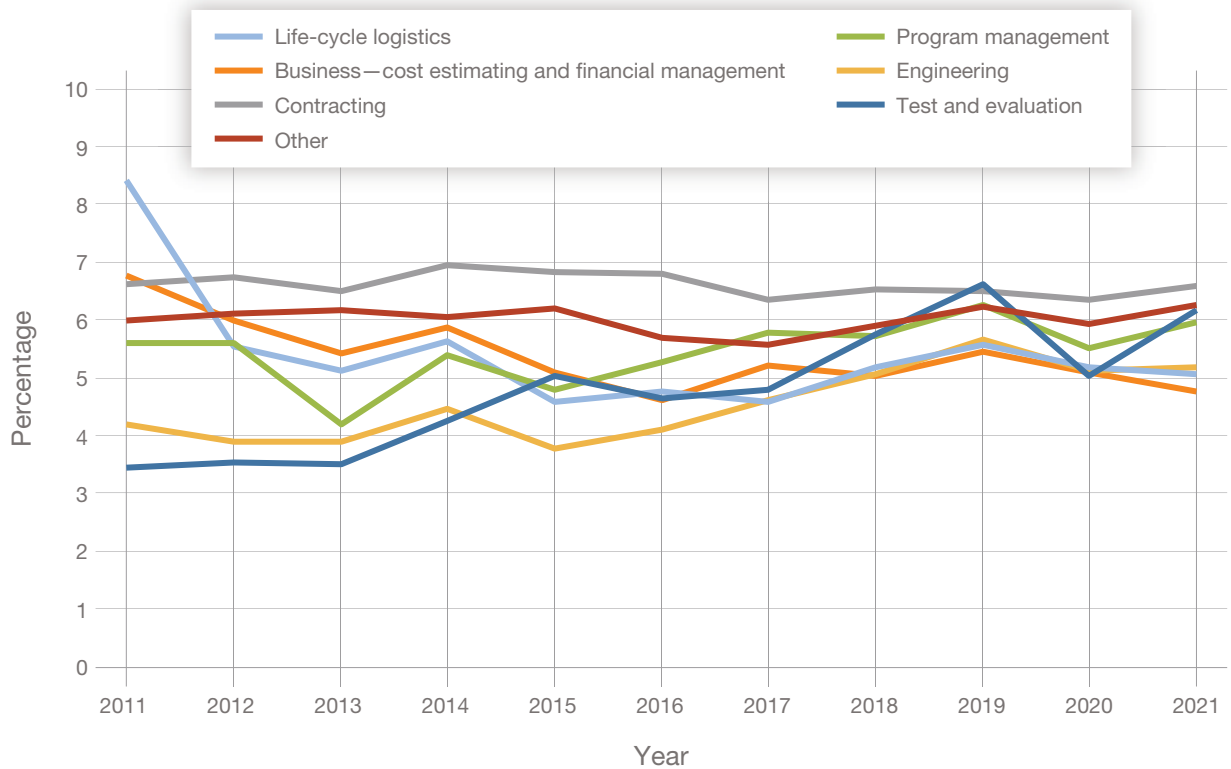
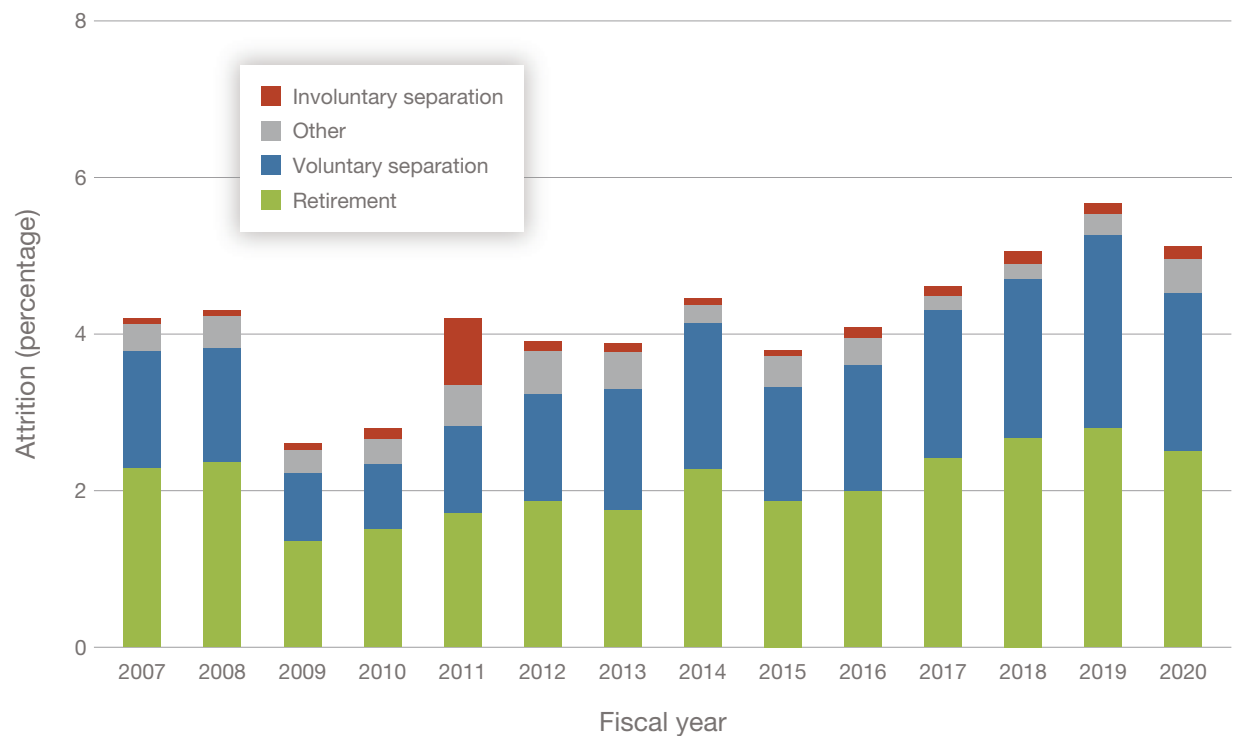


FIGURE 4.6
DoD Civilian Acquisition Workforce Attrition in the Engineering Career Field, by Type, FYs 2006 to 2020



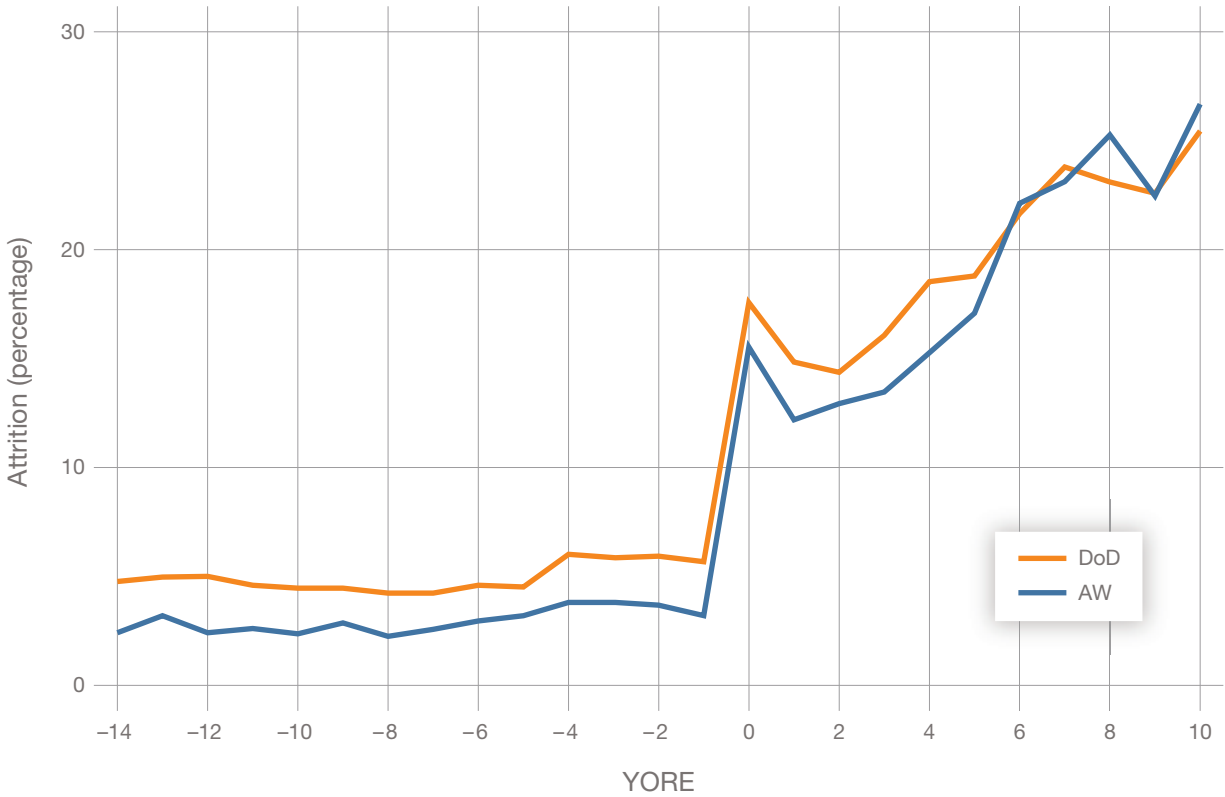
Retirement eligibility is a significant driver of workforce losses; workers at or past retirement age leave the workforce at much higher rates than workers who have not yet reached retirement eligibility. Figure 4.7 shows the rates of attrition for the overall civilian DoD workforce and the civilian AW (as percentages of the prior-year baselines) using the YORE metric. Workers who have a YORE of 0 are those who will become retirement-eligible for the first time in FY 2021 (but who were not yet retirement eligible at the end of FY 2020). The far-left side of the graph reflects those with a decade or more until retirement eligibility, while the far right reflects those who have been retirement-eligible for a decade or more but remain employed.² Members of the civilian AW with a particular YORE are 2–3 percentage points less likely than DoD civilians in general to separate from the workforce—both before and for the first four years after reaching retirement eligibility. This result suggests that members of the AW have a greater attachment to the DoD civilian workforce than DoD civilians do overall.

Structure of the Future Workforce

RAND provides DoD with quarterly updates to a workforce inventory projection model for the civilian workforce. The model extrapolates from recent trends in hiring, attrition, and recategorizations into and out of the AW from non-AW positions in the civilian DoD workforce to make projections about the size and

² Although not shown on this graph, the difference between separation rates for the AW civilians and DoD civilians who are more early-career workers—those who are 15 years or more from retirement—is even greater than the difference in separation rates for those who are within 14 years of retirement.

FIGURE 4.7
DoD Civilian and DoD Civilian Acquisition Workforce Attrition, by YORE, FY 2021



characteristics of the civilian AW over the coming decade. This model can be useful for workforce managers seeking to understand future needs or the likely shape of the future workforce. The features, functions, and limitations of our model are described in detail in Gates et al., 2018, Appendix A.

DoD workforce managers have been concerned about the shape of the workforce in terms of proximity to retirement eligibility. In this chapter, we describe how the hiring efforts that were part of the AW growth initiative have resulted in a more balanced workforce structure. Our projections suggest that this structure is likely to persist if the workforce size levels off.

One version of our model (Model 2) allows users to input target end strengths for the civilian AW, uses recent trends in separations and switches in and out to project the level of new hiring that would be needed to hit those targets, and describes the projected distribution of the workforce in terms of YORE. For example, if the goal were to hold the size of the AW constant over the next decade, the required number of new hires each year would be between 6,700 and 7,300 over the FY 2022–FY 2032 period. Under a no-growth and no-decline assumption, the share of the workforce that is eligible for retirement, which reached 18.1 percent at the end of FY 2018, will decline steadily over the next decade. Table 4.1 details these projections.

The recent increase in the overall separation rate for engineers in the AW appears to be driven by changes in the distribution of that workforce relative to retirement. Our data suggest that the career field has recently passed through a mini retirement wave that is now dissipating. The share of the AW in the engineering career field eligible for retirement was 14.8 percent at the end of FY 2014 but increased to 17.9 percent at the end of FY 2018 and has remained above 17 percent since. As shown in Table 4.2, which details the engineering career field, our projection model suggests that if the engineering workforce size remains the same and historic separation rates endure, the share of the engineering workforce eligible for retirement will decline to the 2014 level within five years and dip below 13 percent by FY 2031.

TABLE 4.1
DoD Civilian Acquisition Workforce Under Stable Workforce Size Assumption, FYs 2022 to 2032

	Projected Workforce Based on User-Input Onboard or Target Strengths									
	2022 Q4	2023 Q4	2024 Q4	2025 Q4	2026 Q4	2027 Q4	2028 Q4	2029 Q4	2030 Q4	2031 Q4
Total workforce (actual or projected), based on user-provided end strengths	170,758	170,758	170,758	170,758	170,758	170,758	170,758	170,758	170,758	170,758
Workforce prior to new hires and/or additional reductions	163,495	163,526	163,574	163,605	163,673	163,763	163,840	163,899	163,943	163,986
Onboard strength (user input)										
Target strength (user input)	170,758	170,758	170,758	170,758	170,758	170,758	170,758	170,758	170,758	170,758
User-provided end strength used in model										
Separations due to attrition	9,611	9,582	9,541	9,514	9,450	9,361	9,287	9,230	9,189	9,150
Switches out	2,823	2,837	2,844	2,849	2,855	2,860	2,861	2,863	2,862	2,861
New hires to meet target or onboard strengths										
Switches in	5,170	5,187	5,201	5,211	5,219	5,225	5,230	5,234	5,237	5,239
Additional reductions to meet target or onboard strengths										
Total CSRS workforce	2,026	1,548	1,178	896	681	518	395	301	229	175
Total "other" workforce	390	321	264	217	178	146	120	98	81	66
Percentage of workforce with										
YORE -21 or less	26.1%	25.8%	25.6%	25.5%	25.5%	25.3%	25.1%	24.7%	24.3%	24.0%
YORE -11 to -20	30.0%	30.4%	30.7%	30.5%	30.2%	30.0%	29.7%	29.5%	29.4%	29.2%
YORE -6 to -10	12.9%	13.1%	13.3%	13.7%	14.3%	14.9%	15.5%	16.1%	16.3%	16.4%
YORE -1 to -5	13.8%	13.6%	13.4%	13.3%	13.4%	13.4%	13.6%	13.7%	14.0%	14.5%
YORE 0 to 4	11.2%	10.9%	10.7%	10.5%	10.3%	10.1%	10.0%	9.9%	9.9%	9.9%
YORE 5 or more	6.0%	6.2%	6.3%	6.3%	6.3%	6.2%	6.2%	6.2%	6.1%	6.0%
Percentage of workforce eligible for retirement	17.2%	17.1%	17.0%	16.9%	16.6%	16.3%	16.2%	16.1%	16.0%	15.9%

NOTES: We used Model 2, which provides key projection results using user-provided end strengths and user-provided or historical parameters. Users may enter target strengths, actual onboard strengths, or both. Target strengths represent goals for future years. Onboard strengths can be used if there are any deviations between the goals and anticipated, actual strengths. If onboard strengths are entered, they override target strengths. If neither target nor onboard strengths are entered, then the model assumes that there are no new hires or additional reductions. Yellow shading represents user input, and orange shading represents values generated using user-input end strengths.

TABLE 4.2
DoD Civilian Engineering Acquisition Workforce Under Stable Workforce Size Assumption,
FYs 2022 to 2032

	Projected Workforce Based on User-Input Onboard or Target Strengths									
	2022 Q4	2023 Q4	2024 Q4	2025 Q4	2026 Q4	2027 Q4	2028 Q4	2029 Q4	2030 Q4	2031 Q4
Total workforce (actual or projected), based on user-provided end strengths	46,595	46,595	46,595	46,595	46,595	46,595	46,595	46,595	46,595	46,595
Workforce prior to new hires and/or additional reductions	44,427	44,433	44,461	44,483	44,521	44,571	44,622	44,663	44,701	44,732
Onboard strength (user input)										
Target strength (user input)	46,595	46,595	46,595	46,595	46,595	46,595	46,595	46,595	46,595	46,595
User-provided end strength used in model	46,595	46,595	46,595	46,595	46,595	46,595	46,595	46,595	46,595	46,595
Separations due to attrition	2,464	2,456	2,428	2,405	2,365	2,314	2,260	2,219	2,181	2,150
Switches out	875	880	882	886	890	893	896	897	897	897
New hires to meet target or onboard strengths	2,168	2,162	2,134	2,112	2,074	2,024	1,973	1,932	1,894	1,863
Switches in	1,171	1,174	1,177	1,179	1,181	1,182	1,183	1,184	1,184	1,185
Additional reductions to meet target or onboard strengths	0	0	0	0	0	0	0	0	0	0
Total FERS workforce	46,023	46,151	46,251	46,328	46,388	46,434	46,468	46,495	46,516	46,532
Total CSRS workforce	541	419	323	250	193	150	118	93	73	58
Total "other" workforce	31	25	20	17	13	11	9	7	6	5
Percentage of workforce with										
YORE -21 or less	39.5%	39.5%	39.4%	39.5%	39.6%	39.3%	38.8%	38.0%	37.2%	36.4%
YORE -11 to -20	25.7%	26.2%	26.6%	26.5%	26.2%	26.3%	26.4%	26.9%	27.3%	27.7%
YORE -6 to -10	8.7%	9.1%	9.5%	10.1%	10.9%	11.5%	12.0%	12.4%	12.5%	12.5%
YORE -1 to -5	9.2%	8.8%	8.6%	8.7%	8.7%	9.0%	9.3%	9.6%	10.1%	10.7%
YORE 0 to 4	10.6%	9.6%	8.8%	8.2%	7.6%	7.1%	7.0%	6.9%	6.9%	6.9%
YORE 5 or more	6.3%	6.8%	7.1%	7.1%	6.9%	6.7%	6.5%	6.3%	6.0%	5.7%
Percentage of workforce eligible for retirement	16.9%	16.4%	15.9%	15.2%	14.5%	13.9%	13.4%	13.1%	12.9%	12.7%

NOTES: We used Model 2, which provides key projection results using user-provided end strengths and user-provided or historical parameters. Users may enter target strengths, actual onboard strengths, or both. Target strengths represent goals for future years. Onboard strengths can be used if there are any deviations between the goals and anticipated, actual strengths. If onboard strengths are entered, they override target strengths. If neither target nor onboard strengths are entered, then the model assumes that there are no new hires or additional reductions. Yellow shading represents user input, and orange shading represents values generated using user-input end strengths.

Characteristics of Recent Cohorts Joining the Civilian Acquisition Workforce

In this chapter, we look closely at the characteristics of recent cohorts joining the civilian AW, which allows us to understand how recent entrants to the civilian AW, new hires from outside the DoD civilian workforce, or internal hires from within that workforce have shaped the civilian AW.¹ We present information on the prior work experiences of members of recent cohorts and discuss our findings in the remainder of this chapter. We also consider a breakdown of recent cohorts by service or agency, career field, education level, and proximity to retirement.

Our data sources and methodology for defining a *cohort* and characterizing past work experience are described in Chapter Two. This analysis includes individuals who were newly hired into the DoD civilian workforce in AW positions, internal hires into AW positions from non-AW positions in the DoD civilian workforce, and people who entered the DoD civilian workforce in the fiscal year in question and who were recoded into the AW in the following fiscal year. We do not include other recode-gains in the cohorts.

Because our AW cohorts incorporate workers recoded into the AW in the year after they entered the DoD civilian workforce in a non-AW position, our cohort analysis ends with the FY 2020 cohort. To produce comparable figures for the FY 2021 cohort, we would need to observe and incorporate recode-gains through the end of FY 2022.

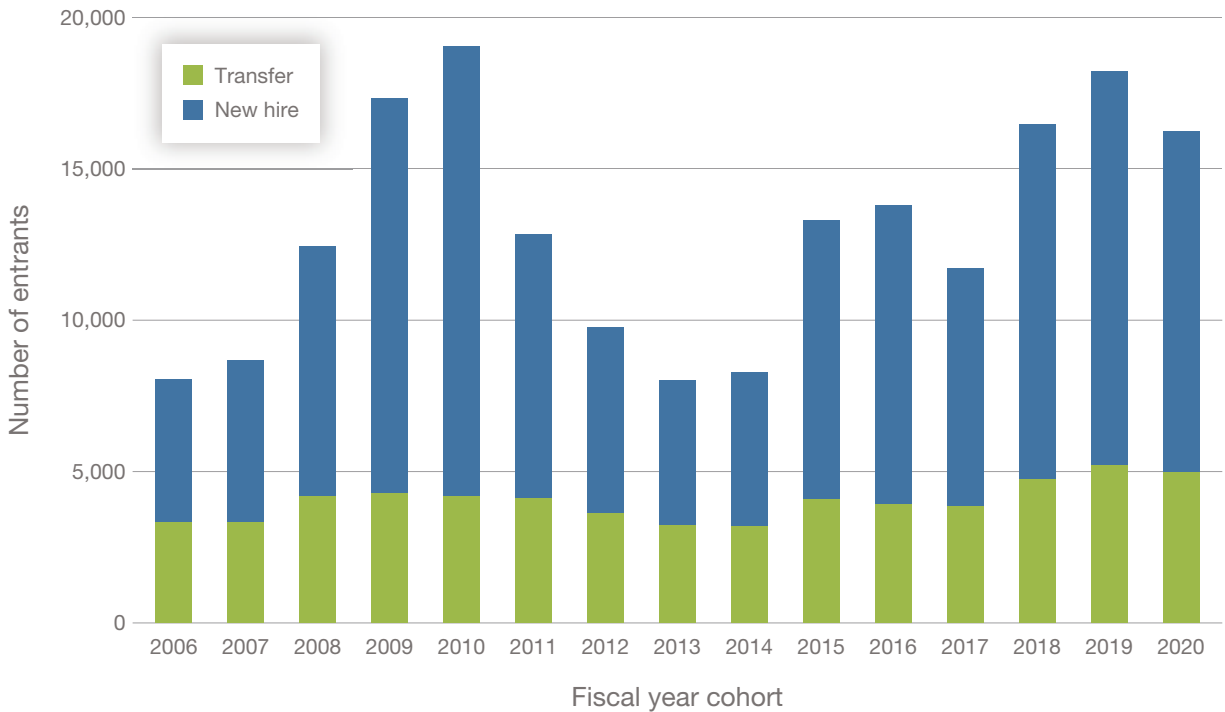
Sizes of Recent Acquisition Workforce Cohorts

Figure 5.1 updates Figure 4.1 from Gates et al., 2018, through FY 2020. These most recent civilian AW cohorts have been larger than in prior years and have had considerably more new hires. Over the 15 years studied, AW cohorts have varied in size, rising to 19,073 in FY 2010; falling back to the 8,000 range in FYs 2013 and 2014, as sequestration hit (see Figure 5.1); and increasing again to 18,224 in FY 2019.

In years with larger entry cohorts, the share of new hires (as opposed to transfers into the AW from non-AW civilian DoD positions) was higher. The number of internal hires remained relatively constant from FY 2006 to FY 2020, including during the years with notably larger entering cohorts (FYs 2008 to 2011 and FYs 2018 to 2020). All cohorts between FY 2006 and FY 2016 had between roughly 3,200 and 5,250 internal hires. By contrast, the cohorts immediately following the launch of the AW growth initiative, as well as the FY 2018 to FY 2020 cohorts, had considerably more new hires than the cohorts from the other years. Specifically, these larger cohorts had about 8,000 or more new hires each (and nearly 15,000 in FY 2010), whereas smaller entering cohorts had as few as 4,750 members.

¹ This chapter draws on Ch. 7 of Powell, 2017, which documents the cohort analysis and presents information on cohorts through FY 2014, as well as Ch. 4 of Gates et al., 2018.

FIGURE 5.1
DoD Civilian Acquisition Workforce Entrants, by Type, FYs 2006 to 2020



Past Work Experience of Civilian Acquisition Workforce Entrants

The past work experience of individuals entering the civilian AW may influence their performance on the job, career progression, and attrition rates. In this section, we provide an update to Figure 4.3 from Gates et al., 2018, which shows the prior work experience of members of cohorts from FYs 2006 to 2020. We used the methodology for characterizing past work experience described in Chapter Two. Our data allow us to capture only whether individuals have prior DoD experience and what type of experience they have (civilian or military). Individuals might have other relevant prior work experience that allows them to make immediate contributions to acquisition programs—for example, as support contractors to DoD.

The new hires that fueled the AW growth initiative (and that contributed to the larger cohorts in the most recent six fiscal years) came from increases in hires from outside DoD. Figure 5.2 shows, at a more precise level, where civilian AW entrants in the cohorts from FY 2006 to 2016 worked immediately before joining the civilian AW. The categories are internal transfers from non-AW civilian DoD positions, new hires who had been in the military AW, new hires who had been in non-AW military positions, and new hires who had not been in DoD positions at all. The greatest variation is in the number of new entrants coming from outside DoD, which peaked at more than 14,000 in FY 2010. The number of people in each cohort who came from military positions (either AW or non-AW) has been very small. The number who transferred from civilian non-AW DoD positions held fairly steady in the 3,000–4,000-person range.

FIGURE 5.2
DoD Civilian Acquisition Workforce Entrants, by Work Experience Immediately Prior to Joining the Acquisition Workforce, FYs 2006 to 2020

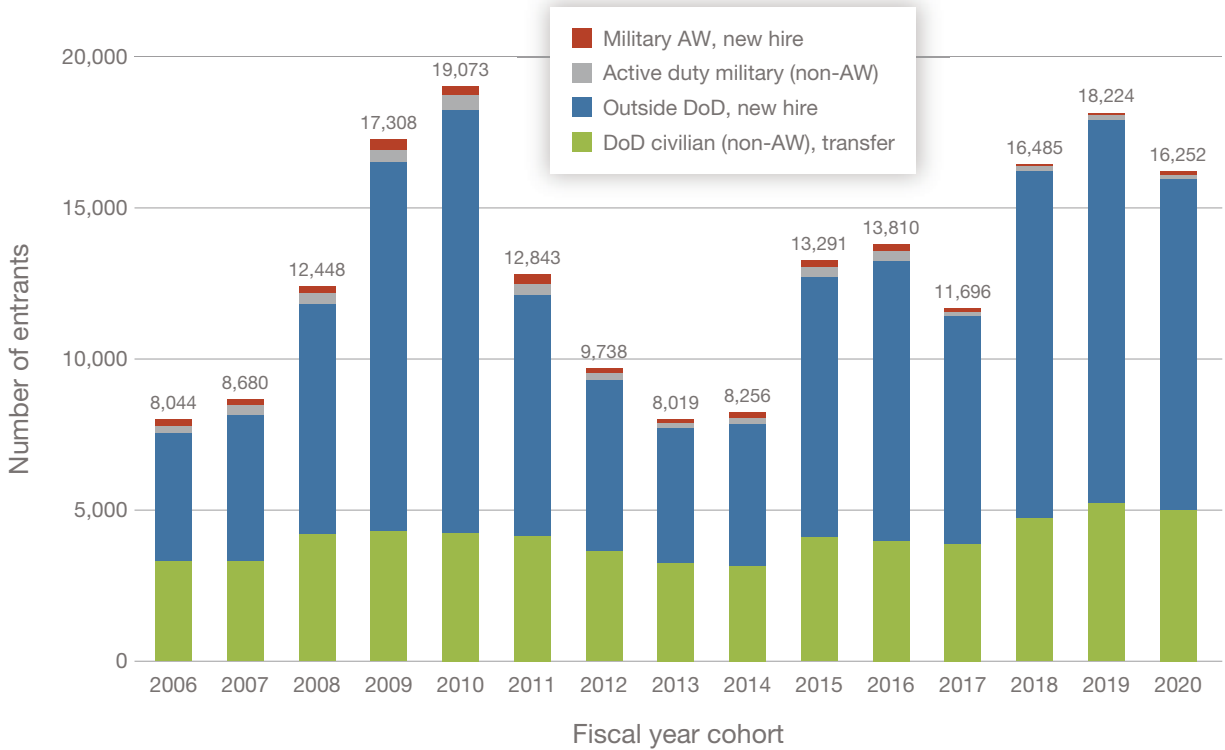


Figure 5.3 presents the numbers of new hires into the civilian AW who did and did not have prior DoD work experience in either the military or the civilian workforce. In recent years with larger cohorts, the overall number of new hires with some DoD experience has increased somewhat, but the percentage with such experience has declined. Figure 5.4 illustrates the experience profile for these outside-DoD hires who had some prior DoD experience, revealing that the patterns we described in our prior report continue to hold. (Note that, because individuals can have both civilian and active duty prior DoD work experiences, the percentages in Figure 5.4 add up to more than 100 percent for each cohort.) Nearly two-thirds of outside hires in the FY 2006 to FY 2020 cohorts with DoD experience had prior active duty experience (but never served in the military AW). About 20 percent of outside-DoD hires with prior DoD experience had experience in the civilian DoD workforce, with about the same share having some prior civilian AW experience as had DoD civilian experience but no AW experience. The percentage of outside hires with active duty experience who spent time in the military AW has consistently hovered around 10 percent.

FIGURE 5.3
DoD Civilian Acquisition Workforce New Hires, by Prior DoD Work Experience, FYs 2006 to 2020

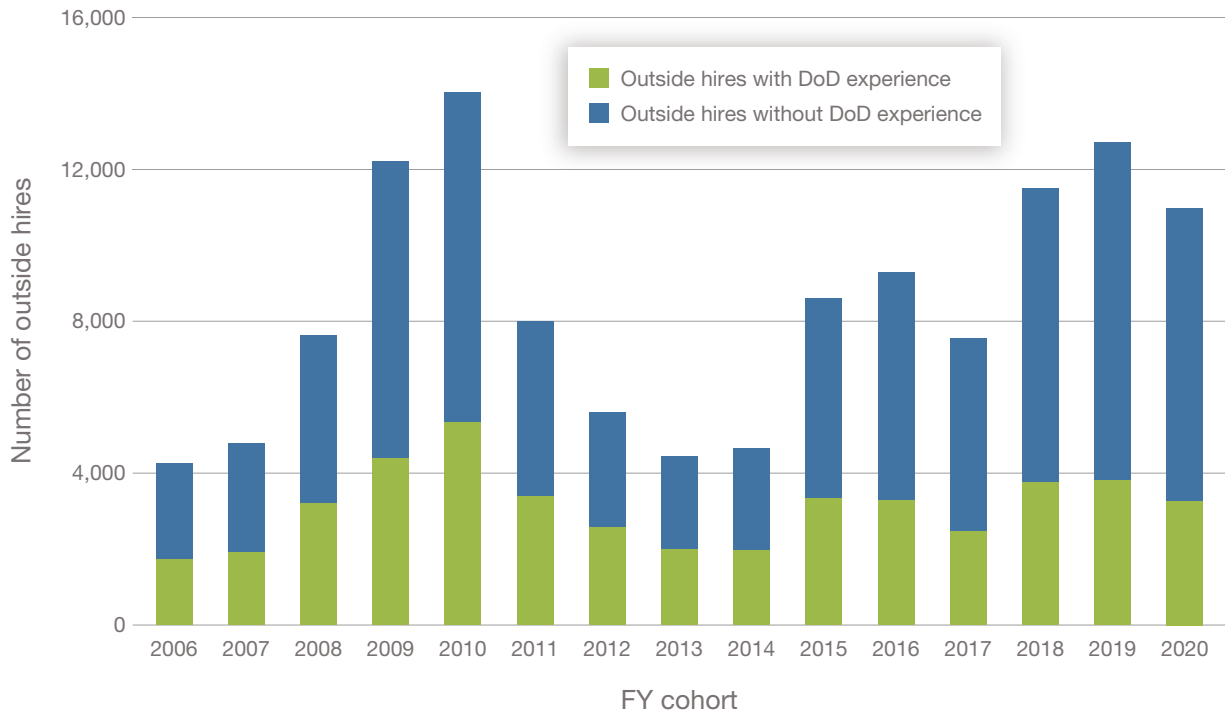
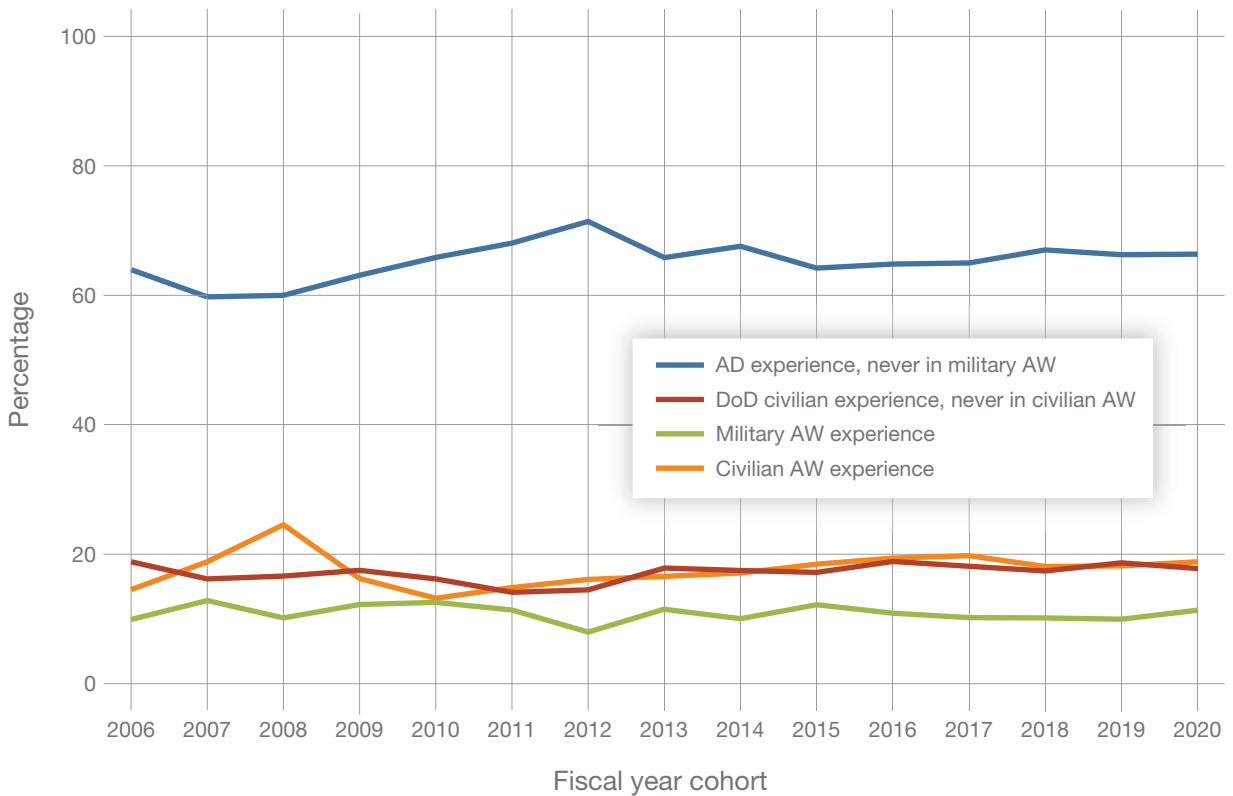


FIGURE 5.4
DoD Civilian Acquisition Workforce Entrants Hired from Outside DoD with Prior DoD Work Experience, by Type of Prior DoD Work Experience, FYs 2006 to 2020



Conclusions and Recommendations

As DoD embarks upon the most significant change to the talent management structure for the AW since DAWIA through the rollout of the BtB initiative, the workforce is robust and, by some available metrics, quite healthy.¹ Among the most-notable observations of the workforce over the past 15 years are the following:

- The workforce has grown dramatically in the past decade because of significant increases in the size of the civilian AW and a decline in the share of the workforce that is eligible to retire. Overall, the workforce is well balanced in terms of proximity to retirement.
- Workforce growth was possible in part because of strong retention. The separation rate for the civilian AW has remained much lower (5–6 percent) than the separation rate for the DoD civilian workforce as a whole (8 percent), reflecting a higher level of attachment for the civilian AW. Differences across AW career fields have grown more limited.
- Workforce growth also relied on hiring efforts; the civilian AW has been able to attract individuals with diverse professional experience and backgrounds, including individuals from outside DoD.
- In terms of gender, racial, and ethnic diversity, the civilian AW has realized little change. It is still predominantly white and male, although it has a greater degree of gender, racial, and ethnic diversity than the military AW. There is a fair amount of variation by career field, with women better represented in the business-oriented career fields and less well represented in the scientific and technical ones. DoD may have missed an opportunity to shift the workforce demographics during the recent period of workforce growth; our analysis revealed that the characteristics of new hires largely mirrored those of the existing workforce. Greater diversity among new hires would be needed to shift the demographic profile of the overall workforce.

The vast majority of AW members are certified for their positions. Since FY 2011, DoD has increased the share of those who are fully certified and reduced the share who do not meet certification requirements or fall within the grace period. We did observe some backsliding in that improvement trend with regard to certification requirements in the past two years, which coincided with the dramatic decrease in DAWDF funding described in Chapter One and the COVID-19 pandemic. It will be important for DoD to closely monitor workforce trends in the coming years and be prepared to respond to continued declines in certification. The BtB transition poses some challenges for such monitoring efforts.

Our review of the BtB plans suggests that the consolidation of career fields into functional areas, combined with the development of cross-cutting knowledge areas and certification structures to go along with those knowledge areas, holds potential for creating a more targeted set of job requirements and more-nimble learning opportunities to support the workforce in meeting those requirements. With effective data collec-

¹ Guo, Hall-Partyka, and Gates, 2014, describes other plausible workforce quality metrics, such as performance evaluation scores, educational attainment, and educational upgrades, and the pros and cons associated with each.

tion about certification and credential expectations for both positions and AW members, this new structure could enable better assessments of workforce quality than are possible with existing data.

Because BtB reduces the number of career levels, changes certification requirements to reduce the learning hours required for certification, and increases the amount of time that workers have to achieve certification requirements (i.e., the grace period), it will not be possible to examine trends to assess whether the recent dip in certification attainment continues. Certification data for FY 2022 will not be comparable with FY 2021 data. It will be critical for DoD to closely monitor certification going forward and clearly specify the definition to be used in determining whether an AW member is in the grace period.

The BtB framework provides a structure for implementing role-relevant defense acquisition credentials that AW members can pursue based on their current needs and future aspirations. A key limitation of the BtB rollout plans, in our view, is the lack of reporting requirements and systems focused on these credentials. Such requirements and systems would allow DoD to conduct more-robust gap analysis, better monitor workforce readiness, and effectively support the AW and, ultimately, the warfighter.

Supplementary Tables

In this appendix, we provide tabulations, based on DAWIA person and position file data, of the percentages of the overall AW, military AW, and civilian AW that fall into three categories of career-level attainment: (1) **meets** requirements, (2) does not meet requirements but is within the 24-month period (**grace period**), or (3) **does not meet** requirements and is outside the 24-month period to obtain certification. We present this information by career field and by fiscal year.

To categorize AW members into the three categories, we first compared the career level required for a member's position with the member's current career level. If the member's current career level was equal to or greater than what was required for the position, they were categorized as "meets requirements." If not, we used two different approaches to determine whether they were within the 24-month window:

1. If a person was not fully qualified, we checked to see whether their career field and career level (**CF + CL**) were the same as they were two years prior.
2. If a person was not fully qualified, we checked to see whether their **position number** was the same as it was two years prior.

If the answer to question 1 or 2 is "no," then the person is in the 24-month grace period per definition 1 and/or definition 2.

Tables A.1 and A.2 present information on the career-level attainment status of the overall AW by career field and fiscal year, measuring eligibility with position number and CF + CL (respectively). Tables A.3 and A.4 present information on the career-level attainment status of the military AW by career field and fiscal year, measuring eligibility with position number and CF + CL (respectively). Tables A.5 and A.6 present information on the career-level attainment status of the civilian AW by career field and fiscal year, measuring eligibility with position number and CF + CL (respectively).

TABLE A.1
Career-Level Attainment Status of the Overall AW (percentage), by Career Field and Fiscal Year: Measuring Eligibility with Position Number

Career Field	Career-Level Attainment	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AW overall	Does not meet	4.86	5.07	4.41	3.00	2.80	2.16	2.22	2.08	1.78	2.15	3.29
	Qualified	60.38	69.05	74.75	78.79	76.19	75.52	76.41	74.69	72.41	71.66	70.46
	Grace period	34.77	25.88	20.84	18.21	21.01	22.32	21.37	23.23	25.81	26.19	26.25
Program management	Does not meet	3.20	3.98	5.14	4.23	3.90	3.77	3.37	3.19	3.01	3.23	4.53
	Qualified	58.33	66.16	71.45	75.24	73.15	71.59	72.49	71.22	68.18	65.68	63.43
	Grace period	38.48	29.86	23.4	20.52	22.95	24.64	24.14	25.59	28.81	31.09	32.05
Contracting	Does not meet	1.67	2.25	2.50	1.80	1.76	1.26	1.28	0.99	0.68	0.81	1.45
	Qualified	71.76	74.81	77.05	80.79	80.02	78.77	79.38	79.34	77.03	76.94	75.30
	Grace period	26.58	22.94	20.44	17.42	18.22	19.97	19.33	19.67	22.29	22.26	23.25
Industrial and contract property management	Does not meet	4.60	6.33	3.80	2.86	4.15	2.78	1.80	1.03	1.40	2.15	1.94
	Qualified	68.62	72.62	78.99	79.95	71.50	71.97	74.29	78.55	66.43	64.59	72.09
	Grace period	26.78	21.04	17.22	17.19	24.35	25.25	23.91	20.41	32.17	33.25	25.97
Purchasing	Does not meet	9.76	10.37	7.42	5.92	6.67	4.61	4.46	4.12	2.51	3.00	5.17
	Qualified	53.66	55.42	66.37	70.04	57.45	51.78	59.93	71.66	63.82	65.55	61.25
	Grace period	36.59	34.22	26.21	24.03	35.88	43.61	35.61	24.22	33.67	31.45	33.58
Facilities engineering	Does not meet	6.83	13.35	3.75	1.62	1.91	1.68	4.32	4.15	2.84	4.20	9.54
	Qualified	45.97	67.39	81.20	88.01	75.70	67.94	59.49	58.64	59.58	59.49	58.34
	Grace period	47.21	19.27	15.05	10.38	22.39	30.38	36.19	37.21	37.58	36.31	32.11
Quality assurance	Does not meet	5.28	4.69	3.52	2.66	4.02	2.14	2.26	2.41	2.58	3.07	3.81
	Qualified	67.87	70.18	71.16	75.23	72.66	73.38	75.33	75.54	73.72	74.35	76.09
	Grace period	26.86	25.12	25.32	22.11	23.33	24.48	22.41	22.05	23.70	22.58	20.10
Science and technology management	Does not meet	31.58	7.26	4.32	2.92	1.99	1.50	2.50	2.19	2.27	2.99	5.03
	Qualified	32.07	69.19	73.97	75.62	73.90	75.32	76.33	75.51	73.08	70.30	68.08
	Grace period	36.35	23.55	21.72	21.46	24.11	23.18	21.17	22.30	24.65	26.71	26.88
Business—financial management	Does not meet	8.00	9.41	9.89	5.85	4.27	2.60	2.86	3.13	2.84	3.50	4.87
	Qualified	41.70	50.95	60.49	69.26	70.92	71.72	70.70	68.14	64.20	61.89	61.29
	Grace period	50.30	39.64	29.62	24.89	24.81	25.69	26.44	28.73	32.96	34.60	33.84
Life-cycle logistics	Does not meet	7.08	7.07	5.46	3.34	2.54	2.23	2.01	1.89	1.40	2.09	2.79
	Qualified	50.94	63.00	72.63	76.07	72.87	74.64	78.76	76.31	73.94	73.36	71.57
	Grace period	41.98	29.93	21.91	20.59	24.59	23.13	19.23	21.8	24.66	24.55	25.64

Table A.1—Continued

Career Field	Career-Level Attainment	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Business—cost estimating	Does not meet	9.54	12.88	14.97	7.42	5.97	5.16	4.28	3.81	3.35	2.44	3.23
	Qualified	12.59	34.26	44.92	55.50	57.87	59.27	62.70	61.26	59.85	60.62	58.83
	Grace period	77.87	52.86	40.11	37.08	36.17	35.56	33.02	34.93	36.80	36.93	37.94
Information technology	Does not meet	7.53	8.69	7.94	6.26	4.62	4.92	4.19	3.15	3.15	4.13	5.60
	Qualified	39.39	48.06	60.95	70.07	64.47	63.26	67.06	63.41	61.17	59.92	60.15
	Grace period	53.08	43.26	31.11	23.67	30.91	31.83	28.75	33.44	35.69	35.95	34.25
Engineering	Does not meet	3.97	4.22	3.81	2.45	2.29	1.39	1.35	1.29	0.95	0.97	1.48
	Qualified	66.54	75.55	80.96	83.82	81.27	80.48	82.75	80.29	78.41	77.66	76.74
	Grace period	29.49	20.23	15.24	13.73	16.43	18.13	15.89	18.42	20.64	21.37	21.78
Test and evaluation	Does not meet	3.61	3.91	5.63	4.41	4.83	4.00	3.57	3.43	3.41	2.95	3.30
	Qualified	59.78	69.68	73.01	74.41	71.78	70.96	71.85	69.67	65.92	65.84	62.92
	Grace period	36.61	26.41	21.36	21.18	23.39	25.04	24.58	26.90	30.67	31.21	33.78
Auditing	Does not meet	0.19	0.31	0.11	0.00	0.12	0.25	0.17	0.27	0.45	1.35	1.87
	Qualified	73.46	74.08	76.09	83.43	84.31	91.89	81.80	77.50	79.57	82.06	81.09
	Grace period	26.35	25.61	23.79	16.57	15.57	7.86	18.02	22.23	19.98	16.58	17.04

TABLE A.2**Career-Level Attainment Status of the Overall AW (percentage), by Career Field and Fiscal Year: Measuring Eligibility with CF + CL**

Career Field	Career-Level Attainment	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AW overall	Does not meet	9.58	8.95	6.67	4.17	3.56	2.98	2.97	2.66	2.44	3.91	6.51
	Qualified	60.38	69.05	74.75	78.79	76.19	75.52	76.41	74.69	72.41	71.66	70.46
	Grace period	30.04	22.00	18.58	17.04	20.25	21.50	20.62	22.65	25.15	24.43	23.03
Program management	Does not meet	8.91	8.75	7.20	5.38	4.63	4.94	4.50	3.92	4.02	5.59	7.90
	Qualified	58.33	66.16	71.45	75.24	73.15	71.59	72.49	71.22	68.18	65.68	63.43
	Grace period	32.77	25.09	21.34	19.38	22.21	23.48	23.01	24.86	27.80	28.73	28.68
Contracting	Does not meet	5.98	5.72	5.40	3.20	2.86	2.21	2.41	2.20	1.58	2.31	4.31
	Qualified	71.76	74.81	77.05	80.79	80.02	78.77	79.38	79.34	77.03	76.94	75.30
	Grace period	22.26	19.47	17.54	16.02	17.12	19.02	18.21	18.46	21.39	20.75	20.39
Industrial and contract property management	Does not meet	7.11	8.82	7.34	6.25	6.99	3.79	4.11	1.03	1.86	3.59	5.10
	Qualified	68.62	72.62	78.99	79.95	71.50	71.97	74.29	78.55	66.43	64.59	72.09
	Grace period	24.27	18.55	13.67	13.80	21.50	24.24	21.59	20.41	31.70	31.82	22.82
Purchasing	Does not meet	14.96	11.46	10.40	8.84	7.82	5.51	4.88	3.29	3.10	4.67	8.12
	Qualified	53.66	55.42	66.37	70.04	57.45	51.78	59.93	71.66	63.82	65.55	61.25
	Grace period	31.38	33.13	23.23	21.12	34.73	42.71	35.19	25.04	33.08	29.78	30.63

Table A.2—Continued

Career Field	Career-Level Attainment	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Facilities engineering	Does not meet	14.95	10.58	7.22	3.75	2.21	1.53	2.04	3.16	3.18	5.97	13.54
	Qualified	45.97	67.39	81.2	88.01	75.7	67.94	59.49	58.64	59.58	59.49	58.34
	Grace period	39.09	22.03	11.58	8.24	22.09	30.53	38.47	38.20	37.23	34.54	28.12
Quality assurance	Does not meet	8.77	6.80	6.22	4.58	5.65	3.21	3.62	3.34	3.34	4.45	6.61
	Qualified	67.87	70.18	71.16	75.23	72.66	73.38	75.33	75.54	73.72	74.35	76.09
	Grace period	23.36	23.02	22.62	20.19	21.70	23.41	21.05	21.12	22.95	21.20	17.29
Science and technology management	Does not meet	3.37	6.81	3.07	2.36	2.02	1.58	2.19	2.32	2.53	3.37	6.26
	Qualified	32.07	69.19	73.97	75.62	73.90	75.32	76.33	75.51	73.08	70.30	68.08
	Grace period	64.56	23.99	22.96	22.02	24.09	23.10	21.47	22.17	24.39	26.34	25.66
Business—financial management	Does not meet	18.74	19.53	16.45	8.59	5.77	4.47	5.57	4.86	4.87	8.21	10.96
	Qualified	41.70	50.95	60.49	69.26	70.92	71.72	70.70	68.14	64.20	61.89	61.29
	Grace period	39.56	29.52	23.06	22.16	23.31	23.82	23.73	27.00	30.93	29.89	27.75
Life-cycle logistics	Does not meet	14.92	13.08	8.89	4.73	3.25	3.11	2.71	2.42	1.94	3.61	5.49
	Qualified	50.94	63.00	72.63	76.07	72.87	74.64	78.76	76.31	73.94	73.36	71.57
	Grace period	34.14	23.92	18.48	19.20	23.88	22.25	18.53	21.27	24.13	23.03	22.95
Business—cost estimating	Does not meet	0.00	21.46	18.64	11.54	9.25	9.96	7.85	7.48	6.30	8.35	12.47
	Qualified	12.59	34.26	44.92	55.50	57.87	59.27	62.70	61.26	59.85	60.62	58.83
	Grace period	87.41	44.28	36.44	32.95	32.89	30.76	29.46	31.25	33.85	31.03	28.71
Information technology	Does not meet	15.46	15.96	10.94	7.11	5.91	5.33	5.17	4.02	3.23	5.71	10.05
	Qualified	39.39	48.06	60.95	70.07	64.47	63.26	67.06	63.41	61.17	59.92	60.15
	Grace period	45.15	35.98	28.10	22.82	29.62	31.42	27.77	32.56	35.60	34.36	29.80
Engineering	Does not meet	8.37	7.56	4.06	2.91	2.52	2.03	1.81	1.44	1.21	2.39	4.21
	Qualified	66.54	75.55	80.96	83.82	81.27	80.48	82.75	80.29	78.41	77.66	76.74
	Grace period	25.09	16.89	14.98	13.28	16.20	17.49	15.44	18.27	20.38	19.95	19.05
Test and evaluation	Does not meet	10.35	8.18	6.19	5.16	5.39	4.54	4.73	4.17	4.17	5.05	7.40
	Qualified	59.78	69.68	73.01	74.41	71.78	70.96	71.85	69.67	65.92	65.84	62.92
	Grace period	29.87	22.14	20.80	20.43	22.83	24.50	23.43	26.16	29.91	29.11	29.68
Auditing	Does not meet	1.56	3.35	7.08	1.14	0.58	0.43	1.31	0.85	1.84	2.76	4.32
	Qualified	73.46	74.08	76.09	83.43	84.31	91.89	81.80	77.50	79.57	82.06	81.09
	Grace period	24.98	22.56	16.82	15.43	15.10	7.68	16.88	21.65	18.59	15.18	14.59

TABLE A.3
Career-Level Attainment Status of the Military AW (percentage), by Career Field and Fiscal Year: Measuring Eligibility with Position Number

Career Field	Career-Level Attainment	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AW overall	Does not meet	6.30	5.47	5.90	3.90	4.17	4.13	3.84	4.13	3.87	4.51	5.41
	Qualified	45.54	52.20	52.73	57.17	59.44	58.58	57.98	58.05	57.18	55.98	51.86
	Grace period	48.16	42.34	41.37	38.92	36.39	37.29	38.18	37.82	38.94	39.50	42.73
Program management	Does not meet	4.23	4.24	3.79	2.01	2.51	3.17	2.91	2.87	3.40	4.01	4.32
	Qualified	59.59	64.53	64.81	67.52	65.42	62.61	61.51	61.60	60.50	59.55	54.71
	Grace period	36.18	31.23	31.41	30.48	32.07	34.22	35.59	35.53	36.09	36.44	40.97
Contracting	Does not meet	3.85	4.71	8.51	5.59	4.84	4.07	2.85	2.30	1.61	1.94	2.52
	Qualified	50.96	50.31	52.29	62.15	71.47	74.51	75.32	74.08	73.43	71.08	68.73
	Grace period	45.19	44.98	39.20	32.26	23.70	21.43	21.83	23.61	24.96	26.98	28.76
Quality assurance	Does not meet	6.97	5.84	5.82	3.50	3.03	3.88	2.96	4.26	4.75	4.81	5.39
	Qualified	51.97	52.76	47.80	51.82	55.41	54.17	55.01	56.39	58.24	60.54	57.68
	Grace period	41.06	41.40	46.38	44.68	41.56	41.95	42.03	39.35	37.01	34.65	36.93
Science and technology management	Does not meet	16.86	6.32	2.38	2.72	2.98	3.16	3.71	3.02	3.75	5.05	11.51
	Qualified	17.62	48.08	44.28	47.49	46.56	47.45	45.48	46.77	50.26	47.47	39.88
	Grace period	65.52	45.59	53.35	49.79	50.46	49.39	50.81	50.22	46.00	47.47	48.61
Business—financial management	Does not meet	9.62	10.64	7.48	6.25	9.58	7.55	12.80	9.80	8.50	5.03	12.82
	Qualified	19.23	20.57	18.37	22.92	19.16	19.50	21.34	26.80	24.84	26.42	15.38
	Grace period	71.15	68.79	74.15	70.83	71.26	72.96	65.85	63.40	66.67	68.55	71.79
Life-cycle logistics	Does not meet	13.47	10.41	9.55	5.99	5.37	5.22	5.20	8.43	7.25	9.67	11.62
	Qualified	17.34	30.82	29.70	30.32	33.94	29.88	30.62	33.8	31.30	29.27	27.38
	Grace period	69.19	58.78	60.76	63.69	60.69	64.90	64.18	57.77	61.45	61.05	61.01
Business—cost estimating	Does not meet	11.32	9.52	18.18	10.00	8.62	5.17	7.25	16.39	4.84	7.55	12.00
	Qualified	0.00	15.87	13.64	26.00	13.79	3.45	10.14	9.84	17.74	13.21	12.00
	Grace period	88.68	74.60	68.18	64.00	77.59	91.38	82.61	73.77	77.42	79.25	76.00
Information technology	Does not meet	11.70	8.40	12.03	7.58	8.96	6.99	10.05	17.28	8.49	12.08	18.34
	Qualified	10.19	13.20	11.20	18.01	15.92	13.54	16.89	14.14	21.70	17.87	13.02
	Grace period	78.11	78.40	76.76	74.41	75.12	79.48	73.06	68.59	69.81	70.05	68.64
Engineering	Does not meet	6.01	4.06	2.28	2.13	2.42	2.41	2.88	3.95	3.00	4.28	4.63
	Qualified	44.89	56.98	59.22	60.93	59.73	60.76	58.94	58.23	56.96	55.51	46.93
	Grace period	49.10	38.96	38.50	36.94	37.85	36.83	38.18	37.82	40.04	40.22	48.45
Test and evaluation	Does not meet	8.48	7.89	6.06	4.44	7.04	7.13	7.31	6.79	7.36	7.23	7.63
	Qualified	33.35	43.09	41.72	41.88	40.69	40.54	38.84	41.14	39.63	39.04	34.92
	Grace period	58.17	49.03	52.22	53.69	52.27	52.34	53.85	52.07	53.00	53.73	57.46

TABLE A.4
Career-Level Attainment Status of the Military AW (percentage), by Career Field and Fiscal Year: Measuring Eligibility with CF + CL

Career Field	Career-Level Attainment	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AW overall	Does not meet	10.40	8.30	7.98	4.95	5.34	5.60	5.27	5.73	5.33	6.45	7.64
	Qualified	45.54	52.20	52.73	57.17	59.44	58.58	57.98	58.05	57.18	55.98	51.86
	Grace period	44.06	39.51	39.30	37.88	35.22	35.83	36.75	36.22	37.49	37.57	40.49
Program management	Does not meet	6.73	6.09	4.97	3.13	3.64	4.41	4.20	4.20	4.84	6.33	7.15
	Qualified	59.59	64.53	64.81	67.52	65.42	62.61	61.51	61.60	60.50	59.55	54.71
	Grace period	33.68	29.38	30.22	29.35	30.94	32.98	34.29	34.20	34.66	34.12	38.14
Contracting	Does not meet	13.50	10.25	12.04	6.46	5.96	6.05	4.14	4.56	3.34	3.41	4.28
	Qualified	50.96	50.31	52.29	62.15	71.47	74.51	75.32	74.08	73.43	71.08	68.73
	Grace period	35.54	39.44	35.67	31.39	22.58	19.45	20.54	21.36	23.23	25.50	27.00
Quality assurance	Does not meet	8.48	7.79	7.08	3.95	4.30	4.60	3.95	4.97	5.87	5.52	5.81
	Qualified	51.97	52.76	47.80	51.82	55.41	54.17	55.01	56.39	58.24	60.54	57.68
	Grace period	39.55	39.45	45.13	44.22	40.29	41.24	41.04	38.64	35.89	33.95	36.51
Science and technology management	Does not meet	1.92	1.34	2.16	2.93	2.52	2.92	3.94	4.09	3.92	5.78	9.72
	Qualified	17.62	48.08	44.28	47.49	46.56	47.45	45.48	46.77	50.26	47.47	39.88
	Grace period	80.46	50.57	53.56	49.58	50.92	49.64	50.58	49.14	45.83	46.75	50.40
Business—financial management	Does not meet	12.18	16.31	14.97	9.72	13.17	8.81	15.85	14.38	11.76	8.18	14.74
	Qualified	19.23	20.57	18.37	22.92	19.16	19.50	21.34	26.80	24.84	26.42	15.38
	Grace period	68.59	63.12	66.67	67.36	67.66	71.70	62.80	58.82	63.40	65.41	69.87
Life-cycle logistics	Does not meet	15.77	13.27	11.12	7.16	6.79	6.21	6.12	9.75	9.05	11.26	13.16
	Qualified	17.34	30.82	29.70	30.32	33.94	29.88	30.62	33.80	31.30	29.27	27.38
	Grace period	66.88	55.92	59.18	62.51	59.27	63.91	63.26	56.45	59.66	59.47	59.46
Business—cost estimating	Does not meet	0.00	6.35	16.67	14.00	6.90	8.62	8.70	22.95	12.90	18.87	22.00
	Qualified	0.00	15.87	13.64	26.00	13.79	3.45	10.14	9.84	17.74	13.21	12.00
	Grace period	100.00	77.78	69.70	60.00	79.31	87.93	81.16	67.21	69.35	67.92	66.00
Information technology	Does not meet	15.47	10.40	14.94	11.85	14.43	8.30	12.33	19.37	8.96	14.98	18.93
	Qualified	10.19	13.20	11.20	18.01	15.92	13.54	16.89	14.14	21.70	17.87	13.02
	Grace period	74.34	76.40	73.86	70.14	69.65	78.17	70.78	66.49	69.34	67.15	68.05
Engineering	Does not meet	10.21	6.06	3.73	3.07	3.36	3.98	4.13	4.35	4.23	6.30	8.03
	Qualified	44.89	56.98	59.22	60.93	59.73	60.76	58.94	58.23	56.96	55.51	46.93
	Grace period	44.89	36.95	37.05	35.99	36.92	35.27	36.94	37.42	38.81	38.19	45.05
Test and evaluation	Does not meet	12.69	10.34	7.96	5.53	8.27	8.78	10.12	8.80	8.50	9.72	10.73
	Qualified	33.35	43.09	41.72	41.88	40.69	40.54	38.84	41.14	39.63	39.04	34.92
	Grace period	53.96	46.57	50.32	52.59	51.05	50.68	51.04	50.05	51.87	51.24	54.35

TABLE A.5
Career-Level Attainment Status of the Civilian AW (percentage), by Career Field and Fiscal Year: Measuring Eligibility with Position Number

Career Field	Career-Level Attainment	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AW overall	Does not meet	4.70	5.03	4.24	2.90	2.66	1.96	2.05	1.89	1.58	1.94	3.10
	Qualified	62.01	70.91	77.26	81.25	77.98	77.28	78.27	76.28	73.83	73.06	72.10
	Grace period	33.29	24.06	18.50	15.86	19.37	20.76	19.68	21.83	24.59	25.01	24.79
Program management	Does not meet	2.79	3.87	5.71	5.12	4.41	3.99	3.54	3.31	2.87	2.97	4.60
	Qualified	57.82	66.82	74.23	78.33	75.99	74.86	76.60	74.73	70.90	67.77	66.34
	Grace period	39.39	29.30	20.06	16.55	19.60	21.15	19.86	21.96	26.24	29.27	29.06
Contracting	Does not meet	1.32	1.83	1.41	1.07	1.18	0.76	1.03	0.79	0.54	0.64	1.30
	Qualified	75.02	78.93	81.57	84.35	81.63	79.52	80.05	80.15	77.57	77.78	76.23
	Grace period	23.66	19.24	17.02	14.58	17.18	19.71	18.92	19.06	21.89	21.57	22.46
Industrial and contract property management	Does not meet	4.61	6.33	3.80	2.86	4.15	2.78	1.80	1.03	1.40	2.15	1.94
	Qualified	68.76	72.62	78.99	79.95	71.50	71.97	74.29	78.55	66.43	64.59	72.09
	Grace period	26.62	21.04	17.22	17.19	24.35	25.25	23.91	20.41	32.17	33.25	25.97
Purchasing	Does not meet	9.76	10.37	7.42	5.92	6.67	4.61	4.46	4.12	2.51	3.00	5.17
	Qualified	53.66	55.46	66.37	70.04	57.45	51.78	59.93	71.66	63.82	65.55	61.31
	Grace period	36.59	34.17	26.21	24.03	35.88	43.61	35.61	24.22	33.67	31.45	33.52
Facilities engineering	Does not meet	6.83	13.35	3.75	1.62	1.91	1.68	4.32	4.15	2.84	4.20	9.54
	Qualified	45.97	67.39	81.20	88.01	75.73	67.98	59.51	58.66	59.60	59.49	58.35
	Grace period	47.20	19.27	15.05	10.38	22.36	30.34	36.17	37.19	37.56	36.30	32.11
Quality assurance	Does not meet	5.15	4.61	3.36	2.60	4.09	2.02	2.21	2.28	2.44	2.95	3.70
	Qualified	69.05	71.41	72.82	76.95	73.84	74.74	76.81	76.86	74.75	75.27	77.38
	Grace period	25.80	23.98	23.82	20.45	22.07	23.24	20.99	20.86	22.81	21.78	18.92
Science and technology management	Does not meet	34.61	7.44	4.64	2.95	1.86	1.29	2.35	2.08	2.03	2.68	4.18
	Qualified	35.04	73.38	78.83	80.23	77.58	78.69	80.19	79.31	76.76	73.69	71.82
	Grace period	30.35	19.18	16.53	16.82	20.56	20.01	17.46	18.61	21.21	23.62	24.01
Business—financial management	Does not meet	7.96	9.38	9.95	5.84	4.12	2.47	2.60	2.98	2.72	3.47	4.70
	Qualified	42.21	51.60	61.47	70.37	72.35	73.07	71.99	69.09	65.06	62.68	62.26
	Grace period	49.82	39.01	28.58	23.78	23.53	24.46	25.41	27.94	32.22	33.86	33.04
Life-cycle logistics	Does not meet	6.65	6.87	5.21	3.18	2.39	2.03	1.81	1.49	1.04	1.65	2.29
	Qualified	53.19	64.93	75.17	78.87	74.99	77.54	81.83	78.92	76.51	75.90	74.11
	Grace period	40.16	28.2	19.61	17.94	22.62	20.43	16.36	19.59	22.44	22.44	23.60

Table A.5—Continued

Career Field	Career-Level Attainment	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Business—cost estimating	Does not meet	9.46	13.05	14.80	7.31	5.85	5.16	4.13	3.26	3.29	2.25	2.93
	Qualified	13.15	35.23	46.58	56.68	59.86	61.73	65.42	63.53	61.68	62.39	60.46
	Grace period	77.39	51.72	38.62	36.01	34.29	33.11	30.46	33.21	35.03	35.35	36.61
Information technology	Does not meet	7.32	8.70	7.76	6.21	4.48	4.85	4.00	2.80	3.01	3.94	5.36
	Qualified	40.86	49.65	63.09	72.05	66.05	64.99	68.65	64.65	62.18	60.92	61.05
	Grace period	51.82	41.66	29.15	21.74	29.47	30.17	27.35	32.55	34.81	35.14	33.60
Engineering	Does not meet	3.87	4.23	3.88	2.47	2.29	1.36	1.30	1.20	0.88	0.87	1.38
	Qualified	67.59	76.49	81.99	84.85	82.15	81.22	83.63	81.05	79.11	78.33	77.63
	Grace period	28.54	19.28	14.13	12.68	15.56	17.42	15.08	17.75	20.01	20.80	20.99
Test and evaluation	Does not meet	2.36	2.89	5.52	4.40	4.29	3.22	2.62	2.55	2.39	1.91	2.27
	Qualified	66.62	76.56	80.95	82.70	79.46	78.61	80.28	77.18	72.68	72.33	69.62
	Grace period	31.03	20.55	13.53	12.90	16.25	18.17	17.10	20.28	24.93	25.76	28.12
Auditing	Does not meet	0.19	0.31	0.11	0.00	0.12	0.25	0.17	0.27	0.45	1.35	1.87
	Qualified	73.46	74.08	76.09	83.43	84.31	91.89	81.82	77.50	79.57	82.06	81.09
	Grace period	26.35	25.61	23.79	16.57	15.57	7.86	18.00	22.23	19.98	16.58	17.04

**TABLE A.6
Career-Level Attainment Status of the Civilian AW (percentage), by Career Field and Fiscal Year: Measuring Eligibility with CF + CL**

Career Field	Career-Level Attainment	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AW overall	Does not meet	9.49	9.03	6.52	4.08	3.37	2.71	2.74	2.36	2.17	3.68	6.41
	Qualified	62.01	70.91	77.26	81.25	77.98	77.28	78.27	76.28	73.83	73.06	72.10
	Grace period	28.50	20.06	16.22	14.67	18.66	20.01	18.99	21.35	24.00	23.27	21.49
Program management	Does not meet	9.78	9.83	8.13	6.27	5.00	5.13	4.61	3.82	3.74	5.34	8.14
	Qualified	57.82	66.82	74.23	78.33	75.99	74.86	76.60	74.73	70.90	67.77	66.34
	Grace period	32.40	23.35	17.64	15.40	19.01	20.01	18.79	21.45	25.37	26.89	25.52
Contracting	Does not meet	4.80	4.96	4.19	2.57	2.27	1.53	2.12	1.83	1.32	2.15	4.32
	Qualified	75.02	78.93	81.57	84.35	81.63	79.52	80.05	80.15	77.57	77.78	76.23
	Grace period	20.18	16.11	14.24	13.08	16.09	18.94	17.83	18.02	21.11	20.06	19.45
Industrial and contract property management	Does not meet	7.13	8.82	7.34	6.25	6.99	3.79	4.11	1.03	1.86	3.59	5.10
	Qualified	68.76	72.62	78.99	79.95	71.50	71.97	74.29	78.55	66.43	64.59	72.09
	Grace period	24.11	18.55	13.67	13.80	21.50	24.24	21.59	20.41	31.70	31.82	22.82

Supplementary Tables

Career Field	Career-Level Attainment	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Purchasing	Does not meet	14.96	11.47	10.40	8.84	7.82	5.51	4.88	3.29	3.10	4.67	8.13
	Qualified	53.66	55.46	66.37	70.04	57.45	51.78	59.93	71.66	63.82	65.55	61.31
	Grace period	31.38	33.07	23.23	21.12	34.73	42.71	35.19	25.04	33.08	29.78	30.56
Facilities engineering	Does not meet	14.95	10.58	7.22	3.75	2.21	1.53	2.04	3.16	3.18	5.97	13.54
	Qualified	45.97	67.39	81.20	88.01	75.73	67.98	59.51	58.66	59.60	59.49	58.35
	Grace period	39.08	22.03	11.58	8.24	22.06	30.49	38.45	38.19	37.22	34.53	28.12
Quality assurance	Does not meet	8.79	6.73	6.16	4.63	5.74	3.11	3.59	3.22	3.17	4.38	6.67
	Qualified	69.05	71.41	72.82	76.95	73.84	74.74	76.81	76.86	74.75	75.27	77.38
	Grace period	22.16	21.87	21.02	18.42	20.42	22.14	19.60	19.92	22.08	20.35	15.95
Science and technology management	Does not meet	3.67	7.90	3.22	2.26	1.95	1.41	1.97	2.08	2.31	3.01	5.81
	Qualified	35.04	73.38	78.83	80.23	77.58	78.69	80.19	79.31	76.76	73.69	71.82
	Grace period	61.29	18.72	17.95	17.50	20.47	19.89	17.84	18.61	20.94	23.30	22.38
Business—financial management	Does not meet	18.90	19.60	16.49	8.56	5.57	4.36	5.30	4.64	4.72	8.21	10.88
	Qualified	42.21	51.60	61.47	70.37	72.35	73.07	71.99	69.09	65.06	62.68	62.26
	Grace period	38.89	28.80	22.04	21.07	22.08	22.58	22.71	26.28	30.22	29.11	26.86
Life-cycle logistics	Does not meet	14.86	13.07	8.76	4.58	3.06	2.91	2.49	1.97	1.51	3.17	5.04
	Qualified	53.19	64.93	75.17	78.87	74.99	77.54	81.83	78.92	76.51	75.90	74.11
	Grace period	31.94	22.00	16.07	16.54	21.95	19.55	15.68	19.11	21.98	20.93	20.85
Business—cost estimating	Does not meet	0.00	22.26	18.74	11.45	9.35	10.02	7.80	6.80	6.01	7.96	12.13
	Qualified	13.15	35.23	46.58	56.68	59.86	61.73	65.42	63.53	61.68	62.39	60.46
	Grace period	86.85	42.51	34.67	31.88	30.79	28.25	26.78	29.67	32.31	29.65	27.41
Information technology	Does not meet	15.46	16.21	10.77	6.93	5.63	5.23	4.95	3.64	3.08	5.49	9.88
	Qualified	40.86	49.65	63.09	72.05	66.05	64.99	68.65	64.65	62.18	60.92	61.05
	Grace period	43.68	34.14	26.14	21.02	28.32	29.79	26.40	31.71	34.74	33.59	29.08
Engineering	Does not meet	8.28	7.64	4.08	2.90	2.49	1.96	1.72	1.34	1.12	2.27	4.09
	Qualified	67.59	76.49	81.99	84.85	82.15	81.22	83.63	81.05	79.11	78.33	77.63
	Grace period	24.13	15.88	13.93	12.25	15.36	16.82	14.65	17.60	19.77	19.40	18.28
Test and evaluation	Does not meet	9.75	7.62	5.74	5.06	4.68	3.47	3.35	2.95	3.06	3.92	6.60
	Qualified	66.62	76.56	80.95	82.70	79.46	78.61	80.28	77.18	72.68	72.33	69.62
	Grace period	23.63	15.82	13.31	12.24	15.86	17.91	16.37	19.88	24.26	23.75	23.78
Auditing	Does not meet	1.56	3.35	7.08	1.14	0.58	0.43	1.31	0.85	1.84	2.76	4.32
	Qualified	73.46	74.08	76.09	83.43	84.31	91.89	81.82	77.50	79.57	82.06	81.09
	Grace period	24.98	22.56	16.82	15.43	15.10	7.68	16.86	21.65	18.59	15.18	14.59

Supplementary Figures

In Appendix B, we provide supplementary figures detailing workforce demographic trends for the civilian and military AWs by career field from FY 2011 to FY 2021 based on workforce data provided by DMDC.

Figure B.1 depicts the race/ethnicity distribution of the civilian AW by career field from FY 2011 to FY 2021. Figure B.2 shows the age distribution of the civilian AW by career field from FY 2011 to FY 2021. Figures B.3, B.4, and B.5 show the race/ethnicity, gender, and age distributions (respectively) of the military AW by career field from FY 2011 to FY 2021.

FIGURE B.1
Race/Ethnicity Distribution of the Civilian Acquisition Workforce, by Career Field,
FYs 2011 to 2021

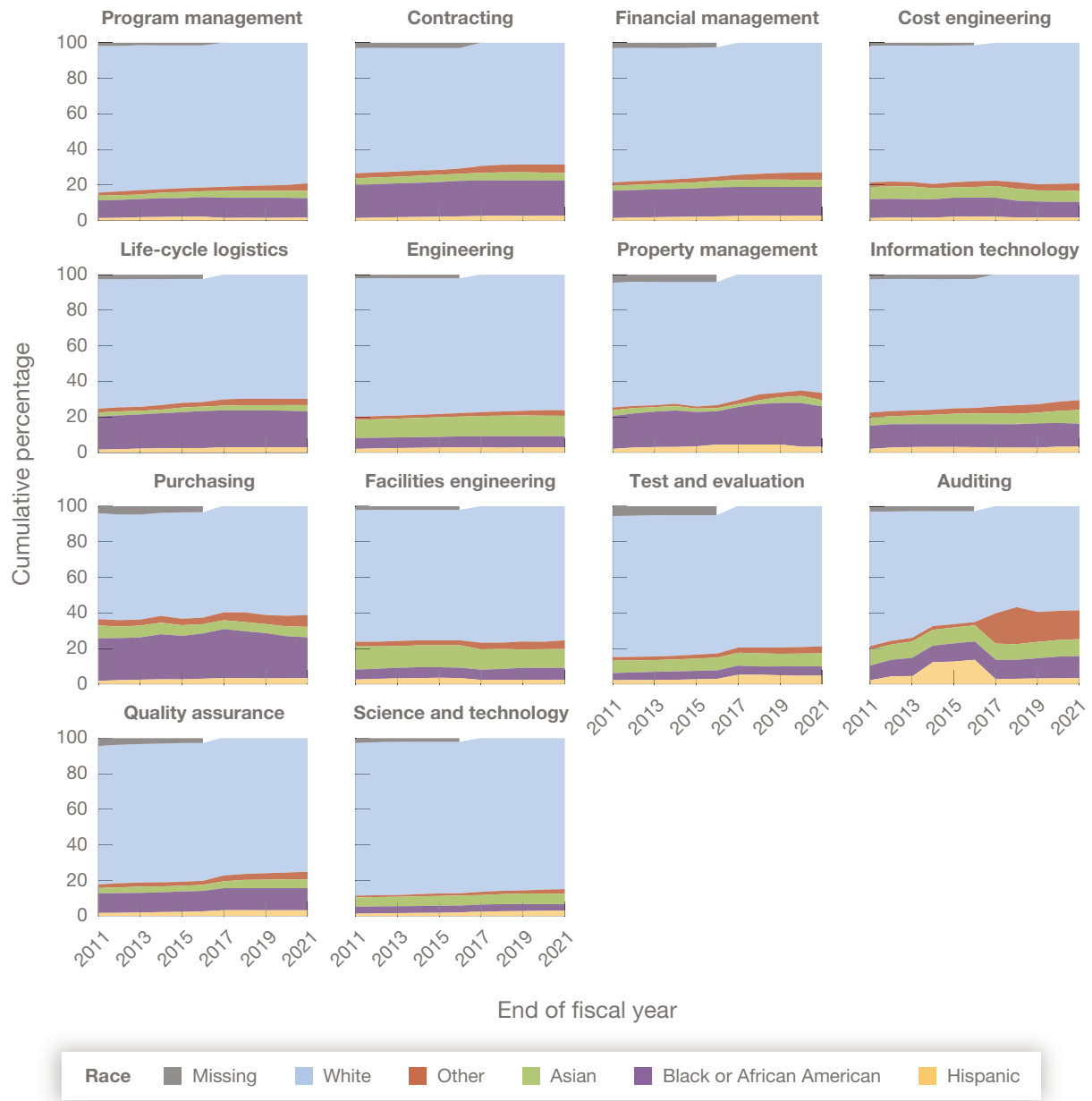


FIGURE B.2
Age Distribution of the Civilian Acquisition Workforce, by Career Field, FYs 2011 to 2021

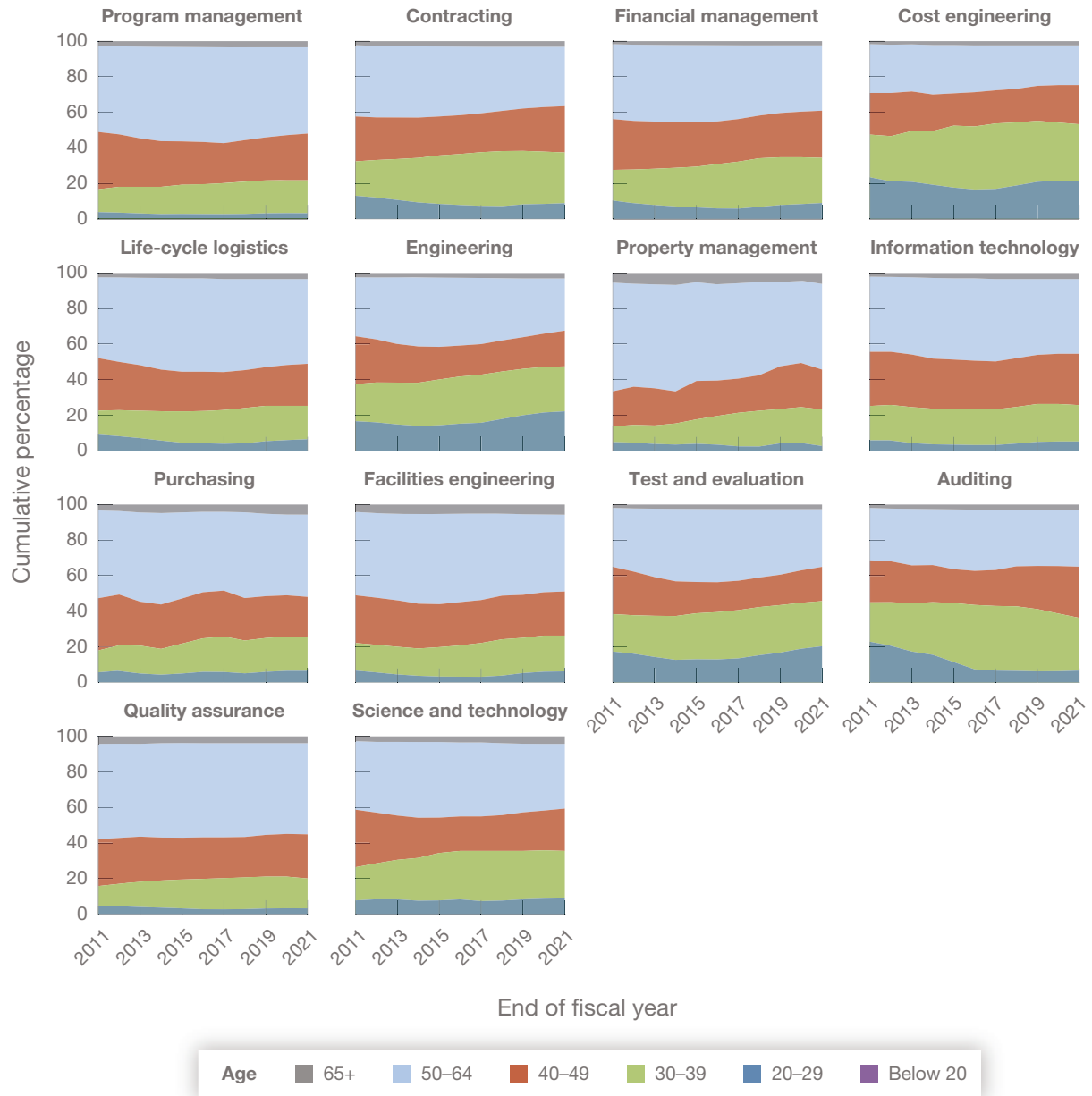


FIGURE B.3
Race/Ethnicity Distribution of the Military Acquisition Workforce, by Career Field, FYs 2011 to 2021

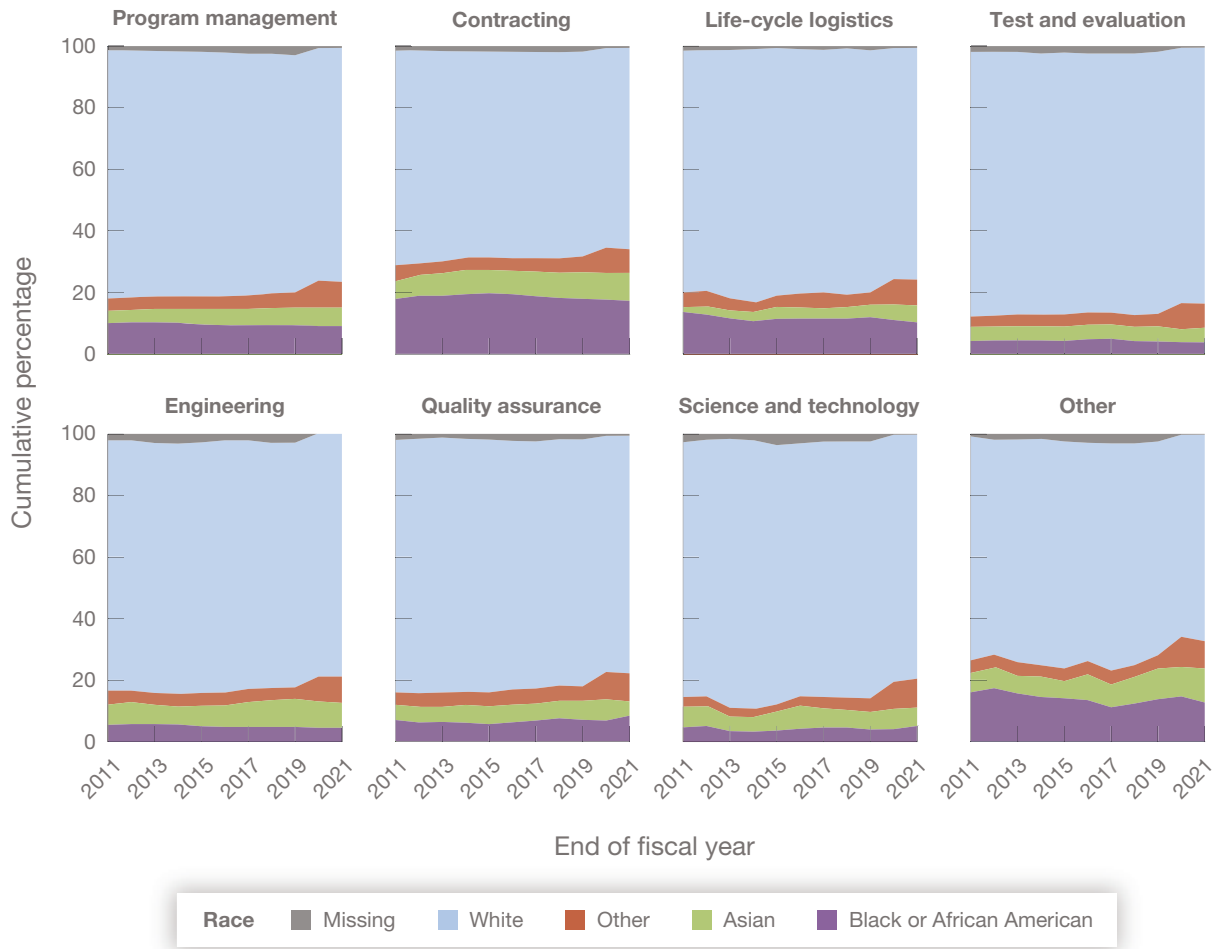


FIGURE B.4
Gender Distribution of the Military Acquisition Workforce, by Career Field, FYs 2011 to 2021

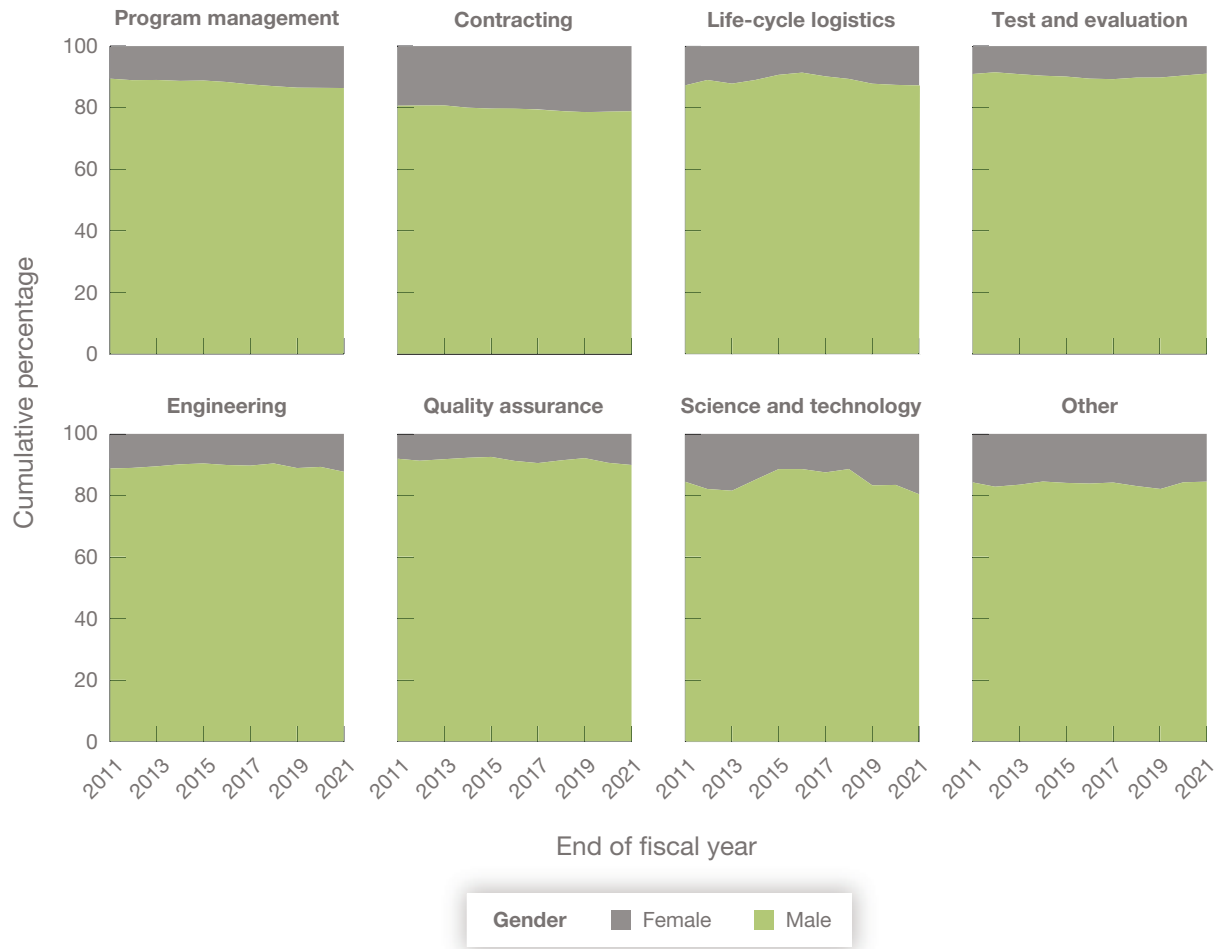
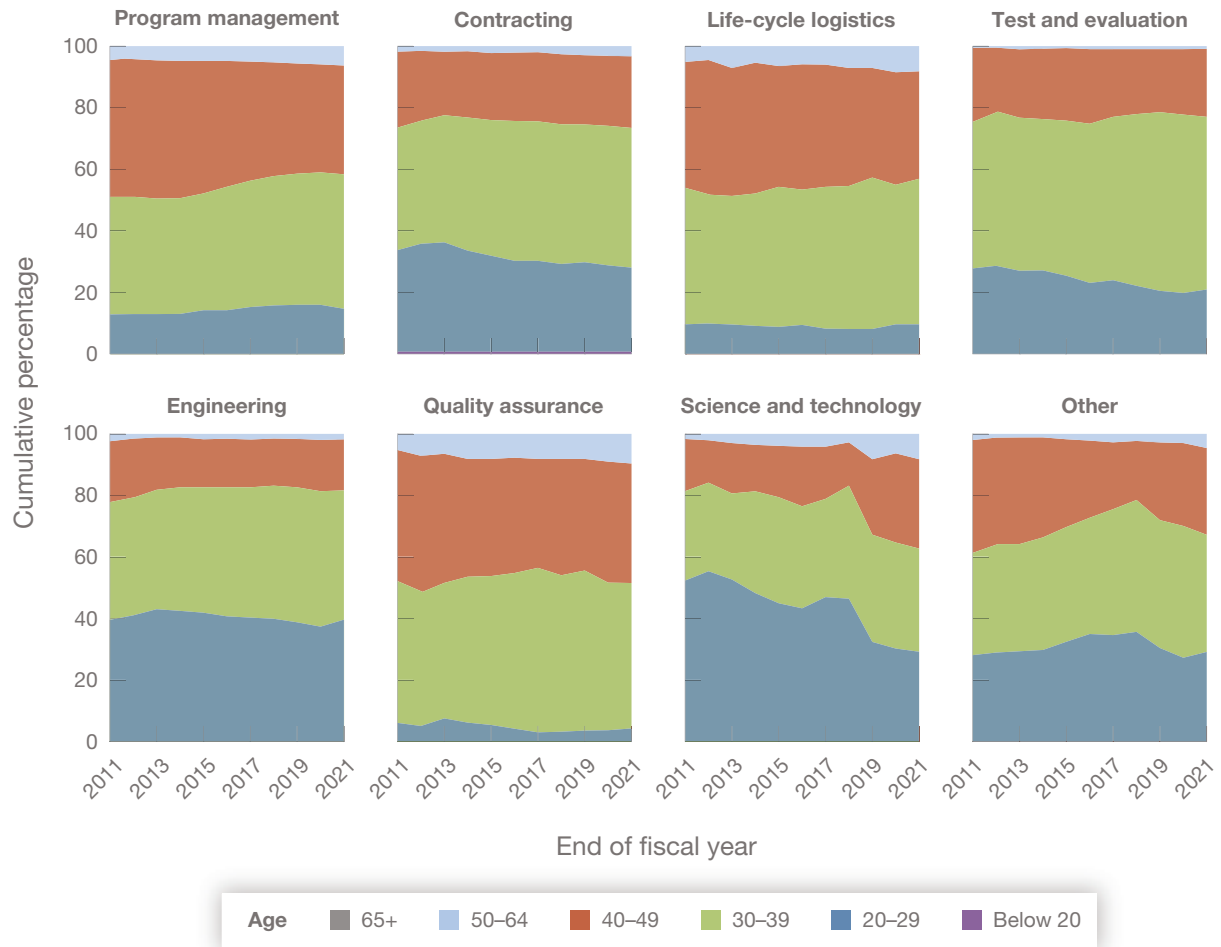


FIGURE B.5
Age Distribution of the Military Acquisition Workforce, by Career Field, FYs 2011 to 2021



Abbreviations

AW	acquisition workforce
BtB	Back to Basics
CF	career field
CL	career level
COVID-19	coronavirus disease 2019
CSRS	Civil Service Retirement System
DAWDF	Defense Acquisition Workforce Development Fund
DAWIA	Defense Acquisition Workforce Improvement Act
DMDC	Defense Manpower Data Center
DoD	U.S. Department of Defense
DoDI	Department of Defense Instruction
FERS	Federal Employees Retirement System
FY	fiscal year
GAO	U.S. Government Accountability Office
HCI	Office of Human Capital Initiatives
NDAA	National Defense Authorization Act
NDRI	RAND National Defense Research Institute
Q	quarter
RIM	RAND Inventory Model
USD(A&S)	Under Secretary of Defense for Acquisition and Sustainment
YORE	years relative to retirement eligibility

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