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Department of the Air Force Civilian Compensation and Benefits

How Five Mission Critical and Hard-to-Fill Occupations
Compare to the Private Sector and Key Federal Agencies



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Preface

This report provides an overview of civilian compensation and benefits in the federal government and identifies the constraints the U.S. Air Force must operate under in comparison with alternative compensation and benefit structures found in federal agencies and the private sector for critical skills or hard-to-fill occupations. The report focuses on five occupational series identified by the Air Force as mission critical or hard to fill: Aircraft Operations (GS-2181), Air Traffic Control (GS-2152), Human Resources Management (GS-0201), Information Technology Management (Cyber) (GS-2210), and Aircraft Mechanic (WG-8852). For each occupational series, the report provides an overview of current Air Force compensation and how that compares with compensation in other federal agencies and the private sector, as well as highlighting key compensation-related recruiting and retention issues. The report then concludes by providing recommendations on actions the Air Force can take to improve the competitiveness of its compensation and benefits packages in order to better recruit and retain top-tier civilian talent.

This report is intended primarily for policymakers responsible for civilian force management and compensation within the Air Force. The findings and recommendations may also be of interest to other military services, the U.S. Department of Defense (DoD), and the U.S. Office of Personnel Management.

This research was sponsored by the Air Force Directorate of Civilian Force Management (AF/A1C) and was conducted within the Manpower, Personnel, and Training Program of RAND Project AIR FORCE as part of a fiscal year 2019 project, “Civilian Compensation and Benefits.”

RAND Project AIR FORCE

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Summary

Issue

A critical tool in recruiting and retaining top-tier civilian talent for the U.S. Air Force is the compensation and benefits package offered. However, the Air Force currently has concerns regarding its ability to compete with private-sector compensation and benefits, particularly for hard-to-fill occupations and mission critical occupations (MCOs).

Approach

PAF conducted semistructured interviews with Air Force representatives and reviewed relevant policy, reports, and statutes to examine the constraints the Air Force must operate under in comparison with alternative compensation and benefit structures found in other federal agencies and the private sector. PAF then assessed differences between Air Force compensation and private-sector compensation at different levels of experience to determine where and to what extent significant compensation gaps exist for five select hard-to-fill occupations or MCOs: Aircraft Operations (GS-2181), Air Traffic Control (GS-2152), Human Resources Management (GS-0201), Information Technology Management (Cyber) (GS-2210), and Aircraft Mechanic (WG-8852). For certain occupations we also compared compensation at select relevant federal agencies (e.g., the Federal Aviation Administration is the main competitor for air traffic controllers, or ATCs).

Conclusions

- The Air Force has not yet developed internal standardized written procedures for determining MCOs.
- For several of the occupations in our review, current Office of Personnel Management (OPM) classification and/or qualification standards do not reflect the current operational environment or job demands.
- For several occupations, our analysis shows that current Air Force pay is significantly lower than that in the private sector. But there is often substantial variation between the state level and the locality pay area level, which needs to be taken into account when hiring in local labor markets.
- The use of recruitment, relocation, and retention incentives varies across installations, and use is dependent upon the availability of local base or activity funds.
- The Air Force's use of special salary rates is critical in trying to close the private-sector pay gap, but statutory pay caps hinder this approach.

- Job vacancy announcements often include boilerplate language, provide wide ranges of pay grades and associated salary levels (e.g., GS-1 to GS-15), and lack mission and culture statements.
- Air Force personnel covered by pay band systems have the potential to receive higher pay, and that may assist in recruiting and retaining mission critical personnel.

Recommendations

We outline potential actions the Air Force should explore in improving the recruitment and retention of civilians in the occupations considered in this study. Some of these initiatives are actions the Air Force can pursue directly. Other actions would require OPM or legislative changes, however, making them more difficult to achieve.

What the Air Force Can Approach on Its Own

- Develop a policy and approach for determining and addressing MCOs.
- Explore whether special salary rates need to be established or updated for MCOs and hard-to-fill occupations and localities.
- Establish Air Force–level data collection standards and an analysis plan for incentive use and examine the feasibility of establishing central funding for recruiting, retention, and relocation incentives and permanent change of station for MCOs and hard-to-fill occupations.
- Update vacancy announcements to ensure that they are more applicant friendly and provide more specific, accurate, and enticing information regarding compensation and benefits.
- Establish Air Force–wide communities of practice for recruiting and retaining MCOs and hard-to-fill occupations.
- Use Transition Assistance Programs to help fill jobs.

What Requires DoD Coordination

- Petition OPM to review classification and qualification standards and to update them as necessary to reflect current Air Force occupational requirements.

What Requires Legislation

- Explore the potential implications of raising the salary pay cap for aircraft operations and ATC positions, which require higher special salary rates.
- Pursue the ability of the Air Force to establish and use pay bands for MCOs or hard-to-fill occupations.

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Abbreviations

3Rs	recruitment, relocation, and retention
ACC	Air Combat Command
AcqDemo	Acquisition Workforce Personnel Demonstration Project
ACS	American Community Survey
AETC	Air Education and Training Command
AF/A1C	Air Force Directorate of Civilian Force Management
AFB	Air Force Base
AFGSC	Air Force Global Strike Command
AFMC	Air Force Materiel Command
AFPC	Air Force Personnel Center
AFR	Air Force Reserve
AFRC	Air Force Reserve Command
AFRL	Air Force Research Laboratory
AFSOC	Air Force Special Operations Command
AFSPC	Air Force Space Command
AMC	Air Mobility Command
ANG	Air National Guard
ATC	air traffic controller
BLS	Bureau of Labor Statistics
C.F.R.	Code of Federal Regulations
CHCOC	Chief Human Capital Officer Council
CPC	certified professional controller
DCPAS	Defense Civilian Personnel Advisory Service
DCPDS	Defense Civilian Personnel Data System
DoD	Department of Defense
ECI	Employment Cost Index

FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FDIC	Federal Deposit Insurance Corporation
FEHB	Federal Employees Health Benefits
FEPCA	Federal Employees Pay Comparability Act of 1990
FERS	Federal Employees Retirement System
FIRREA	Financial Institutions Reform, Recovery, and Enforcement Act of 1989
FPL	facility pay level
FSA	Flexible Spending Account
FSC	Federal Salary Council
FWS	Federal Wage System
FY	fiscal year
GAO	U.S. Government Accountability Office
GG	General Government
GS	General Schedule
HCOP	Human Capital Operating Plan
HR	human resources
IT	information technology
Lab Demo	DoD Science and Technologies Laboratory Demonstration Projects
LPA	locality pay area
MCO	mission critical occupation
MSA	Metropolitan Statistical Area
NASA	National Aeronautics and Space Administration
NCS	National Compensation Survey
NCUA	National Credit Union Association
NDAA	National Defense Authorization Act
OES	Occupational Employment Statistics
OPM	U.S. Office of Personnel Management
PAF	Project AIR FORCE

PCS	permanent change of station
SHRM	Society for Human Resource Management
SOC	Standard Occupational Classification
TSP	Thrift Savings Plan
USAF	U.S. Air Force
U.S.C.	United States Code

1. Introduction

As of 2019, the U.S. Department of the Air Force has approximately 200,000 civilian employees in support of its mission, with civilians working in 600 different Air Force occupations and professions. This includes approximately 170,000 appropriated fund civilians and more than 16,000 civilian employees who work in specialized research facilities and laboratories across 22 different locations throughout the United States (Air Force Civilian Service, undated). Air Force civilians work across 11 major commands, with more than 147,000 civilian employees (including 36,110 dual-status civilian/military technicians) who contribute to the major command missions.¹ Table 1.1 provides information on the Air Force major commands, their missions, the number of civilian employees, and the percentage of civilians within the overall workforce. In addition to the major commands, the Air Force also has three Direct Reporting Units with 2,519 civilian employees and other organizational units grouped together with 52,417 civilian employees (Air Force Association, 2018b).

Table 1.1. Civilians in Air Force Major Commands

Major Command	Mission	Number of Civilian Employees	Percentage of Civilians in the Command Workforce
Air Combat Command (ACC)	Primary force provider of combat airpower—fighter, conventional bomber, reconnaissance, battle management, and electronic combat aircraft—to combatant commands. Provide command, control, communications, and intelligence systems. Conduct global information operations.	10,748	12
Air Education and Training Command (AETC)	Recruit, train, and educate airmen through basic military training, initial and advanced technical training, and professional military education.	14,317	20
Air Force Global Strike Command (AFGSC)	Organize, train, equip, maintain, and provide intercontinental ballistic missile forces and long-range bomber forces to combatant commanders; provide installation mission support.	3,991	13
Air Force Materiel Command (AFMC)	Research, develop, procure, test, and sustain U.S. Air Force weapon systems.	61,652	78

¹ Dual-status civilian/military technicians are full-time civilian Air Force positions that also require membership in the Air Force Reserve (AFR) or the Air National Guard (ANG). These individuals work full-time as civilians during the week and then also serve the same unit in their capacity as reservists or National Guardsmen.

Major Command	Mission	Number of Civilian Employees	Percentage of Civilians in the Command Workforce
Air Force Reserve Command (AFRC)	Provide strike, air mobility, and special operations forces; rescue; aeromedical evacuation; aerial firefighting and spraying; weather reconnaissance; cyberspace operations; intelligence, surveillance, and reconnaissance; space operations; flying training; and other capabilities to support the active duty force and assist with domestic and foreign disaster relief.	12,519 (includes dual civilian/military technicians)	15
Air Force Space Command (AFSPC)	Organize, train, equip, maintain, and provide space and cyberspace operations forces. Develop, procure, and test space systems. Sustain national space launch facilities.	6,904	34
Air Force Special Operations Command (AFSOC)	Organize, train, equip, maintain, and provide special operations airpower forces to combatant commanders.	1,736	11
Air Mobility Command (AMC)	Organize, train, equip, maintain, and provide air mobility forces to sustain worldwide airpower operations.	7,723	16
Pacific Air Forces	Provide U.S. Pacific Command with integrated expeditionary Air Force capabilities, including strike, air mobility, and rescue forces.	3,151	10
U.S. Air Forces in Europe—Air Forces Africa	Serves as the air component for U.S. European Command and U.S. Africa Command, directing air operations, including warfighting and humanitarian/peacekeeping actions, and maintains combat-ready forces for North Atlantic Treaty Organization responsibilities.	1,552	6
ANG	Provide combat capability to the active duty force and security for the homeland. Support U.S. domestic and foreign humanitarian and disaster relief.	23,591 (includes dual civilian/military technicians)	18
Total		147,884 (includes dual civilian/military technicians)	

SOURCE: Air Force Association, 2018a.

A critical tool in recruiting and retaining top-tier civilian talent for the Air Force is the compensation and benefits package offered. However, a recent 2017 study by the Congressional Budget Office found that the competitiveness of federal wages in general varies widely depending on educational attainment. For example, “federal civilian workers with no more than a high school education earned 34 percent more, on average, than similar workers in the private sector,” while “federal workers with a professional degree or doctorate earned about 24 percent less, on average, than their private-sector counterparts” (Congressional Budget Office, 2017, p. 2).

One contributing factor to pay differences, when compared with the private sector, is that the Air Force civilian workforce is distributed across multiple personnel systems and pay plans based on the General Schedule (GS) classification and pay system that was developed decades ago (U.S. Government Accountability Office [GAO], 2014b; President’s Pay Agent, 2018;

Risher, 2019a; Risher, 2019b). This not only complicates the recruitment and hiring process but also presents significant challenges in meeting today's mission requirements based on the lack of agility associated with the GS system (GAO, 2014b). In an interview with the Federal News Network, Lt Gen Brian Kelly explained, "One of our biggest challenges is on the civilian side and particularly it's on the civilian side in regard to how we remain competitive and how we remain attractive to recruit and retain civilian talent using the existing federal hiring practices and regulations" (Kelly, 2018).

Study Objective and Approach

In fiscal year 2019, the Air Force Directorate of Civilian Force Management (AF/A1C) asked the RAND Corporation's Project AIR FORCE to conduct a study to help address Air Force concerns regarding its ability to compete with private-sector compensation and benefits, particularly for hard-to-fill occupations and mission critical occupations (MCOs). The objective of the study was to examine the constraints the Air Force must operate under in comparison with alternative compensation and benefit structures found in other federal agencies and the private sector and to provide recommendations on actions the Air Force can take to improve the competitiveness of its compensation and benefits packages to better recruit and retain top-tier civilian talent. Given the large number of civilian occupations (600) within the Air Force, the study focuses specifically on the five following occupations identified by the Air Force as priorities because they are either designated as mission critical or are particularly hard to fill: Aircraft Operations (GS-2181), Air Traffic Control (GS-2152), Human Resources Management (GS-0201), Information Technology Management (Cyber) (GS-2210), and Aircraft Mechanic (WG-8852).

To inform the study recommendations, the RAND team performed the following research tasks:

1. reviewed civilian compensation and benefits policy and related documentation to better understand the structure of civilian compensation and benefits in the Air Force compared with other federal government agencies and the private sector
2. conducted a literature review of prior government, private-sector, and research-based reports, as well as congressional testimonies, executive orders, and updates in legislation aimed to address recruiting and retention challenges related to compensation for each of the five occupational series under review
3. conducted semistructured interviews with career field managers and advisers, major command representatives, and civilian human resources (HR) professionals to learn more about specific recruiting and retention issues and associated compensation for the five occupational series under review. This included gathering information on any recent requests submitted to the U.S. Office of Personnel Management (OPM) for special salary rates or supplemental classification and qualification standards changes for the occupational series under review (for more detail on interview methodology, see Appendix A)

4. assessed differences between Air Force compensation and private-sector compensation at different levels of experience to determine where and to what extent significant compensation gaps exist for each of the occupational series (for more detail on our methodology for comparing compensation, see Appendix B)
5. reviewed a snapshot of current Air Force job openings on the USAJobs website for each of the occupations under review to identify potential areas for improvement in advertising positions compared with the private sector (for more detail on this methodology, see Appendix C)
6. developed recommendations for actions the Air Force can take to improve the competitiveness of its compensation and benefits packages to better recruit and retain top-tier civilian talent.

Limitations

As with all research, we encountered some limitations in the scope and analyses we were able to conduct for this study. First, it is important to note that the objective of this study was to examine the constraints the Air Force must operate under in comparison with alternative compensation and benefit structures found in other federal agencies and the private sector. Acknowledging that compensation and benefits are only one factor in employment and retention decisions for personnel, it was beyond the scope of the current study to examine other potential factors that may influence recruiting and retention for the five occupational series under review (e.g., person-job fit, job satisfaction, leader interactions, workplace environment, work-family balance, etc.). Further, comparison of nonwage benefits or other job amenities that may favor Air Force employment (such as job security or a sense of mission) were also beyond the scope of the analysis. In addition, although we include dual civilian/military technicians in the AFR and ANG in our counts and compensation comparison for Air Force civilian positions, it was beyond the scope of the current study to also examine recruiting and retention issues that may be unique to the AFR and ANG. Instead, we focused on conducting interviews with key representatives from Air Force recruiting, relevant major commands, and career field managers and advisers. We also encountered limitations associated with the availability of data for the five occupational series—not only that there are very little data available in public sources due to the fact that very few (if any) systematic studies having been carried out on each of the five occupational series, but also limitations regarding the collection of data at the Air Force level. In particular, we did not have access to a reliable Air Force-level file for vacancies for these positions or the frequency of use of incentives for recruitment, relocation, and retention (the 3Rs). Instead, we were told during interviews with HR specialists that these data are most accurately maintained at the local level. To monitor these issues in the future, the Air Force may want to explore establishing standards for the collection and maintenance of these types of data at the Air Force level instead of only at the local level. Finally, although our compensation comparisons include base salary, locality pay, and special rates, we note that the exact structure of compensation may vary across employers, agencies, and localities. We attempt to address these differences in compensation structures where possible.

The Structure of This Report

The remaining chapters in this report provide critical background information for the study and document the study findings and recommendations. Chapters 2 and 3 provide an overview of the structure of civilian compensation and benefits in the federal government compared with the private sector. Chapter 4 then provides an overview of the definition and process for identifying occupations as mission critical. Chapters 5–9 provide our key study findings on each of the five occupations identified for review in the current study. Finally, Chapter 10 describes the study conclusions and recommendations.

The study also includes several appendixes. Appendix A provides more detail on our interview participants and methodology, including protocols. Appendix B provides more detail on our methodology for comparing compensation within the Air Force with that of the private sector. Appendix C provides an overview of our approach for reviewing current job openings for the occupations under review. Appendix D provides a list of the most recent Air Force MCOs (in Table D.1) and a comparison of OPM, Department of Defense (DoD), Air Force, Army, and Navy MCOs (in Table D.2). Appendix E provides a full list of special rates tables for aircraft operators, air traffic controllers (ATCs), information technology (IT), and aircraft mechanics. Appendix F provides an overview of the Federal Aviation Administration's (FAA's) compensation system for ATCs as a comparison with that of the Air Force. Finally, Appendix G provides an overview of all the occupation-specific recommendations found in Chapters 5–9.

2. Civilian Compensation in the Federal Government

In this chapter we discuss the civilian compensation system used in the federal government to establish a baseline understanding of how pay is established, set, and changed. We address the different pay systems that the Air Force must understand, and apply personnel actions within the different pay system constructs. By laying out all the different complex parts of federal civilian pay, we also highlight the constraints the Air Force must operate under regarding compensation. We then discuss previous efforts and findings comparing federal government compensation with that of the private sector.

Compensation in the Federal Government

Title 5 of the United States Code (U.S.C.) and the Code of Federal Regulations (C.F.R.) give OPM the authority and responsibility for position classification, which is a process through which federal jobs (i.e., positions) are assigned to a pay system, series, title, and grade or band, based on the consistent application of classification standards. The laws and regulations specify that federal employees will receive “equal pay for substantially equal work” and that variations in pay will be in proportion to “substantial differences in the difficulty, responsibility and qualifications requirement of the work performed and the contributions of employees to efficiency and economy of the service” (title 5 U.S.C, section 5101). In addition, the law specifies that positions will be grouped and identified by classes and grades in accordance with their duties, responsibilities, and qualification requirements. OPM develops and publishes the standards that are the basis of the federal classification and compensation systems.

White-collar employees are paid under the GS classification and pay system. Blue-collar employees are paid under the Federal Wage System (FWS). In the sections below, we detail the various rules and authorities that govern compensation under these systems. We also discuss the flexibilities present in alternate systems utilized in some federal organizations as well as the Air Force.

The General Schedule Classification and Pay System

The GS classification and pay system covers 1.5 million white-collar civil employees, thus accounting for the vast majority of federal employees (OPM, undated p). These employees are spread between professional, technical, and administrative positions covering 15 grades. Each grade has ten step rates (Steps 1–10) that are each approximately 3 percent of the employee’s salary. Within-grade step increases are based on an acceptable level of performance and longevity (waiting periods of one year at Steps 1–3, two years at Steps 4–6, and three years at Steps 7–9). It can take 18 years to advance from Step 1 to Step 10 within a single GS grade.

However, employees with outstanding (or equivalent) performance ratings may be considered for additional quality step increases (with a maximum of one per year). Employees can be promoted to a higher grade after being in their positions for an established amount of time (usually at least a year). Promotion to a higher grade requires competition or successful completion in a career-ladder position with identified promotion potential. The promotion potential of a position is advertised in the job announcement. Along with promotions, employees may receive bonuses, awards, or similar cash payments as long as the money received would not take them over the annual rate of basic pay established by Title 5. Furthermore, employees in the GS system cannot earn an annual salary that is more than the yearly pay of Level IV of the Executive Schedule, a total of \$166,500 (Executive Order No. 13866). The current base wages by pay grade are shown in Table 2.1.

Table 2.1. General Schedule Base Salaries, 2019

Grade	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10
1	\$19,048	\$19,686	\$20,320	\$20,949	\$21,583	\$21,953	\$22,579	\$23,211	\$23,236	\$23,827
2	\$21,417	\$21,927	\$22,636	\$23,236	\$23,497	\$24,188	\$24,879	\$25,570	\$26,261	\$26,952
3	\$23,368	\$24,147	\$24,926	\$25,705	\$26,484	\$27,263	\$28,042	\$28,821	\$29,600	\$30,379
4	\$26,233	\$27,107	\$27,981	\$28,855	\$29,729	\$30,603	\$31,477	\$32,351	\$33,225	\$34,099
5	\$29,350	\$30,328	\$31,306	\$32,284	\$33,262	\$34,240	\$35,218	\$36,196	\$37,174	\$38,152
6	\$32,716	\$33,807	\$34,898	\$35,989	\$37,080	\$38,171	\$39,262	\$40,353	\$41,444	\$42,535
7	\$36,356	\$37,568	\$38,780	\$39,992	\$41,204	\$42,416	\$43,628	\$44,840	\$46,052	\$47,264
8	\$40,263	\$41,605	\$42,947	\$44,289	\$45,631	\$46,973	\$48,315	\$49,657	\$50,999	\$52,341
9	\$44,471	\$45,953	\$47,435	\$48,917	\$50,399	\$51,881	\$53,363	\$54,845	\$56,327	\$57,809
10	\$48,973	\$50,605	\$52,237	\$53,869	\$55,501	\$57,133	\$58,765	\$60,397	\$62,029	\$63,661
11	\$53,805	\$55,599	\$57,393	\$59,187	\$60,981	\$62,775	\$64,569	\$66,363	\$68,157	\$69,951
12	\$64,490	\$66,640	\$68,790	\$70,940	\$73,090	\$75,240	\$77,390	\$79,540	\$81,690	\$83,840
13	\$76,687	\$79,243	\$81,799	\$84,355	\$86,911	\$89,467	\$92,023	\$94,579	\$97,135	\$99,691
14	\$90,621	\$93,642	\$96,663	\$99,684	\$102,705	\$105,726	\$108,747	\$111,768	\$114,789	\$117,810
15	\$106,595	\$110,148	\$113,701	\$117,254	\$120,807	\$124,360	\$127,913	\$131,466	\$135,019	\$138,572

SOURCE: U.S. Office of Personnel Management Pay Tables.

Base pay within the GS system may be adjusted annually each January. A federal pay raise each year is not guaranteed; in several recent years there were no pay raises, and this affected federal recruitment capabilities.

Recommended pay increases are based on changes in wages and salaries for employees in the private sector. The pay increase is determined by a formula established in Title 5, Section 5305, which states, “Pay increase is equal to ½ of 1 percentage point less than the percentage by which the Employment Cost Index (ECI) for the base quarter of the year before the preceding calendar year exceeds the ECI for the base quarter of the second year before the preceding calendar year”

(5 U.S.C. 5305).¹ The ECI is the Bureau of Labor Statistics' (BLS's) extensive database of detailed information on wages and benefits for government and the private sector (Lebow, Saks, and Wilson, 1999). Data from the BLS are also used to ensure that federal employees are compensated in line with the wages and benefits afforded to private-sector employees in the same geographical areas. The recommended pay increase is considered by the President and Congress, who either agree with the recommendation, suggest alternate increases, or freeze pay at the previous year level.

Locality Pay

Federal employee wages are also affected by locality pay, a percentage rate based on how much nonfederal workers make in a specific geographic area. Locality pay is determined using surveys conducted by the BLS. There are currently 47 locality pay areas (LPAs). The pay areas cover all 50 states and Washington, D.C., as well as U.S. territories and possessions. The remainder of the areas is included in the LPA designated as Rest of U.S. (OPM, undated p). Locality pay was established in the Federal Employees Pay Comparability Act of 1990 (FEPCA). In addition, FEPCA established the Federal Salary Council (FSC), an advisory body of the Executive Branch that makes recommendations on locality pay. The FSC makes recommendations on locality pay to the President's Pay Agent, which comprises the Secretary of Labor and the directors of the Office of Management and Budget and OPM. This group makes final decisions on determining LPAs, as well as recommending the amount of the annual federal pay increase to the President.

As stated, locality pay is based on a comparison between the salaries and wages of federal employees versus nonfederal employees, and it aims to reduce the pay gap between these two groups to at least 5 percent. It is important to note, however, that employees who have a special salary rate either receive their special rate adjustment or their locality adjustment, whichever is higher (5 U.S.C. 5305); they do not receive both. For employees in alternative pay systems that use pay bands (see the section "Pay Banding, the Laboratory Demonstration Project, and the Acquisition Demonstration Project" later in this chapter), locality pay is added to their basic band pay. There are 47 LPAs across the United States, with plans to add four new areas (OPM, 2018c). Like base pay, locality pay may be adjusted annually with recommendations made by the FSC.

Special Rates

A special rate, or special salary rate, is a higher rate of basic pay established by OPM for a group or category of GS positions in one or more geographic areas. Within this report we use the

¹ Earlier RAND research has questioned the use of ECI as a metric for adjusting wages, most notably for adjusting military basic pay. However, some of the points carry over to the civilian sector, including compositional differences between federal employee and civilian workforces. See Hosek et al., 2018.

terms *special salary rates* and *special rates* interchangeably. OPM establishes special salary rates to address difficulties in recruiting or retaining well-qualified employees. OPM (undated h) states that it may use special salary rates to address problems caused by

- Significantly higher non-Federal pay rates than those payable by the Federal Government within the area, location, or occupational group involved;
- The remoteness of the area or location involved;
- The undesirability of the working conditions or nature of the work involved; or
- Any other circumstances OPM considers appropriate.

The authority to grant special rates is found in Title 5, Section 5305 (Special Pay Authority) and 5 C.F.R. Part 530, Subpart C (Special Salary Schedules for Recruitment and Retention).

Agencies may request that special rates be established or increased by providing information required by OPM's Worksheet for Special Rate Requests, Form 1397 (see OPM, undated ac). Requests must come to OPM through agency headquarters and certify that the requested rates are necessary to ensure adequate staffing levels to accomplish the agency's mission. OPM may require that the supporting data include a survey of prevailing nonfederal pay rates in the relevant labor market. If other agencies have similar issues, OPM may designate a lead agency to coordinate data collection. In evaluating agency requests, OPM may consider a number of factors, including the number of vacant positions and the length of time they have been vacant; attrition rates and supporting evidence; recruitment and hiring numbers; the nature of the labor market, including rates of pay; the degree to which the agency has used other pay and nonpay flexibilities; and the effect of the staffing problem on the agency's missions.

The minimum special rate may not exceed 30 percent of the maximum rate for grade, and the maximum rate may not exceed Level IV of the Executive Schedule. OPM publishes tables of special rates annually (see OPM, 2019c). The tables provide rates by occupation, agency, and location. Any approved special salary rate is added to the nonlocality pay rates. Employees cannot receive both locality pay and a special salary rate (OPM, undated al). Further information regarding special salary rates is included in Chapter 4 and the discussions of the occupations in Chapters 5–9.

Pay Banding, the Laboratory Demonstration Project, and the Acquisition Demonstration Project

While most federal employees are paid within the GS system, some agencies are authorized to use other systems. One notable authorization can be found in the Defense Civilian Intelligence Personnel, which covers agencies within the DoD intelligence system and allows employees to be paid outside the GS system. Some employees are paid using the General Government (GG) pay rates, which are generally identical to those in the GS system. But other employees within Defense Civilian Intelligence Personnel are compensated using pay bands (Department of

Defense Instruction 1400.25, 2012). Pay banding is an alternative approach to classification and pay wherein two or more grades are combined into pay bands. As there is no standard structure for pay bands, agencies that use them typically combine multiple types of positions classified in different occupational series into single bands, resulting in three or four different pay bands covering all of their employees. The pay bands are then typically further divided into three to four levels. This system has fewer levels than the GS structure and, as a result, promotions are less frequent; however, when they are given, raises can be larger (Montoya and Graham, 2007). As an example, in a pay banding system where one band has the salary range of four GS grades, an employees' salary can increase to anywhere within the band without the employee having to compete for the pay increase.

Pay banding was implemented to improve recruiting and hiring, as it allows managers to be more flexible in setting the compensation for new employees. Generally, in the GS system, new employees are placed in a specific position at a set pay grade, whereas new employees in a pay banding structure may be able to earn more depending on the hiring manager's discretion. While pay banding has been an effective alternative pay structure for some agencies, according to OPM, the system will only work if the organization has certain characteristics. These characteristics include having a strong performance-based culture, support for pay banding from top management, and an accurate, well-designed budgeting and allocation system (OPM, 1996).

Agencies covered by the general pay and position classification requirements in Title 5 are not eligible to use pay banding, but it is commonly found in alternative personnel systems and demonstration projects throughout the federal government; Title 5, Chapter 47 gives certain agencies the authority to establish alternative personnel systems or demonstration projects in order to create alternatives to the GS system. The Acquisition Workforce Personnel Demonstration Project (AcqDemo) and the DoD Science and Technologies Laboratory Demonstration Project (Lab Demo) are two of the demonstration projects utilized within the Air Force that use pay banding to attract and retain employees. We describe each of these in more detail below.

The Air Force Research Laboratory (AFRL) was able to create an alternative human capital system called the DoD Science and Technologies Laboratory Demonstration Projects (Lab Demo). The National Defense Authorization Act (NDAA) for Fiscal Year 1995 gave DoD the authority to develop a system that implemented pay banding for employees, a pay-for-performance system, and an improved managerial system for human capital in research labs across the department (Public Law 103-337). Within the Air Force, the AFRL uses the flexibilities from Lab Demo to implement multiple compensation and managerial policies that are not found in the traditional GS system. Programs such as these are typically authorized for agencies that need to improve their human capital management and could benefit from a system that allows them to better attract and retain qualified professionals (OPM, 2007).

Lab Demo allows the AFRL to use multiple flexibilities for more agile hiring and compensation programs. The AFRL uses a pay banding system for compensation instead of the GS system. Its pay band consists of four levels in four career paths: Scientists and Engineers, Business

Management/ Professional, Mission Support, and Technicians. Each pay band covers multiple GS grades, which allows for significant salary growth for employees without needing to change positions (Wright-Patterson Air Force Base, 2019). Pay increases are dictated by employees' contributions in four areas: Problem Solving, Communication, Teamwork and Leadership, and either Business Management or Technology Management (only for scientists and engineers). The scores on these four areas are averaged into an overall contribution score, which is then used to determine employees' salaries (OPM, 2019c). A comparison between the AFRL pay bands and corresponding GS salaries is shown in Table 2.2.

Table 2.2. Air Force Research Laboratory Pay Bands and General Schedule Base Salary Comparison, 2019

Career Paths	Corresponding GS Grades														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Band structure														
Scientists and engineers							DR-I \$36,356–\$69,951				DR-II \$64,490–\$99,691		DR-III \$90,621–\$117,810		DR-IV \$106,595–\$138,572
Business management/ professional							DO-I \$36,356–\$69,951				DO-II \$64,490–\$99,691		DO-III \$90,621–\$117,810		DO-IV \$106,595–\$138,572
Mission support	DU-I \$19,048–\$34,098			DU-II \$29,350–\$42,535			DU-III \$36,358–\$52,341		DU-IV \$44,471–\$63,661						
Technician	DX-I \$19,048–\$34,098			DX-II \$29,350–\$47,264				DX-III \$40,263–\$63,661			DX-IV \$53,805–\$83,840				

SOURCES: Pay band structure from Wright-Patterson Air Force Base, 2019; salary data from U.S. Office of Personnel Management Pay Tables.

The impact of Lab Demo flexibilities on the labs' workforce has been evaluated multiple times, most recently in 2012. While there have been no assessments of the AFRL individually, a 2012 evaluation of the effectiveness of Lab Demo included inputs from each of the involved labs. The evaluators reported that the project had an overall positive impact on labs, and the flexibilities allowed compensation to be competitive with the private sector. Most employees echoed this sentiment, indicating that they earned more than they would if they were in the GS system. However, employees in high-level management positions stated that pay was significantly lower than in the private sector. This was determined to be a result of more employees hitting the pay ceiling in Lab Demo's pay banding system (Cole, 2012).

Like Lab Demo, AcqDemo was designed to improve DoD's ability to attract and retain talent. Furthermore, AcqDemo also utilizes a pay banding system for compensation. Based on their occupations, employees are placed into one of three career paths: Business Management and Technical Management Professional (NH), Technical Management Support (NJ), or

Administrative Support (NK). NH and NJ each have four pay bands, while NK has three. The GS base salary comparison with the AcqDemo pay bands is shown in Table 2.3.

Table 2.3. AcqDemo Pay Bands and General Scale Base Salary Comparison, 2019

Business and Technical Management Professional (NH)			
I \$19,048–\$34,098 (GS 1–4)	II \$29,350–\$69,951 (GS 5–11)	III \$64,490–\$99,691 (GS 12–13)	IV \$90,621–\$138,572 (GS 14–15)
Technical Management Support (NJ)			
I \$19,048–\$34,098 (GS 1–4)	II \$29,350–\$69,951 (GS 5–8)	III \$ 44,471–\$69,951 (GS 9–11)	IV \$64,490–\$99,951 (GS 12–13)
Administrative Support (NK)			
I \$19,048–\$34,098 (GS 1–4)	II \$29,350–\$47,264 (GS 5–7)	III \$40,263–\$63,661 (GS 8–10)	

SOURCES: AcqDemo Program Office for pay band structure, 2016; U.S. Office of Personnel Management Pay Tables.

AcqDemo supervisors have the ability to set a new employee’s pay at different points within the appropriate pay band upon initial appointment and upon promotion to a higher band. Compensation is tied to the employee’s contributions to the organization and is evaluated through what is known as the Contribution-Based Compensation and Appraisal System. Much as in Lab Demo’s system of employee evaluations, employees are assessed on six factors: problem solving, teamwork and cooperation, customer relations, leadership and supervision, communication, and resource management. Employees’ scores on each of these factors are averaged into an overall contribution score, and that determines how much employees are compensated (10 U.S.C. 1762).

AcqDemo was most recently evaluated in 2016, in a RAND assessment that examined the demonstration project’s effect on employee compensation, retention, and career outcomes (Lewis et al., 2017). The researchers found that, annually, AcqDemo employees earned \$1,500 to \$1,800 more than comparable GS employees. Furthermore, employees in AcqDemo with higher overall contribution scores saw faster increases in salaries than those with lower scores. Survey responses from AcqDemo employees indicated that nearly 60 percent of employees were satisfied with their pay. The study found no significant differences in the overall retention rates of employees in AcqDemo compared with employees in the GS system, but the researchers did find that performance level moderated this relationship, concluding that “AcqDemo retains higher performing employees at a higher rate and low-performing employees at a lower rate” (Lewis et al., 2017, p. 56). A previous 2014 RAND study found that employees entering AcqDemo or other demonstration plans were retained longer compared with those under the GS system (Guo, Hall-Partyka, and Gates, 2014).

The Federal Wage System

While the discussion so far has mostly focused on white-collar employees compensated through the GS system, the federal government also employs a large number (over 41,000) of trade, craft, and labor employees (OPM, 2019d). These blue-collar federal workers are often referred to as “wage grade” employees and are compensated through the FWS. The FWS was established in 1972, with the passing of Public Law 92-392, and is administered by OPM. As in the GS system, OPM guides FWS policies and establishes pay-setting procedures. Public Law 92-392 also created the Federal Prevailing Rate Advisory Committee, which consists of five labor members, five management members, and an independent chairman appointed by the director of OPM; it advises OPM on the creation and administration of FWS policies. Using these policies and procedures, agencies determine grade levels for work, basic pay, and premium pay for employees and wage schedules (OPM, 2019c). Wage area pay tables are split between three levels of expertise: worker, leader, and supervisor. Workers and leaders each have 15 grades with five steps in each, while supervisors have 19 grades with five steps in each. Employees can advance to higher steps based on job performance and length of service.

Like the GS system, the FWS aims to establish pay rates in line with similar work in the private sector based on locality. Yet while both systems have similar goals, the methodologies they employ are different. DoD has been designated as the lead agency to conduct wage surveys and issue FWS wage schedules. DoD’s Defense Civilian Personnel Advisory Service (DCPAS), Wage and Salary Division, collects wage data from private companies in each wage area. The data collection is handled by local wage survey committees found in each local area. Labor organizations provide representatives at all levels of this process. Two of the five members of DoD’s Wage and Salary Division are federal representatives from the largest unions in the country representing federal employees (OPM, 2019c). On the local level, the largest union in a wage area has three members on each of the local wage survey committees. These committees collaborate in the annual prevailing wage surveys to determine the FWS pay schedules. A team consisting of one labor data collector and one management data collector visit each of the private companies that are being surveyed for wage data.

The FWS uses two types of surveys, “full-scale” and “wage-change.” Full-scale surveys occur every two years, wherein DoD creates a list of private companies that fit in the scope of the wage survey and wage area. Teams of data collectors reach out to these establishments and collect wage data from the organizations that voluntarily wish to share the information (OPM, 2019c). The wage-change survey occurs during the years when DoD does not conduct the full-scale survey. For these surveys DoD simply updates the information found from the previous full-scale wage survey and uses this to update the FWS wage tables.

Recruitment, Relocation, and Retention Incentives

Along with locality pay, FEPCA included authorizations for recruitment and relocation bonuses, as well as retention allowances when an agency has difficulty recruiting and retaining

employees. Each of these incentives takes the form of cash payments to employees. The total recruitment incentive payment may not exceed 25 percent of an employee's annual rate of basic pay in effect at the beginning of the service period, multiplied by the number of years in that service period (the amount of time the employee agrees to serve for the payment). If the agency determines that there is critical need for the position, the cap on the incentive pay can be increased to 50 percent, but only if the total incentive does not exceed 100 percent of the employee's annual rate of basic pay. The cash incentive can be paid as a lump-sum payment at either the start or end of the service period, disbursed as regular payments throughout the service period, or some form of combination of these methods. The incentive can also be paid to an individual before the start of his or her service if he or she has received a written offer of employment and signed a written service agreement (Public Law 101-509). There is also a limit on the payment, as the employee's aggregate annual compensation must fall below the annual rate of pay for Level I of the Executive Schedule (5 C.F.R. 530.201). Before paying any of these incentives, the agency must create an agency plan that outlines the selection of officials with authority to guide the policies and distribution of the incentives.

Recruitment bonuses are cash incentives that are used when the hiring agency has determined that a position would be too difficult to fill without the added incentive. Recruitment bonuses are available for individuals who have either never worked for the federal government before or for appointed employees who have had a break in service of at least 90 days since their last appointments as federal government employees.

Relocation allowances may be used if an agency must relocate a current employee in order to fill a position in a different geographic area. If the agency determines that the position would be too difficult to fill without the incentive, it can offer the incentive to the employee. The employee can only receive the incentive if he or she has received a "fully successful" or equivalent rating on an official performance appraisal.

An agency may pay employees a retention bonus if it determines that the employees' services are essential to the agency's mission and that the employees would leave if they do not receive the incentive. If these criteria are met, the agency can offer retention incentives to an employee or a group of employees (5 U.S.C. 5754). Similar to the requirements for relocation allowances, employees are eligible for a retention bonus if they have received a "fully successful" or equivalent rating in an official performance appraisal.

An employee must sign a written agreement to complete a specified period of employment with the Air Force at his or her duty station before receiving a 3R incentive. The service agreement must specify the amount, length, start, termination date, and method and timing of incentive payments. The agreement includes the conditions under which an agreement will be terminated by the agency, any agency or employee obligations if a service agreement is terminated (including the conditions under which the employee must repay an incentive or under which the agency must make additional payments for partially completed service), and any other terms and conditions for receiving and retaining a relocation incentive. A written service

agreement is not required if the agency pays the retention incentive in biweekly installments and sets the biweekly installment payment at the full retention incentive percentage rate established for the employee (see 5 C.F.R. 575.310(f)). For a recruitment incentive, the required service period may not be less than six months and may not exceed four years. Under the rules for a relocation incentive, there is no minimum service period, but required service cannot exceed four years (U.S. Air Force, 2015a; U.S. Air Force, 2015b; U.S. Air Force, 2018a).

A January 2016 OPM memorandum acknowledged that the 3Rs represent “essential pay flexibilities for agencies facing serious staffing challenges” (Cobert, 2016a; GAO, 2017b, p. 26). As there are statutory spending limitations associated with the 3Rs, the memorandum provided guidance to agencies facing staffing challenges on exceptions to the existing spending limitations. In November 2016, OPM issued another memorandum providing guidance on how agencies may use flexibilities available to recruit and retain employees in MCOs, such as cybersecurity positions. Among the flexibilities included in the memorandum were the use and combination of several special payment authorities to recruit and retain cybersecurity personnel (Cobert, 2016d).

Within the Air Force, the 3Rs are typically funded at the base or activity level. Centrally funded intern programs provide the incentives (including the 3Rs) and pay for Air Force interns.

Comparing Federal Salaries and Wages with Those of the Private Sector

Federal organizations aim to compensate employees at rates similar to those in the private sector. However, as we discuss in this section, comparing these compensation rates has been shown to be a major challenge. Furthermore, the FSC has continually expressed concerns over the pay gap between federal and private-sector workforces. In 2018 the FSC reported that federal employees were paid 32 percent less than private-sector employees (Yoder, 2018). The methodology the FSC uses to compare the employees is outlined in an annual report.

For the past few years, the FSC has reviewed salary data from two BLS surveys: the National Compensation Survey (NCS) and a survey from the Occupational Employment Statistics (OES) program. The NCS data contain information on occupational earnings and compensation cost trends and are used to analyze how levels of work affect the salaries earned by nonfederal employees. Likewise, the OES program has data for wages by occupation for each LPA. The FSC compares the data from these two sources with a regression-based process known as the NCS/OES model, which is used to estimate the pay disparities between federal and nonfederal employees. Each year, the BLS calculates wage estimates broken down by area, occupation, and grade level. While OES data have wage estimates for each occupation at every LPA, they do not have information broken down by grade level. The NCS, on the other hand, has wage data broken down by grade level, but has a smaller sample size that can be used to calculate occupation area estimates. The information from both samples is combined using a regression model that utilizes several assumptions about the differences in observed wages. First, the model assumes that differences between the wages observed by the NCS and OES for any given area, occupation, and grade level can be explained by several key variables; the most important

variable would be the grade level of the occupation. Second, the model also assumes that the relationship between wages and levels is consistent across all locality areas. Third, the model predicts how much wages will increase based on grade level. The model is then used by the Pay Agent to predict the hourly wage rate for certain areas, occupations, and grades. This wage rate is then multiplied by the total number of work hours in a year to calculate an estimate of annual earnings for a certain position. The estimates are averaged in order to form an estimate of annual earnings across job families and grade areas. The pay disparity is estimated by calculating how much the nonfederal wage exceeds the overall average GS rate for each occupational family (FSC, 2019).

The methodology used to calculate the pay disparity has been highly controversial (Congressional Budget Office, 2002). The FSC itself has noted multiple shortcomings in the current salary survey methodology due to budget-driven limitations. In lieu of available data for nonfederal salaries, the model utilizes statistical modeling. Furthermore, the current methodology does not account for benefits. The FSC presented five options to the Pay Agent (FSC, 2019) to improve the process. Three of these options could be implemented administratively, while the remaining two would require a change in law. The first option would be to continue the use of the NCS/OES model without making changes. The second option would be to modify the salary survey methodology to reduce its reliance on statistical modeling. This would involve larger sample sizes of nonfederal wage data and utilizing benchmark jobs for salary estimations. The third administrative option would be to continue to use the existing salary survey methodology but supplement the results with salary and/or attrition data from other sources to verify the validity of estimations calculated by the NCS/OES model. The final two options would both require a change in the law. The first of these options would be to develop a method that would account for benefits when comparing federal and nonfederal pay. If a proper methodology was created for this, the Pay Agent would be able to get more information on the total compensation of employees. The second of these options would be to develop a periodic review of total compensation for white-collar federal civilians. Like the first of these two options, this option could provide the Pay Agent with more data on the total compensation for employees.

Another methodology to calculate differences has been employed by the Congressional Budget Office. In a 2017 review of federal civilian compensation and private-sector compensation, the office indicated that comparing compensation is made more difficult due to major differences in the characteristics of the two workforces. Compared with private-sector workers, federal employees tended to be older, more educated, and more concentrated in professional occupations. The Congressional Budget Office used wage data from 2011–2015 provided by the BLS's Current Population Survey. Education was a major factor in the differences between compensation of federal and private-sector workers:

- Federal civilian workers whose highest level of education was a bachelor's degree earned 5 percent more, on average, in the federal government than in the private sector.

- Federal civilian workers with no more than a high school education earned 34 percent more, on average, than similar workers in the private sector.
- By contrast, federal workers with a professional degree or doctorate earned 24 percent less, on average, than their private-sector counterparts. (Congressional Budget Office, 2017, p. 2)

Criticisms such as these have been offered against FEPCA since its original implementation (Congressional Budget Office, 2002). As a result, FEPCA's calculations for pay adjustments have never been fully implemented. Instead, each president since FEPCA's creation has used his authority to create an alternative pay plan. This is possible through a president's ability to ignore FEPCA's recommendation if there is a "national emergency or serious economic conditions affecting the general welfare" (5 U.S.C. 5303). While FEPCA's methodology has been consistently called into question, experts have argued over the pay gap between federal and nonfederal employees.

Conclusions

Federal civilian pay is a complex system of multiple authorities, processes, and different categories of employees. There are a number of pay systems and structures that apply to different categories of Air Force civilian employees. The workforce is broken into two broad categories that are dependent upon the type of work performed: the GS classification and pay system covering white-collar occupations and the FWS covering blue-collar occupations. Under the GS classification and pay system, employees are either under a 15-grade with ten steps single-grade pay schedule or under an alternative personnel system authority that authorizes combining grades into a pay band structure consisting of a small number of pay bands with multiple levels in different career paths. AcqDemo and Lab Demo projects have the flexibility of using pay bands (each using a different pay band construct) that affords their managers the flexibility to place employees in salary ranges that do not require competition to move up. Within a pay band structure there is an increased emphasis on performance and mission accomplishment, while the single-grade GS structure is based on longevity. In addition to pay based on the level of work performed, federal employees can also receive additional locality pay determined by the difference in pay in the private sector in specific geographic locations. Special rates are available for certain FWS and GS occupations to address difficulties in recruiting or retaining well-qualified employees in specified geographic locations. The Air Force has the authority to pay recruitment and relocation bonuses and retention allowances when an agency has difficulty recruiting and retaining an employee. These incentives are funded at different organizational levels in the Air Force.

The FWS establishes pay rates in line with similar work in the private sector based on locality pay surveys conducted by DoD. Wage area pay tables are split between three levels of expertise: worker, leader, and supervisor. Workers and leaders each have 15 grades, with five

steps in each, while supervisors have 19 grades, with five steps in each. Employees can advance to higher steps based on job performance and length of service.

There is controversy over the right method of determining the rate federal civilian employees should be paid and what the actual difference is between federal and private-sector pay. Differences of opinion are raised each year when calculations are submitted to support recommendations for basic and locality pay raises. Ultimately Congress and the President determine what pay raises will be made and funded each year. In the recent past, federal pay has been frozen by presidential decree, and that can pose recruitment and retention issues for the Air Force.

Throughout this report, when we conduct comparisons between Air Force civilian compensation and private-sector or other agency compensation for similar occupations, we account for differences in education, experience, and location wherever possible. Due to the differences in data used in these comparisons, as described in Appendix B, these adjustments differ depending on the MCO in question; however, we note that, in general, such adjustments—most notably experience and location—have large effects on our estimates of pay gap.

3. A Comparison of Civilian Benefits: The Federal Government and the Private Sector

In discussing the total compensation of federal employees, it is important to include the benefits they receive in addition to their salaries. The April 2017 Congressional Budget Office report comparing federal and private-sector pay and benefits during the 2011–2015 period states that “the federal and private sectors differed much more with regard to the costs that employers incurred in providing current and future benefits—including health insurance, retirement benefits, and paid leave—than they did with regard to wages” (Congressional Budget Office, 2017). When considering the total compensation package for employees, including both compensation and benefits, the federal government on average spent 17 percent more on its employees than did organizations in the private sector between 2011 and 2015 (Congressional Budget Office, 2017). The differences between benefits offered by federal government and private-sector employers varied according to employees’ educational attainment:

- Average benefits were 52 percent higher for federal employees whose highest level of education was a bachelor’s degree than for similar private-sector employees.
- Average benefits were 93 percent higher for federal employees with no more than a high school education than for their private-sector counterparts.
- Among employees with a doctorate or professional degree, by contrast, average benefits were about the same in the two sectors. (Congressional Budget Office, 2017, p. 2)

Although the employer cost of benefits offered to civilian employees in the federal government is greater than what is offered in the private sector, it is important to consider differences when identifying areas where federal benefits can be improved and leveraged to increase recruitment and retention for the civilian workforce. This chapter highlights some key benefits offered in the federal government and in the private sector. They are not listed in a particular order, but we first describe benefits related to insurance and retirement, followed by leave-, care-, and assistance-related benefits, and end with a discussion of some alternative and less commonly offered benefits. The discussion of benefits contained in this chapter is by no means intended to be a comprehensive list of all available benefits nor an in-depth description or quantitative comparison of the prevalence and effectiveness of these benefits. Instead, the following information is intended to give an overview of some of the differences between federal government employers and private-sector employers regarding which benefits they tend to offer. The availability of benefits depends on agency, the type of appointment, and the availability of funds. Agencies identify the type of benefits authorized when they post position vacancy announcements.

We drew on a number of sources to develop this chapter, but it was beyond the scope of our study to do an independent assessment of the sources or the benefits themselves. In addition, it is important to note that the surveys and reviews used in this chapter do not all look at the same populations. Therefore, we try to note the specific populations from which the data were taken throughout. Our key data sources are as follows:

1. Findings from the BLS's 2017, 2018, and 2019 NCSs were used to describe the prevalence of certain benefits in the private sector. It is important to note that the data used by the BLS did not include responses from federal employees.
2. Findings from a number of surveys from the Society for Human Resource Management (SHRM) were used in our discussion of benefits, both for prevalence data and background information. It is important to note that the SHRM surveys used a convenience sample of SHRM members across four sectors: private, public, government, and nonprofit. Since the government data do not distinguish federal from state and local government, the findings we use in this chapter are presented as the prevalence of certain benefits in organizations across the sectors. We also utilized a reported analysis of SHRM's data comparing private- and public-sector benefit offerings, the latter including the federal government (see Cournoyer, 2018).
3. Findings from United Benefit Advisors' 2018 benefit cost benchmarking report were used to describe the typical costs of health plans for the government and other industries, though it is important to note that this was not specified as federal, state, or local government, and the survey also included workers in the education and utility fields in this sector.
4. American Student Assistance's findings on "young workers" (defined as those ages 22 to 33) and their attitudes toward student debt were used to outline some of the potential benefits of offering student loan assistance to employees (American Student Assistance, 2017). These findings were taken from a survey of young workers and human resource managers across companies with 100 or more employees, but represented sectors were not disclosed, and thus may not include federal employees or be generalizable to federal employees.

A number of other sources were used to collect background information on the benefits discussed throughout this chapter, though we did not conduct an exhaustive review of all literature available on benefit offerings in the federal government and the private sector.

Health Insurance

Civilians employed by the federal government have access to a vast selection of health insurance plans through the Federal Employees Health Benefits (FEHB) program. These insurance plans are available to "federal employees, retirees, and their survivors" (OPM, undated u) and have no age or health restrictions, with each agency covering the majority of insurance costs (Go Government, undated). "Federal employees" also covers those serving in a temporary or seasonal position, provided they "work at least 130 hours per month for at least 90 days" (OPM, undated v). Unlike in the private sector, those who retire from federal service

are generally able to maintain their FEHB coverage, and at the same cost as those currently employed in a federal agency; this is also available for surviving spouses of retired federal employees. To help in choosing from the vast selection of plans that vary in coverage, deductibles, account type, and organization type, OPM has a comparison tool available so that employees can select the plans most appropriate for their needs. In addition to the FEHB health plan, there are no restrictions to participation in “pharmacy-sponsored incentive or pharmaceutical company co-pay reimbursement programs” (OPM, undated u). Optional vision and dental coverage is also available to federal employees.

While these benefits are available to a vast majority—up to 89 percent—of civilians in the federal government, private-sector organizations that responded to the NCS noted that they offer medical care benefits to an average of only about 69 percent of their workers (BLS, 2018d). On average, however, private-sector employees are responsible for only 19 percent of medical care premiums (BLS, 2018d), while civilians in the federal government are responsible for at least 25 percent of their medical care premiums, depending on the type of plan selected (OPM, undated m).

According to the United Benefit Advisors’ survey of employers, the average health plan cost per government employee (which, for this survey, includes education and utility workers, and not specifically federal employees) was \$11,943 in 2018. The average for other private industries was roughly \$10,076 per employee. The government has the highest employee cost for health insurance plans out of all industries, with the next highest being the cost for employees in the finance, insurance, and real estate industries, at \$11,218 per employee (United Benefit Advisors, 2018). Table 3.1 provides a summary of the differences in health insurance benefits offered in the federal government and the private sector.

Table 3.1. Summary of Health Insurance Data

	Accessibility	Average Amount for Which Employee Is Responsible	Average Yearly Cost to Employer per Employee
Federal government	89 percent of employees	25 percent of medical premium	\$11,943
Private sector	69 percent of employees	19 percent of medical premium	\$10,076

SOURCES: Accessibility and private-sector premium responsibility data from BLS, 2018d; federal government premium responsibility data from OPM, undated m; cost data from United Benefit Advisors, 2018, which might not be representative of the federal government.

Life Insurance

Full- and part-time federal employees, retirees, and their family members are covered by Federal Employees’ Group Life Insurance. Employees are automatically enrolled (unless they waive the coverage) in basic life insurance, and have three levels of optional insurance they can

choose to elect in addition to the basic coverage. The premium rate for the basic coverage is the same for all enrollees and does not take specific demographics, like age or health, into account. Thus, younger employees might be paying higher premiums than they would be for an age-based coverage policy (OPM, undated x). But they are also provided an “Extra Benefit, which increases the amount of Basic insurance payable at the time of death for enrollees under age 45” (OPM, undated y). Federal Employees’ Group Life Insurance coverage of retirees is what sets it apart from other group life insurance policies. The premium costs younger enrollees pay are designed to cover their coverage costs later in life and during retirement, so after age 65—or at retirement—some life insurance coverage can be continued at no cost. The insurance is available to 100 percent of government employees (OPM, undated x), while, as summarized in Table 3.2, only 57 percent of private-sector workers have access to employer-sponsored life insurance (BLS, 2018d).

Table 3.2. Summary of Life Insurance Data

	Accessibility (Percentage)
Federal government	100
Private sector	57

SOURCES: Federal government data from OPM, undated x; private-sector data from BLS, 2018d.

Retirement

Since 1987, new federal employees are covered by the Federal Employees Retirement System (FERS), which provides retirement benefits from three different sources: the Basic Benefit Plan, Social Security, and the Thrift Savings Plan (TSP). For the Basic Benefit Plan, the employee contributes a percentage of his or her salary that is withheld from each paycheck by the agency, which also contributes a percentage. To receive retirement benefits from this plan, the employee must have worked for the federal government for at least five years. The Basic Benefit Plan includes long-term disability and survivor benefits for spouses and children (OPM, 1998).

Social Security involves automatic deductions from an employee’s paycheck, along with employer contributions for each pay period (OPM, undated n). At the full retirement age (66.5 in 2019) a retiree receives monthly benefit payments for the rest of his or her life. Individuals can claim these benefits as early as age 62, at 72.5 percent of the full payment amount. Similar to the Basic Benefit Plan, Social Security provides for disability and survivors (OPM, 1998).

Finally, the TSP is similar to the traditional 401(k) plan commonly offered by private-sector employers. The agency automatically contributes 1 percent of an employee’s salary to the plan. The agency will also match employee contributions on the first 5 percent of pay that they contribute each pay period (TSP, undated). Unlike in the Basic Benefit Plan, an employee can carry his or her TSP account over to the next job if he or she leaves the federal government

before retirement (OPM, undated n). This only applies for those who are vested in the contributions, which, for most FERS participants, is after three years of completed service (TSP, undated). If the participant leaves before meeting this requirement, the employer's contributions are forfeited (TSP, undated). Some agencies of the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA) add their own 401(k) programs to increase the potential for retirement savings. The National Credit Union Association (NCUA) Savings Plan is an additional tax-deferred retirement savings and investment plan. The NCUA automatically contributes 3 percent of an employee's salary to the agency's 401(k) savings plan whether or not the employee contributes. Employees who contribute can receive up to an additional 2 percent in NCUA matching contributions for a total of 5 percent from the NCUA each year (NCUA, 2018).

The private sector offers its own variety of retirement savings plans, including the traditional 401(k) plan, a Roth 401(k), defined benefit pension plans, Social Security, and other far less common offerings. The traditional 401(k) plan, including similarly defined retirement savings plans, is offered by 93 percent of the organizations that participated in SHRM's 2019 Employee Benefits Survey (SHRM, 2019c). Table 3.3 summarizes retirement plan accessibility and available types in both the federal government and the private sector.

Table 3.3. Summary of Retirement Data

	Availability	Options
Federal government	100 percent of employees	Three
Private sector	93 percent of employees	Vary by organization

SOURCES: Federal government data from OPM, undated m; private-sector data from SHRM, 2019c.

Leave

Paid Holidays

Federal employees receive ten paid holidays each year, during which they do not need to work but still receive their standard rate of pay (5 U.S.C. 6103). The ten holidays are the same every year:

1. New Year's Day
2. Martin Luther King, Jr.'s, birthday
3. George Washington's birthday (Presidents' Day)
4. Memorial Day
5. Independence Day
6. Labor Day
7. Columbus Day
8. Veterans Day
9. Thanksgiving Day
10. Christmas Day. (5 U.S.C. 6103)

For the holidays that fall on a “non-workday” or, in most cases, Saturday or Sunday, employees receive the workday immediately preceding the holiday as their paid holiday (5 U.S.C. 6103). Federal employees in the Washington, D.C., area also receive an administrative dismissal for Inauguration Day, which occurs every four years (5 U.S.C. 6103).

While it is required for federal offices to close on these holidays, private employers have more flexibility in the days they offer as paid holidays. Employers in the private sector are not required to observe any of the national holidays, though most observe the “standard six”: New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. Presidents Day, Good Friday, the Friday after Thanksgiving, Christmas Eve, and New Year’s Eve are also commonly observed and offered as paid holidays by private employers (Business & Legal Resources, undated; SHRM, 2016). On average, employers in the private sector offer eight paid holidays to their employees (BLS, 2017a), compared with the federal government’s offering of ten paid holidays, as summarized in Table 3.4. Some private employers who provided data for SHRM’s 2017 Holiday Schedules Survey also offer floating holidays, which employees can use as a paid day off when they wish, or the option to swap holidays, where they can work on a scheduled holiday in exchange for taking a different day off as a holiday (SHRM, 2016).

Table 3.4. Summary of Holiday and Annual Leave Benefits

	Holidays	Annual Leave	
	Number of Paid Holidays	Availability	Number of Days
Federal government	10	100 percent of employees	13–26 days (based on years of service)
Private sector	8 (on average)	89 percent of employees	10–20 days (based on years of service)

SOURCES: Federal government paid holiday data from 5 U.S.C. 6103; private-sector paid holiday data from BLS, 2017a; Federal government annual leave data from OPM, undated I; private-sector annual leave data from BLS, 2017c, and BLS, 2018d.

Annual Leave

With their immediate supervisor’s approval, federal employees “may use annual leave for vacations, rest and relaxation, and personal business or emergencies.” Employees accrue their leave at different rates, based on the type of employees they are and how many years of service they have provided. Full-time employees with less than three years of service accrue four hours for each pay period they complete—about 13 days per year—while those with three to 15 years of service accrue six hours for each pay period—about 19.5 days per year. Full-time employees with 15 years of service or more accrue eight hours of leave for each pay period, or about 26 days per year. There are a variety of accrual rates for part-time employees, employees on

uncommon tours of duty, and those in Senior Executive Service, senior-level, and scientific or professional positions. Before initial appointment, new employees can request that their previous work experience be used to advance their annual leave accrual rate. Each agency will have a procedure on the process for advanced accrual rate. Also, at the agency's discretion, annual leave can be advanced to employees ahead of their accrual rate, as long as the advanced amount is no more than the employees would accrue within the year and the employees will be returning to duty after taking their leave (OPM, undated l).

Annual leave can also be carried over into the following year, though the amount that can be carried over varies by employee type. Generally, federal employees stationed in the United States can carry up to 30 days over to the next year; members of the Senior Executive Service can carry over 90 days, and federal employees stationed overseas can carry over 45 days. Overall, the decision of how much, when, and for what reasons annual leave is used falls on the employee's supervisor to deconflict schedules for other employees' leave and work deadlines and to ensure minimum forfeiture of accrued days by an employee (OPM, undated l). Federal employees can also receive a lump-sum payment for any unused annual leave when they separate from federal service or if they enter active duty in the armed forces and elect to receive such a payment (OPM, undated f).

In the private sector, paid vacation is provided to 89 percent of those working in large establishments that would compare with the size of the Air Force (BLS, 2018d). Some private-sector organizations, like General Electric, LinkedIn, Netflix, and Virgin Group, offer unlimited paid vacation to employees, but this is a rare occurrence (Frohlich, 2015).¹ Like federal employees, private-sector employees often accrue their paid leave at different rates based on years of service. According to the BLS's 2017 Employee Benefits Survey, the average number of paid vacation days in the private sector is ten for employees with one year of service, 15 for those with five years of service, 17 for those with ten years of service, and 20 for those with 20 years of service (BLS, 2017c).

Sick Leave

Federal employees use their accrued sick leave for personal medical needs. Though accrual rates vary for different employee types, full-time federal employees accrue four hours of sick leave for each pay period—up to 13 days per year (OPM, undated i). There is no limit on the

¹ Frohlich (2015) lists seven private-sector companies that offer unlimited vacation for employees. Some organizations, such as Grubhub, offer unlimited paid vacation for all of their employees, whereas others only offer this benefit to a certain group of more senior employees—as is the case with General Electric. A list published by Glassdoor explains that these organizations approach unlimited paid time off in a variety of ways. Many require manager approval and tracking, while others do not keep track of the time employees take off, with the expectation that they are completing their work. While there is some concern about employees taking advantage of the policy, most organizations seem to make the decision to offer unlimited paid time off to exhibit trust in their employees and to shift the focus from number of hours worked to the actual work being produced (Glassdoor, 2020).

total number of sick leave hours a civilian employee can accrue. In addition to personal medical needs, federal employees can use their sick leave to care for family members with ongoing or sudden medical needs, for bereavement, and for reasons related to the adoption of a child, including before the adoption is finalized and after the child has been adopted (OPM, undated g; OPM, undated h). There are no limits for how much of their sick leave employees can use for their own personal medical needs, but there is a yearly limit of 13 days, or 104 hours, for family care and bereavement and 12 weeks, or 480 hours, for caring for a family member with a serious health condition (OPM, undated i). OPM provides specific definitions regarding family members, immediate relatives, and partners for whom sick leave can be used. It also sets rules for using sick leave to add to retirement service computation date (OPM, undated e).

While all federal workers have access to sick leave, paid sick leave is available to 87 percent of workers in large private-sector establishments that provided data (BLS, 2018d). The average private-sector employee receives between seven and eight paid sick days per year (BLS, 2017b). Table 3.5 summarizes the comparison of federal government and private-sector sick leave offerings.

Table 3.5. Summary of Sick Leave Benefits

	Availability	Number of Paid Sick Days
Federal government	100 percent of employees	13 days accrued per year
Private sector	87 percent of employees	7–8 days allotted per year

SOURCES: Federal government data from OPM, undated i; private-sector data from BLS, 2017b, and BLS, 2018d.

While federal law does not mandate sick leave, it should be noted that sick leave benefit offerings in the private sector are affected by state laws mandating paid sick leave. While the amount of paid sick leave required varies by state, private industry employees receive an average of seven paid days of sick leave per year (eight days at 20 years of service). Sick leave is also affected by company size, with employees in smaller organizations tending to receive fewer paid sick days compared with employees in larger organizations (BLS, 2018). The following states and the District of Columbia have laws mandating paid sick leave (Nagele-Piazza, 2019):

- Arizona
- California
- Connecticut
- Maryland
- Massachusetts
- Michigan
- New Jersey
- Oregon

- Rhode Island
- Vermont
- Washington (state)
- Washington, D.C.

Maternity and Paternity Leave

Civilian employees in the federal government can take up to 12 weeks of unpaid leave after the birth of a child. Prior to the signing of the fiscal year (FY) 2020 NDAA into law, civilian employees were not offered separate leave benefits for maternity or paternity leave but could use their Family and Medical Leave Act allotted time to care for a newborn child (OPM, 2015). The FY 2020 NDAA authorized maternity or paternity leave for federal civilian employees to follow the recent authorization of maternity or paternity leave for military members (Public Law 116-92). Regulations and implementation rules will need to be developed before this benefit can be implemented. Federal employees can also use their accrued annual leave as they please, though it must be approved by a supervisor (OPM, 2015). Civilian employees may *not* use sick leave to care for a healthy newborn child but may use their sick leave for taking care of a child with a routine illness or serious health condition, or to bring the child to and from medical appointments (OPM, 2015). As shown in Table 3.6, this puts federal employees on par with 87 percent of private-sector employees with unpaid family leave (Tian, 2016).

Table 3.6. Summary of Maternity and Paternity Leave Benefits

	Availability (Unpaid Leave)	Availability (Paid Leave)
Federal government	100 percent of employees	0 percent of employees
Private sector	87 percent of employees	12–34 percent of employees

SOURCES: Federal government data from OPM, 2015; private-sector data from SHRM, 2019d, and Tian, 2016.

Reports on paid maternity and paternity leave are somewhat conflicting. According to a 2016 report, only about 12 percent of employees in the private sector have access to paid maternity or paternity leave (Tian, 2016). However, the findings from SHRM’s 2019 survey on employee benefits across sectors show that 34 percent of participating organizations offer paid maternity leave and 30 percent of organizations offer paid paternity leave (SHRM, 2019d). Since these data do not separate the private sector from federal government organizations—along with state and local government, nonprofit, and public organizations—it is difficult to determine what the true prevalence of paid maternity and paternity leave benefits is like to be able to compare private and federal government offerings. While companies like Amazon, IBM, and Microsoft are lauded for their parental leave policies that allow up to 20 weeks of paid leave for employees (Lotze, 2019), this is far from common in the private sector. In fact, the small percentage of organizations

offering paid parental leave average between eight and 12 weeks of leave, with about 25 percent offering less than eight weeks of paid parental leave for employees (Ferrante, 2018).

The Family and Medical Leave Act applies to employees in private organizations (with 50 or more employees), public organizations (including local, state, or federal agencies), and public or private elementary and secondary schools (U.S. Department of Labor, 2012). It federally mandates 12 weeks of “unpaid, job-protected leave” for “certain family and medical reasons,” including the birth of a child and care for a newborn child (U.S. Department of Labor, undated). In addition, several states have laws mandating maternity-specific leave benefits, including California, Connecticut, Hawaii, Iowa, Kansas, Kentucky, Louisiana, Maine, Massachusetts, Minnesota, Montana, New Hampshire, New Jersey, New York, Oregon, Rhode Island, Vermont, and Washington, as does Washington, D.C. (Zintl, undated). The amount of leave mandated varies by state (and district), as do the requirements for pay, though many of the states do not require paid leave. In fact, paid parental leave is mandated for employees only in California, New Hampshire, New Jersey, New York, and Washington, D.C. (Bulger, 2019). When comparing maternity and paternity leave offerings from the federal government and the private sector, it is important to keep in mind that some figures on availability are affected by these state (and district) laws.

Leave Donation

Federal employees have two options for donating their accrued leave to other employees who may need it. A voluntary leave bank can be established by agencies (at their own discretion) to allow employees to contribute annual leave that they will not use to other employees who have used all of their available paid leave and need more to address a personal or family medical emergency (OPM, undated j). The Voluntary Leave Transfer Program allows for a direct donation of annual leave from one employee to another for the same reason. Additionally, employees can participate in both types of leave donation programs and may accept donated leave from both, when available. Unlike the Voluntary Leave Bank Program, agencies are required to administer a Voluntary Leave Transfer Program for their employees (OPM, undated k). According to respondents of a 2017 survey on employee benefits, very few organizations across the private, nonprofit, public, and government sectors offer a leave donation option; only 11 percent offer this option for vacation leave, and 7 percent for sick leave (SHRM, 2017).

Disability Insurance

Short-term and long-term disability insurance is offered to 42 percent and 34 percent, respectively, of private industry workers. Furthermore, of those with access to these forms of disability, 98 percent participate in their organization’s short-term disability insurance plan, and 96 percent participate in the long-term disability insurance plan (BLS, 2019). However, the federal government does not offer either forms of disability insurance to its employees. While

some options exist for federal employees to purchase their own supplemental policies, they are otherwise required to either use their available leave or to apply for disability retirement, and that comes with its own lengthy set of requirements (OPM, undated n). Federal employees with disabilities can also qualify for Social Security Disability Insurance, but they must meet the requirements to receive Social Security and their disability must fall under the Social Security Administration's definition of a disability (USAGov, 2020). Even with these options, employees working for the federal government do not receive nearly the same level of protection as those in the private sector if they are faced with a short-term or long-term disability that keeps them from being able to work.

Workers' Compensation

The Federal Employees' Compensation Act is administered by the Office of Workers' Compensation Programs of the U.S. Department of Labor, and it provides compensation benefits to civilian employees for disability due to personal injury sustained while in the performance of duty or to employment-related disease. The act also provides for the payment of benefits to dependents if the injury or disease causes the employee's death. Benefits cannot be paid if the injury or death is caused by the willful misconduct of the employee or by the employee's intention to bring about his or her injury or death or that of another, or if intoxication (by alcohol or drugs) is the proximate cause of the injury or death (U.S. Department of Labor, Office of Workers' Compensation Programs, undated). Each of the 50 states, the District of Columbia, and the U.S. territories has its own workers' compensation program, and there are several federal workers' compensation programs. There are no federal laws that set standards for the state workers' compensation programs, but there are a number of federal programs, such as the Black Lung Disability Trust Fund and the Longshore and Harbor Workers' Compensation, that insure workers in specific occupations (Weiss, Murphy, and Boden, 2019, pp. 5, i).

Because there is significant variation by and even within states regarding workers' compensation programs, it is difficult to provide a more general comparison of the level of benefits provided by companies in the private sector versus the federal government, although workers' compensation programs are designed to cover work-related injuries and illnesses in both sectors. The interested reader can review a report on workers' compensation that can help provide more detailed information in this area (Weiss, Murphy, and Boden, 2019).

Long-Term Care

Federal employees can apply for insurance coverage for their long-term care needs through the Federal Long-Term Care Insurance Program. This can be used "to help pay for costs of care when enrollees need help with activities they perform every day" or "have a severe cognitive impairment, such as Alzheimer's disease." Most federal employees are eligible if they are also eligible for the FEHB program, though they do not need to be enrolled in the FEHB program to

use Federal Long-Term Care Insurance Program (OPM, undated z). SHRM's 2019 Employee Benefits Survey found that 32 percent of participating organizations across private, nonprofit, public, and government sectors offered long-term care insurance to their employees, and 15 percent offered the option to purchase this insurance for family members (SHRM, 2019b).

Flexible Spending Accounts

The Federal Flexible Spending Account (FSA) Program is available for those employees in federal agencies that have adopted the Federal Flexible Benefits Plan. The program acts as a “savings account that helps . . . pay for items that aren't typically covered by [the] Federal Employees Health Benefits Plan, the Federal Employees Dental and Vision Insurance Program, or other health insurance coverage.” A Dependent Care FSA, offered as part of the Federal FSA Program, acts as an account for expenses related to young children or elder care (OPM, undated o). Those who utilize the Federal FSA Program can use pretax dollars to save an average of 30 percent on their health care expenses for personal, family, and dependent care expenses (OPM, undated an).

While nearly all civilians working in the federal government have access to an FSA, employers in the private sector are not required to offer this benefit, and many do not. According to a 2016 survey on Employer Health Benefits, 75 percent of large firms (more than 200 workers) in the public and private sectors offered FSAs to their employees, and only 12 percent of small firms (less than 200 workers) did so (Claxton et al., 2016). Data on FSA accessibility in the private sector are limited, but the BLS reports that 36 percent of employees in the private sector had access to a dependent care FSA in 2014 (Stoltzfus, 2015).

Child and Dependent Care

It is at the discretion of the federal agency as to which dependent care programs and policies they implement, so availability of these benefits varies across the federal government. These benefits fall into two broad categories: child care and elder and adult dependent care (OPM, undated aa). Agencies can offer things like “on-site child care, resource and referral services, and the child care subsidy program” to help parents employed by the government face the challenge of finding child care (OPM, undated b). For elder care, agencies might offer resources like support groups or emergency back-up care for elder caregivers, though all federal employees have access to their agency's work-life coordinator, who should be able to provide additional resources, and the “elder care locator” to help find local options for elder care (OPM, undated c).

According to a 2019 survey of SHRM members regarding employee benefits, child care and elder care options are limited across organizations in the private, nonprofit, public, and government sectors. The most common child care option offered by these organizations is the ability to bring a child to work in an emergency, offered by 25 percent of organizations. Eleven percent offer a child care referral service, 4 percent offer a subsidized or nonsubsidized

child care center on- or near-site, and 3 percent allow infants to be brought to work. Elder care options are even less common, with only 10 percent offering elder care referral services, 7 percent offering access to elder care services and information, and 6 percent offering on-ramping programs for those with elder care responsibilities, such as reduced schedule options (SHRM, 2019a).

The Employee Assistance Program

An Employee Assistance Program is another resource that can be used by federal employees dealing with a variety of “life challenges that may adversely affect job performance, health, and personal well-being to optimize an organization’s success.” In addition to helping employees locate resources that can help them work through their challenges, an Employee Assistance Program can include assessments and counseling, as well as referrals for additional forms of counseling for specific concerns, “such as stress, financial issues, legal issues, family problems, office conflicts, and alcohol and substance use disorders” (OPM, undated d). Employee Assistance Programs are offered by 92 percent of public employers, and only 74 percent of private employers, indicating that government employers might be more likely to offer Employee Assistance Programs than those in the private sector (Cournoyer, 2018).

Student Loan Repayment and Education Expense Support

Implemented as a recruitment and retention incentive, agencies (at their discretion) are able to repay student loans for candidates and current employees at rates of up to \$10,000 per employee per calendar year, and “a total of not more than \$60,000 for any one employee” (OPM, undated ai). OPM lists the Student Loan Repayment Programs of three agencies as “best practices” to follow for implementing such a program. The U.S. Securities and Exchange Commission (SEC), U.S. Department of Justice, and U.S. Department of State each determine eligibility of student loan repayment based on the employee’s position, the type of degree acquired, when the degree was acquired, and whether the employee will be able to make these repayments as promised (OPM, undated aj).

According to participants in SHRM’s 2019 Survey on Employee Benefits, only 8 percent of employers across sectors offer student loan repayment assistance. While this is an uncommon benefit, it has doubled in prevalence from 2018, when only 4 percent of organizations offered it to their employees (SHRM, 2019e).

An American Student Assistance survey of “young workers” and HR managers found that 56 percent of participating workers between the ages of 22 and 33 worry either often or all of the time about repaying their student loans. The same survey found that 86 percent of these workers would spend five years with an employer in exchange for assistance with repaying student loans (American Student Assistance, 2017). While private-sector employers are less likely to offer student loan repayment for employees, there has been an increased response to the trend toward offering these benefits in the last year.

Alternative Work Methods and Schedules

To meet the growing demand among both private-sector and federal government employees for flexibilities to allow for work-life balance, employers can offer more flexible alternatives for work, such as telework and alternative work schedules. We describe some of those options below.

Telework

Federal agencies can allow their employees to work remotely, at the agency's discretion. This can be done on a routine basis, "as part of an ongoing, regular schedule," or situationally, on a case-by-case basis (OPM, 2011). Employers in the private sector are more likely than those in the public sector to offer telecommuting as an option, either full-time (26 percent versus 10 percent, respectively) or part-time (38 percent versus 24 percent; Cournoyer, 2018). While it should be acknowledged that this is not always an option for many Air Force civilians due to the nature of their work, for those in roles that could be filled away from the office, it should be considered.

Alternative Work Schedules

The basic 40-hour workweek in the federal government holds employees accountable for five consecutive eight-hour workdays. Alternative work schedules allow for more flexibility, which gives federal employees greater control of their time to better balance work and family responsibilities (OPM, undated t). While not all agencies and positions lend themselves to alternative work schedules, those that do can pursue two options: flexible work schedules and compressed work schedules.

In flexible work schedules, full-time federal employees must work 80 hours for each biweekly pay period, but the timing of when this work is completed can vary at the discretion of the employee and the agency (OPM, undated s). For example, an employee can work five consecutive ten-hour workdays, followed by five consecutive six-hour workdays, for a total of 80 hours in a pay period. According to a 2019 SHRM survey on employee benefits, 57 percent of participating organizations across the private, nonprofit, public, and government sectors allow their employees to utilize flexible work schedules (SHRM, 2019d).

The other type of alternative work schedule available to some federal employees is a compressed work schedule, which requires 80 hours of work in less than ten workdays in a biweekly pay period (OPM, undated r). An example of this would be an employee working four consecutive ten-hour workdays each week. Thirty-two percent of organizations across private, nonprofit, public, and government sectors offer the option of compressed work schedules (SHRM 2019d).

Conclusions

Federal employees are afforded a number of benefits, including a broad selection of health insurance policies to match any situation, multiple retirement options, flexibilities for leave and work schedules, and resources for dependent care and other personal circumstances. However, when looking at additional benefits offered in other industries and organizations, we see that there may be gaps in things that are appreciated, and sometimes even perceived as required, by today's and the next generation's workforce. In reviewing current and potential benefits, it may wish to add in the future, the Air Force may want to look at the industries with higher benefit satisfaction ratings for examples. Overall, finance, IT, and manufacturing are the industries in which workers had the highest satisfaction with their benefits packages, according to data collected by Glassdoor (Tian, 2016). For civilian workers in these specialties, particularly, it would be valuable to assess the benefits offered in these industries and in some FIRREA agencies and examine the feasibility of offering a version of them to encourage both recruitment and retention in the civilian workforce.

As we will discuss later in this report, many benefits that are offered are also not well advertised to job seekers. The Air Force should explore how to best emphasize the current benefits available to civilian employees in job vacancy announcements and when advertising for civilian jobs. Addressing availability and adequately budgeting for these benefits in a way that encourages private-sector employees to enter the civilian workforce and Air Force civilians to continue their civil service can go a long way.

4. Air Force Mission Critical Occupations

For the Air Force to achieve its strategic objectives and carry out its national defense mission, it needs civilian personnel with the right set of skills and qualifications. In recent years, as a significant share of civilian employees have become eligible to retire and the competition with the private sector for critical skills has intensified (GAO, 2016), the Air Force—similar to other agencies across the federal government—has experienced a shortage of qualified civilian personnel in occupations deemed mission critical to the service. In time the cumulated effect of these shortages is likely to put in danger the Air Force’s ability to carry out its mission successfully, and for this reason it needs to take action to address at-risk occupations. With the exception of the Aircraft Mechanic occupational series, the occupations included in the current study have been designated as mission critical.

To provide context for the MCOs included in this report, this chapter reviews the main definitions of MCOs used by OPM, DoD, and the Air Force and then discusses the process by which MCOs are determined across each of the three organizations. We then review the implications (particularly within the Air Force) of designating an occupation as mission critical.

Defining Mission Critical Occupations

OPM defines MCOs as “occupations agencies consider core to carrying out their missions. Such occupations usually reflect the primary mission of the organization without which mission-critical work cannot be completed” (OPM, undated am). Along similar lines, in the FY 2018–FY 2019 DoD Civilian Human Capital Operating Plan (HCOP), DoD defines an MCO as “an occupation having the potential to put a strategic program or goal at risk of failure related to human capital deficiencies” (DoD, 2018b, p. C-6), while in previous iterations of its Strategic Workforce Plan (2013–2018), DoD defined MCOs as “occupations or occupational groups that set direction, directly impact, or execute performance of mission-critical functions or services” (GAO, 2014a, p. 8). The latter is the definition that the Air Force is currently using for MCOs (AF/A1C, 2019b).

DoD includes in its MCO list series that “present recruiting and retention challenges” (GAO, 2014a, p. 8). The department removes an MCO from the list when the competency or resource gap for the respective occupational series has been addressed.

During numerous conversations, the Air Force civilian personnel leadership explained the process the Air Force uses to remove MCOs from its list, which is different from the DoD process. For the Air Force, given the focus of the definition on occupational groups with a direct impact on the execution of mission critical functions or services, an occupational series is removed from the MCO list only when targeted hiring and retention efforts resulted in recruiting and keeping employees that met the new educational requirements, or when a combination of

strategies resolved the resource gap. An occupation can also be removed when it is no longer deemed necessary to the performance of a function deemed critical to the accomplishment of Air Force missions. For instance, if the Information Technology Management occupational series would stop being vital to the Air Force’s ability to successfully carry out its mission, then the Air Force would remove the occupational series from its MCO list. Meanwhile, the Air Force will continuously monitor the occupational series (and all other occupational) series included on the MCO list, and it will rank them according to the level of risk they experience.¹

Determining Mission Critical Occupations

OPM, DoD, and individual components—such as the Air Force—determine which MCOs are relevant at the federal, department, and component or agency levels. OPM identifies the skill gaps in the federal workforce that have governmentwide “significant programmatic impact” (GAO, 2015, n.p.).² The office generally identifies broad occupational categories, and in its update in April 2016 identified six occupational series as being mission critical across the federal government (Cobert, 2016b). DoD identifies occupational series that it considers mission critical across the entire department, which includes the three military departments (i.e., Air Force, Army, and Navy,) and the so-called Fourth Estate (DoD, undated).³ The 2019 DoD MCO list includes 33 MCOs (AF/A1C, 2019b; GAO, 2014a).⁴ The Air Force and the other DoD components also identify MCOs that are specific to the accomplishment of their individual mission (Cobert, 2016c). As of January 2019, the Air Force has identified 34 occupational series as mission critical, covering approximately 52,500 employees or 41 percent of their civilian employees. (For a list of OPM, DoD, and Air Force MCOs, see Appendix D.) The number of MCOs in a component is subject to change as they continue to review their agency requirements.

It is important to note that there is no requirement that these lists overlap or aggregate. For example, the DoD MCO list does not have to include all the MCOs included on the Air Force list, and the OPM list does not have to include all the occupations on the DoD list if it has been

¹ For more details regarding the three levels of risk in which Air Force MCOs can be categorized, see the section “Air Force Determination of Mission Critical Occupations” in this chapter.

² Based on the definition included in the Strategic Human Capital Management High Risk Initiative of the OPM and Chief Human Capital Officers Council (CHCOC), which is cited in a 2015 GAO report, “a skills gap may consist of one or more of the following: a (1) ‘staffing gap,’ in which an agency has an insufficient number of individuals to complete its work, such as a lack of contracting officers within its workforce; and/or a (2) ‘competency gap,’ in which an agency has individuals without the appropriate skills, abilities, or behaviors to successfully perform the work, such as an information technology workforce without up-to-date cybersecurity skills” (GAO, 2015, pp. 1–2).

³ The Fourth Estate includes “the Office of the Secretary of Defense, the Office of the Chairman of the Joint Chiefs of Staff and the Joint Staff, the Defense Agencies, the DoD Field Activities, and all other organizational entities in the DoD that are not in the Military Departments or the Combatant Commands” (DoD, 2017, p. 2).

⁴ In line with the provisions of the DoD Civilian HCOP for FY 2018–FY 2019 (DoD, 2018b), DoD was, at the time of this report’s writing, in the process of updating its MCOs list. The RAND team was able to preview an updated draft MCO list, which included 33 MCOs, and which are presented in Table D.2 in Appendix D.

determined that there is no skill gap at those broader levels. For example, while there is some overlap across OPM, DoD, and Air Force MCOs, there are some MCOs that are Air Force and DoD specific and not captured in any of the general OPM-identified categories. Table D.2 in Appendix D provides an overview of the Air Force MCOs, how those MCOs compare with the other DoD components, and how they compare with the MCOs for OPM and DoD. Overall, there are four occupational series that are mission critical specifically for the Air Force and 11 that are mission critical for the Air Force and at least one other military department (e.g., the Army or the Navy) but have not been identified as critical across the entire DoD or the federal government.⁵

Two of the Air Force occupational series on which we focus in this study—Human Resources Management (GS-0201), and Information Technology Management (Cyber) (GS-2210)—are included in the updated DoD list (AF/A1C, 2019b) and in the latest OPM revalidation of governmentwide high-risk missions critical occupations (Cobert, 2016b).⁶ Also, with the exception of the Aircraft Operations and Aircraft Mechanic occupations series, each of the remaining three series discussed in this study overlaps to some extent with the series included in the MCO lists for the other three DoD components. For instance, the Human Resources Management occupational series is also included on the MCO lists for the Navy and the Fourth Estate; the Air Traffic Control occupational series is included on the Army MCO list, and the Information Technology Management occupational series is an MCO across all four DoD components.

The lack of overlap at the DoD level is a point of concern for the Air Force. For example, the Aircraft Operations occupational series is mission critical for the Air Force, and without pilots not only is the mission of the Air Force endangered but also the overall national security mission of DoD. However, the Aircraft Operations series is not included in the DoD MCO list. As this example demonstrates, not all Air Force MCOs make it onto the DoD MCOs list (no matter how critical some of them are for the Air Force and the overall functioning of the department) and not all DoD MCOs are included on the Air Force list if the occupation is not mission critical for the department or if there are no resource or skills gaps within the Air Force for the respective occupational series. A similar situation occurs in the case of OPM-determined critical occupations, which is discussed in the following section.

⁵ For more details, see Tables D.2 and D.3 in Appendix D.

⁶ Information Technology Management (Cyber) (GS-2210) is not explicitly cited in the OPM 2016 memorandum, but it is included in the science, technology, engineering, and mathematics functional area, which is one of the five areas OPM identified as representing high-risk, mission critical series.

Office of Personnel Management Determination of Mission Critical Occupations

In support of OPM's efforts to identify and predict current and future skills gaps, the CHCOC established a working group in September 2011 (DCPAS, 2019) that "identified skills gaps in six government-wide, mission-critical occupations" (GAO, 2015, p. 8); these were then revalidated in an April 2016 memorandum as representing high-risk MCOs across the federal government (Cobert, 2016b). OPM also attempts to identify emerging skills gaps, but according to a GAO report, individual agencies have uneven capacity to assess workforce competency gaps. This has an impact on OPM's ability to identify "emerging cross-agency skills gaps" (GAO, 2015, n.p.).

In response to the recommendations issued in the 2015 GAO report, by 2017 OPM and the CHCOC "improved the method that agencies use to identify mission-critical occupations with skills gaps" (GAO, 2017a, p. 65). Previous efforts were not grounded in quantitative analysis and did not use "workforce analytics, such as employee attrition rates, until after it had already selected an initial set of occupations based on qualitative methods" (GAO, 2017a, p. 65). In response to these concerns, OPM and the CHCOC worked with the agencies to implement a "quantitative multi-factor model—which included the 2-year retention rate, the quit rate, retirement rate, and average manager satisfaction with applicant quality" and to refine and narrow down the scope of governmentwide and agency-specific skill gaps (GAO, 2017a, p. 65).

As a result, the quantitatively driven process revalidated the previously identified mission critical skills gaps in six governmentwide occupational areas: cybersecurity; acquisition; HR specialist; auditor; economist; and science, technology, engineering, and mathematics. Subsequently, OPM and the CHCOC asked individual federal agencies to use the same data-driven process to internally identify two to three occupations for which skills gaps existed (GAO, 2017a, p. 65). For this narrow pool of occupations, they worked with the agencies to establish working groups in which the root causes behind the gaps in skills were analyzed. Afterward, they developed "strategies to address skills gaps through action plans and monitor progress in closing skills gaps within each occupation" (GAO, 2017a, p. 66).

Department of Defense Determination of Mission Critical Occupations

Following the NDAA for FY 2006 (Public Law 109-163), in November 2007, DoD submitted the Civilian Human Capital Strategic Plan: 2006–2010 and the corresponding implementation plan, which identified 25 MCOs.⁷ They represented occupations that were

⁷ Previous strategic plans for civilian personnel were known as Civilian Human Resources Strategic Plans. The change in terminology took place in 2006, with the 2007 plan being known as the Civilian Human Capital Strategic Plan. For details, see DoD, 2006, p. 59. The 25 MCOs identified were "general engineering, civil engineering, computer engineering, electronics engineering, physical scientist, mathematician, computer scientist, physician, nurse, pharmacist, security administration, police officers, intelligence, foreign affairs, international relations, language specialist, financial management, accounting, auditing, budget analysis, logistics management, contracting, quality assurance, information technology management, and human resource management." GAO, 2008, p. 6, n. 12.

determined on the basis of qualitative analysis (GAO, 2008, p. 11) to be “key to current/future mission requirements and presented a challenge regarding recruitment and retention rates and for which succession planning was needed” (U.S. House of Representatives, 2011, p. 6). The updated DoD MCO list presented in the 2013–2018 Strategic Workforce Plan included 32 MCOs (GAO, 2014a, p. 8), while the most recent list from 2019 includes 33 MCOs (AF/A1C, 2019b).

In its assessment and prioritization of which occupations are mission critical across the entire department, DoD considers the extent and manner in which an occupation has an impact on the mission (i.e., strategic, core, support); staffing gaps; strength; losses; use for the 3Rs; special hiring authority use; long vacancy windows; whether the occupation employs more than ten individuals; whether the occupation links to the Agency Strategic Plan and to initiatives mentioned in the HCOP; and the extent to which MCOs overlap across DoD components. The linkages to strategic documents and to HCOP initiatives are used to justify the MCO status (DoD, 2018a). The FY 2017 NDAA requires DoD to revalidate and update its list of MCOs every two years (DCPAS, 2019).

For instance, if an occupation is identified as mission critical across the Air Force, Army, Navy, and the Fourth Estate, then it is added to the list of DoD MCOs. But DoD reserves the right to conduct its own assessment and add to its MCO list occupations deemed mission critical only by the military department or a combination of any one or two of the military departments and the Fourth Estate. At the end of the assessment process, a maximum of 10 percent of the total occupations assessed can be designated as mission critical (AF/A1C, 2019b). According to information the RAND team received from an Air Force civilian personnel functional expert, the 10-percent threshold is based on guidelines the Human Capital Institute recommended to DoD as appropriate for scoping MCOs.

Interviews with force management analysts within the Air Force also revealed that if an MCO is not included on the DoD list, and if it is a single military department’s problem, that military department has to first figure out and use the tools it already has available (e.g., incentives to recruit and retain) to solve the matter before going to OPM to ask for relief. However, if the problem is broader, and more than one military department encounters difficulties hiring and retaining and/or achieving required competencies and proficiency levels in the critical occupation, it is easier to argue that the matter requires a higher-level solution that involves asking OPM for a new authority that would relieve the pressure on the respective military departments.

Each DoD MCO is placed into one of the following three categories—strategic, core, or support—which are defined as follows:

- strategic MCOs “have a direct impact on the performance or delivery of mission specific functions or services” and they “directly influence performance of DoD/AF [Air Force] strategic priorities”

- core MCOs are those “occupations or competencies that execute the agency mission functions or services to ensure operational performance,” and they “may indirectly link to the strategic documents”
- support MCOs are “necessary to maintaining internal processes underlying strategic and core agency-specific functions,” but to be declared mission critical a support occupation requires career field, DCPAS, and deputy assistant secretary of defense approval. (DCPAS, 2019, p. 7)

Across the entire component and DoD workforce, only 5–10 percent of occupational series can be considered strategic; 15–20 percent are considered core; and 60–75 percent are considered support. These percentages are based on industry standards for workforce segmentation (DCPAS, 2019, p. 6). On the most recent DoD MCO list, out of 33 MCOs identified, 18 are considered strategic and 15 core, with no support occupational series being included (AF/A1C, 2019b).

Air Force Determination of Mission Critical Occupations

For the Air Force, MCOs are occupations that are essential to the current or future mission of the organization and for which there is a shortage of personnel resulting from difficulties in recruitment and retention. Then the associated risk level is determined based on several factors based on gaps in skills and HR deficiencies. Depending on the role they play, MCOs are further classified as strategic, core, or support. The definitions of and percentages of occupational series that can be deemed strategic, core, and support MCOs within the Air Force are identical to the DoD requirement as described above (AF/A1C, 2019b). In the latest Air Force MCO list, out of 34 MCOs, 20 occupational series were deemed strategic and 14 core; no support occupational series have been included on the list (AF/A1C, 2019b; U.S. Air Force, 2018b). As has been previously mentioned, the Air Force list will change over time.

The DoD MCOs are to be identified in the agency’s Human Capital Framework, which OPM mandates and inspects. Once its MCOs are identified, the Air Force must develop mitigation strategies, which are usually laid out in the agency’s Strategic Workforce Plan.

Based on a review of internal Air Force documents and interviews with force management analysts, we found that the Air Force identifies occupational series as an MCO if not filling those positions would result in mission failure. These occupations are also included if they are at risk or likely to become at risk due to lack of resources or required capabilities, competencies, or training. The Air Force places each occupational series into one of three categories—strategic, core, and support—with strategic occupational series being more likely to be included on the final MCO short list. Subsequently, to determine the level of risk—which can be high, medium, or low—the Air Force engages in an assessment of resource and skill gaps. To identify gaps in resources, the Air Force examines staffing gaps (people, skills, etc.); strength (authorized versus assigned/funded and unfunded authorizations); losses; retention; incentives usage (the 3 Rs); student loan repayments; special hiring authority usage; and ratio of applicants per position

across occupations and locations. Afterward, to identify the gap in skills, the Air Force scrutinizes whether the existing personnel are adequately trained and developed to fulfill the mission. This assessment of gaps in resources and skills and how critical an occupation is to the Air Force's mission is currently a qualitative judgment call from a team of Air Force career functional managers and HR specialists. According to force management analysts, the Air Force does not currently have in place written procedures and standards. Therefore, it would be helpful to have an Air Force policy document that specifies thresholds for attrition rates that are considered when determining whether an occupation is mission critical or not. An Air Force guide codifying the process for MCOs and high-risk determination is being written, but at the time of this report, the study team did not have an opportunity to review the draft.

During the MCO risk assessment process, additional factors are being considered, such as the level of funding available; the competition for talent in the local market; the local or nationwide shortage of available skills required for each occupation; the OPM qualification standards in place; other legal requirements (e.g., NDAA mandates, executive orders, changes in legislation); and the desirability of the geographic location (AF/A1C, 2019b, p. 5). Last but not least, the assessment also takes into account whether the risk is Air Force-wide, career-field-wide, regional, or local (AF/A1C, 2019b, p. 5).

While under the FY 2017 NDAA the Air Force and the other DoD components are mandated to revalidate and submit to DoD an updated list of MCOs every two years, according to Air Force personnel analysts internal (but not necessarily formal) directions within the Air Force are for the list of MCOs to be updated in “real time” or as often and as soon as gaps in resources and skills are detected and the occupation is determined to have become high risk.

The Implications of Declaring an Occupation as Mission Critical

Air Force civilian personnel managers stated that designating an occupational series as mission critical signals that it should be assessed for degree of risk and managed accordingly. Once the Air Force identifies the potential MCOs and prioritizes among them to arrive at a manageable short list, it then attempts to identify the root causes for the high-risk and medium-to high-risk MCOs. For the MCOs that are considered to be at high risk or “unhealthy,” the Air Force is required to identify the root causes of the problem and to adopt and implement mitigating strategies that address them and reduce the gap in resources or skills. Such a requirement is not present for other occupations in which shortages in personnel or gaps in skills exist.

Although not an exhaustive list, some of the tools that the Air Force can leverage to address identified issues include

- direct hire authority
- special salary rates

- internship programs (one of three Pathways initiative components)⁸
- student loan repayment
- 3R incentives
- permanent change of station (PCS) assistance
- training and development programs.

Although some of these tools are available to all occupations regardless of MCO status, other flexibilities such as direct hire authority and special salary rates give an edge to MCOs that come to be considered high risk over other occupational series where recruitment and retention issues are present. We now present brief overviews of each tool, noting that we have already provided details on some of these tools or flexibilities in Chapters 2 and 3.

Direct Hire Authority

Agencies currently have the ability to request a direct hire authority to fill “a position or group of positions where OPM has determined that there is either a severe shortage of candidates or a critical hiring need for such positions” (GAO, 2016, p. 6). DoD has also been authorized the use of a number of DoD specific direct hire authorities through separate statutes. The purpose of the direct hire authority is to expedite the traditional hiring process by eliminating competitive rating and ranking procedures (U.S. Air Force Manpower and Reserve Affairs, 2018), which are part of the competitive hiring authority included in Title 5 (GAO, 2016, p. 6). According to Air Force HR specialists, when using direct hire authority, the Air Force is able to recruit and hire qualified candidates quicker than through the traditional competitive hiring process.

Special Rates

As was explained in Chapter 2, special rates represent a higher rate of basic pay that OPM sets up “to address existing or likely significant handicaps in recruiting or retaining well-qualified employees” in an occupational series “specialty, grade-level, and/or geographic area” (OPM, undated ab). To obtain a special rate table, the Air Force is required to submit to OPM documentation justifying the request, such as “evidence reflecting recruitment and retention challenges for the specific position(s), previous efforts to address the problem, and the basis for requested payment amounts” (GAO, 2017b, p. 6). OPM approval is required before a special rate table is published.

⁸ Pathways is an OPM initiative aimed at recruiting students and recent graduates into federal public service. Pathways has three core programs: the Internship Program; the Recent Graduates Program; and the Presidential Management Fellows Program. OPM, undated ai.

Internship Programs

Based on interviews the RAND team conducted with Air Force recruiters and supervisors, the Internship Program (OPM, undated w), used Air Force–wide for student placement, represents one of the tools that the Air Force has at its disposal to recruit and train students who are still in college (or in vocational training programs) and who may be hired into MCOs upon graduation. This allows the Air Force to have a pool of readily trained candidates who are familiar with the organization and with the basic tasks they need to perform on the job once they are hired into full-time positions upon graduation.

Student Loan Repayment Program

The Student Loan Repayment Program for federally insured student loans is one of the recruitment and retention flexibilities the Air Force uses for MCOs, but also for positions for which it would encounter difficulties hiring or retaining employees in the absence of such a program (Air Force Instruction 36-802, 2012). It is one of the most frequently used OPM flexibilities. In 2015 the program was widely used across government agencies for employees in MCOs, and DoD was one of the top five agencies that most frequently used the student loan repayment authority for MCOs (GAO, 2017b, p. 16).

Recruitment, Relocation, and Retention Incentives

As was discussed in detail in Chapter 2, the Air Force has at its disposal the ability to offer 3R incentives to support and improve MCO recruitment and hiring. Interviews with Air Force Personnel Center (AFPC) recruiters revealed that among the 3Rs, recruitment and retention bonuses are the two most used incentives, with relocation bonuses a distant third, as they are seldom offered.

Permanent Change of Station

PCS payment represented the most prevalent flexibility upon which the Air Force relies to attract and hire personnel for hard-to-fill occupations and MCOs. A PCS is an assignment of a new appointee to an official station or the transfer of an employee from one official station to another on a permanent basis (U.S. General Services Administration, undated). Payment for PCS means that the Air Force would pay for the cost of the move. PCS and 3R incentives are critical tools to have when recruiting and ultimately hiring staff for geographically remote areas where a limited pool of expertise is available (Air Force Instruction 36-802, 2012).

Air Force recruiters at the AFPC mentioned that in their absence, the Air Force encounters difficulties hiring at air bases in Alaska or at Laughlin Air Force Base (AFB), Texas, where few suitable candidates usually apply, for example. Concern was raised that the 2018 change in tax law that makes moving expenses subject to income and employment taxes (Internal Revenue Service, 2018) might further limit the number of personnel willing to move to hard-to-fill locations once they find out that the PCS payments are now taxable, however.

Training and Development

Providing on-the-job training, technical training, continuing education, and other professional development opportunities are additional strategies that can be used to help retain qualified personnel. However, we were told by Air Force representatives that training and development opportunities are often limited by the budget available to the Air Force for such activities, and they are usually the first ones to suffer when budget cuts take place.

Conclusions

As of January 2019, the Air Force has identified 34 occupational series that are mission critical, covering 41 percent of its civilian workforce. The most recent DoD MCO list has 33 occupations, and OPM's MCO list contains six occupational series and areas that are mission critical department- and governmentwide. Human Resources Management and Information Technology Management (two of the five occupational series on which we focus in this report) are included on both the DoD and OPM MCO lists, while the Aircraft Operations occupational series is an Air Force-specific MCO and is not captured on the MCO lists of any of the other DoD components.

The Air Force generally follows DoD guidelines to identify MCOs, but it still lacks a formalized written policy that explicitly states the internal standards and procedures to follow in the process of identifying and designating MCOs. The Air Force currently identifies the occupational series that would lead to mission failure were they to be designated high risk. These series are placed into three distinct categories—strategic, core, and support—depending on their contribution to the Air Force's mission. Occupational series categorized as strategic are more likely included on the final Air Force MCO short list, which—based on DoD guidelines—can incorporate a maximum 10 percent of the service's total occupational series. The Air Force is mandated to revalidate and update the MCO list every two years, but internal directives indicate that the list be updated in real time as soon as an occupational series has become classified as high risk.

Once an occupational series is declared an MCO, the Air Force pays additional attention to the series and provides closer monitoring and assistance to address the root causes driving the shortage in resources or skills for the series. During the interviews RAND conducted in the spring of 2019 with Air Force recruiters and program specialists, we found that the Air Force uses a combination of available tools and flexibilities such as direct hire authorities, special salary rates, student internship programs, student loan repayments, 3R incentives, PCS, and training and development programs to boost recruitment and retention for MCOs. At the same time, the Air Force has to take into account the funding necessary, statutory limitations associated with the respective flexibilities, and the tax implication to the employee. In addressing issues related to the department's critical hard-to-fill occupations and MCOs, it should consider process and policy changes, collaboration with OPM, and development of supporting data to

justify change, as well as increased funding (both centrally and at the local level) to support training, incentives, and PCS costs.

In Chapters 5–9 we will describe our key study findings related to five select hard-to-fill or mission critical occupations series: Aircraft Operations, Air Traffic Control, Human Resources Management, Information Technology Management (Cyber), and Aircraft Mechanic.

5. Aircraft Operations: Pilots and Simulator Instructors

An Overview of the Occupation

The OPM *Handbook of Occupational Groups and Families* describes the Aircraft Operations (GS-2181) occupational series as all positions primarily involved in

(1) piloting or copiloting of aircraft to carry out various programs and functions of federal agencies; (2) providing ground and flight instruction and in-flight evaluation in the piloting of aircraft; (3) flight testing of developmental and modified aircraft and components; (4) in-flight inspection and evaluation of air navigation facilities and the environmental conditions affecting instrument flight procedures; and (5) performing staff work concerned with planning, analyzing, or administering agency aviation programs, where the work requires primarily the application of pilot knowledge and skills.¹ (OPM, 2018b, p. 121)

Within the Air Force, this occupational series includes positions involved in flying aircraft as well as positions responsible for aircraft simulator training. (This chapter does not cover flying remotely piloted vehicles.)

As was noted in Chapter 4, the Aircraft Operations occupational series is an Air Force-specific MCO and is not included in the MCO list for the other DoD Components (e.g., the Army, Navy, and Fourth Estate). The series is included in the Air Force MCO list given the importance of these positions to the overall Air Force mission and because the department is experiencing a shortage of both civilian pilots and simulator instructors. The pilot shortage in the Air Force is not unique to civilian positions alone, however, and is an issue that the active duty Air Force is addressing as well (see Mattock et al., 2019; Robbert et al., 2015; Schulker and Terry, 2018). To this end, several working groups have been put in place over the past few years to determine what can be done to improve recruitment and retention for pilots across the total force.

As of March 2019, Air Force civilian personnel records indicate that there are a total of 996 civilian personnel in the Aircraft Operations occupational series within the Air Force (a total that includes dual military/civilian technicians in the AFR or ANG). This represents roughly 34 percent of all aircraft operations positions within the federal government, with June 2018 data from FedScope indicating that there are a total of 2,950 aircraft operations personnel across the federal government (OPM, 2019d).²

¹ This occupational series also includes positions under alternative pay systems, but, for simplicity, we only denote the GS system.

² In the absence of availability of official data as of March 2019 for the total number of aircraft operations personnel in the federal government, the total number used is based on the latest June 2018 FedScope data.

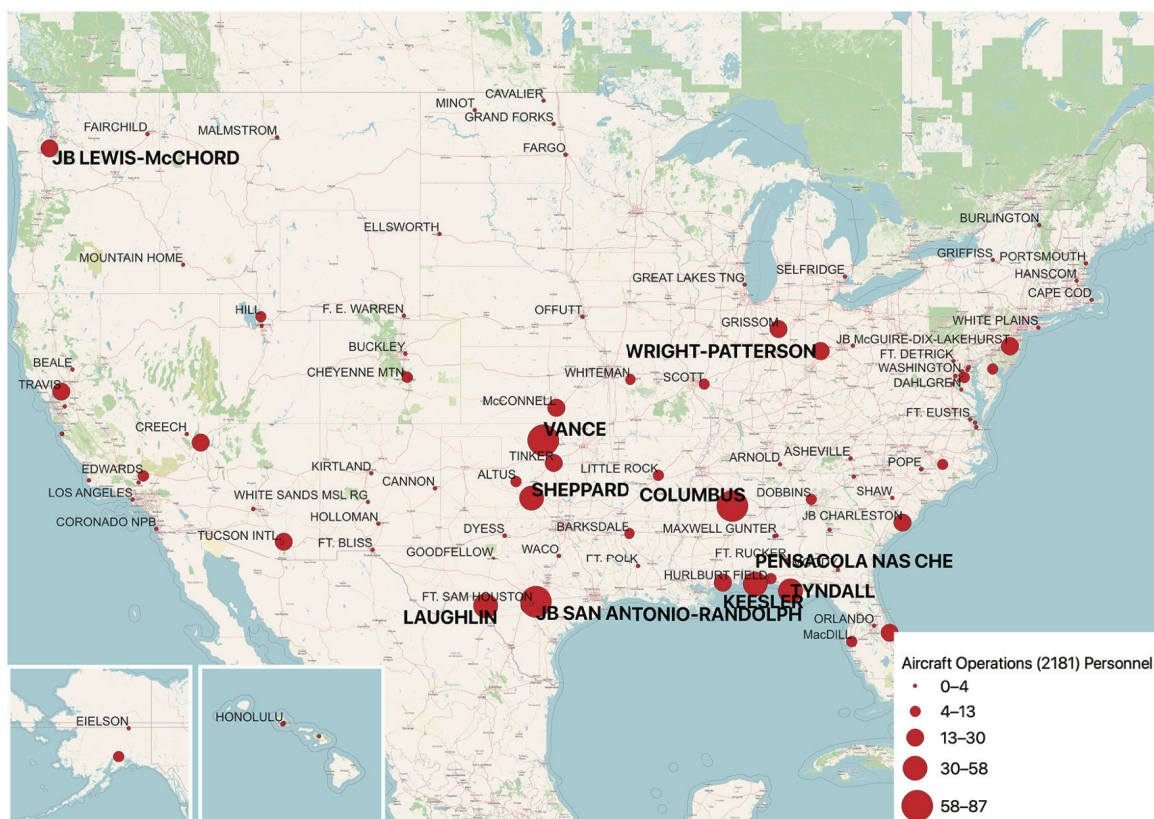
As Table 5.1 shows, 50 percent of all civilian personnel in Air Force aircraft operations positions are dual military/civilian technicians in the AFR. The highest concentration of non-dual-status personnel are under AETC (41 percent of all civilian personnel). As Figure 5.1 shows, personnel are most concentrated across key AETC training bases, including Columbus, Laughlin, Joint Base San Antonio–Randolph, Sheppard, and Vance AFBs.

Table 5.1. Aircraft Operations Personnel, by Air Force Organization

Air Force Organization	Number of Civilian Personnel	Percentage of Total Civilian Personnel
ACC	48	5
AETC	408	41
AFMC	36	4
AFRC	495	50
AFSOC	4	<1
AMC	5	1

SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

Figure 5.1. Location of Air Force Aircraft Operations Personnel Across the United States



SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

Aircraft Operations Compensation

As Table 5.2 shows, the majority of Air Force personnel within the Aircraft Operations occupational series are at the GS-12 and GS-13 (or equivalent) pay grades (87 percent combined). However, there are also 35 personnel (4 percent) in positions that do not follow the GS pay grade structure and instead are part of the AcqDemo (NH positions) pay banding system for compensation. As was discussed in Chapter 2, the pay banding system allows the Air Force more flexibility in the pay offered upon recruitment as well as bonuses and rewards for good performance. All of the pay band positions within the Aircraft Operations occupational series are under AFMC.³ In our discussions with AFMC representatives, they described appreciating the flexibility that was offered with the pay banding system. At the time of this report, however, they were in the process of converting their current AcqDemo positions for pilots back to the GS pay system, as they were able to pay them more with the current special salary rates offered than they could under AcqDemo (see the “Special Rates” section below).

Table 5.2. Air Force Aircraft Operations Personnel, by Pay Grade

Pay Grade	Number of Civilian Personnel	Percentage of Civilian Personnel
GS-11	<10	<1
GS-12	386	39
GS-13	480	48
GS-14	94	9
NH-03	<10	1
NH-04	30	3

SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

NOTE: GS positions include any designated GG positions at the equivalent pay grade.

Special Rates

To help address difficulties in recruiting and retaining aircraft operators, there are already established special rates to increase compensation beyond the standard pay associated with the GS pay levels above. As was described in Chapter 2, a special rate is a premium pay established by OPM for a group or category of FWS or GS positions in one or more geographic areas to help address difficulties in recruiting or retaining well-qualified employees. To address pay gaps for the Aircraft Operations occupational series, there are 12 special rate tables for aircraft operator positions, with each table establishing special salary rates for a specific geographic area. The aircraft operator positions included in these tables must be filled by individuals assigned to a

³ Due to the AFMC’s mission, these positions can be under the AcqDemo pay structure.

“position that requires piloting of aircraft.” In addition, there is one table—Table 0769, for Aircraft Operator (Simulator Instructor)—that is limited to “simulator instructors and their supervisors” (OPM, 2019c). A full list of special rate tables for aircraft operators is provided in Appendix E.

The special rate tables for aircraft operator positions reflect and vary by LPA and vary somewhat by agency. Most aircraft operator rate tables cover positions in the Air Force, Department of Energy, Department of State, Federal Bureau of Investigation (FBI), National Aeronautics and Space Administration (NASA), and U.S. Marshals Service.

The tables for aircraft operator positions also cover multiple occupations. For example, Special Rate Table 0759 includes all of the occupations listed in Table 5.3. We note that aircraft operators should not be considered in a vacuum; in some locations they share rates with other occupations, which speaks to hiring/retention issues in the geographic area rather than single occupational issues.

Table 5.3. Series Covered by Special Rate Table 0759 (San Jose–San Francisco–Oakland)

Series	Occupation Name
0018	Safety and Occupational Health Management
0301	Miscellaneous Administration and Program
0340	Program Management
0343	Management and Program Analyst
0346	Logistics Management Spec
0861	Aerospace Engineer
1601	Equipment, Facilities, and Services
2101	Transportation Specialist
2181	Aircraft Operator

SOURCE: OPM, 2019c.

Other special salary rate tables vary slightly in occupational coverage, so it is important to look at each special salary rate table to determine coverage.⁴ All special rate tables for aircraft operator positions cover GS-11 through GS-15. Table 0769, for Aircraft Operator (Simulator Instructor), is different in that it covers only Air Force simulator instructors and their supervisors in grades GS-12 and GS-13 and only in one location—at Laughlin AFB, Texas. We should note that the special salary rate for simulator instructors is significantly lower than for pilots flying aircraft outlined in the report tables below, since the OPM-approved special salary rate is based on evidence of pay being provided to the same occupations in the targeted geographic area.

⁴ Tables 558A, 558H, and 558P, which apply to positions in Alaska, Hawaii, and Puerto Rico, do not include the Aerospace Engineer occupational series.

There is no special salary rate table for the Aircraft Operator (Pilot) occupational series with which Laughlin AFB could compare special salary rate rates.

Among aircraft operators covered by special salary rate Table 0759, those in the San Jose–San Francisco–Oakland LPA receive the highest pay/supplemental percentage. While the special rate for the San Jose–San Francisco–Oakland area seems extremely high—ranging from 68 percent at the GS-11 level to 49 percent at the GS-15 level—it is not really that high when considering that the locality pay in the same area is 40.35 percent. When comparing the special rate with the locality rate for the San Jose–San Francisco–Oakland area, the actual special salary rate for the GS-11 level is only 27.65 percent above what other federal employees are receiving in the same locality area.⁵ The difference at the GS-15 level is only 8.65 percent. Those aircraft operators covered by special salary rate Table 0767, which includes the locality area for Rest of U.S., receive the smallest supplement. Table 5.4 compares the representative rate (Step 4) for the GS with the highest and lowest special salary rate percentages approved for aircraft operators as expressed in two special rate tables.⁶

Table 5.4. Impact of Aircraft Operators Special Rate Tables 0759 (San Jose–San Francisco–Oakland) and 0767 (Rest of U.S.), 2019

2019 Rates—Aircraft Operators					
Grade	GS Rates (Step 4)	Special Rate Table 0759		Special Rate Table 0767	
		Rates	Supplement (percentage)	Rates	Supplement (percentage)
GS-11	\$59,187	\$99,434	68	\$85,821	45
GS-12	\$70,940	\$119,179	68	\$102,863	45
GS-13	\$84,355	\$141,716	68	\$122,315	45
GS-14	\$99,684	\$158,498	59	\$134,573	35
GS-15	\$117,254	\$166,500	49	\$146,568	25

SOURCES: OPM 2019 Special Rate Table 0759 and Special Rate Table 0767; OPM 2019 GS Pay Table without Locality Pay.

NOTE: GS rates do not include locality pay.

Although there are established special salary rates for aircraft operations positions, it is also important to note that there are limits on the amount that can be supplemented for these positions. 5 U.S.C. 5305(a) and 5 C.F.R. 530.304(a) set special salary rate pay limitations such

⁵ Personnel cannot receive special salary rate pay plus locality pay; whichever rate is higher is paid. The true impact of a special salary rate percentage pay increase can only be determined by subtracting the locality pay rate to equalize the payment with other employees working in that locality.

⁶ A representative rate is the going rate (i.e., the rate or step keyed to the prevailing rate determination—for example, the established rate on a single-rate schedule, the second rate on a five-rate regular wage schedule, the fourth rate on the GS or a class under the Foreign Service officer and Foreign Services staff schedules) of the jobs or grades between which the employee is being moved. OPM, undated aj.

that the minimum rate may not exceed 30 percent of the maximum rate for grade, and the maximum rate may not exceed Level IV of the Executive Schedule. Table 5.5 displays the impact of this pay cap on the ability to pay aircraft operators higher salaries, showing how the pay cap depresses the ability to pay more as the GS grades increase, resulting in almost a \$40,000 difference at the GS-15 level.

Table 5.5. Impact of Special Salary Rate Pay Cap on Aircraft Operator Pay

Aircraft Operators Table 0759 (San Jose–San Francisco–Oakland), 2019			
Grade	Step 1 Max	Step 10 Without Cap	Step 10 With Cap
GS-11	\$90,392	\$117,518	\$117,518
GS-12	\$108,343	\$140,851	\$140,851
GS-13	\$128,834	\$167,480	\$166,500
GS-14	\$144,087	\$187,318	\$166,500
GS-15	\$158,827	\$206,472	\$166,500

SOURCE: OPM 2019 Special Rate Table 0759.

Table 5.6 shows the supplement for the only special salary rate table for simulator instructors and identifies the difference between what an employee under locality pay in the same geographic area would make against an employee covered by the special salary rate table. Once the locality pay for the area covered by the special salary rate table is compared with the special salary rate itself, the percentage of the increase is not as significant as it initially appears.

Table 5.6. Impact of Simulator Instructors Special Rate Table 0769 (Laughlin Air Force Base), 2019

2019 Rates—Aircraft Operators (Simulator Instructors)						
Grade	Special Rate Table 0769			Locality Pay		Difference Between Special Salary Rates and Locality Area Pay
	GS Rates (Step 4)	Rates (Step 4)	Supplement (percentage)	Rest of U.S. (percentage)	GS Rates for Federal Employees in Area (Step 4)	Yearly Increase over Locality Pay (Step 4)
GS-12	\$70,940	\$95,769	35	15.67	\$82,056	\$13,713 (14.31 percent)
GS-13	\$84,355	\$105,444	25	15.67	\$97,573	\$7,871 (7.46 percent)

SOURCES: OPM 2019 Special Rate Table 0769; OPM 2019 GS Salary Table without Locality Pay.

NOTE: GS rates do not include locality pay.

Because simulator instructors are in the Aircraft Operator occupational series, they must be qualified pilots. Air Force career field managers have indicated that the lack of special salary rates for simulator instructors in other locations makes recruiting and retention difficult. Several interviewees believe that the lack of broader coverage is due in part to the fact that some DoD components (e.g., the Army) classify simulator instructors under the General Education and Training occupational series (GS-1701), where the paramount qualification requirement is knowledge of or skill in education, training, or instruction. There are no special rates for that

series. To address this classification issue, at the time of this study the Air Force was preparing a package that will be submitted through appropriate channels proposing that OPM require coverage of simulator instructors under the Aircraft Operations series rather than the General Education and Training series.

Use of Recruitment, Relocation, and Retention Incentives

In addition to special salary rates, Air Force representatives informed us that they try to use all the tools available to attract qualified candidates to open aircraft operations positions, including 3R incentives when possible. However, we were informed by HR specialists during interviews that it can be difficult to use such incentives, since the corresponding funds are managed at the installation level. Therefore, the availability of these incentives depends on the availability of money at the base or activity level. In a recent effort, the Air Force reached out to all installations employing civilian aircraft operations personnel to identify if and how often incentives were being used. The data showed that many locations that were facing challenges were not using the 3R incentives available. In our review, Air Force civilian personnel data indicate that across Air Force installations in the last five years, 34 recruitment incentives, 325 retention incentives (with 232 of those being used in 2018 alone), and three relocation incentives have been used for aircraft operations positions.⁷ The majority of these incentives were used by AETC, although ACC, AFMC, and AFSOC also used recruitment and retention incentives.

A Comparison of Air Force Compensation with That of Other Federal Agencies and the Private Sector

In this section we explore how current Air Force pay compares with pay in the private sector to identify what, if any, gaps in pay exist that could affect retention and recruiting and to determine the size of those gaps. The specific skills demanded for Aircraft Operations (Pilot) occupational series hiring in the Air Force are not directly observable in large-scale statistically accurate data sets; however, for this occupation, and the occupations discussed below, there are analogous individual occupations or sets of occupations in the Standard Occupational Classification (SOC) System.⁸ For the aircraft operations occupation, that

⁷ Our data only provided the total number of incentives used in a particular year. We were not able to assess the percentage of eligible personnel who were offered these incentives and who then chose to take them.

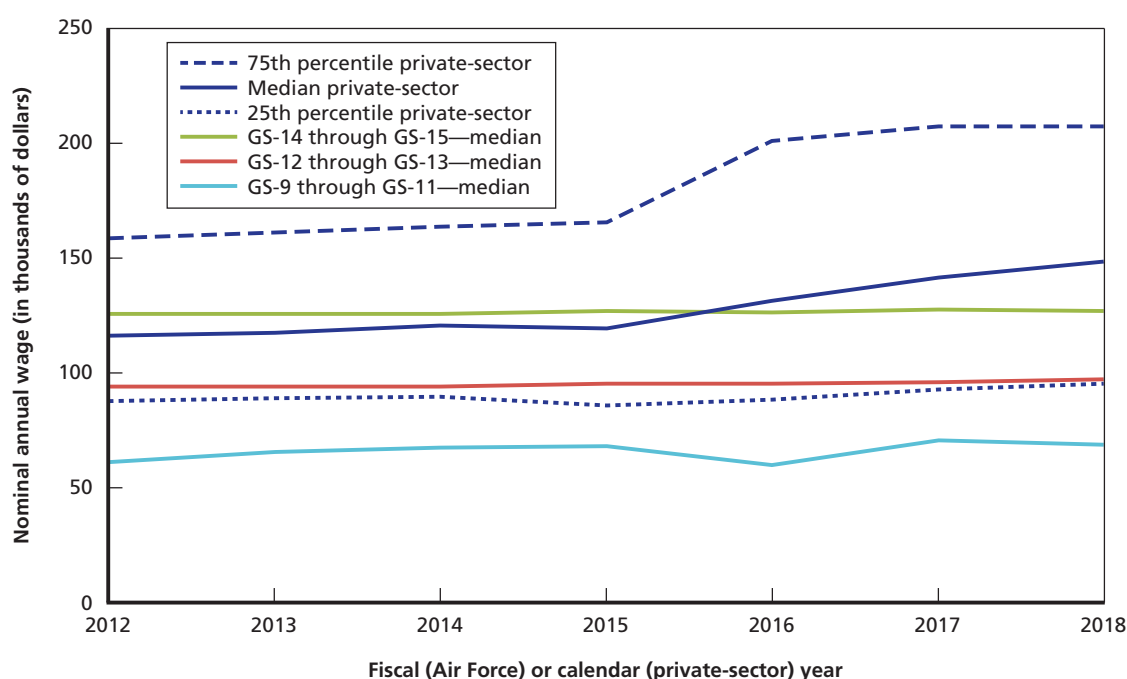
⁸ As the BLS notes, “The 2018 Standard Occupational Classification (SOC) system is a federal statistical standard used by federal agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. All workers are classified into one of 867 detailed occupations according to their occupational definition. To facilitate classification, detailed occupations are combined to form 459 broad occupations, 98 minor groups, and 23 major groups. Detailed occupations in the SOC with similar job duties, and in some cases skills, education, and/or training, are grouped together.” BLS, undated.

analogous occupation is SOC 53-2011 (Airline Pilots, Co-Pilots, and Flight Engineers), described as

Pilot and navigate the flight of fixed-wing, multi-engine aircraft, usually on scheduled air carrier routes, for the transport of passengers and cargo. Requires Federal Air Transport certificate and rating for specific aircraft type used. Includes regional, National, and international airline pilots and flight instructors of airline pilots. (BLS, 2018c)

Using the BLS OES,⁹ we calculate median, twenty-fifth percentile, and seventy-fifth percentile private-sector annual salary for the airline pilot occupation, from 2012 to 2018, as shown in Figure 5.2. Although estimates of pay are shown for each year, these estimates are intended to convey general trends, since the OES is not designed to calculate precise year-over-year changes. (For a detailed description of the OES and the other data sources used to provide non–Air Force pay comparisons, see Appendix B.)

Figure 5.2. Annual Salaries for Air Force Civilian Pilots (GS-2181), Including Base Salary, Locality Pay, and Special Rates, and Private-Sector Airline Pilots (53-2011), by Pay Grade and Percentile



SOURCES: RAND calculations. Statistics for private-sector airline pilots from BLS OES; Air Force civilian pilot pay from the Defense Civilian Personnel Data System (DCPDS).

⁹ The most statistically reliable source for estimates of monetary compensation by occupation is the BLS’s OES. The BLS produces annual updates to the OES with national estimates for both the average monetary compensation for over 800 detailed occupations, as well as specific points in the earnings distribution (i.e., the tenth, twenty-fifth, median, seventy-fifth, and ninetieth percentiles, given appropriate sample sizes for statistical reliability and confidentiality).

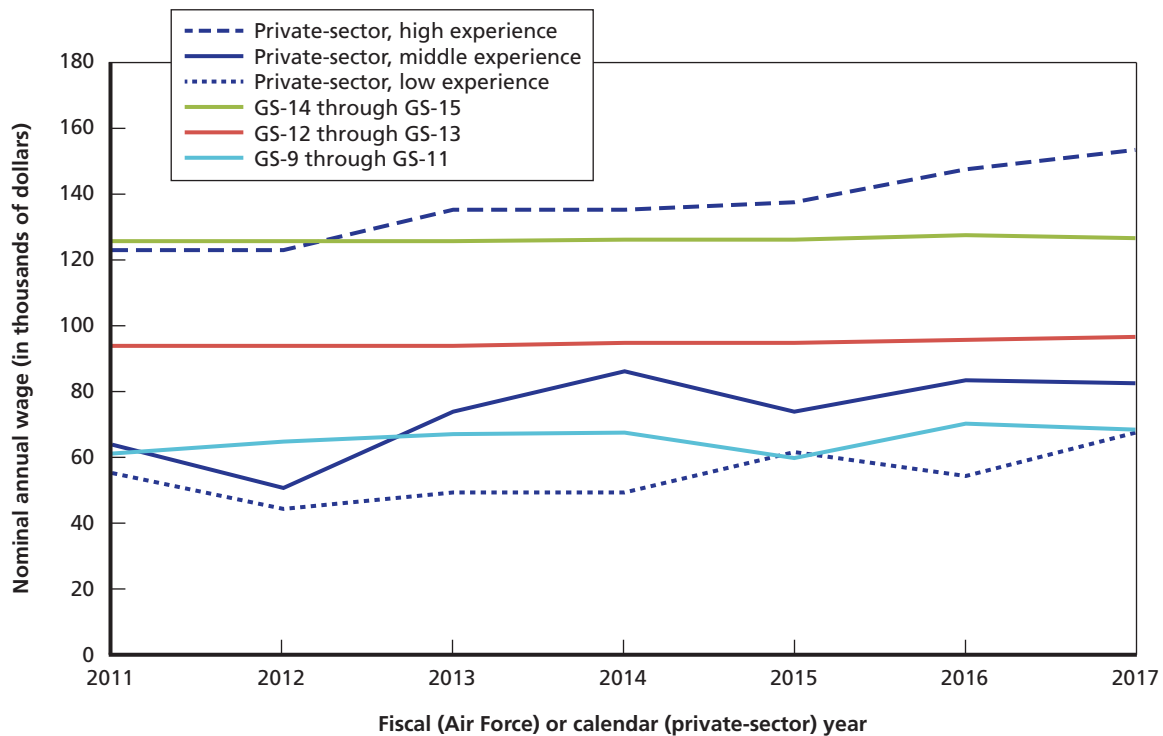
In Figure 5.2 we present OES-based pay statistics alongside Air Force civilian employee pay at three pay grade ranges: GS-9 through GS-11, GS-12 through GS-13, and GS-14 through GS-15, where the pay series is calculated as the median annual salary for an Air Force civilian employee in the Aircraft Operations (Pilot) occupation series, including base pay, special salary rates, and any locality pay. As the figure indicates, private-sector pay generally exceeds Air Force civilian pay, and private-sector annual salaries at the median and the seventy-fifth percentile have increased markedly since 2015. Although GS-14/15 pay exceeded median private-sector pay in 2012, by 2018 median private-sector airline pilot pay was now above that of GS-14/15 pay. In the chapters to follow, we provide linear extrapolations of median private-sector pay; these extrapolations are based only on projecting forward 2012–2018 average annual growth and are provided for insight into levels of private-sector pay in the near future if recent trends are predictive of future trends. We refrain from providing these extrapolations in this chapter, since there has been a sharp increase in private-sector airline pilot pay at the median and above since 2015. That is, because there has not been a stable recent trend in pay, we do not project forward such a trend. We note that the current difference between private-sector pay and GS-12/13 pay would grow even larger if a sharp increase like the one observed in 2016 at the seventy-fifth percentile and the median of the private-sector airline pilot distribution occurs again.

However, one area of concern in conducting direct comparisons between different places in the private-sector pay distribution with different Air Force civilian pay grades is that these points in the distribution of private-sector pay do not correspond to the same experience or skill levels appropriate for the GS pay grade comparisons. To provide more appropriate comparisons, we turn to the American Community Survey (ACS), a large nationally representative survey of American households and their residents, with detailed occupation measures, as well as a rich array of sociodemographic characteristics. (For a description of the ACS, see Appendix B.) Drawing on the age and educational attainment observed in the ACS for those reporting working full-time in the Airline Pilots (53-2011) classification, we constructed the following experience measures for bachelor's or high school graduates based on consultation with this report's sponsor:

- “low experience”: bachelor's degree plus two years' experience or high school degree plus five years' experience
- “middle experience”: bachelor's degree plus five years' experience or high school degree plus eight years' experience
- “high experience”: bachelor's degree plus 11 years' experience or high school degree plus 14 years' experience.

Figure 5.3 shows the estimated median annual salary for these three groups of airline pilots, and the pay for the Air Force civilian pay grade ranges GS-9 through GS-11, GS-12 through GS-13, and GS-14 through GS-15, respectively. Restricting the comparisons to these specific experience groups, even accounting for the differences in the ACS and OES described in Appendix B, shows that Air Force civilian pay exceeds private-sector pay for analogously lower experience levels. However, pay at the GS-14/15 levels, although slightly exceeding the

Figure 5.3. Median Annual Salaries for Civilian Air Force Pilots (2181), Including Base Salary, Locality Pay, and Special Rates, and Private-Sector Airline Pilots (53-2011), by Pay Grade and Experience



SOURCES: RAND calculations. Statistics for private-sector airline pilots calculated from ACS microdata; Air Force civilian pilot pay from the DCPDS.

“high experience” private-sector comparison group in 2011, stayed relatively unchanged through 2017, whereas private-sector annual pay among these “high experience” pilots grew by over \$30,000 a year.¹⁰ This recent increase observed in our data is consistent with estimates from recent RAND research examining civilian airline pilot pay (Mattock et al., 2016), despite the use of different data sources. Indeed, the projections Mattock and colleagues made in 2016 are largely accurate given the observed increases in pay through 2018.

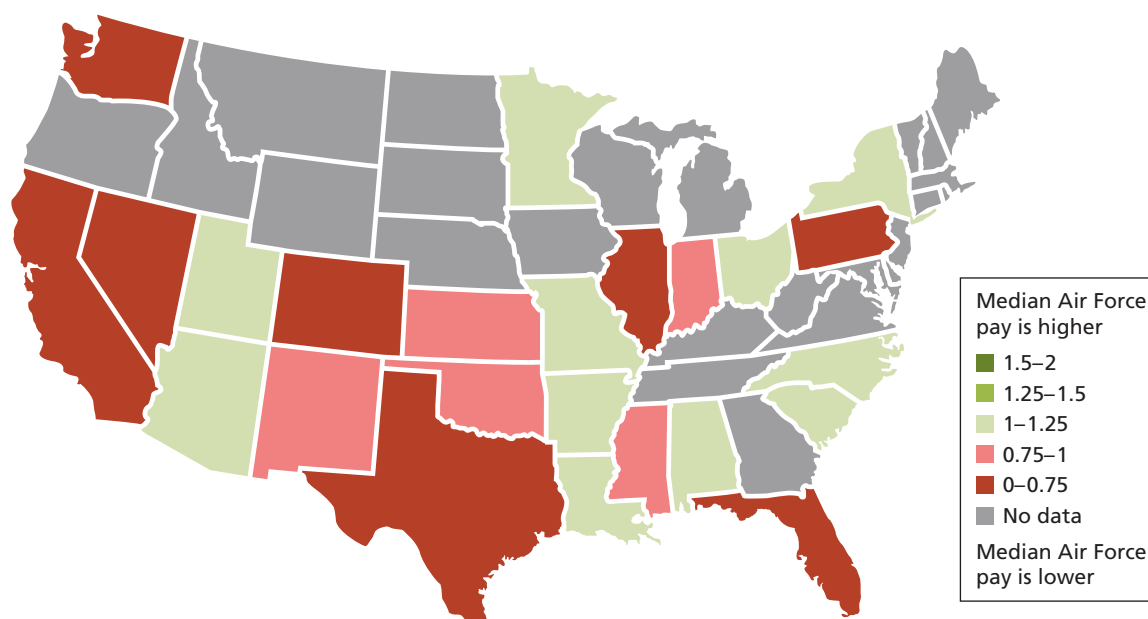
Although these national-level comparisons show increasing pay at the middle and top of the private-sector distribution, while Air Force civilian pay has stayed relatively unchanged, national-level analyses often belie substantial geographic differences. Drawing on state-level and metropolitan statistical area-level OES estimates of airline pilot pay, we compared state and LPA differences in pay between OES data and Air Force civilian records from the DCPDS. One should first note that although the national-level comparisons were focused on private-sector

¹⁰ When looking at pilot salaries, it is important to note that their salaries may vary according to the type of aircraft that they are flying and how long they have been at an airline.

airline pilot pay, the OES does not provide subnational estimates of pay by sector, and the ACS does not have a sufficient sample size to provide statistically reliable estimates of salary for the occupations under study by state or metropolitan statistical area (MSA). As such, our comparison is with the annual salary of all civilian airline pilots.

Figure 5.4 provides a state-by-state comparison of the median annual salary of Air Force civilian pilots, including base salary, locality pay, and special rates, and all personnel in the Airline Pilots (53-2011) classification in 2018. States wherein median Air Force GS-12/13 pilots are paid more are marked in green, with the intensity of the green indicating how much more Air Force GS-12/13 pilots are paid: light green (one to 1.25 times median airline pilot pay); medium green (1.25 to 1.5 times median airline pilot pay); and dark green (1.5 to two times median airline pilot pay). Red indicates that Air Force GS-12/13 pilots are paid less than the median airline pilot pay, with light red indicating pay that is between 75 percent and 99 percent of airline pilot pay, and dark red indicating pay below 75 percent of airline pilot pay. Due to firm and individual confidentiality as well as statistical power, the BLS does not publish estimates for all occupations in all states every year. Furthermore, the Air Force does not employ civilian pilots in every state; hence, there are many states for which comparisons between the two are unavailable. Regardless, there is substantial variability from state to state in the relative pay for pilots, with Air Force civilian pay at or above median airline pilot pay in 11 states, but below median airline

Figure 5.4. Median Annual Pay for GS-12/13 Air Force Civilian Pilots, Including Base Salary, Locality Pay, and Special Rates, Relative to All Airline Pilots, by State, 2018



SOURCES: RAND calculations. Median airline pilot pay from BLS OES; median Air Force civilian pilot pay from the DCPDS, which includes base salary, locality pay, and special rates.

NOTE: States without published OES data for this occupation or states without a sufficient number of civilian Air Force employees result in a lack of an estimated ratio.

pilot pay in 13 states (and, in eight of these states, airline pilot pay exceeds Air Force civilian pay by at least 25 percent).

Finally, Table 5.7 lists relative pay at the LPA level for all LPAs for which an estimate was available from the OES for airline pilots in 2018. Because the OES provides statistics at the MSA,

Table 5.7. Average Annual Pay, by Occupational Employment Statistics or Air Force Civilian Pay Grade

LPA	Civilian Annual Salaries				Air Force Civilian Annual Pay, Including Base Salary, Locality Pay, and Special Rates	
	All, 2012	All, 2018	Percentage Growth	95-Percent Confidence Interval of Percentage Growth	GS-12/13, 2018	GS-14/15, 2018
Alaska	140,850	148,820	5.7	(-33.3, 44.0)	122,877	161,472
Albany–Schenectady, NY-MA		80,560				
Chicago–Naperville, IL-IN-WI	130,920	193,800	48.0	(6.4, 89.7)		
Cincinnati–Wilmington–Maysville, OH-KY-IN	129,490	129,970	0.4	(-37.2, 37.6)		
Columbus–Marion–Zanesville, OH		156,600				
Dallas–Fort Worth, TX-OK	173,213	189,920	9.6	(-31.1, 50.2)	115,306	139,691
Denver–Aurora, CO	91,740	203,220	121.5	(50.3, 192.8)		
Indianapolis–Carmel–Muncie, IN	109,420	131,950	20.6	(-10.0, 51.2)		
Las Vegas–Henderson, NV-AZ		224,010			109,409	121,543
Los Angeles–Long Beach, CA	125,570	183,910	46.5	(6.3, 86.6)	107,138	140,029
Miami–Fort Lauderdale–Port St. Lucie, FL	136,740	190,590	39.4	(-7.5, 85.3)	107,844	136,395
Minneapolis–St. Paul, MN-WI		103,960			105,542	128,632
New York–Newark, NY-NJ-CT-PA	166,080	150,280	-9.5	(-49.5, 29.5)	114,305	146,425
Phoenix–Mesa–Scottsdale, AZ		132,450				
San Antonio–New Braunfels–Pearsall, TX		112,150				
San Jose–San Francisco–Oakland, CA	112,730	247,120	119.2	(58.8, 179.7)	113,346	137,752
Seattle–Tacoma, WA	141,580	240,290	69.7	(9.0, 130.5)	111,918	130,446
Tucson–Nogales, AZ		129,330			113,908	123,331

SOURCES: RAND calculations. Civilian statistics derived from BLS OES; Air Force civilian pay from the DCPDS.

NOTE: Cells are missing where data were not published for the year and area in question, or if there were too few Air Force employees; 95-percent confidence intervals that include zero indicate that the data are insufficiently precise to determine whether pay increased or decreased from 2012 to 2018.

not the LPA, level, many LPAs required aggregation from more than one MSA. Unfortunately, since the OES is not microdata, one cannot accurately calculate the median of a large group from the medians of smaller, constituent groups. Instead, we focused on *average* annual pay, based on weighted averages of pay, using airline pilot employment in each MSA as the weights. We then compared these LPA estimates, where available, with average annual pay for Air Force civilian pilots in different pay grade groups. Additionally, where available, we included the 2012 OES estimates, and, when both 2012 and 2018 OES estimates are present, the corresponding total growth for airline pilots between these two years.

Consistent with the state-level comparisons, there is substantial variation in pay for airline pilots across these LPAs. Even more remarkably, growth in average local pay has varied considerably when these estimates are available, with some LPAs (i.e., Denver-Aurora, CO; San Jose–San Francisco–Oakland, CA) seeing pay more than double, and others seeing limited or declining pay. However, these geographically specific estimates produced by the BLS contain a significant amount of uncertainty due to sampling variation; we use the standard errors provided by the BLS to construct a 95-percent confidence interval for the estimated growth rate from 2012 to 2018, shown in the column next to the growth rate. Appendix B discusses the construction of these confidence intervals further, but a short description is that if we were to repeat the sampling given the sampling process, we would expect that the actual growth rate would fall within the stated interval 95 percent of the time. Hence, the smaller the interval, the more confident we are of the estimated magnitude of the growth rate. So, for example, the 121.5 percent growth rate for airline pilots in the Denver-Aurora, CO, LPA has a confidence interval extending from 50.3 percent to 192.8 percent, indicating a wide range of potential growth rates, although we can have a high level of confidence that salaries grew substantially, given the lower bound of the interval.

Figure 5.3 shows that Air Force civilian pilots receive higher compensation than do similarly experienced airline pilots in the private sector, with the exception of recent trends for the most experienced pilots. This lack of a pay gap is a national average; Table 5.7 illustrates substantial regional variation. For example, in the Los Angeles–Long Beach, CA, LPA, annual pay in 2018 was \$183,910, whereas GS-12/13 annual pay averaged \$107,138.

In sum, there has been substantial growth in private-sector airline pilot pay since 2015, with this growth generally accruing to pilots with more experience and/or at the top of the pay distribution. As a result, although the Air Force still pays at or above private-sector pay for comparable experience groups, private-sector pay increases have narrowed this gap, and for the most experienced pilots, the private sector now pays substantially more. However, there is significant regional variation in both the current level and recent growth in pay for airline pilots, indicating that local labor market conditions for this occupation must be explored.

It is also important to note that the Air Force also has competition within the federal government with agencies that can pay more for pilots. For example, the FAA has a separate pay table for pilots authorized under its alternative personnel system. Based on an FAA vacancy announcement

posted on USAJobs, a journeyman level position in Arlington, Virginia, is under the FAA FV J pay band, with a minimum salary posted at \$103,147 and a maximum salary posted at \$159,907 per year. The Washington, D.C., locality pay table, which the Air Force must use in the same location, lists the following journeyman pay for the same location:

- GS-12: Step 1, \$83,398; Step 10, \$108,422
- GS-13: Step 1, \$99,172. Step 10, \$128, 920.

The pay rate posted in the FAA vacancy announcement is more in line with a senior Air Force position, which would be at the GS-14 level, with a minimum pay of \$117,191 and a maximum pay of \$152,352.

The Air Force Cost of Matching Private-Sector or Other Government Agency Pay

Using the information provided in Table 5.7, we know that there were 20 Air Force civilian pilots in the Los Angeles–Long Beach, CA, LPA in 2018. Closing this local annual pay gap at the GS-12/13 level would require the Air Force to spend an additional \$1,535,440 per year, or \$76,772 per pilot per year. Contrast this cost to the Tucson-Nogales, AZ, LPA, where closing the local annual pay gap for the 16 Air Force civilian pilots would cost \$246,752, or only \$12,337 per pilot per year. The Minneapolis–St. Paul, MN-WI, LPA is the only one for which GS-12/13 pay exceed average civilian airline pilot pay; the gap for some of the others—such as the Seattle-Tacoma, WA, LPA; the San Jose–San Francisco–Oakland, CA, LPA; and the Las Vegas–Henderson, NV-AZ, LPA—have pay gaps exceeding \$100,000 per pilot per year. This wide variation in civilian airline pilot pay, especially given the limited variation across Air Force civilian pilot pay, suggests that competitive salaries in some LPAs will be substantially lower than in the more expensive ones discussed herein. Moreover, competitive pay may differ by area if the skill and experience of airline pilots in different LPAs differ substantially.

Additional Recruiting and Retention Issues Related to Compensation

Through our interviews with recruiters in the AFPC, career field managers, and major command representatives, we identified several additional compensation related barriers to those already discussed above. These barriers include challenges with OPM qualification and classification standards, Air Force requirements at the journeyman level that individuals have prior experience flying military aircraft, and difficulties in hiring in less populated geographic locations.

One of the most consistently mentioned barriers across our interviews with Air Force representatives was difficulties in candidates meeting current OPM qualification standards.¹¹

¹¹ For more details, see OPM, undated a.

Specifically, current OPM qualification standards require civilian instructors to have a minimum of 1,500 total flying hours for all positions at the GS-11 level and above. Air Force representatives informed us, however, that many active duty Air Force pilots, who represent the primary pool from which civilian instructors are recruited, often do not have the required 1,500 flying hours (AFPC, 2018c) due to changes in the types of planes and flights required on active duty (Losey, 2018; Pawlyk, 2016). For example, many active duty pilots spend time in simulators due to limitations on available opportunities for actual cockpit hours in the air, but simulator time does not qualify as flying hours under current OPM qualification standards (AFPC, 2018c; AFPC, 2018d). In response to this issue, RAND interviewees at the AFPC indicated that the Air Force has drafted a supplement to the OPM qualification standards recommending a reduction in the number of required flying hours, as well as inclusion of simulator time as flight hours (AF/A1C, 2019a). At the time this report was written, this Air Force effort was moving forward.

In addition to the number of air flight hours required, OPM classification standards also create challenges in the pay grades associated with Air Force aircraft operations positions. The current OPM standards were published in 1988 and state that flying experience should be on fixed-wing or rotary wing aircraft, without mention of tiltrotor aircraft (OPM, 1988). While fixed-wing and rotary wing were the prevailing types of aircraft on which pilots could train at the time the OPM standards were written, today's pilots also fly tiltrotor aircraft, in which engines and propellers tilt upward for vertical takeoff and landing like a helicopter but then pivot to traditional fixed-wing configuration for flight (U.S. Air Force, undated), which is not accounted for under current OPM standards (Whittle, 2012). According to our interviews with career field managers at the AFPC, an update is also needed to the aircraft classification based on weight and number of engines, because today both criteria are heavily influenced by advancements in technology, and most aircraft—including fifth-generation aircraft (AFPC, 2018b)—are lighter and have fewer engines than a few decades ago (AFPC, 2018d). At the time of this study, the Air Force was also in the process of writing a draft of proposed revisions to classification standards for submission to OPM to help address this issue (AFPC, 2018d; AFPC, 2018e).

As mentioned above, the primary pool of candidates for civilian aircraft operations positions is individuals with a military background who have specific flying experience on a certain type of aircraft. As has been discussed, the main limitation with this category of potential candidates is that they are unlikely to meet the minimum number of hours required by the current OPM qualification standard. In addition, in discussions with Air Force career field managers, we were told that the GS pay system can also be particularly constraining when hiring from this pool of candidates, as they are less likely to accept an entry-level GS-11 or GS-12 position after having filled a higher-ranking position in the Air Force, such as lieutenant colonel. According to Air Force civilian personnel data as of March 2019, only 2 percent of aircraft operations personnel are nonveterans, with 39 percent of personnel being retired officers. The current 180-day waiting period requirement (U.S. Congress, 2016) restricting the hiring of retired military members into civilian positions creates challenges in bringing prior military individuals into these positions in

a timely manner. Currently, positions under special salary rates are exempt from the 180-day requirement (Salomon, 2017).

Finally, Air Force representatives indicated in interviews that recruiting and hiring for aircraft operations positions is more difficult in locations that are not near larger metropolitan areas. For example, they have more success attracting qualified candidates in San Antonio, Texas, where they report receiving an average of 50–60 applications per position, compared with locations such as Altus AFB in Oklahoma, Columbus AFB in Mississippi, or Laughlin AFB in Texas, where they can have the opening available for 60–90 days and only receive one application.

A Review of Air Force Vacancies

In an effort to identify additional barriers that may exist to recruitment in aircraft operations positions, our team compared current Air Force job listings with listings from other federal agencies and from the private sector. (For an overview of the methodology, see Appendix C.) We synthesized findings across two domains: (1) content (information contained within the listing) and (2) structure (how information is organized and displayed).

Compared with vacancies we reviewed for other occupational series, job titles within the Aircraft Operations occupational series were generally more informative and consistent across listings. Specifically, across the Air Force vacancies we reviewed, there were five distinct job titles that reflected the positions: (1) Aircraft Operations—Direct Hire Authority, (2) Supervisory Airplane Flight Instructor, (3) Airplane Pilot, (4) Airplane Flight Instructor, and (5) Airplane Pilot (Simulator Instructor). Additionally, unless the job announcement was for a general open position, the job titles also indicated seniority (e.g., “Supervisory”) and role (e.g., “Pilot” versus “Instructor”) and were consistent in related pay grades (e.g., “Supervisory” listings started at GS-13, whereas nonsupervisory roles were listed at GS-12). Both findings were true across all DoD listings in this occupational series and in the private-sector postings. This consistency across listings may lend itself to better applicant role comprehension and site navigation.

The majority of Air Force vacancies we reviewed did not explicitly list position qualifications beyond general requirements and conditions of employment (e.g., “Must be a U.S. Citizen”), but these vacancies tended to utilize boilerplate language that included a link to general OPM qualification standards; applicants are instructed to refer to these standards to determine their fitness for the position. In contrast, similar vacancies across the Army and Navy were more likely to include specific qualifications (e.g., “You must have at least 1,750 hours of total flight time”). All private-sector positions were specific, with requirements and qualifications.

Unlike in the private sector, all federal postings contained information on salary (starting salary and/or salary range). However, Air Force open vacancy announcements with direct hire authority that were made for multiple positions and/or locations had wide pay grade and salary information (e.g., GS-1 to GS-15) even though these positions start at the GS-12 level. Furthermore, the salary provided on the cover listing indicated that the salary started at compensation for the

lowest grade—for example, a GS-1 and only a little over \$21,000 per year (i.e., a candidate would only see the full range of what someone at the highest level might make by clicking on the full position description). Only a small handful of postings indicated that relocation assistance might be available to applicants. In contrast to federal postings, similar vacancies across the private sector did not include any relocation or compensation information at all.

Finally, in terms of the structure of the postings, we found that like other federal listings, Air Force job postings for this series did not include an organizational culture or mission statement. These types of statements can be helpful in distinguishing a civilian career in the Air Force from other jobs that applicants may be considering and in providing an additional avenue for trying to entice potential job candidates to apply. We also found that job postings did not include specific information on benefits that are offered. Instead, the benefits section included a link to a page on USAJobs that outlines general federal employee benefits. In contrast, one private-sector vacancy had an embedded benefits section while others had separate employee benefits areas on their career sites. Federal vacancies also tended to rely on blocks of text over concise, bulleted lists.

Options for Developing More Competitive Compensation and Benefits

The Aircraft Operations occupational series is included in the Air Force MCO list given the importance of these positions to the overall Air Force mission and because the department is experiencing a shortage of both civilian pilots and simulator instructors. Although the Air Force has already taken some steps to try to address pay discrepancies to help attract and retain critical talent (e.g., special salary rates), our study identified additional avenues the Air Force may want to explore to improve its competitiveness. Some of these initiatives are actions the Air Force can pursue directly. Other actions would require OPM or legislative changes, however, making them more difficult to achieve.

What the Air Force Can Approach on Its Own

- **Ensure that installations are using all incentives available to them to recruit and retain talent.** Previous Air Force efforts examining incentive use show that incentives are employed inconsistently across installations. Ensuring that recruitment and relocation bonuses are used to the fullest may help alleviate some of these challenges. Along similar lines, the Air Force might consider establishing a central fund for payment of 3R incentives for MCOs at risk until their status improves. Designing and implementing a system that allows for the use of central funding might help to address the shortages that have resulted in an MCO being assessed as at risk of failure.
- **Explore the need for potential updates in special salary rates for certain locations.** Our analysis found that although the Air Force still pays at or above private-sector pay for comparable experience groups, private-sector pay increases have narrowed this gap. And, for the most experienced pilots, the private sector now pays substantially more. Yet there is significant regional variation in both the current level and recent growth in pay for airline pilots, indicating that local labor market conditions for this occupation must be

explored. For example, at the time of this study, there was only one simulator instructors special salary rate table covering Laughlin AFB. There are other locations with simulator instructors, and the Air Force would benefit from a systematic review of all locations with simulator instructors to determine if special salary rate request packages should be submitted.

- **Update vacancy announcements to ensure that they are more applicant friendly and provide more specific and accurate information regarding compensation and benefits.** Requirements should be clearly defined instead of using boilerplate language or referring prospective applicants to review general OPM qualification standards to determine their qualifications for the position. Even open Air Force vacancy announcements that cover multiple positions and/or locations should provide more specific potential pay grades (e.g., GS-11 to GS-13) and associated salaries instead of listing the full pay grade range (e.g., GS-1 to GS-15) and the lowest possible starting salary.

What Requires Department of Defense Coordination

- **Continue to pursue coverage of simulator instructors under the Aircraft Operations series where they would be eligible for special salary rates.** At the time of this study, the Air Force was preparing a package proposing that OPM require coverage of simulator instructors under the Aircraft Operations series rather than the General Education and Training series to help address the discrepancy. The Air Force should continue to pursue this approach.
- **Continuing to pursue changes to current OPM classification and qualification standards to better match the current operational environment and training platforms.** The current OPM classification standards were published in 1988 and do not reflect the current operating environment for pilots, which influences the potential pay grades associated with positions. At the time of this study, the Air Force was in the process of writing a draft of proposed revisions to classification standards for submission to OPM to help address this issue. Additionally, at the time of this study, the Air Force had also already drafted a supplement to the OPM qualification standards recommending a reduction in the number of required flying hours, as well as inclusion of simulator time as flight hours. This can help broaden the pool of eligible talent for aircraft operations positions.

What Requires Legislation

- **Explore the potential implications of raising the pay cap for MCOs that require higher special salary rates.** Currently, 5 U.S.C. 5305(a) and 5 C.F.R. 530.304(a) set special salary rate pay limitations such that the minimum rate may not exceed 30 percent of the maximum rate for grade, and the maximum rate may not exceed Level IV of the Executive Schedule. In certain locations, this cap can significantly depress the ability to pay more as the GS grades increase.

6. Air Traffic Control

An Overview of the Occupation

The OPM *Handbook of Occupational Groups and Families* (2018b) describes the Air Traffic Control (GS-2152) occupational series as all positions primarily concerned with

(a) the control of air traffic to insure the safe, orderly and expeditious movement along air routes and at airports when a knowledge of aircraft separation standards and control techniques, and the ability to apply them properly, often under conditions of great stress, are required; (b) the providing of preflight and in-flight assistance to aircraft requiring a knowledge of the information pilots need to conduct safe flights and the ability to present that information clearly and concisely; or (c) the development, coordination, and management of air traffic control programs. Positions in this occupation require an extensive knowledge of the laws, rules, regulations and procedures governing the movement of air traffic. (OPM, 2018b, p. 121)

Within the Air Force, this occupational series includes positions focused on performing air traffic control duties, as well as positions responsible for training military members in the performance of air traffic control duties.

The Air Traffic Control occupational series is an Air Force specific MCO and is also included in the MCO list for the Army; it is not listed as an MCO for the other DoD Components, however. The occupational series is included in the Air Force MCO list because it contributes significantly to the Air Force's ability to fulfill its mission, and the department expects to experience a shortage of employees in the coming years. HR specialists at the AFPC indicated that together with the Aircraft Operations occupational series, recruitment and retention in this series represents one of the Air Force's top two civilian personnel priorities. For this reason, the Air Force has established several working groups to improve recruitment and retention for ATCs.

As of March 2019, Air Force civilian personnel records indicate that there are a total of 827 civilian personnel in the Air Traffic Control occupational series within the Air Force (a total that includes dual military/civilian technicians in the AFR or ANG). This represents roughly 4 percent of all air traffic control personnel within the federal government. As of June 2018, data from FedScope indicate that there are a total of 20,702 air traffic control personnel across the federal government. Of this total number, 18,862 employees (91 percent) work for the FAA under the Department of Transportation. Other than the FAA, DoD is the only agency in the federal government that employs ATCs. While the Air Force has the largest number of ATCs in DoD, the Army (576 employees) and Navy (274 employees) also have ATCs (OPM, 2019d).

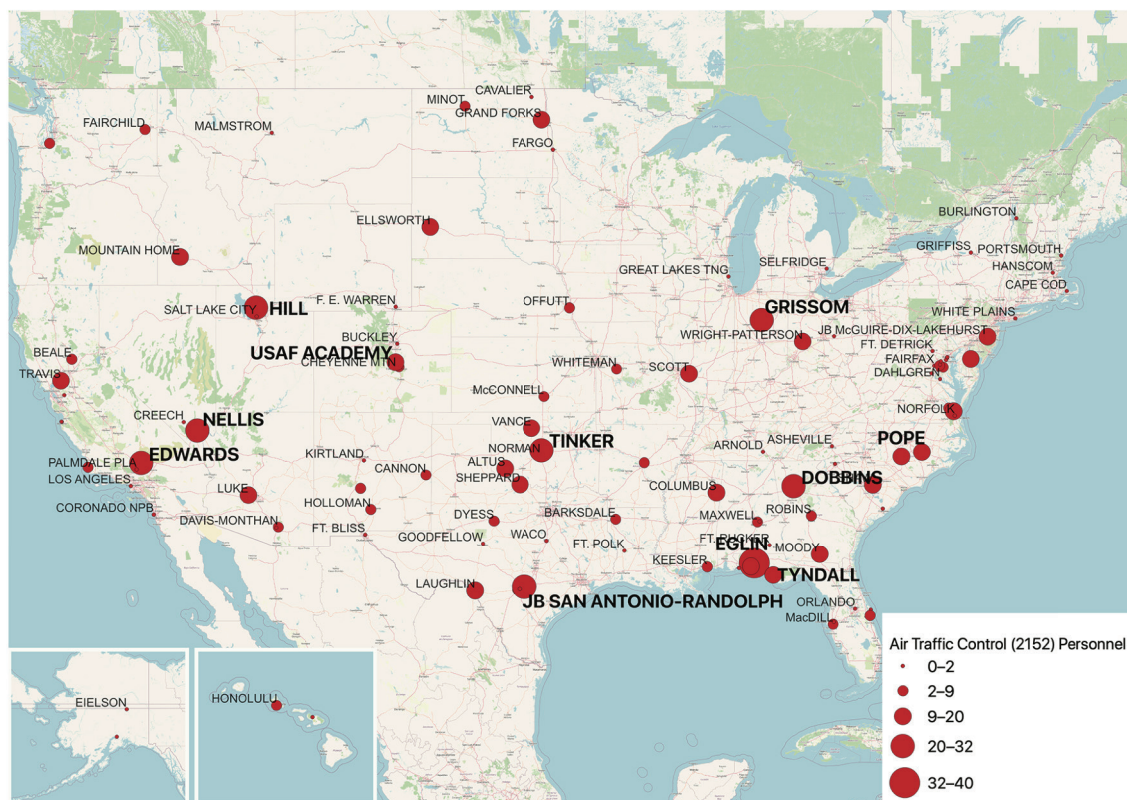
As Table 6.1 shows, 16 percent of all Air Force civilian personnel are dual military/civilian technicians in the AFR and 4 percent in the ANG. Among personnel who are not dual-status technicians, air traffic control personnel are spread across Air Force major commands but include higher concentrations in ACC, AETC, AFMC, and AMC. Personnel are also widely distributed across Air Force installations, as shown in Figure 6.1.

Table 6.1. Air Traffic Control Personnel, by Air Force Organization

Air Force Organization	Number of Civilian Personnel	Percentage of Total Civilian Personnel
ACC	161	19
AETC	155	19
AFGSC	30	4
AFMC	112	14
AFRC	129	16
AFSPC	12	1
AFSOC	22	3
AMC	106	13
ANG	36	4
Pacific Air Forces	25	3
U.S. Air Forces in Europe—Air Forces Africa	14	2
Headquarters, U.S. Air Force and Support Elements	3	<1
North American Aerospace Defense Command	2	<1
Air Force Flight Standard Agency	17	2

SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

Figure 6.1. Location of Air Force Air Traffic Control Personnel Across the United States



SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

Air Traffic Control Compensation

As Table 6.2 shows, the majority of Air Force employees within the Air Traffic Control operational series are in positions at the GS-11 or GS-12 level (80 percent combined). According to Air Force representatives, the entry level is GS-11 for those positions in the tower, GS-11 or GS-12 for line controller positions, and GS-13 and above for positions at headquarters. For Air Force ATCs, there is a higher complexity involved with more planes in motion, different types of aircraft (both fixed-wing and rotary wing), and training along with certified pilots. In addition to the GS positions, there are 42 positions that do not follow the GS grade structure but are instead part of the alternative AcqDemo pay structure that uses a pay banding system. Similar to aircraft operators, all of the air traffic controller (ATC) demonstration project positions are located in AFMC. As was discussed in Chapter 2, the pay banding system allows the Air Force more flexibility in the pay offered upon recruitment as well as bonuses and rewards for good performance. AFMC representatives describe appreciating the flexibility that was offered with the pay banding system, including the ability to offer higher starting salaries based on the pay band.

Table 6.2. Air Force Air Traffic Control Personnel, by Pay Grade

Pay Grade	Number of Civilian Personnel	Percentage of Total Civilian Personnel
GS-9	<10	<1
GS-10	46	6
GS-11	335	41
GS-12	325	39
GS-13	67	8
GS-14	<10	1
GS-15	<10	<1
NH-02	<10	<1
NH-03	30	4
NH-04	11	1

SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

Special Rates

As there are for aircraft operators, there are already established special rates designed to increase compensation beyond the standard pay associated with the GS pay levels above for ATCs. There are eight special rate tables for ATCs. Each covers a single occupation (air traffic control) and applies to positions in the Air Force, Army, Marine Corps, and/or Navy. The tables apply to multiple U.S. LPAs, Alaska, Hawaii, and foreign areas. Covered employees include ATCs and their supervisors who perform separation and control of air traffic or air space functions. Four of the tables cover employees performing radar control duties, and four cover employees and their supervisors performing nonradar control duties. Until a few years ago, the ATC positions had the same coverage notes. However, for the tables that cover multiple

U.S. LPAs (0565 and 0566), the notes are different from those in the other six tables. The note for the six tables that cover Alaska, Hawaii, and foreign areas reads, “This schedule is limited to GS-2152 and their supervisors who perform separation and control of Air Traffic Control of air traffic or air space functions plus Headquarters staff ATC positions.” In contrast, the note for the two tables that cover multiple U.S. LPAs reads, “This schedule is limited to GS-2152 and their supervisors who perform separation and control of air traffic or air space functions. Headquarters staff level ATC positions must be performing radar (0565)/non-radar (0566) duties as stated in their current position description (PD) in order to be eligible for the special salary rate.” Career field managers informed us that the Air Force has requested that OPM remove the language in the notes for headquarters staff specifying radar or nonradar duties and should revert back to the language used for the other four tables with just “plus Headquarters staff ATC positions.”

All special salary rate tables cover pay grades GS-9 through GS-15.¹ A full list of special rates tables for ATCs is provided in Appendix E. For each locality, the pay rate and supplement percentage are higher for positions that perform radar approach control duties than those that do not. The rates and supplement percentages are highest in Alaska, followed by Hawaii and then foreign areas. The rates and supplements are the lowest for positions in the continental United States. Table 6.3 compares the representative rates (Step 4) for radar and nonradar positions in the continental United States within the two special salary rate tables to show the difference between the difference in pay between radar and nonradar approach control positions at the same location.

Table 6.3. Impact of Air Traffic Controller Special Rate Tables 0565 and 0566 That Cover Multiple U.S. Locality Pay Areas, 2019

2019 Rates—ATCs				
Special Rate Table 0565			Special Rate Table 0566	
Grade	Radar Approach Control		Non-Radar Approach Control	
	GS Rates (Step 4)	Supplement (Percentage)	Rate	Supplement (Percentage)
GS-9	\$63,592	30	\$61,146	25
GS-10	\$70,030	30	\$67,336	25
GS-11	\$76,943	30	\$73,984	25
GS-12	\$92,222	30	\$88,675	25
GS-13	\$109,662	30	\$105,444	25
GS-14	\$129,589	30	\$124,605	25
GS-15	\$152,430	30	\$146,568	25

SOURCES: OPM 2019 Special Rate Table 0565 and Special Rate Table 0566; OPM 2019 GS Pay Table without Locality Pay.

¹ Tables 0565, 565A, 565H, and 565F cover positions that perform radar approach control duties; tables 0566, 566A, 566H, and 566F cover positions that perform nonradar approach control.

As was discussed in Chapter 5, there are limits on the amount that can be supplemented for positions covered by special salary rates. Currently, 5 U.S.C. 5305(a) and 5 C.F.R. 530.304(a) set special salary rate pay limitations such that the minimum rate may not exceed 30 percent of the maximum rate for grade, and the maximum rate may not exceed Level IV of the Executive Schedule. This pay cap also affects the ability to pay ATCs (who use radar approach control) higher salaries. For example, for ATCs who use radar approach control, the pay cap depresses the ability to pay more as the GS grades increase, resulting in a greater than \$13,500 pay difference at the GS-15 level (Table 0565). Similarly, for ATCs in the same location who use a nonradar approach control, there is still a significant loss of almost \$8,500 a year due to the pay cap (Table 0566).

Use of Recruitment, Relocation, and Retention Incentives

As is the case in other occupations, installations are able to use 3R incentives for ATCs if needed for hard-to-fill positions and if funding is available at the local level. Air Force civilian personnel data indicate that across Air Force installations, no recruitment incentives have been used for air traffic control positions in the last five years studied (2014–2018), however, and only three retention incentives and one relocation incentive have been used.² All of the retention incentives were used by AFGSC at a single AFB (Minot), and the single relocation incentive was also used by AFMC (unknown location).

A Comparison of Air Force Compensation with That of Other Federal Agencies and the Private Sector

In this section we explore how current Air Force pay compares with pay in the federal government and the private sector to identify what, if any, gaps in pay exist that could affect retention and recruiting and to determine the size of those gaps. There is a directly comparable SOC code occupation for ATCs, SOC 53-2021, which entails the following:

Control air traffic on and within vicinity of airport and movement of air traffic between altitude sectors and control centers according to established procedures and policies. Authorize, regulate, and control commercial airline flights according to government or company regulations to expedite and ensure flight safety. (BLS, 2017g)

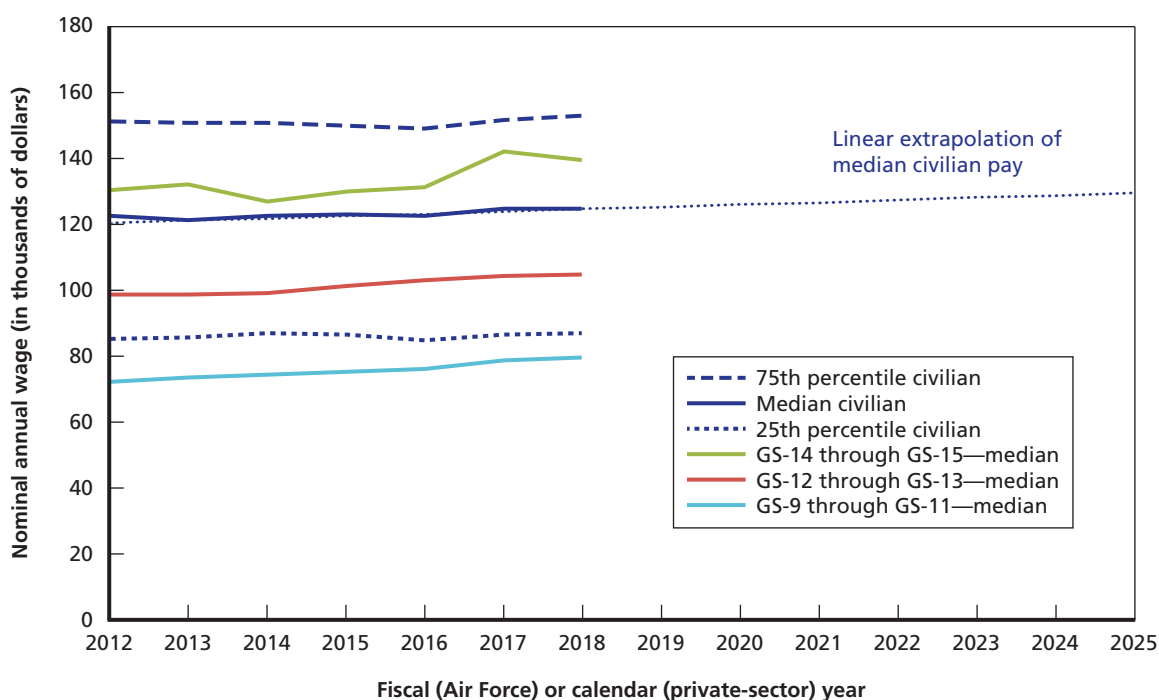
Although there is this directly comparable SOC occupation, in contrast to the airline pilots discussed above, there is no substantial employment of ATCs outside the federal government. For example, RAND calculations from BLS OES data indicate that there were 22,390 ATCs in the United States in 2018, but 20,430 (over 90 percent) were employed by the federal

² Our data only provided the total number of incentives used in a particular year. We were not able to assess the percentage of eligible personnel who were offered these incentives and who then chose to take these incentives.

government. Therefore, conducting comparisons with private-sector ATC pay faces both a logistical challenge (a small sample size of private-sector employment) and a theoretical one (competitive compensation is likely not driven by such a small fraction of overall employment).

For these reasons, we first provide national-level measures comparing Air Force civilian ATC pay with pay for all ATCs in the United States, including federal ATCs. As Figure 6.2 shows, pay across the distribution for all ATCs has stayed largely constant over this period, and a simple linear extrapolation of median ATC pay suggests that if future pay increases are consistent with the increases seen from 2012 to 2018, median ATC pay will stay relatively constant. However, this pay exceeds civilian Air Force ATC pay for each comparison group. For example, median pay for all ATCs exceeds \$120,000 in each year, whereas median pay for Air Force civilian ATCs grows to only just over \$104,000 by 2018.

Figure 6.2. Annual Salaries for Air Force Civilian Air Traffic Controllers (2152), Including Base Salary, Locality Pay, and Special Rates, and All Air Traffic Controllers (53-2021), by Pay Grade and Percentile



SOURCES: RAND calculations. Statistics for civilian ATCs from BLS OES; Air Force civilian pay from the DCPDS. NOTE: Linear extrapolation is based on ordinary least squares fit of 2012–2018 median private-sector pay, extended to 2025.

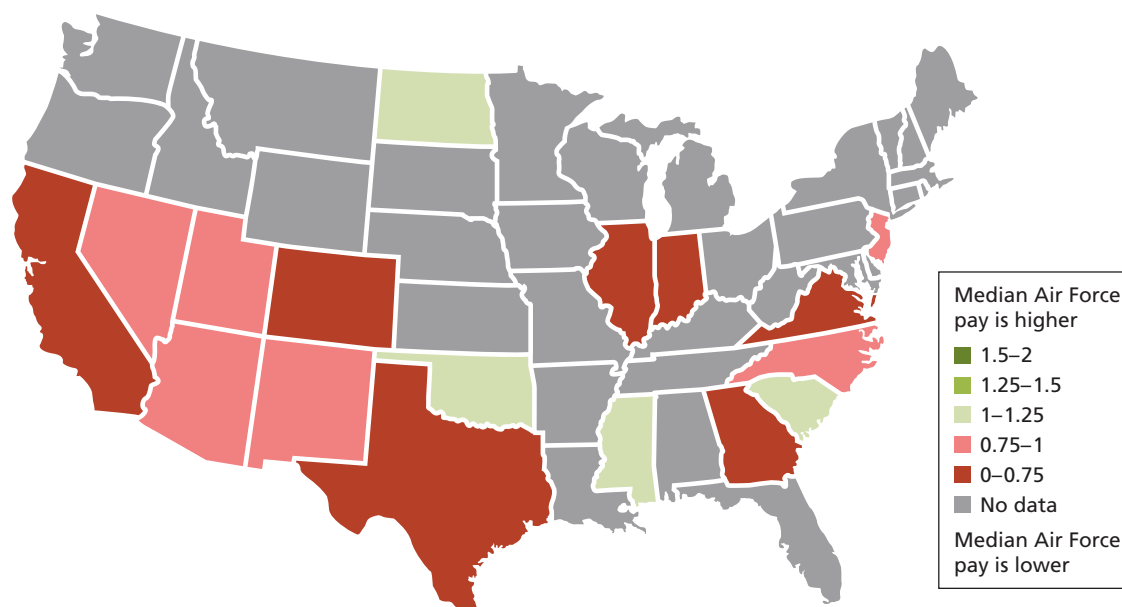
Air Force civilian ATC pay is lower than in the occupation as a whole, but this varies by LPA. Moreover, although this is not shown here, according to OES data, private-sector ATCs make, at the median, \$30,000 less per year than those employed by the federal government. Data on these private-sector ATCs are difficult to acquire given their limited number. Taking that into account, we conducted a scrape of job postings with the term “air traffic controller” on the

websites CareerBuilder, Glassdoor, Indeed, and Monster from August 15 to September 10, 2019, to determine which private-sector employers were hiring ATCs and where they were being hired. Our results were limited; there were fewer than 100 unique openings for ATCs posted by employers that were not federal agencies. These firms were either Air Force or, more broadly, defense contractors (e.g., AECOM, American Systems, Oasis Systems, and SAIC/Leidos); contractors in the aviation industry (e.g., Cavan Solutions); or stakeholders seeking to hire liaisons to the FAA or direct labor relations (e.g., the National Air Traffic Controllers Association and Southwest Airlines). Three localities account for the vast majority of the openings we identified: Chicago; the Washington, D.C., area; and the Las Vegas area. Furthermore, these postings generally corresponded to training, liaison, supervisory, or support positions or for en route positions rather than full-time approach ATC positions.

Unfortunately, the relatively low total number of ATCs (22,390 in 2018, in contrast to over 80,000 airline pilots in that year) prevents statistically reliable analysis by experience as was conducted in Chapter 5. That is, the ACS does not contain a sufficient number of ATC respondents by respective education and age group to allow for valid comparisons of levels or trends in ATC pay.

As Figure 6.3 shows, there is not substantial geographic variation in this relative pay; Air Force civilian pay meets general pay for only four states with available data in 2018. In the rest,

Figure 6.3. Median Annual Pay for GS-12/13 Air Force Civilian Air Traffic Controllers, Including Base Salary, Locality Pay, and Special Rates, Relative to All Air Traffic Controllers, by State, 2018



SOURCES: RAND calculations. Median airline pilot pay from BLS OES; median Air Force civilian pilot pay from the DCPDS, which includes base salary, locality pay, and special rates.

NOTE: States without published OES data for this occupation or states without a sufficient number of civilian Air Force employees result in a lack of an estimated ratio.

Air Force civilian pay lags behind that of all ATCs. That being said, there is substantial variation in both levels and recent growth in ATC pay across LPAs, as shown in Table 6.4. For example, in the New York–Newark LPA, median ATC pay has increased by over 34 percent, from \$103,720 to \$139,770, between 2012 and 2018, exceeding median Air Force GS-12/13 pay by over \$40,000 in 2018. In the Washington, D.C., area, however, median pay fell 15.7 percent, from \$139,110 to \$117,290, between 2012 and 2018, exceeding Air Force GS-12/13 pay by less than \$7,000 in 2018.

Table 6.4. Average Annual Pay, by Occupational Employment Statistics or Air Force Civilian Pay Grade

LPA	Civilian Average Annual Salary				Air Force Civilian Average Annual Pay, Including Base Salary, Locality Pay, and Special Rates		
	All, 2012	All, 2018	Percentage Growth	95-Percent Confidence Interval of Percentage Growth	GS-9/11, 2018	GS-12/13, 2018	GS-14/15, 2018
Atlanta–Athens–Clarke County–Sandy Springs, GA-AL	139,300	144,000	3.4	(–3.5, 9.3)	84,421	99,268	
Boston–Worcester–Providence, MA-RI-NH-ME	129,970	144,990	11.6	(4.3, 18.8)	78,468		
Buffalo–Cheektowaga, NY		103,880					
Burlington–South Burlington, VT		81,630					
Chicago–Naperville, IL-IN-WI	145,050	147,540	1.7	(–7.9, 9.5)			
Columbus–Marion–Zanesville, OH		115,680					
Dayton–Springfield–Sidney, OH		94,020			75,988		
Denver–Aurora, CO	137,740	125,590	–8.8	(–14.0, –4.3)			
Detroit–Warren–Ann Arbor, MI		135,190			83,392	100,202	
Hawaii	104,350	110,050	5.5	(–11.3, 21.6)	97,357	116,993	
Huntsville–Decatur–Albertville, AL		82,080					
Kansas City–Overland Park–Kansas City, MO-KS	127,280	125,140	–1.7	(–10.3, 6.3)	85,272		
Las Vegas–Henderson, NV-AZ	111,110	124,490	12.0	(–4.2, 27.9)		102,109	
Minneapolis–St. Paul, MN-WI		135,720					
New York–Newark, NY-NJ-CT-PA	103,720	139,770	34.8	(19.2, 50.3)	79,460	98,974	
Philadelphia–Reading–Camden, PA-NJ-DE-MD	140,010	138,560	–1.0	(–14.0, 11.9)	83,699	101,578	
Portland–Vancouver–Salem, OR-WA		109,850					
Sacramento–Roseville, CA-NV		151,960			77,937		
St. Louis–St. Charles–Farmington, MO-IL	118,020	111,490	–5.5	(–11.6, –1.3)	78,711	97,734	

LPA	Civilian Average Annual Salary			Air Force Civilian Average Annual Pay, Including Base Salary, Locality Pay, and Special Rates			
	All, 2012	All, 2018	Percentage Growth	95-Percent Confidence Interval of Percentage Growth	GS-9/11, 2018	GS-12/13, 2018	GS-14/15, 2018
Virginia Beach–Norfolk, VA-NC	95,950	96,810	0.9	(–5.2, 6.6)			
Washington–Baltimore–Arlington, DC-MD-VA-WV-PA	139,110	117,290	–15.7	(–28.1, –4.6)		110,766	138,127

SOURCES: RAND calculations. Civilian statistics from BLS OES; Air Force civilian pay from the DCPDS.

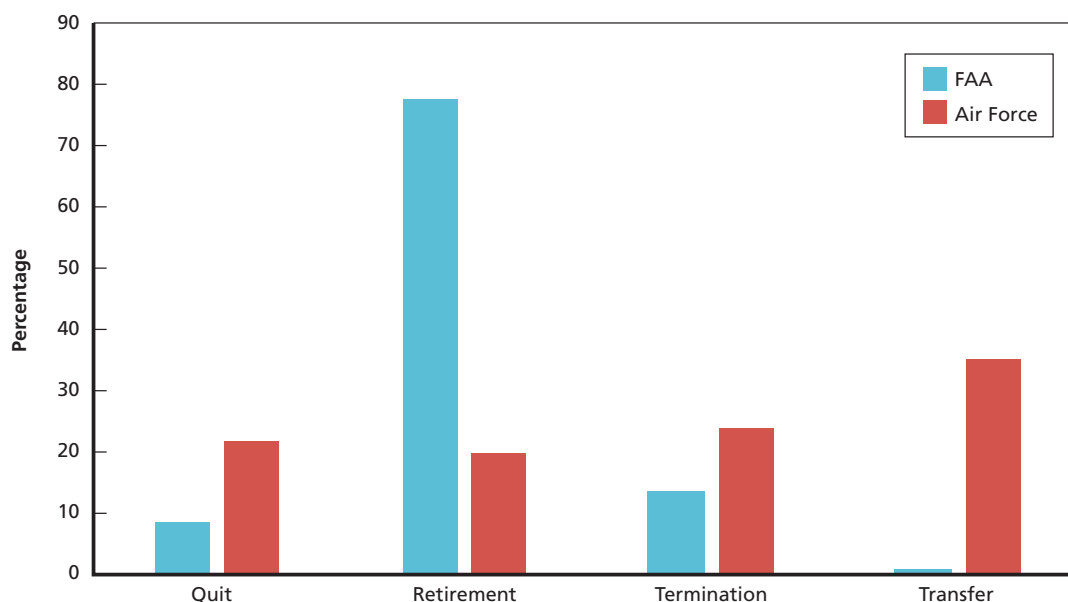
NOTE: Cells are missing where data were not published for the year and area in question, or if there were too few Air Force employees; 95-percent confidence intervals that include zero indicate that the data are insufficiently precise to determine whether pay increased or decreased from 2012 to 2018.

Comparisons to the Federal Aviation Administration

Although these calculations show overall and geographic comparisons of all ATCs, a single agency represents an overwhelming majority of employment for this occupation: in 2017, the FAA employed 18,715 ATCs, over 80 percent of total employment. As such, we can conduct additional analyses using publicly available OPM Federal Workforce Data (or FedScope) on employment and attrition for ATCs, comparing Air Force civilian employees with FAA workers.

In particular, we focus on separations among ATCs for the FAA and Air Force civilian employees. As Figure 6.4 shows, as a percent of the total number of separations, by far the most

Figure 6.4. Distribution of Air Traffic Controller Separations, by Agency



SOURCES: RAND calculations. Statistics for FAA from OPM Federal Workforce Data (FedScope); Air Force civilian statistics from the DCPDS.

common type of separation in the FAA is retirement, accounting for nearly 80 percent of all ATC separations from the FAA. In contrast, the most common type of separation among Air Force civilian ATCs is a transfer to another agency, which accounts for just over one-third of all separations. Retirements are the least likely type of separation, at just under 20 percent, with quits and terminations accounting for 22 percent and 24 percent, respectively.

These calculations are based on the total number of separations in a given year; however, these types of separation have different underlying rates based on length of service. In the FedScope data we use, length of service is available, defined as “the number of years of federal civilian employment, creditable military service, and other service made creditable by specific legislation” (OPM, 2019d). Additional figures on when these separations occur by years of service and pay level are provided in Appendix B.

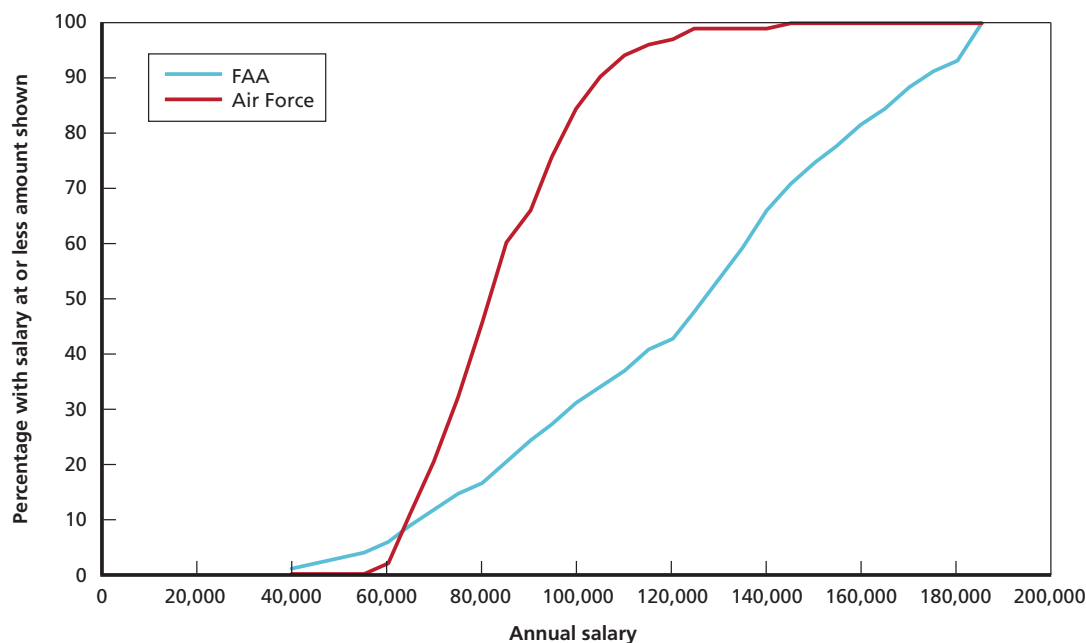
We now turn to another question, however: Does the FAA systematically pay ATCs more? As shown in Appendix F, the chief difficulty in answering such a question is that the FAA employs a distinct pay grade system, so any pay disparity for an ATC in the FAA and one employed as an Air Force civilian could be due to either higher pay *or* to different characteristics, such as greater responsibilities, differences in experience, or residence in a different part of the country.

One way to address these issues is to draw on the OPM FedScope employment files of civilian federal employees from FY 2011 to FY 2017, which contain information on each employee’s agency, occupation, salary, length of service, state of employment, supervisor status, age (in five-year age groups), and educational attainment. We can then limit our analysis to civilian ATCs working for the FAA or the Air Force and compare annual salaries of these ATCs, pooling across these years while controlling for these variables.

Figure 6.5 shows the cumulative distribution of annual salary for ATCs across the two agencies; a cumulative distribution reports the fraction of workers with a salary at or less than the salary on the *x* axis. For example, the cumulative distribution for the Air Force reaches 0.5 at a salary of approximately \$80,000 per year, indicating that one-half of ATCs working as Air Force civilians earn \$80,000 or less, and one-half earn more than \$80,000. But, in fact, only 17 percent of FAA ATCs earn \$80,000 or less, so 83 percent earn more than \$80,000. With the exception of more FAA ATCs earning less than \$65,000, when we go above \$65,000 there are substantially more FAA ATCs earning higher salaries than Air Force civilian ATCs. For example, 2.5 percent of ATCs employed as Air Force civilians earn more than \$120,000, while nearly 57 percent of FAA ATCs earn more than \$120,000.

This figure alone would suggest that, on average, the FAA pays ATCs substantially more than the Air Force does, although other differences in the experience of FAA ATCs may account for these pay disparities. For example, calculations using FedScope data indicate that there is a similar number of ATCs with fewer than ten completed years of service, but the FAA has a substantially higher number of ATCs with more years of service after this ten-year mark. For example, less than 5 percent of ATCs employed as Air Force civilians have more than 20 years

Figure 6.5. Cumulative Percent of Air Traffic Controllers, by Annual Pay and Agency, 2011–2017, Including Base Salary, Locality Pay, and Special Rates



SOURCES: RAND calculations. Statistics for FAA from OPM Federal Workforce Data (FedScope); Air Force civilian statistics from the DCPDS.

of service, whereas 25 percent of FAA ATCs have more than 20 years of service. We would thus expect that with more experience comes higher salaries, explaining a portion of the pay disparity observed in Figure 6.5, although we note again that the measure of years of service is “the number of years of federal civilian employment, creditable military service, and other service made creditable by specific legislation” (OPM, 2019d). As such, the prior military experience of civilian Air Force ATCs is likely underrepresented in these measures.

However, one major drawback in relying on completed years of service is that, as discussed below, nearly all Air Force civilian ATCs have previously served, with the majority having retired from the military. As such, the available measures of years of service, as well as the current pension entitlements and the rates of pension entitlement accumulation, prevent direct comparison of pay. That is, with the data on hand, we are unable to separate these qualitative differences in prior experience and pension entitlement from current pay. We did conduct this analysis, however, to determine how much of the pay gap as measured with both the FedScope data and the OES data can be explained. We found that nearly half of this difference can be explained through geographic location and individual characteristics, but a substantial portion remains. Yet we caution that not all pertinent information as to salary differences is available in the OPM FedScope data. For example, we cannot observe location of employment at a finer level than the state, yet we know from Table 6.6 that local labor markets matter.

Table 6.5 compares minimum and maximum pay across the FAA and Air Force civilian ATCs in two locations: Las Vegas and Oklahoma. In Oklahoma, pay is relatively similar

between the two agencies: at the Oklahoma City tower, the minimum FAA salary for a certified professional controller (CPC) was \$91,363 in 2019, while the lowest actual pay was \$90,948 for GS-12 and \$94,535 for GS-13 Air Force civilian ATCs in 2018. The maximum pay was \$123,341 for FAA CPCs, and the highest pay was \$115,626 for GS-12 and \$122,896 for GS-13 Air Force civilian ATCs in Oklahoma. However, in Las Vegas, there is a substantial pay disparity, with the maximum Air Force civilian pay, \$127,812, only slightly exceeding the *minimum* FAA CPC pay of \$123,635. Although the data sources in question do not allow for differences according to individual characteristics, the magnitude of the variation in the pay gap across locations speaks to the importance of tailoring pay differently based on local conditions.

Table 6.5. Relative Annual Pay for Civilian Air Traffic Controllers at the Federal Aviation Administration (2019) and in the Air Force (2018)

	Minimum	Median	Maximum
FAA CPC: Las Vegas tower	123,635		166,911
GS-12/13 Air Force: Las Vegas LPA	79,500	100,838	127,812
FAA CPC: Oklahoma City tower	91,363		123,341
GS-12/13 Air Force: State of Oklahoma	90,948	110,291	122,896

SOURCES: RAND calculations. Civilian Air Force ATC pay from DCPDS; FAA pay from 123ATC, undated.

Figure 6.4 suggests that transfers are substantially more common among Air Force civilian ATCs than they are in the FAA. Furthermore, timing of different separation types varies; terminations happen at fewer years of service in the FAA and retirement happens at higher years of service. Altogether, there is a substantial pay gap between Air Force civilian ATCs and the occupation at large, and higher attrition rates than in the FAA. Although a substantial portion of this pay gap can be explained by FAA ATCs having substantially more observed years of service, the majority of the gap remains, and we note the presence of substantial local variation in the size of this gap and the inability to conduct comparisons based on both civilian and military experience. Finally, we note that systematic differences in nonsalary compensation across agencies—for example, the generosity and structure of pension entitlements—would have a direct impact on the relevance of the pay gap in considerations of changes to pay intended to make Air Force civilian compensation more competitive.

The Air Force Cost of Matching Private-Sector or Other Government Agency Pay

The magnitude of the differences in pay between all ATCs and Air Force civilian ATCs, as shown in Figure 6.2, allows for an estimate of the annual cost of closing this pay gap for GS-12/13 Air Force civilian ATCs. If one applies the \$20,091 overall pay gap estimate to the 392 civilian Air Force ATC positions in these pay grades, the cost of meeting the average ATC salary is \$7,875,746 per year. However, we caution that given the extensive military background of

civilian Air Force ATCs, annual salaries may not be directly comparable for the ATCs in question. Additionally, there is substantial geographic variation in this pay gap. For example, in Hawaii and Oklahoma there does not appear to be any pay gap, whereas the pay gap in the Las Vegas LPA is substantial.

Additional Recruiting and Retention Issues Related to Compensation

According to the Air Force representatives we interviewed, most civilian ATCs are retired military personnel or have some previous military experience. In fact, Air Force civilian personnel data (as of March 2019) indicate that less than 1 percent of current Air Force civilian ATCs are nonveterans (roughly 70 percent are retired enlisted service members, 4 percent are retired officers, and 26 percent are veterans).³ We were told that this has provided a somewhat steady pipeline to fill air traffic control positions, and the Air Force has not yet had to engage in aggressive recruiting. According to career field managers and advisers, the Air Force typically has between three and ten qualified applicants for each position vacancy, and this rate has been steady over the years.

Recently, however, the ATC community has undergone two significant consistency reviews: one related to compensation and one related to classification (but which had compensation implications, including the downgrading of some ATCs). According to Air Force representatives, both consistency reviews are likely to have implications on recruitment and retention in the near future. This is because the grade of ATC positions may be lower than it is now and civilian employees moving to headquarters and staff positions will not be able to receive special rate pay.

One recruitment issue facing the recruitment and hiring of a federal ATC is the age and retirement limitations. ATCs covered under FERS are qualified for a special ATC retirement if they

- are age 50, with 20 years of service
- are any age, with 25 years of service
- occupy a position that requires the employee to be engaged in the separation and control of air traffic in providing preflight, in-flight, or airport advisory service to aircraft operators or as an immediate supervisor.

There is a mandatory retirement age of 56, with 20 years of “good time” (i.e., service that is creditable for ATC retirement) service. The annuity is computed similarly to a regular retirement. Ex-military applicants are afforded some additional time based on their military service.

³ This does not include dual-status military/civilian technicians in the AFR and ANG.

Compensation Consistency Review

As described above, Air Force civilian ATCs can receive special salary rates and are covered under multiple special salary rate tables. According to interviews with HR specialists and career field managers at the AFPC, a 2017 Air Force consistency review of ATC personnel records identified administrative discrepancies and that some special salary rate tables had been applied inconsistently (Control and Reporting Center, 2017). As a result, some ATCs were overcompensated while others were undercompensated. In addition, some ATCs were under the wrong retirement system. These errors affected more than one-third of the Air Force ATC workforce.

The same career field managers indicated that the Air Force corrected the pay for all those affected. When the Air Force corrected the pay, those who had been underpaid received the difference up to the amount they should have been paid. Employees who had been overpaid stopped being overpaid; they did not have to repay the overpayments. The field managers voiced concerns about future recruitment and retention being negatively affected by these compensation errors.

Classification Consistency Review

Concerns over the OPM classification standards used to evaluate the grade levels of ATC positions were raised in interviews with career field advisers and HR specialists. OPM classification standards provide a description of the type and level of work performed that when measured against duties performed on a job result in the assignment of a grade level. The classification standard for the Air Traffic Control occupational series was developed in 1977 (OPM, 1978). There have been significant changes in the duties and complexity of ATC positions since that time, and no adjustments have been made to the standard. Career field managers pointed out that the current OPM standard does not adequately address military-specific operations, such as landing a formation of F-15s, and the fact that Air Force ATCs must work simultaneously with different aircraft at very different speeds (e.g., helicopters, fighter jets, transport aircraft, and trainers). There is also a disagreement over how radar is being used in military towers. Information provided during interviews and in reviewed documents enforce the Air Force position that the OPM classification standard does not capture the complexity of operations Air Force ATCs perform today.

A number of GS-11 ATCs at Sheppard AFB submitted a classification appeal to OPM; the appeal package requested that their positions be upgraded from GS-11 to GS-12 based on the duties they were performing. OPM evaluated the work “assigned to and performed by the appellants” and—based on this review—decided in October 2018 to lower the grade of the appealed positions to GS-10 and directed the Air Force to downgrade the positions (OPM, 2018a). The rationale OPM provided for the downgrade was that in the course of the review the auditors did not find that the Air Force civilian ATCs were performing at the level they claimed.

Subsequently, OPM conducted audits at other installations where it identified similar positions. Air Force career field managers and HR specialists at the AFPC stated that the downgrading and subsequent follow-up audits raised concerns across the ATC community, with many of its members fearing that their grades and salaries would be reduced in the future. Air Force representatives expressed concerns that the outcome of the recent classification consistency reviews may increase attrition and reduce interest in Air Force civilian ATC positions (U.S. Air Force Flight Standards Agency, 2018).

A Review of Air Force Vacancies

In an effort to identify additional barriers that may exist to recruitment in ATC positions, our team compared current Air Force job listings with listings from other federal agencies and from the private sector. (For an overview of the methodology, see Appendix C.) We synthesized findings across two domains: (1) content (information contained within the listing) and (2) structure (how information is organized and displayed).

Compared with vacancies for some other occupations, job titles within the Air Traffic Control occupational series were consistent as simply “Air Traffic Control” or “Air Traffic Control Specialist.” All Air Force vacancies did not explicitly list ATC-specific qualifications and instead only listed general requirements and conditions of employment (e.g., “Must be a U.S. Citizen”). Similar to other positions, these vacancies used boilerplate language that included a link to general OPM qualification standards. In contrast, similar vacancies across the FAA tended to include role-specific requirements (e.g., “Required to pass the Ten Eleven Twelve Radar Assessment”). Unlike the Air Force, FAA positions also included job questionnaires that were intended to guide applicants through the application process.

Similar to vacancies for the Aircraft Operations occupational series, open vacancy direct hire listings that were for multiple positions and/or locations in this category were vague—advertising roles across entire pay scale ranges (i.e., GS-1 through GS-15) and listing the starting salary at the lowest level (roughly \$21,000), even though starting positions for this series are GS-11 or GS-12. In comparison, listings within the FAA appeared to be more deliberate, only recruiting for specific positions and listing the associated pay level. None of the Air Force positions indicated that relocation assistance might be available to applicants. In contrast to Air Force postings, FAA positions described the inclusion of a locality pay adjustment based on position location and included a fixed relocation pay of \$27,000.

Finally, in terms of structure of the postings, we found that, similar to other federal listings, Air Force job postings for this series included neither an organizational culture or mission statement nor specific benefits information. They also tended to rely on blocks of text over concise, bulleted lists. Like other Air Force postings, the benefits section included a link to a page on USAJobs that outlines general federal employee benefits. In contrast, for benefits, FAA positions included a link that redirects applicants to an FAA-specific benefits page that utilized infographics in conjunction with plain text to outline key benefits.

Options for Developing More Competitive Compensation and Benefits

The Air Traffic Control occupational series is included in the Air Force MCO list because it contributes significantly to the Air Force's ability to fulfill its mission. And, although it currently does not have issues with recruiting or retention, the department has concerns that it may experience a shortage of employees in the coming years. Unlike other occupations in which the Air Force is competing with the private sector for talent, the main competitor for ATCs is the FAA, which is not required to operate under the same federal constraints as the Air Force and has its own unique compensation structure for ATCs. Our analysis shows that there is a substantial pay gap between Air Force civilian ATCs and the occupation at large, as well as higher attrition rates than in the FAA. If the Air Force would like to ensure that compensation is on par with the FAA and that compensation is not an issue in recruiting and retaining talent in the future, it could explore whether it is possible to pursue a similar pay authority or structure to that of the FAA or even look at paying the FAA through interagency fund transfers to have its air traffic control positions manned by the FAA.

If these options do not seem feasible or desirable, the Air Force may at minimum wish to pursue the initiatives suggested below. As with the initiatives suggested in Chapter 5, some of these are actions the Air Force can pursue directly; others would require OPM or legislative changes, making them more difficult to achieve.

What the Air Force Can Approach on Its Own

- **Explore whether special salary rates need to be updated for certain localities.** Understanding that there is considerable variability across local labor markets, the Air Force should explore whether special salary rates need to be increased and respond accordingly to OPM's annual survey.
- **Update vacancy announcements to ensure that they are more applicant friendly and provide more specific and accurate information regarding compensation and benefits.** Follow the lead provided by the FAA on how they advertise their position vacancies. Requirements should be clearly defined instead of using boilerplate language or referring prospective applicants to review general OPM qualification standards to determine qualifications for the position. Even open Air Force vacancy announcements that cover multiple positions and/or locations should provide more specific potential pay grades (e.g., GS-11 to GS-12) and associated salaries instead of listing the full pay grade range (e.g., GS-1 to GS-15) and the lowest possible starting salary. Describe compensation and benefits in an enticing manner to interest applicants. Emphasize the Air Force mission on the vacancy announcement and emphasize the importance of being a full member of the Air Force team.

What Requires Department of Defense Coordination

- **Develop a package regarding how to have OPM update its classification standard.** As noted in this chapter, the current OPM ATC standard was developed in 1977 and does not reflect the current complexity of Air Force ATC positions. As a result, this has implications for the grade level of assigned positions within this occupational series.

What Requires Legislation

- **Explore the potential implications of raising the salary pay cap.** Similar to limitations in the Aircraft Operations occupational series, current special salary rate pay limitations suppress the final pay for higher grades in certain locations, potentially making these positions less competitive. The Air Force may wish to explore the potential implications of raising the salary caps on recruiting and retention.
- **Explore the potential to receive the same pay authorities as the FAA.** While the FAA has the ability to pay more to its ATCs, the Air Force will be fighting to retain the staff needed to support its mission. Requesting and receiving statutory authority for pay parity in all areas—to include headquarters and staff personnel, premium pays, improved salaries, and a higher pay cap—can help the Air Force recruit and retain the staff it needs to man its towers and train military ATCs (which is also part of a civilian Air Force ATC’s job).

7. Human Resources Management

An Overview of the Occupation

In the OPM *Handbook of Occupational Groups and Families*, the Human Resources Management occupational series (GS-0201) includes positions that manage, supervise, administer, advise on, or deliver HR management products or services. The work can be in any or a combination of the following nine different subspecialties: information systems, military, classification, compensation, recruitment and placement, employee benefits, human resource development, performance management, employee relations, and labor relations (OPM, 2018b). In the Air Force, HR specialists support the wing commanders at Air Force installations and support the AFPC, which is responsible for executing programs “covering the entire life cycle of military and civilian personnel for the Air Force, from accession through retirement, including readiness, growth, development and deployment” (AFPC, 2017).

The Human Resources Management occupational series has been designated an MCO by the Air Force, the Navy, and the Fourth Estate, and it is included in the DoD and OPM MCO lists. According to Air Force career field managers, the series is included on the Air Force MCO list due to a shortage of HR specialists at several installations and an expectation of a wave of retirements that will take place in the next few years. The Air Force is concerned that the upcoming retirements will result in a severe gap in available personnel and skills (competencies). In addition to these concerns, Air Force representatives indicated that HR management experiences high levels of turnover, and we were told that HR specialists are often military spouses who relocate with their partners.

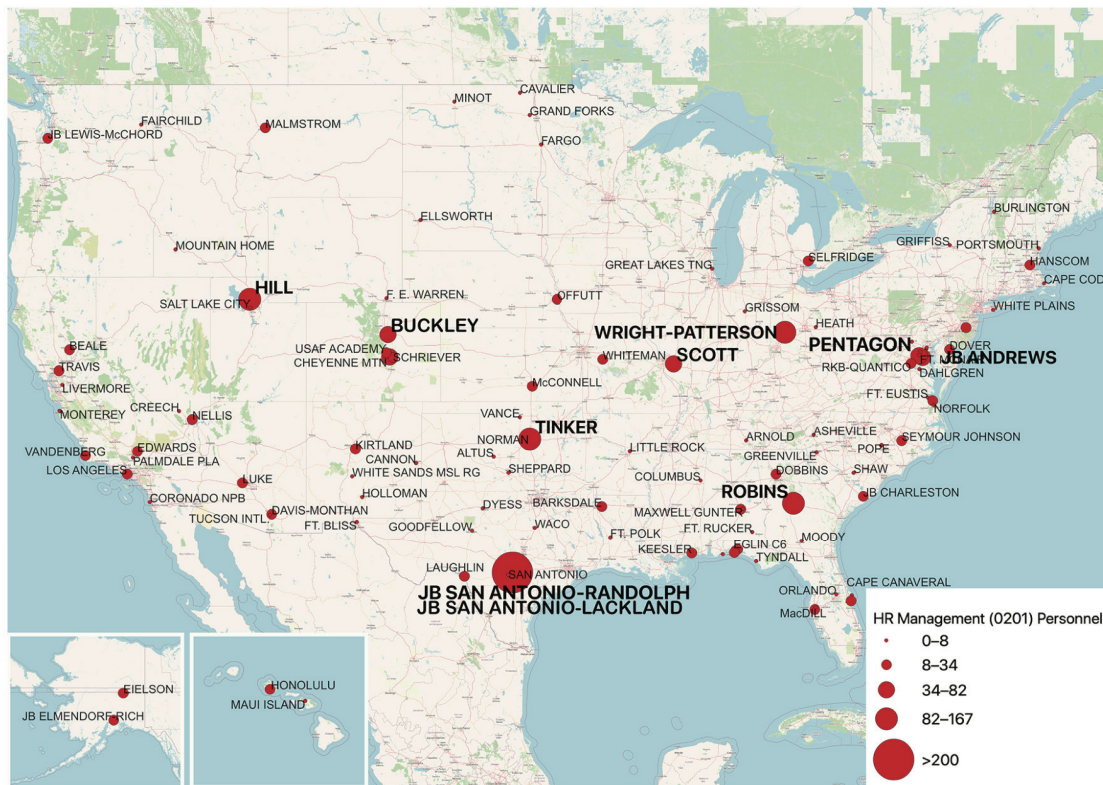
As of March 2019, Air Force civilian personnel records indicate that there are a total of 2,845 civilian personnel in the Human Resources Management occupational series within the Air Force. This represents roughly 9 percent of all personnel within the occupational series in the federal government, with June 2018 FedScope data indicating that there is a total of 30,175 Human Resources management personnel across the federal government (OPM, 2019d). As Table 7.1 shows, the largest concentrations of HR positions within the Air Force are at the AFPC (30 percent) and AFMC (18 percent), with the highest concentration of positions located at Joint Base San Antonio–Randolph, where the AFPC is located (see Figure 7.1).

Table 7.1. Human Resources Management Personnel, by Air Force Organization

Air Force Organization	Number of Civilian Personnel	Percentage of Total Civilian Personnel
Air Force Audit Agency	1	<1
Air Force Civilian Career Training Center	99	3
Air Force Installation and Mission Support	11	<1
Air Force Office of Special Investigations	13	<1
AFPC	864	30
Air Force Review Boards Agency	33	1
North American Aerospace Defense Command	2	<1
U.S. Central Command	4	<1
U.S. Cyber Command	2	<1
U.S. Northern Command	8	<1
AFSOC	27	<1
U.S. Special Operations Command	5	<1
U.S. Transportation Command	17	1
ACC	128	4
AETC	200	7
Air Force District of Washington	31	1
Air Force Global Strike Command	72	3
AFMC	514	18
AFRC	346	12
AFSPC	74	3
AMC	121	4
ANG	1	2
ANG Support Center	41	1
Headquarters and Support Elements	91	3
Pacific Air Force	63	2
U.S. Air Force Academy	8	<1
U.S. Air Forces in Europe—Air Forces Africa	47	2
U.S. Strategic Command	22	1

SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

Figure 7.1. Location of Air Force Human Resources Management Personnel Across the United States



SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

NOTE: Only one installation, Joint Base San Antonio–Randolph, where the AFPC is located, has more than 200 HR management personnel, with a total of 1,021.

Human Resources Management Compensation

As Table 7.2 shows, the majority of Air Force civilian HR specialists are in grades GS-11 to GS-12 (54 percent combined). However, there are also 265 personnel (9 percent) in positions that do not follow the GS pay scale but instead are part of the alternative AcqDemo pay scale (NH positions), and one civilian that is part of Lab Demo under AFMC (DO positions). All of these positions are in AFMC. Similar to the other occupations for which AFMC uses pay band structures, we were told during interviews with HR specialists that they found the flexibilities of the alternative pay bands helpful in recruiting and retaining personnel, and indicated that the pay bands allowed them to offer higher initial salaries than they would otherwise be able to under the current GS system.

Special Rates

There are currently no special salary rates for HR specialists within the Air Force or other federal government agencies.

Table 7.2. Air Force Human Resources Management Personnel, by Pay Grade

Pay Grade	Number of Civilian Personnel	Percentage of Total Civilian Personnel
DO-01	<10	<1
GS-5	<10	<1
GS-7	108	4
GS-9	422	15
GS-11	787	28
GS-12	743	26
GS-13	372	13
GS-14	115	4
GS-15	30	1
NH-02	66	2
NH-03	178	6
NH-04	21	1

SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

NOTE: GS positions include any designated GG positions at the equivalent pay grade.

Use of Recruitment, Relocation, and Retention Incentives

Similar to other occupations, the use of 3R incentives for HR management positions depends on the need, as well as the availability, of funds at the local level. Air Force civilian personnel data indicate that in the last five years, no recruiting incentives for these positions have been used. Retention and relocation incentives have also been used sparingly, with only 13 retention and eight relocation incentives having been offered for personnel in this occupation within the five years under study (2014–2018). These were used by several different commands and across several different installations.¹

The availability of PCS funds is discussed in Chapter 4. AFPC career field managers and HR specialists indicated that at the installation level, PCS is an incentive that is being offered as much as possible within the limit of funds available. However, PCS is not usually offered for positions in San Antonio, Texas, where there is a large applicant pool available, as AFPC career field managers perceived little to no need for the incentive to be offered at that location.

A Comparison of Air Force Compensation with That of Other Federal Agencies and the Private Sector

In this section we explore how current Air Force pay compares with pay in other federal government agencies and the private sector to identify what, if any, gaps in pay exist that could affect retention and recruiting and to determine the size of those gaps. The SOC occupational

¹ Our data only provided the total number of incentives used in a particular year. We were not able to assess the percentage of eligible personnel who were offered these incentives and who then chose to take these incentives.

classification system has multiple occupations within the broad area of HR, but in consultation with this report’s sponsor, we identified two suboccupations that reflect the skills in question:

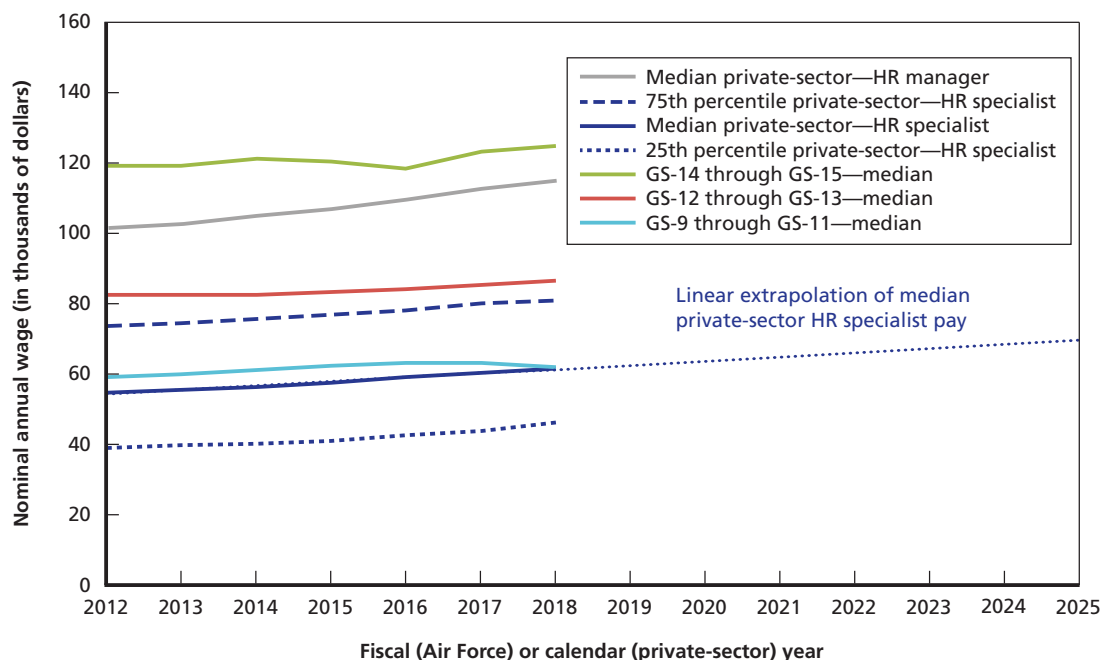
- 13-1071 Human Resources Specialists: Perform activities in the human resource area. Includes employment specialists who screen, recruit, interview, and place workers. (BLS, 2017d)
- 13-1075 Labor Relations Specialists: Resolve disputes between workers and managers, negotiate collective bargaining agreements, or coordinate grievance procedures to handle employee complaints. (BLS, 2017e)

Throughout this analysis, we refer to these two occupations together as “HR specialists.” Additionally, to allow for comparisons with the GS-14/15 HR pay grade, we draw on another SOC classification:

- 11-3121 Human Resources Managers: Plan, direct, or coordinate human resources activities and staff of an organization. Excludes managers who primarily focus on compensation and benefits (11-3111) and training and development (11-3131). (BLS, 2017f)

Figure 7.2 shows national trends in annual pay for private-sector HR specialists, by position in the income distribution, as well as annual pay among Air Force civilian HR specialists, by pay grade, and median pay for HR managers.

Figure 7.2. Annual Pay for Air Force Civilian Human Resources Specialists (0201), Including Base Salary, Locality Pay, and Special Rates; Private-Sector Human Resources Specialists (13-1071, 13-1075); and Private-Sector Human Resources Managers (11-3121), by Pay Grade and Percentile



SOURCES: RAND calculations. Statistics for private-sector HR specialists from BLS OES; Air Force civilian pay from the DCPDS.

NOTE: Linear extrapolation is based on ordinary least squares fit of 2012–2018 median private-sector pay, extended to 2025.

In contrast to the pilots and ATCs discussed in Chapters 5 and 6, respectively, pay among Air Force civilian HR specialists substantially exceeds HR specialists’ pay in the private sector. Annual pay for GS-12 through GS-13 exceeds the seventy-fifth percentile of private-sector HR specialists’ pay. GS-9 through GS-11 pay exceeds the twenty-fifth percentile of private-sector HR specialists’ pay. Furthermore, there have not been marked recent increases in private-sector HR specialists’ pay, and if median HR specialists’ pay continues to grow at the same annual rate as it has from 2012 to 2018, it would still be less than 2018 median GS-12/13 pay. However, we caution that although a linear model appears to match recent pay trends in the private sector closely, future pay changes may deviate from trends in the recent past. Finally, even the substantially more highly paid occupation of HR manager has a median annual salary below median GS-14/15 pay.

Although both of the HR specialist suboccupations contain relevant skills, one issue with providing statistics combining them provides an average that may obscure substantial heterogeneity in employment or salary changes. Table 7.3 provides employment and pay statistics for each suboccupation separately. The two suboccupations have grown across both these dimensions between 2012 and 2018; however, 13-1071 represents the vast majority of our combined HR specialists group, while 13-1075 has seen higher salary growth. Growth in employment among the 13-1071 suboccupation is particularly notable, averaging just over 7 percent per year since 2012, resulting in the overall growth rate from 2012 to 2018.

Table 7.3. Employment and Median Annual Salary Differences Across Human Resources Suboccupations

		13-1071 HR Specialists	13-1075 Labor Relations Specialists
Total Employment	2018	593,790	77,140
	percent change, 2012–2018	50.6	1.6
Median Annual Salary	2018	60,880	67,790
	percent change, 2012–2018	9.1	24.0

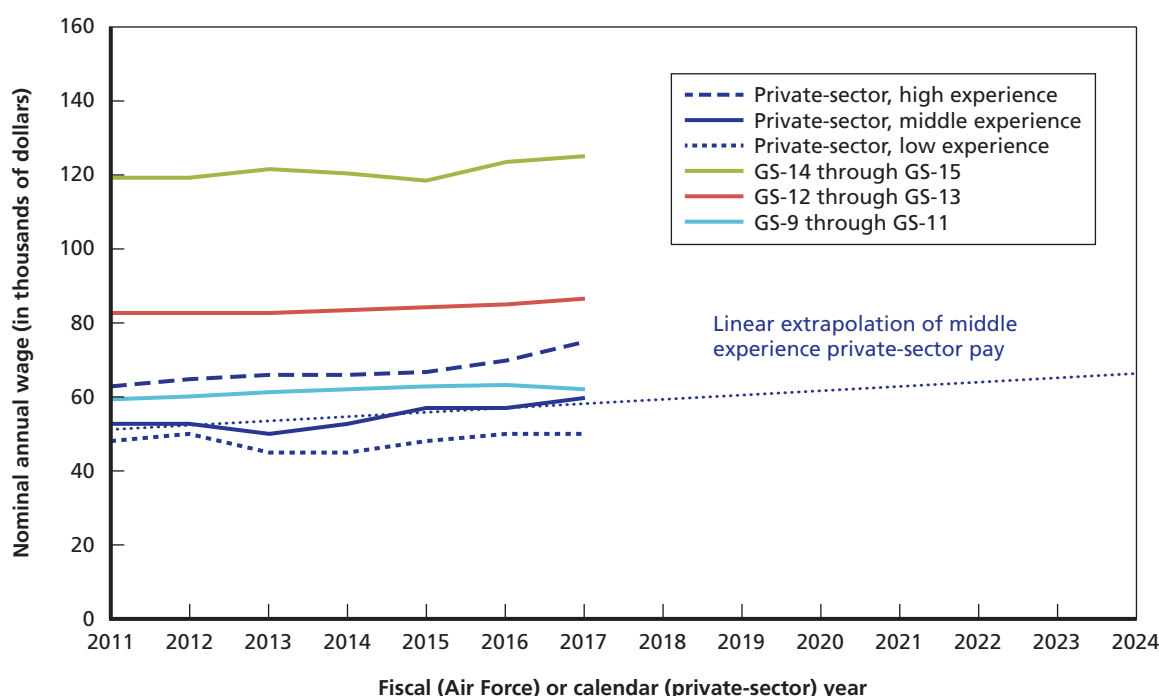
SOURCE: RAND calculations. Statistics for HR suboccupations from BLS OES.

We next examine how private-sector pay for HR specialists differs by experience level by drawing on the same experience definitions described in Chapter 5:

- “low experience”: bachelor’s degree plus two years’ experience or high school degree plus five years’ experience
- “middle experience”: bachelor’s degree plus five years’ experience or high school degree plus eight years’ experience
- “high experience”: bachelor’s degree plus 11 years’ experience or high school degree plus 14 years’ experience.

As in Chapter 5, we use ACS responses; given the number of workers in these occupations, there are sufficient observations to provide statistics according to these experience groupings, as shown in Figure 7.3. These series indicate that Air Force civilian pay exceeds comparable experience groupings by even more than in Figure 7.2. For example, until 2015, GS-9 through GS-11 pay nearly met the “high experience” private-sector HR specialists’ pay.

Figure 7.3. Annual Pay for Air Force Civilian Human Resources Specialists (0201), Including Base Salary, Locality Pay, and Special Rates, and Private-Sector Human Resources Specialists (13-1071, 13-1075), by Pay Grade and Experience



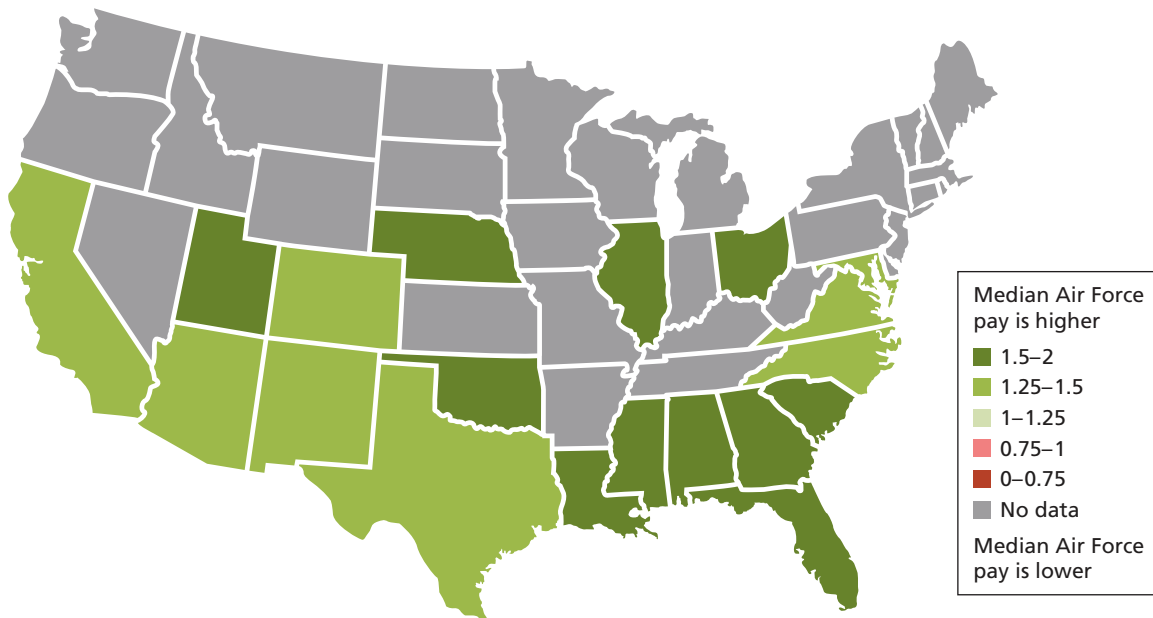
SOURCES: RAND calculations. Statistics for private-sector HR specialists from ACS microdata; Air Force civilian pay from the DCPDS.

NOTE: Linear extrapolation is based on ordinary least squares fit of 2012–2018 median private-sector pay, extended to 2025.

Figure 7.4 compares median HR specialists’ pay with GS-12/13 Air Force civilian HR specialists’ pay. Although the extent to which Air Force civilian HR specialists’ pay exceeds private-sector HR specialists’ pay varies, there is no state for which private-sector pay is higher.

Table 7.4 shows all HR specialists’ pay and Air Force civilian HR specialists’ pay by LPA. Due to the larger number of HR specialists, we are able to provide statistics for more LPAs. Again, Air Force civilian HR specialists’ GS-12/13 pay always exceeds median HR specialists’ pay; however, growth rates by LPA for HR specialists vary widely, from a 28.4-percent increase in the St. Louis–St. Charles–Farmington LPA to a 0.5-percent decrease in the Chicago–Naperville LPA.

Figure 7.4. Median Annual Pay for GS-12/13 Air Force Civilian Human Resources Specialists, Including Base Salary, Locality Pay, and Special Rates, Relative to Annual Salary for All Human Resources Specialists, by State, 2018



SOURCES: RAND calculations. Median airline pilot pay from BLS OES; median Air Force civilian pilot pay from the DCPDS, which includes base salary, locality pay, and special rates.

NOTE: States without published OES data for this occupation or states without a sufficient number of civilian Air Force employees result in a lack of an estimated ratio.

Table 7.4. Average Annual Pay, by Occupational Employment Statistics or Civilian Air Force Pay Grade

LPA	Civilian HR Specialist Annual Salary				Air Force Civilian HR Specialist Annual Pay, Including Base Salary, Locality Pay, and Special Rates		
	All, 2012	All, 2018	Percentage Growth	95-Percent Confidence Interval of Percentage Growth	GS-9/11, 2018	GS-12/13, 2018	GS-14/15, 2018
Alaska	54,615	63,838	16.9	(11.1, 22.7)	75,673	98,070	129,666
Albany–Schenectady, NY–MA	57,622	61,019	5.9	(–3.6, 14.2)			
Albuquerque–Santa Fe–Las Vegas, NM	53,800	58,771	9.2	(–1.7, 18.8)	58,555	76,899	
Atlanta–Athens–Clarke County–Sandy Springs, GA–AL	52,868	60,484	14.4	(8.3, 20.5)	68,710	99,930	
Austin–Round Rock, TX	55,766	66,111	18.5	(1.4, 35.7)			
Birmingham–Hoover–Talladega, AL	50,118	59,013	17.7	(10.8, 24.7)			

LPA	Civilian HR Specialist Annual Salary				Air Force Civilian HR Specialist Annual Pay, Including Base Salary, Locality Pay, and Special Rates		
	All, 2012	All, 2018	Percentage Growth	95-Percent Confidence Interval of Percentage Growth	GS-9/11, 2018	GS-12/13, 2018	GS-14/15, 2018
Boston–Worcester–Providence, MA-RI-NH-ME	61,639	72,402	17.5	(10.5, 24.5)	67,643	105,400	
Buffalo–Cheektowaga, NY	53,105	58,209	9.6	(4.5, 14.7)	60,382	96,011	
Burlington–South Burlington, VT	52,593	60,634	15.3	(7.8, 22.8)			
Charlotte–Concord, NC-SC	55,103	62,078	12.7	(5.4, 19.9)			
Chicago–Naperville, IL-IN-WI	61,016	60,691	–0.5	(–9.5, 7.4)			
Cincinnati–Wilmington–Maysville, OH-KY-IN	50,522	60,561	19.9	(12.9, 26.8)			
Cleveland–Akron–Canton, OH	52,914	60,541	14.4	(8.2, 20.6)			
Colorado Springs, CO	57,691	61,118	5.9	(–1.8, 12.0)	64,407	92,057	125,745
Columbus–Marion–Zanesville, OH	56,109	60,914	8.6	(2.5, 14.6)			
Corpus Christi–Kingsville–Alice, TX	42,340	52,789	24.7	(15.0, 34.4)			
Dallas–Fort Worth, TX-OK	57,707	64,324	11.5	(5.4, 17.6)	67,270	104,064	125,987
Davenport–Moline, IA-IL	52,302	62,950	20.4	(5.9, 34.8)			
Dayton–Springfield–Sidney, OH	53,765	55,502	3.2	(–6.7, 11.8)	59,698	88,117	133,703
Denver–Aurora, CO	61,091	66,736	9.2	(5.0, 13.5)	65,603	91,910	
Detroit–Warren–Ann Arbor, MI	58,436	62,807	7.5	(1.0, 13.9)	68,070	91,536	127,874
Harrisburg–Lebanon, PA	53,633	58,330	8.8	(1.7, 15.8)			
Hartford–West Hartford, CT-MA	64,745	65,602	1.3	(–6.9, 7.8)	72,972	117,501	
Hawaii	48,736	59,261	21.6	(14.4, 28.8)	68,136	97,742	128,773
Houston–The Woodlands, TX	60,080	65,151	8.4	(2.4, 14.4)		92,165	
Huntsville–Decatur–Albertville, AL	60,943	66,756	9.5	(–4.1, 23.0)			
Indianapolis–Carmel–Muncie, IN	52,732	56,742	7.6	(1.8, 13.4)			
Kansas City–Overland Park–Kansas City, MO-KS	53,055	61,017	15.0	(11.0, 19.0)	63,177	87,907	
Laredo, TX	35,785	44,254	23.7	(5.9, 41.5)			
Las Vegas–Henderson, NV-AZ	45,864	52,954	15.5	(10.7, 20.2)	60,687	96,623	
Los Angeles–Long Beach, CA	61,322	67,943	10.8	(4.5, 17.1)	77,801	99,335	
Miami–Fort Lauderdale–Port St. Lucie, FL	48,416	56,404	16.5	(9.6, 23.4)	70,665	101,399	

LPA	Civilian HR Specialist Annual Salary				Air Force Civilian HR Specialist Annual Pay, Including Base Salary, Locality Pay, and Special Rates		
	All, 2012	All, 2018	Percentage Growth	95-Percent Confidence Interval of Percentage Growth	GS-9/11, 2018	GS-12/13, 2018	GS-14/15, 2018
Milwaukee–Racine–Waukesha, WI	51,214	61,072	19.3	(13.8, 24.7)			
Minneapolis–St. Paul, MN-WI	52,449	61,882	18.0	(13.3, 22.7)	66,783	81,079	
New York–Newark, NY-NJ-CT-PA	63,602	72,535	14.0	(10.0, 18.1)	68,567	101,141	
Omaha–Council Bluffs–Fremont, NE-IA	51,427	59,518	15.7	(10.1, 21.4)			
Palm Bay–Melbourne–Titusville, FL	49,367	50,774	2.9	(–9.0, 14.7)	64,868	99,127	124,328
Philadelphia–Reading–Camden, PA-NJ-DE-MD	59,770	67,735	13.3	(9.8, 16.9)	69,973	107,470	
Phoenix–Mesa–Scottsdale, AZ	52,971	58,411	10.3	(5.0, 15.6)	64,403	92,212	
Pittsburgh–New Castle–Weirton, PA-OH-WV	52,567	60,374	14.9	(9.6, 20.2)	60,527	82,798	
Portland–Vancouver–Salem, OR-WA	55,413	62,518	12.8	(7.8, 17.8)			
Raleigh–Durham–Chapel Hill, NC	54,103	63,444	17.3	(10.7, 23.8)	70,024	83,501	
Richmond, VA	57,407	66,717	16.2	(10.5, 21.9)			
Sacramento–Roseville, CA-NV	56,886	68,170	19.8	(8.0, 31.6)	72,271	105,127	
San Antonio–New Braunfels–Pearsall, TX	54,109	62,466	15.4	(5.3, 25.6)			
San Diego–Carlsbad, CA	56,288	63,356	12.6	(5.8, 19.3)			
San Jose–San Francisco–Oakland, CA	71,960	82,146	14.2	(8.5, 19.8)	79,289	128,158	
Seattle–Tacoma, WA	62,448	72,222	15.7	(9.3, 22.0)	68,770	98,136	
St. Louis–St. Charles–Farmington, MO-IL	50,274	64,540	28.4	(21.2, 35.6)	65,564	92,057	122,131
Tucson–Nogales, AZ	45,568	52,924	16.1	(7.4, 24.8)	64,313	82,291	
Virginia Beach–Norfolk, VA-NC	51,166	60,325	17.9	(11.9, 23.9)			
Washington–Baltimore–Arlington, DC-MD-VA-WV-PA	71,822	77,763	8.3	(4.8, 11.7)	74,404	103,154	138,644

SOURCES: RAND calculations. Civilian statistics derived from BLS OES; Air Force civilian pay from the DCPDS.

NOTE: Cells are missing where data were not published for the year and area in question, or if there were too few Air Force employees; 95-percent confidence intervals that include zero indicate that the data are insufficiently precise to determine whether pay increased or decreased from 2012 to 2018.

A Comparison of Air Force Compensation with That of FIRREA Agencies

Given the differing regulatory and bureaucratic environments of the federal government, and DoD-specific HR work relative to private-sector employment, we also provide comparisons with another set of federal agencies that compete for HR employees: FIRREA agencies. These agencies recruit the majority of their financial management employees from the high-paying private-sector financial community and have the ability to pay their employees with significantly higher salaries. As of 2019, these include

- the Commodity Futures Trading Commission
- the Consumer Financial Protection Bureau
- the Farm Credit Administration
- the Federal Deposit Insurance Corporation (FDIC)
- the Federal Housing Finance Agency
- the National Credit Union Administration
- the Office of the Comptroller of the Currency
- the Securities and Exchange Commission.

However, most of these agencies employ only a small number of HR specialists, limiting reliable comparisons of relative compensation with Air Force civilian HR specialists. As such, we focus on the three agencies that employ more than five HR specialists at each pay grade under study:

- the FDIC (135 total specialists in 2017)
- the Office of the Comptroller of the Currency (91 total specialists in 2017)
- the Securities and Exchange Commission (60 total specialists in 2017).

Although HR specialists employed by these agencies are federal employees, each agency compensates its employees through a pay scale separate from the GS system. Following OPM GS-equivalent pay grades for the FDIC, and USAJobs postings for the SEC and OCC, we assign an HR specialist pay grade in each agency to a GS pay grade for the purpose of comparison using the following approach:

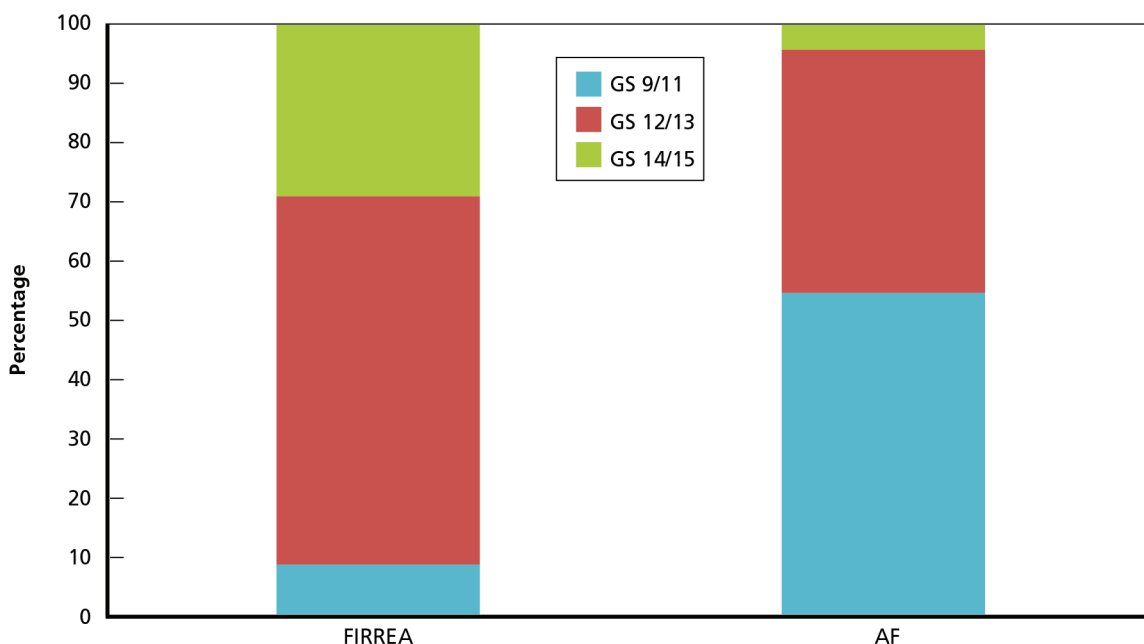
- FDIC pay grades CG-9/11 as GS-9/11
- FDIC pay grades CG-12/13 as GS-12/13
- FDIC pay grades CG-14/15 as GS-14/15
- OCC pay grades NB-III as GS-9/11
- OCC pay grades NB-V as GS-12/13
- OCC pay grades NB-VI/VII as GS-14/15
- SEC pay grades SK-09 as GS-9/11
- SEC pay grades SK-12/13 as GS-12/13
- SEC pay grades SK-14/15/16/17 as GS-14/15.

Although these agencies represent competing employment opportunities, we note here that there are substantially fewer HR specialists in these agencies. In 2017 there were 2,883 Air Force civilian HR specialists, but only 286 HR specialists across these three FIRREA agencies, or

387 across all nine agencies. The comparison of FIRREA agency pay is particularly important in the Washington, D.C., area, where the Air Force has difficulty recruiting and retaining HR specialists.

Furthermore, there is substantial variation in pay grade. As Figure 7.5 shows, FIRREA HR specialists tend to be in pay grades equivalent to GS-12/13, whereas there is a substantially higher fraction of GS-9 through GS-11 HR civilian employees working for the Air Force, accounting for more than one-half of such workers. Moreover, separation rates among HR employees in the Air Force, as shown in Figure 7.6, are higher across each pay grade than for FIRREA HR specialists.

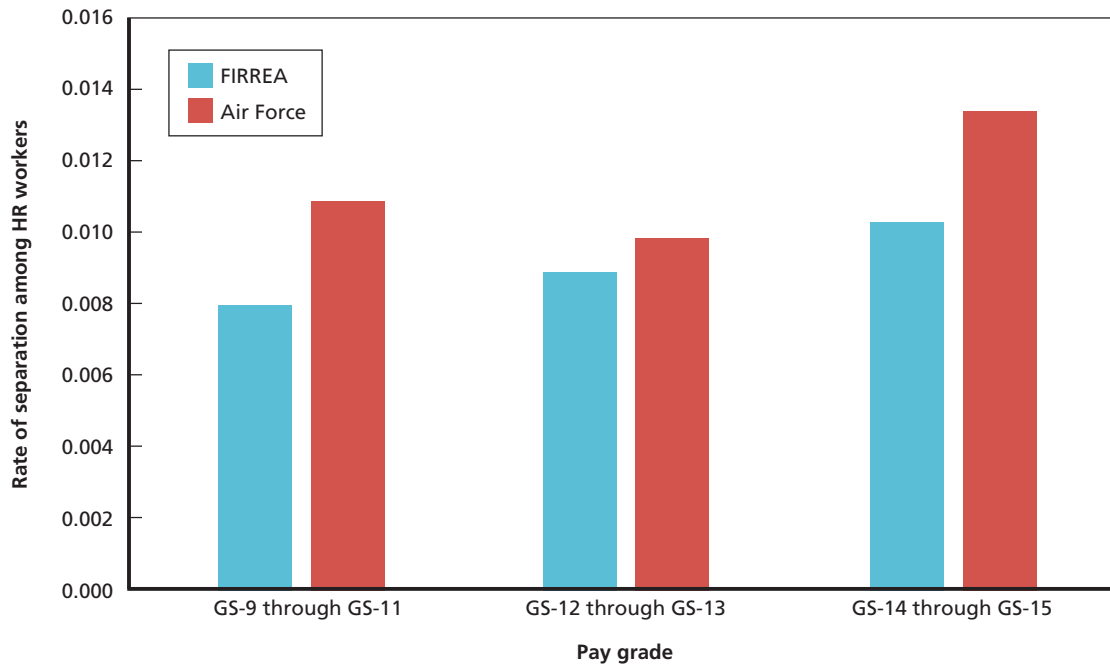
Figure 7.5. Pay Grade Distribution of Human Resources Specialists (0201), by Agency, 2011–2017



SOURCES: RAND calculations. Statistics for FIRREA agencies from OPM Federal Workforce Data (FedScope); Air Force civilian statistics from the DCPDS.

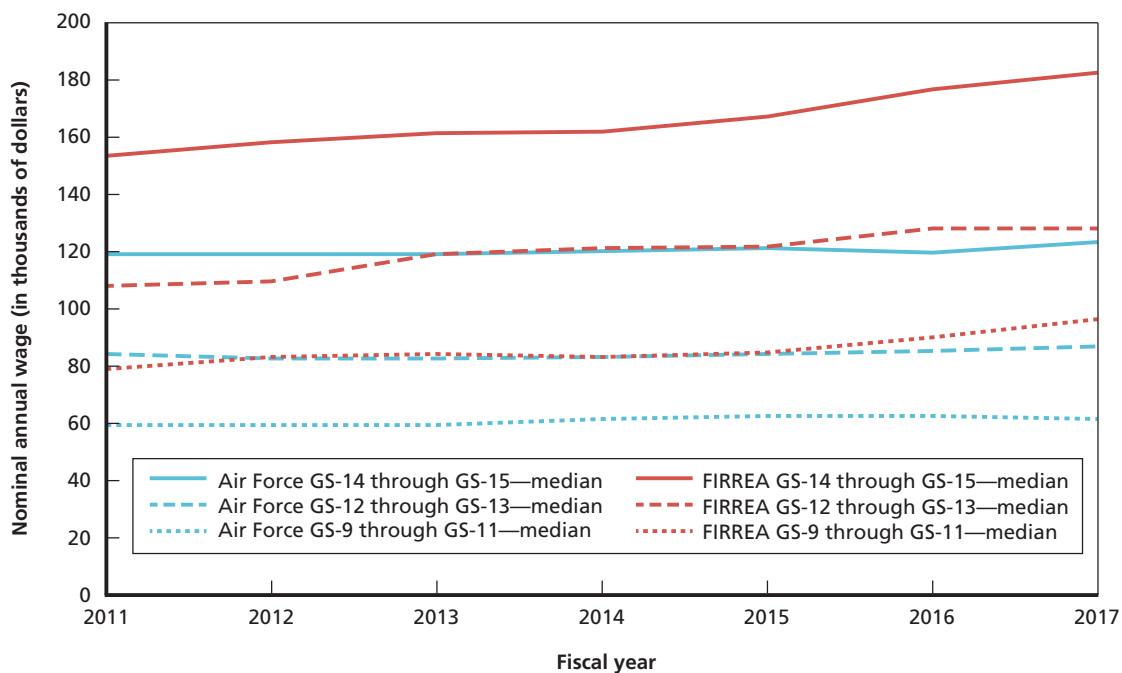
Finally, Figure 7.7 compares annual salary, by pay grade, for HR specialists in the Air Force versus those working for FIRREA agencies. Pay in these FIRREA agencies greatly exceeds that of HR specialists in the Air Force within pay grades with the same required experience levels. These differences are substantial enough such that GS-9 through GS-11 pay for HR specialists in FIRREA agencies generally exceeds GS-12 through GS-13 pay for Air Force civilian HR specialists.

Figure 7.6. Separation Rates, Human Resources Specialists (0201), by Pay Grade and Agency, 2011–2017



SOURCES: RAND calculations. Statistics for FIRREA agencies from OPM Federal Workforce Data (FedScope); Air Force civilian statistics from the DCPDS.

Figure 7.7. Air Force Civilian Human Resources Specialists' Versus FIRREA Human Resources Specialists' Median Annual Pay, Including Base Salary, Locality Pay, and Special Rates, by Pay Grade, 2011–2017



SOURCE: All salary calculations from FedScope data, which include base salary, locality pay, and special rates.

In sum, Air Force civilian HR pay greatly exceeds private-sector HR pay, both nationally as well as in each state and LPA under study. However, attrition rates are higher for HR specialists in the Air Force than HR specialists at FIRREA agencies, and annual salaries are substantially lower, with FIRREA pay for HR specialists equivalent to GS-12 through GS-13 matching or exceeding Air Force GS-14 through GS-15 pay, and FIRREA pay for HR specialists equivalent to GS-9 through GS-11 matching Air Force GS-12 through GS-13 employees' pay. In short, although these agencies employ far fewer workers, Air Force pay substantially lags behind FIRREA pay for HR specialists. Additionally, some FIRREA agencies provide additional benefits like the NCUA's payment into a supplemental pension plan, as discussed earlier in the report.

The Air Force Cost of Matching Private-Sector or Other Government Agency Pay

If one's goal was to match HR FIRREA pay at each pay grade, given the number of Air Force civilian HR employees in each pay grade and the corresponding pay gap between the Air Force and these FIRREA agencies, it would cost an additional \$96,631,612 per year to close this gap. However, FIRREA agencies employ substantially fewer HR employees than does the Air Force; in the 2017 OPM FedScope data, there were only 286 HR employees in the three FIRREA agencies under study, and 387 across all FIRREA agencies, whereas there were 2,377 Air Force civilian HR employees. Although these FIRREA agencies do compete for HR workers, and, in general, pay them substantially more than the Air Force does, their ability to compete for a substantial number of said employees is limited, and further analysis is required to pinpoint which HR employees are on the margin of transferring from the Air Force to one of these agencies.

Additional Recruiting and Retention Issues Related to Compensation

According to Air Force representatives whom the RAND team interviewed, entry-level HR positions are not hard to fill, and the Air Force usually receives more applications for those positions than it can hire. Unlike in the private sector, HR specialists in the Air Force (and DoD more broadly) need to be familiar not only with federal HR regulations but also specific DoD and Air Force regulations. Therefore, there is no ready pool of candidates within the private sector that can easily be hired into journeyman and higher-level positions (GS-14 and GS-15). Instead, HR specialists must be developed internally. According to interviews with AFPC recruiters, potential candidates with a skill set close to what the Air Force needs can be found in other DoD components, such as the Army, but even in such situations, there is a training and learning curve resulting from the differences in regulations and practices between the two DoD components.

For these reasons, the Air Force often ends up growing its own talent when possible by hiring college graduates and then training them internally, often starting with internships and other career

experience programs targeting college students. Our interviews with AFPC HR specialists, career field managers, and major command representatives indicated that compensation might not be the main factor affecting retention in this occupational series, but the implementation of a process whereby they have separated staffing duties and have limited training opportunities is more likely to influence retention levels.

Specifically, we were told by career managers during interviews that there was previously a rotation system in place for HR specialists at the AFPC. However, HR specialists now do not rotate all the way through the different HR functions, and instead usually remain in one function, where they perform the respective task particularly well (for example, posting vacancy announcements). As a result, some HR specialists believe that this stops them from qualifying as generalists and they cease to be competitive in the job market. As a result, Air Force representatives stated that they see many HR specialists starting to leave the Air Force so that they can get broader experiences and have access to more training opportunities. It was beyond the scope of the current study to confirm this potential retention barrier, however.

Additionally, grades at the base level are set given the level of work performed against position classification standards, limiting the compensation that individuals can receive throughout their career if they remain with the same installation. Under these circumstances, if HR specialists want to move up the career path and increase their compensation, they need to move to a different location. However, interviews with career managers mentioned that many HR specialists at installations have deep roots in their communities and are often reluctant to move somewhere else, which means that they are at the highest grade possible at their installations and are likely to leave the Air Force once an opportunity comes up for advancement in their geographic area.

In further discussions regarding filling and retaining HR specialists at the GS-14 and GS-15 levels in the Washington, D.C., area, we were told that these positions can be extremely difficult to fill: the Air Force must compete with agencies where the pay is dramatically higher, and the work may not be as demanding as that in the Pentagon.

A Review of Air Force Vacancies

In an effort to identify additional barriers that may exist to recruitment in HR management positions, our team compared current Air Force job listings with listings from other federal departments and from the private sector. (For an overview of the methodology, see Appendix C.) We again synthesized findings across two domains: (1) content (information contained within the listing) and (2) structure (how information is organized and displayed).

Compared with other Air Force vacancies, job titles within the Human Resources Management occupational series were fairly consistent. Specifically, across the Air Force vacancies related to Human Resources Management, there were four distinct job titles: (1) Human Resources Specialist—Pathways Recent Graduates—Direct Hire Authority; (2) Human Resources Specialist (Recruitment and Placement); (3) Human Resources Specialist; and (4) Human

Resource Management—Direct Hire Authority. Similar to vacancies for the Aircraft Operations occupational series, open vacancy direct hire listings that were for multiple positions and/or locations in this category were vague, advertising roles across entire pay scale ranges (i.e., GS 1–15) and listing the starting salary at the GS-1 level. This feature was found to be consistent across all DoD listings. Like direct hire authority listings, all other vacancies in the series advertised a range of pay scales (e.g., GS-5 through GS-14) instead of positions with a specific pay grade, with the exception of one. Analogous private-sector roles had similar job titles (e.g., HR generalist, HR specialist) but did not include pay scale ranges and instead relied on their respective qualifications sections to signal role seniority. Across the Air Force vacancies we reviewed, all included compensation information associated with the pay grades listed, and none suggested that relocation assistance might be available to applicants. In contrast, similar postings across the private sector did not include compensation information at all.

Most Air Force vacancies did not explicitly list HR-specific qualifications and instead only listed general requirements and conditions of employment (e.g., “Must be a U.S. Citizen”). When compared with other federal vacancies in this series, Air Force positions were more likely to include boilerplate language that listed general OPM qualification standards (e.g., “GS-5: Three years of general experience with at least one year of which was equivalent to performing work at the GS-4 level”) with no additional clarification. Similar vacancies across the Army and Navy were more likely to include boldfaced sections that were role-specific (e.g., “Providing human resources advisory services in human resource functions”). Listings from NASA instead included marketing language within the qualifications section (e.g., “Do you have a strong desire to lead, inspire and develop people?”) and a responsibilities section that interwove information about agency culture (e.g., “We recognize the vital role that supervisors play to empower our diverse workforce to achieve goals”). Out of the federal listings studied, those from NASA were most similar to those sampled from the private sector. All private-sector vacancies we reviewed included specific requirements that signaled role seniority (e.g., “2+ years of experience in inferential statistics, workforce planning, annual planning, and/or organizational health design”).

Finally, in terms of structure of the postings, we found that, similar to other federal listings, Air Force job postings for this series included neither an organizational culture or mission statement nor specific benefits information. Instead, the benefits section included a link to a page on USAJobs that outlined general federal employee benefits. In contrast, one private-sector vacancy had an embedded benefits section, while others had separate employee benefits areas on their career sites. Federal vacancies also tended to rely on blocks of text over concise, bulleted lists.

Options for Developing More Competitive Compensation and Benefits

The Human Resources Management occupational series is included in the Air Force MCO list due to a shortage of HR specialists at several installations and an expectation of a wave of retirements that will take place in the next few years. In contrast to the airline pilots and ATCs

discussed in Chapters 5 and 6, pay among civilian Air Force HR specialists substantially exceeds HR specialists' pay in the private sector. However, compared with FIRREA agencies, annual salaries are substantially lower.

What the Air Force Can Approach on Its Own

- In the Washington, D.C., area, where the majority of the FIRREA HR jobs are located, if the Air Force finds that personnel are leaving for the FIRREA agencies to receive higher pay, it could consider using retention incentives to retain its staff in the local area.
- Although it was beyond the scope of the current study, our interviews suggested that the Air Force may also wish to explore how it could modify the training and education of HR specialists to ensure that there are sufficient developmental opportunities for individuals, as well as strengthening the cohort across the Air Force in order to support an HR community that can contribute to the mission.
- Although there were no broad recruiting and retention issues currently identified for this occupation, in anticipation of upcoming potential challenges the Air Force should look to ensuring that installations will be aware of and prepared to use all available incentives to recruit and retain talent.
- The Air Force should also explore ways to update its vacancy announcements to ensure that they are more applicant friendly, provide specific information regarding compensation and benefits, and include language regarding the Air Force culture and mission to help differentiate the Air Force from other federal departments and agencies.

8. Information Technology Management (Cyber)

An Overview of the Occupation

The OPM *Handbook of Occupational Groups and Families* (2018b) describes the Information Technology Management (Cyber) (GS-2210) occupational series as covering positions that

manage, supervise, lead, administer, develop, deliver, and support information technology (IT) systems and services. This series covers only those positions for which the paramount requirement is knowledge of IT principles, concepts, and methods; e.g., data storage, software applications, networking. Information technology refers to systems and services used in the automated acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, assurance, or reception of information. Information technology includes computers, network components, peripheral equipment, software, firmware, services, and related resources. This series has eleven subspecialties: Policy and Planning, Enterprise Architecture, Security, and Systems Analysis, Application Software, Operating Systems, Network Services, Data Management, Internet, Systems Administration, and Customer Support. (OPM, 2018b, p. 123)

The Air Force used the National Institute of Standards' National Initiative for Cybersecurity for Education Cyber Workforce Framework to analyze and code the 11 subspecialties included in the occupational series Information Technology Management (Cyber) (GS-2210) positions as “cyber” (Newhouse et al., 2017).

The Information Technology Management occupational series has been designated an MCO by the Air Force, Army, Navy, and the Fourth Estate. It is also included in the DoD and OPM MCO lists. According to career field managers and force management analysts, the occupational series is an Air Force MCO because it makes a key contribution to the Air Force's ability to perform its mission, and the service encounters challenges recruiting the cybersecurity talent that it needs, especially at the entry level.¹

As of March 2019, Air Force civilian personnel records indicate that there are a total of 6,371 civilian personnel within the Information Technology Management occupational series within the Air Force (including dual-status military/civilian technicians in the AFR and ANG). This represents roughly 8 percent of all IT management personnel within the federal government, with

¹ Based on interviews with career field managers, we have ascertained that there is fairly good retention for cybersecurity experts in this occupational series; in 2018 the Air Force lost approximately 500 people out of a total of 8,300 employees, representing only a 6-percent loss.

June 2018 FedScope data indicating that there are a total of 75,787 positions across the federal government (OPM, 2019d).

As Table 8.1 shows, IT management personnel are spread across Air Force organizations, with the largest concentration of personnel under AFMC (31 percent) and ACC (16 percent). Similarly, Figure 8.1 shows a fairly wide spread of personnel across Air Force installations.

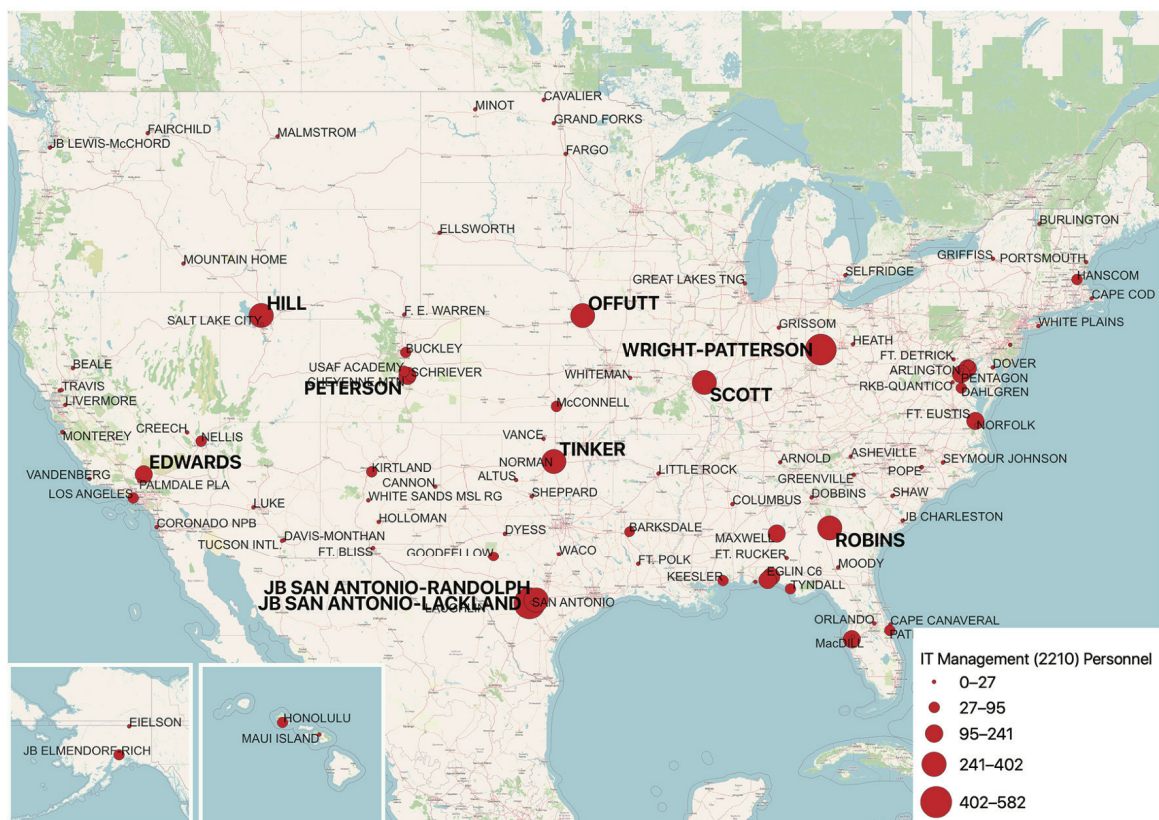
Table 8.1. Information Technology Management Personnel, by Air Force Organization

Air Force Organization	Number of Civilian Personnel	Percentage of Total Civilian Personnel
Air Force Agency for Modeling/Simulation	5	<1
Air Force Audit Agency	8	<1
Air Force Civilian Career Training Center	117	2
Air Force elements (other)	6	<1
AFGSC	119	2
Air Force Historical Research Agency	2	<1
Air Force Inspection Agency	2	<1
Air Force Installation and Mission Support	60	1
Air Force Legal Services Agency	25	<1
Air Force Office of Special Investigations	89	1
Air Force Operational Test & Evaluation Center	17	<1
Air Force Operations Group	2	0
AFPC	50	1
Air Force Review Boards Agency	1	<1
Air Force Safety Center	6	<1
AFSOC	73	1
Air Force Technical Application Center	43	1
U.S. Joint Chiefs of Staff	2	<1
North American Aerospace Defense Command	1	<1
U.S. Central Command	42	1
U.S. Cyber Command	94	1
U.S. Northern Command	57	1
U.S. Special Operations Command	66	1
U.S. Transportation Command	75	1
ACC	1,024	16
AETC	556	9
AFRC	274	4
Air Force District of Washington	77	1
Air Force Manpower Analysis Agency	12	<1
AFMC	1,973	31
Air Force Mortuary Affairs Operations	1	<1
Air Force Public Affairs Agency	1	<1
AFSPC	277	4
AMC	189	3
ANG	13	<1

Air Force Organization	Number of Civilian Personnel	Percentage of Total Civilian Personnel
ANG Support Center	79	1
HQ Air Force Flight Standard Agency	13	<1
HQ Air Force Medical Operations Agency	9	<1
Headquarters and Support Elements	213	3
National Air and Space Intelligence Center	157	2
Non-DoD And Other Support	33	1
Pacific Air Force	138	2
U.S. Air Force Academy	39	1
U.S. Air Forces in Europe—Air Forces Africa	68	1
U.S. Strategic Command	265	4
U.S. Army Cyber Command	1	<1

SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

Figure 8.1. Location of Air Force Civilian Information Technology Management Personnel Across the United States



SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

Information Technology Management (Cyber) Compensation

Within the Air Force, Table 8.2 shows that the majority of IT management personnel are in positions at the GS-11 to GS-13 levels (76 percent total). There are also personnel in positions that do not follow the GS pay scale but instead are part of alternative pay scales that use a pay banding system for compensation. In particular, 670 personnel are part of AcqDemo (NH positions) and 44 personnel are part of Lab Demo under AFMC (DO positions). As already discussed for other occupations that have pay banding under AFMC, the use of pay bands has been found to provide greater flexibility for recruiting and retention within these occupations. AFMC representatives also reported that pay banding allowed them to provide higher starting salaries compared with the GS system.

Table 8.2. Air Force Civilian Information Technology Management Personnel, by Pay Grade

Pay Grade	Number of Civilian Personnel	Percentage of Total Civilian Personnel
GS-5	<10	<1
GS-7	49	1
GS-9	442	7
GG-10	<10	<1
GS-11	1,338	21
GS-12	2,406	38
GS-13	1,058	17
GS-14	308	5
GS-15	51	1
DO-01	<10	<1
DO-02	37	1
DO-03	<10	<1
DO-04	<10	<1
NH-02	110	2
NH-03	487	8
NH-04	73	1

SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

NOTE: GS positions include any designated GG positions at the equivalent pay grade.

Special Rates

There are already established special rates designed to increase compensation beyond the standard pay associated with the GS pay levels for IT management positions. There are twelve special rate tables for IT management positions. Each applies to positions in all federal agencies, and they cover three specific occupations—Computer Engineer (GS-0854), Computer Science

Specialist (GS-1550), and Information Technology Management (Cyber) (GS-2210). The tables cover different grade levels ranging from GS-5 through GS-12.

As with other special salary rate tables, rates and supplement percentage vary by location. There are five tables that cover positions within the continental United States, and six covering positions in various other locations (including Alaska, Hawaii, Guam, Puerto Rico, the U.S. Virgin Islands, and foreign areas). A full list of special rates tables for Information Technology positions is provided in Appendix E.

Use of Recruitment, Relocation, and Retention Incentives

Similar to other occupations, installations are able to use 3R incentives for IT management positions if needed for hard-to-fill positions and if funding is available at the local level. Air Force civilian personnel data show that the Air Force has recently increased its use of recruitment incentives compared with previous years, using 42 bonuses for hiring into technology management positions in FY 2018 compared with only using recruitment incentives five or fewer times in the previous four fiscal years. Fewer retention and relocation incentives appear to be used for these positions, with only a total of 12 retention bonuses and eight relocation bonuses being given to personnel in the five years under study (2014–2018).² The majority of recruiting incentives have been used by AFMC and the Air Force Civilian Career Training Center, but across installations; AFMC is also the main command that has used retention and relocation incentives, again across several installations.

According to career field managers and AFPC HR specialists, the Air Force also uses leave accrual based on prior military or grade-level experience, to compensate for the fact that very often the service brings in cybersecurity experts at the GS-11 level.³ Advanced leave accrual is usually offered on a case-by-case basis, with applicants generally asking for it, as in certain situations some hiring managers are not aware that this recruitment incentive is available.

An additional incentive the Air Force uses specifically to attract and recruit cybertalent is the student loan repayment program. However, as many of those who are offered the student loan repayment incentive are being hired at the GS-5, GS-7, and GS-9 levels, career field managers and AFPC HR specialists indicated that the Air Force runs into two challenges: (1) the statutory maximum limit of \$60,000 that the service can repay the graduates, and (2) the amount repaid is being taxed (AFPC, undated). As the cost of undergraduate and graduate computer engineering programs is high, prospective job candidates usually have student debt above the \$60,000

² Our data only provided the total number of incentives used in a particular year. We were not able to assess the percentage of eligible personnel who were offered these incentives and who then chose to take these incentives.

³ Generally, new employees accrue four hours of leave per pay period. But when they are given credit for prior military experience or grade-level experience, they can increase the number of leave hours to six or eight per pay period. The Air Force would bring recent graduates at a GS-11 level without prior experience when hiring in the D.C. area to offset the higher living expenses.

statutory ceiling, and private-sector compensation allows them to reimburse student loans sooner. Moreover, with students paying interest on the loans, while the loan repayment under the program is taxed as income, many perceive that they are double-taxed, further reducing the appeal of the program.⁴

A Comparison of Air Force Compensation with That of the Private Sector

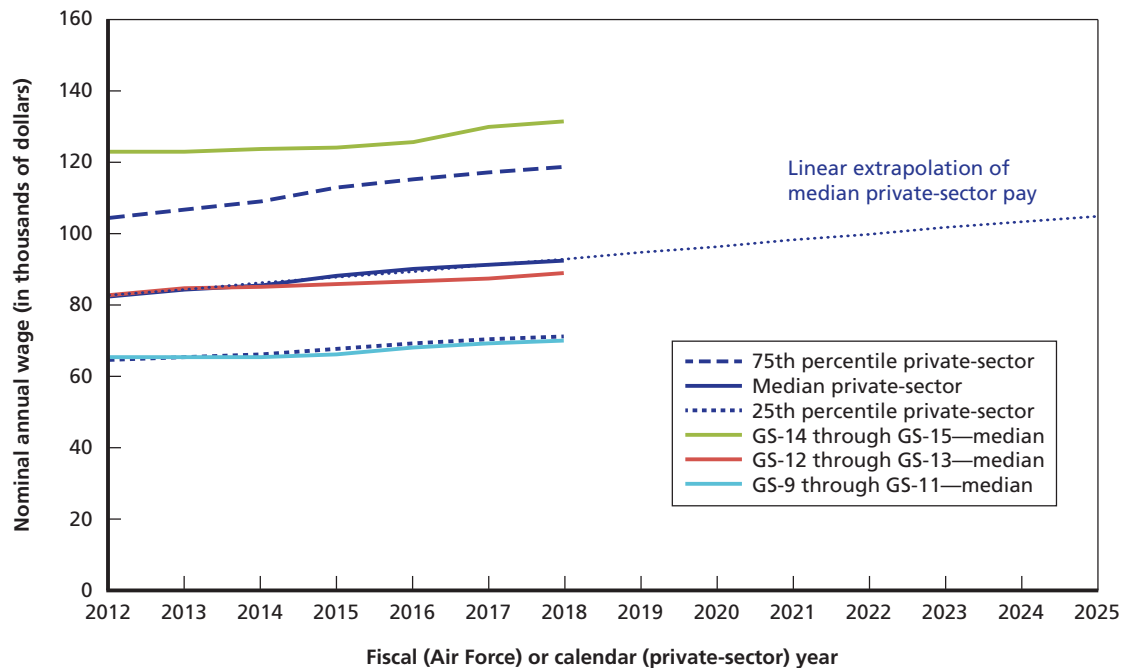
In this section we explore how current Air Force civilian pay compares with pay in the private sector to identify what, if any, gaps in pay exist that could affect retention and recruiting and to determine the size of those gaps. An entire major occupation group (15—Computer and Mathematical Occupations) is dedicated to occupations with skill content that is at least related to this MCO. However, in consultation with this report’s sponsor, we focused on three suboccupations with the most relevant skills:

- 15-1111 Computer and Information Research Scientists: Conduct research into fundamental computer and information science as theorists, designers, or inventors. Develop solutions to problems in the field of computer hardware and software. (BLS, 2017f)
- 15-1121 Computer Systems Analysts: Analyze science, engineering, business, and other data processing problems to implement and improve computer systems. Analyze user requirements, procedures, and problems to automate or improve existing systems and review computer system capabilities, workflow, and scheduling limitations. May analyze or recommend commercially available software. (BLS, 2018a)
- 15-1122 Information Security Analysts: Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. May respond to computer security breaches and viruses. Excludes “Computer Network Architects.” (BLS, 2016)

Private-sector pay for these occupations (referred to collectively as cybersecurity specialists) and civilian Air Force pay by pay grade are shown in Figure 8.2. In contrast to previous MCOs, GS-12 through GS-13 pay approximately matches median private-sector pay, GS-9 through GS-11 pay matches twenty-fifth percentile private-sector pay, and GS-14 through GS-15 pay exceeds seventy-fifth percentile private-sector pay. Although GS-12/13 pay has slightly been overtaken by median private-sector pay, these comparisons indicate that civilian Air Force pay is competitive with broad measures of private-sector pay. However, pay for private-sector cybersecurity specialists has seen continued growth from 2012 to 2018, and *if pay continues to rise at a similar rate*, the shortfall between GS-12/13 pay and median private-sector pay will increase.

⁴ This is only a perception; students are not actually double-taxed.

Figure 8.2. Annual Pay for Air Force Civilian Cybersecurity Specialists (2210), Including Base Salary, Locality Pay, and Special Rates, and Private-Sector Cybersecurity Specialists (15-1111, 15-1121, 15-1122), by Pay Grade and Percentile



SOURCES: RAND calculations. Statistics for private-sector HR specialists from BLS OES; Air Force civilian pay from the DCPDS.

NOTE: Linear extrapolation is based on ordinary least squares fit of 2012–2018 median private-sector pay, extended to 2025.

As in Chapter 7, combining suboccupations into a single group may mask differential growth trends in each suboccupation. Table 8.3 provides employment and annual salary levels and growth for each suboccupation; 15-1121 (Computer Systems Analysts) represents the majority of cybersecurity specialist workers, and hence pay growth for this suboccupation will have stronger weight in statistics for the larger cybersecurity specialist group. Pay in this group is also the

Table 8.3. Employment and Median Annual Salary Differences Across Cybersecurity Suboccupations

		Computer and Information Research Scientists (15-1111)	Computer Systems Analysts (15-1121)	Information Security Analysts (15-1122)
Total Employment	2018	30,070	587,970	108,060
	percent change, 2012–2018	20.9	22.0	48.7
Median Annual Salary	2018	118,370	88,740	98,350
	percent change, 2012–2018	15.8	11.4	14.1

SOURCE: RAND calculations. Statistics for cybersecurity suboccupations from BLS OES.

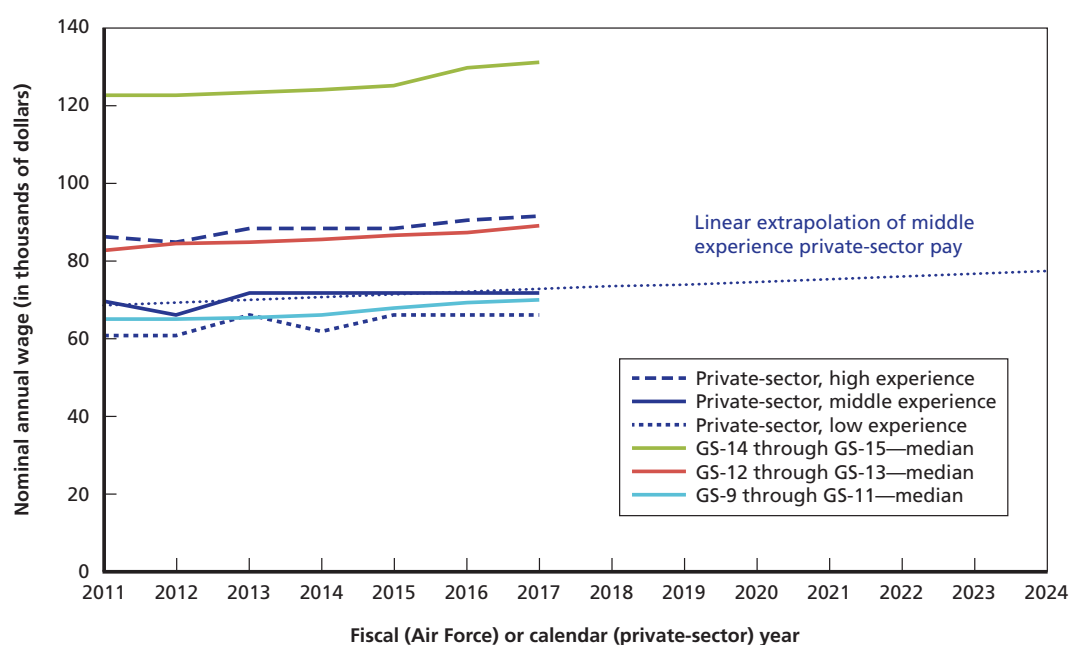
lowest among the three suboccupations and has grown the slowest, at just over 11 percent. However, pay for the other two suboccupations have not grown substantially higher, at 15.8 percent and 14.1 percent for 15-1111 and 15-1122, respectively. Such differences should be taken into account if a particular skill set relevant to only one of these suboccupations is sought.

As in previous chapters, pay grades generally correspond to in-field experience, not points in the pay distribution. And, as in previous chapters, we estimate these comparable experience levels with age and educational attainment in the ACS. We follow a similar approach, but construct a “younger comparison” group that skews toward those more recently out of school, reflecting the quickly changing skills necessary for this MCO:

- “low experience”: bachelor’s degree plus two years’ experience or high school degree plus five years’ experience
- “middle experience”: bachelor’s degree plus five years’ experience or high school degree plus eight years’ experience
- “high experience”: bachelor’s degree plus seven years’ experience or high school degree plus ten years’ experience.

Pay for these groups is shown in Figure 8.3. In contrast to the findings in Figure 8.2, civilian Air Force pay exceeds private-sector pay for comparable experience levels, especially at the

Figure 8.3. Annual Pay for Air Force Civilian Cybersecurity Specialists (2210), Including Base Salary, Locality Pay, and Special Rates, and Private-Sector Cybersecurity Specialists (15-1111, 15-1121, 15-1122), by Pay Grade and Experience, Younger Comparison



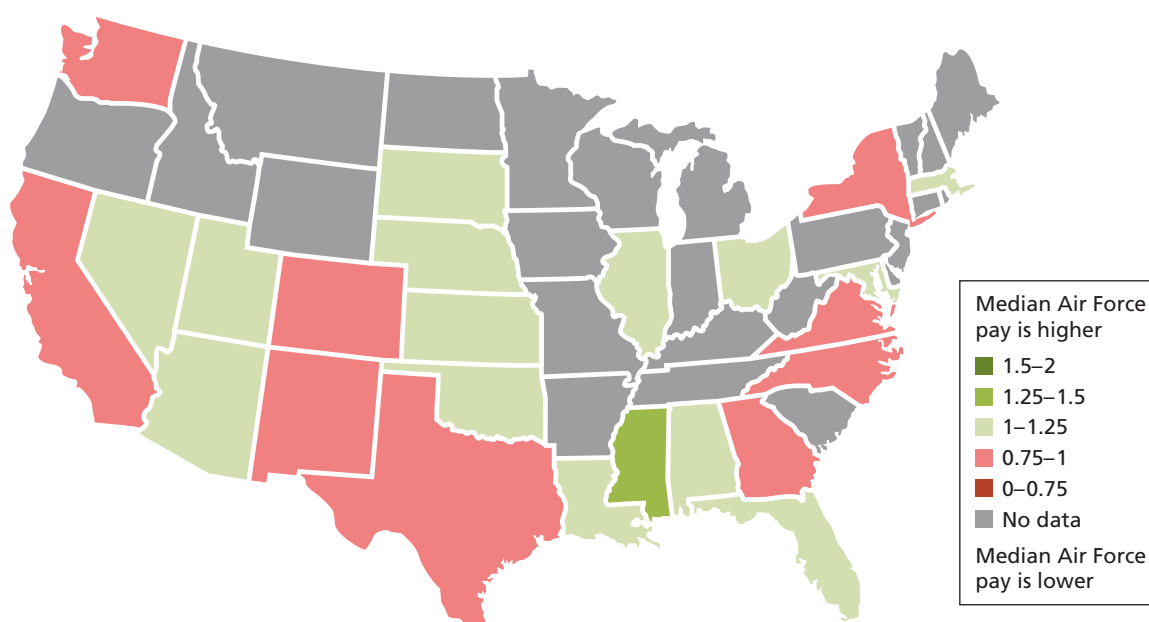
SOURCES: RAND calculations. Statistics for private-sector cybersecurity specialists from ACS microdata; Air Force civilian pay from the DCPDS.

NOTE: Linear extrapolation is based on ordinary least squares fit of 2012–2018 median private-sector pay, extended to 2025.

GS-12/13 and GS-14/15 levels. Pay at lower experience levels is similar throughout this time period.

However, these national comparisons mask substantial geographic variation. Figure 8.4 shows how civilian Air Force cybersecurity pay compares with all cybersecurity specialists' pay on a state-by-state basis in 2018. In many states, Air Force civilian pay meets or exceeds all cybersecurity specialists' pay, but there are notable exceptions, including California, New York, Texas, Virginia, and Washington State.

Figure 8.4. Median Annual Pay for GS-12/13 Civilian Air Force Civilian Cybersecurity Specialists, Including Base Salary, Locality Pay, and Special Rates, Relative to All Cybersecurity Specialists, by State, 2018



SOURCES: RAND calculations. Median airline pilot pay from BLS OES; median Air Force civilian pilot pay from the DCPDS, which includes base salary, locality pay, and special rates.

NOTE: States without published OES data for this occupation or states without a sufficient number of civilian Air Force employees result in a lack of an estimated ratio.

A further analysis, in Table 8.4, illustrates the variation in pay by LPA. Levels and growth rates for all cybersecurity specialists' pay vary considerably, with the New York–Newark and San Jose–San Francisco–Oakland LPAs having high levels and growth rates, and Alaska having a median salary nearly \$50,000 lower than the San Francisco Area LPA and having experienced a drop in median growth.

Table 8.4. Average Annual Pay, by Occupational Employment Statistics or Air Force Civilian Pay Grade

LPA	Civilian Annual Salary				Air Force Civilian Annual Pay, Including Base Salary, Locality Pay, and Special Rates		
	All, 2012	All, 2018	Percentage Growth	95-Percent Confidence Interval of Percentage Growth	GS-9/11, 2018	GS-12/13, 2018	GS-14/15, 2018
Alaska	76,055	73,690	-3.1	(-18.0, 11.8)	87,809	102,733	
Albany-Schenectady, NY-MA	74,723	83,277	11.4	(5.1, 17.8)			
Albuquerque-Santa Fe-Las Vegas, NM	83,581	99,786	19.4	(4.7, 34.0)	69,890	94,793	115,686
Atlanta-Athens-Clarke County-Sandy Springs, GA-AL	78,539	94,056	19.8	(12.2, 27.4)	71,581	89,045	
Austin-Round Rock, TX	84,640	94,382	11.5	(-1.3, 23.7)			
Birmingham-Hoover-Talladega, AL	74,458	81,573	9.6	(4.0, 15.1)			
Boston-Worcester-Providence, MA-RI-NH-ME	88,666	98,821	11.5	(5.1, 17.8)	76,664	103,610	
Buffalo-Cheektowaga, NY	74,379	85,290	14.7	(7.4, 22.0)	67,749	82,115	
Burlington-South Burlington, VT	69,490	83,546	20.2	(9.7, 30.8)			
Charlotte-Concord, NC-SC	84,788	97,340	14.8	(9.3, 20.3)			
Chicago-Naperville, IL-IN-WI	76,728	91,522	19.3	(13.3, 25.3)			
Cincinnati-Wilmington-Maysville, OH-KY-IN	84,951	90,562	6.6	(-3.0, 16.2)			
Cleveland-Akron-Canton, OH	72,915	84,388	15.7	(9.5, 22.0)			
Colorado Springs, CO	93,940	104,564	11.3	(4.2, 18.4)	71,255	93,168	131,427
Columbus-Marion-Zanesville, OH	78,991	97,285	23.2	(14.2, 32.1)		96,532	
Corpus Christi-Kingsville-Alice, TX	71,510	97,870	36.9	(17.7, 56.0)			
Dallas-Fort Worth, TX-OK	82,653	98,796	19.5	(12.9, 26.2)	68,773	97,111	
Davenport-Moline, IA-IL	75,270	90,759	20.6	(12.3, 28.8)			
Dayton-Springfield-Sidney, OH	83,528	87,306	4.5	(-5.3, 13.8)	66,903	92,770	132,295
Denver-Aurora, CO	94,088	96,567	2.6	(-12.8, 16.5)	76,784	95,901	119,609
Detroit-Warren-Ann Arbor, MI	84,122	86,123	2.4	(-3.9, 6.9)	77,451	82,972	
Harrisburg-Lebanon, PA	70,960	93,205	31.3	(18.2, 44.5)			
Hartford-West Hartford, CT-MA	88,031	94,362	7.2	(3.0, 11.3)	74,318		
Hawaii	73,108	83,685	14.5	(6.2, 22.8)	83,471	97,235	132,301

LPA	Civilian Annual Salary				Air Force Civilian Annual Pay, Including Base Salary, Locality Pay, and Special Rates		
	All, 2012	All, 2018	Percentage Growth	95-Percent Confidence Interval of Percentage Growth	GS-9/11, 2018	GS-12/13, 2018	GS-14/15, 2018
Houston–The Woodlands, TX	96,045	109,200	13.7	(3.8, 23.5)			
Huntsville–Decatur–Albertville, AL	91,257	94,424	3.5	(–2.2, 8.8)			
Indianapolis–Carmel–Muncie, IN	75,646	82,908	9.6	(2.5, 16.7)		86,243	
Kansas City–Overland Park–Kansas City, MO-KS	78,570	81,434	3.6	(–6.0, 13.3)	70,180	84,916	
Laredo, TX	73,340	79,200	8.0	(–14.7, 29.3)			
Las Vegas–Henderson, NV-AZ	80,663	84,090	4.2	(–9.5, 17.0)	71,001	87,091	
Los Angeles–Long Beach, CA	91,451	97,678	6.8	(2.0, 11.6)	75,052	103,556	132,249
Miami–Fort Lauderdale–Port St. Lucie, FL	88,995	86,902	–2.4	(–14.2, 9.1)	70,054	96,199	
Milwaukee–Racine–Waukesha, WI	77,490	80,788	4.3	(–1.5, 9.0)			
Minneapolis–St. Paul, MN-WI	80,878	95,527	18.1	(13.7, 22.5)	70,545	90,233	
New York–Newark, NY-NJ-CT-PA	96,895	116,697	20.4	(15.3, 25.6)	76,650	99,441	
Omaha–Council Bluffs–Fremont, NE-IA	74,338	79,891	7.5	(3.3, 11.6)			
Palm Bay–Melbourne–Titusville, FL	84,378	95,744	13.5	(1.4, 25.5)	74,565	92,980	
Philadelphia–Reading–Camden, PA-NJ-DE-MD	91,420	101,843	11.4	(6.2, 16.6)	72,868		
Phoenix–Mesa–Scottsdale, AZ	81,127	91,544	12.8	(7.7, 18.0)	73,996	97,761	
Pittsburgh–New Castle–Weirton, PA-OH-WV	70,949	93,364	31.6	(22.1, 41.0)	70,760	82,798	
Portland–Vancouver–Salem, OR-WA	84,445	92,625	9.7	(2.0, 17.3)	84,525		
Raleigh–Durham–Chapel Hill, NC	83,729	94,197	12.5	(3.3, 21.7)	77,650	87,690	
Richmond, VA	80,111	97,223	21.4	(14.6, 28.1)			
Sacramento–Roseville, CA-NV	80,843	88,652	9.7	(1.1, 18.3)	70,396	89,999	
San Antonio–New Braunfels–Pearsall, TX	75,724	97,651	29.0	(15.7, 42.3)			
San Diego–Carlsbad, CA	87,021	103,297	18.7	(7.6, 29.8)		116,056	
San Jose–San Francisco–Oakland	100,492	122,144	21.5	(15.1, 28.0)	84,156	91,535	149,369
Seattle–Tacoma, WA	98,222	105,737	7.7	(–4.8, 18.5)	74,108	98,684	

LPA	Civilian Annual Salary				Air Force Civilian Annual Pay, Including Base Salary, Locality Pay, and Special Rates		
	All, 2012	All, 2018	Percentage Growth	95-Percent Confidence Interval of Percentage Growth	GS-9/11, 2018	GS-12/13, 2018	GS-14/15, 2018
St. Louis–St. Charles– Farmington, MO-IL	80,800	92,035	13.9	(7.7, 20.1)	69,806	93,499	119,529
Tucson–Nogales, AZ	74,560	83,036	11.4	(–6.4, 28.3)	70,570	86,814	
Virginia Beach–Norfolk, VA-NC	81,225	90,875	11.9	(4.2, 19.5)			
Washington–Baltimore– Arlington, DC-MD-VA- WV-PA	101,624	108,578	6.8	(0.9, 12.8)	75,069	107,260	140,884

SOURCES: RAND calculations. Civilian statistics from BLS OES; Air Force civilian pay from the DCPDS.

NOTE: Cells are missing where data were not published for the year and area in question, or if there were too few Air Force employees; 95-percent confidence intervals that include zero indicate that the data are insufficiently precise to determine whether pay increased or decreased from 2012 to 2018.

The Air Force Cost of Matching Private-Sector or Other Government Agency Pay

National-level statistics indicate that Air Force civilian cybersecurity employees receive higher compensation than do similarly experienced private-sector cybersecurity specialists. However, there is substantial state- and LPA-level variation that needs to be taken into account to hire in local labor markets. For example, in Colorado Springs, there is a difference of \$11,396 between the local annual salary of cybersecurity specialists and the civilian Air Force GS-12/13 salary for this occupation. Given the 158 Air Force civilian employees in this occupation in the Colorado Springs LPA, closing this gap would cost \$1,800,568 per year. However, as noted in the discussion in MCO sections in earlier chapters, focusing on this gap alone neglects other drivers of retention or recruitment differences, and there is wide variation across localities in relative pay.

Additional Recruiting and Retention Issues Related to Compensation

According to interviews with career field managers, despite differences in compensation the Air Force has succeeded in recruiting for cybersecurity related positions due to the Air Force mission and unique nature of the work (e.g., ethical hacking or sanctioned hacking for mission purposes; see Hardison et al., 2019, p. 46), which is not found in the private sector (Losey, 2017). We were told by career field managers that this is particularly appealing to former military members who want to continue as civilian members the work they were doing while on active duty. Additionally, we were told that the difference in pay from the private sector also seems to have less of an impact on retention compared with other factors.

Through our interviews, we did identify several potential barriers to successful recruitment and retention that the Air Force may want to address. For example, according to Air Force career field managers, the OPM qualification standards for the cybersecurity series (OPM, undated q) cannot keep up with the changes that occur in the cybersecurity domain, including changes in programming languages. Furthermore, the current qualification standards require at least a bachelor's degree for hires at the GS-5 level (the lowest entry level in the series). However, according to Air Force recruiters and career field managers, the nature of the work the new employees at this level are required to perform is usually more narrowly focused on knowledge and expertise with a specific programming language for which a professional certificate or accreditation would suffice, and for which there is no practical need for a bachelor's degree. As a result of this mismatch between current OPM qualification standards and what is actually needed in the position, many hiring managers have difficulty finding the candidates they really need for the job. To help address this challenge, the Air Force is pushing for the inclusion of microcredentialing (i.e., certification in a particular topic area) as part of the qualification standards for cybersecurity positions.

In addition, Air Force representatives told us that the lengthy duration of the security clearance process can negatively affect hiring. A high-level security clearance is often needed to perform cybersecurity work in the Air Force. The process for receiving a security clearance can take up to 18 months, however, and most candidates are not able to wait this length of time; as a result, they find other jobs. Similarly, we were told that this can also result in hiring managers narrowing their pool of candidates to only those that already possess a security clearance.

Direct Hire Authority

Regarding cybersecurity specialists, in 2003 OPM “authorized government-wide direct hire for the 2210 series IT Specialists, in GS grades 9 and above, in the Information Security specialty” (DoD, 2011, p. 26). According to Air Force recruiters and AFPC HR specialists, the Air Force uses direct hire authority to recruit newly minted graduates directly out of college and at university recruitment fairs. The direct hire authority speeds up the hiring process and minimizes the number of qualified candidates lost to the private sector as a result of the lengthy government hiring process. Moreover, for cybersecurity specialists, the direct hire authority has allowed the Air Force the flexibility it needed to adapt to the local pool of applicants available at each installation.

A Review of Air Force Vacancies

In an effort to identify additional barriers that may exist to recruitment in cybersecurity-related IT positions, our team compared current Air Force job listings with listings from other federal departments and from the private sector. (For an overview of the methodology, see Appendix C.) We synthesized findings across two domains: (1) content (information contained within the listing) and (2) structure (how information is organized and displayed).

In terms of content, we found that job titles were generally vague and not suggestive of which skills would be most relevant to the role listed. Specifically, across the Air Force vacancies related to cybersecurity, there were three distinct job titles: (1) Information Technology Management—Direct Hire Authority/EHA ACWA Assessment GIS-2210-5, (2) IT Cybersecurity Specialist (INFOSEC), and (3) IT Specialist (Security). These titles were also used across other DoD positions in the series, but the titles did not readily map to the private sector. Moreover, job titles did not contain any information regarding position seniority; the only reliable indicator of role seniority was pay grade. This finding was consistent across all DoD positions we reviewed, not just Air Force positions. Additionally, most of the position openings reviewed did not contain any information regarding specific software or computer languages, suggesting that hiring coordinators are responsible for much of the qualification matching. Along these lines, qualifications sections tended to emphasize broad, nonspecific skills (e.g., knowledge of information security principles and methods). Our team found this to be true across all similar DoD-related positions within this series, though some Army listings highlighted key qualifications (e.g., attention to detail, customer service) with boldfaced texts. Private-sector vacancies, in contrast, tended to be more specific about requirements (e.g., five or more years' experience with preparing full Risk Management Framework security authorization packages or legacy DoD Information Assurance Certification and Accreditation Process packages).

Unlike in the private sector, all federal postings contained information on salary (starting salary and/or salary range). But Air Force open vacancy announcements that were made for multiple locations and agencies had wide pay grade and salary information (e.g., GS-5 to GS-15), with the cover listing indicating the salary started at compensation for the lowest grade (i.e., a candidate would only see the full range of what someone at the highest level might make by clicking on the full position description). Other DoD positions, in contrast, tended to have narrower pay scale and salary ranges for each posting. Like other federal listings, relocation assistance was not included for any of the Air Force positions in this series listed as GS-12 or lower (or their equivalent). In contrast, analogous postings across the private sector did not include compensation information at all, while relocation information varied between organizations.

Finally, in terms of structure of the postings, we found that—again, similar to other federal listings—Air Force job postings for this series did not include an organizational culture or mission statement, which based on our interviews with recruiting representatives may be particularly helpful in attracting candidates to an Air Force civilian cybersecurity career. Job postings also did not provide specific benefits information. Instead, the benefits section included a link to a page on USAJobs that outlined general, federal employee benefits. Federal vacancies also tended to rely on blocks of text over concise, bulleted lists.

Options for Developing More Competitive Compensation and Benefits

The Information Technology Management occupational series is included in the Air Force MCO list because of its key contribution to the Air Force's ability to perform its mission. It has also been designated an MCO by DoD and OPM. The Air Force has already taken steps to try to address pay discrepancies and attract and retain critical talent, including governmentwide direct hire authority and special salary rates. Although interviews with career field managers indicated that recruiting and retention were not currently an issue despite gaps in compensation for certain locations, if the Air Force wants to ensure that it is on par with competitors or that compensation is not an issue for maintaining top talent in this area, our study identified additional avenues the Air Force may want to explore to improve its competitiveness. As with the occupations studied in earlier chapters, some of these initiatives are actions the Air Force can pursue directly. Other actions would require OPM or legislative changes, however, making them more difficult to achieve.

What the Air Force Can Approach on Its Own

- **Explore the need for special salary rate increases for certain locations and respond accordingly to OPM's annual survey.** Our analysis found that Air Force civilian cybersecurity employees receive higher compensation than do similarly experienced private-sector cybersecurity specialists. However, there is substantial state- and LPA-level variation that needs to be taken into account to hire in local labor markets.
- **Update vacancy announcements to ensure that they are more applicant friendly and provide more specific and accurate information regarding compensation and benefits.** Position titles, descriptions, and requirements should be clearly defined instead of using generic or boilerplate language. Open, continuous Air Force vacancy announcements that cover multiple positions and/or locations should provide more specific potential pay grades and associated salaries instead of listing the full pay grade range and the lowest possible starting salary. The Air Force may also benefit from including clear mission and culture statements to distinguish the type of work someone in the cybersecurity field can do compared with other jobs.
- **Explore options for providing an unclassified holding pen or temporary work for candidates who are awaiting security clearances.** In order to expand the pool of potential candidates, the Air Force would benefit from finding ways for candidates who are awaiting security clearances to be given meaningful work until their clearances are available.
- **Expand data collection.** Collect data to see how often applicants find other jobs after tentative selection pending security clearances.

What Requires Department of Defense Coordination

- **Work with OPM to review and update both the classification standard and qualifications standards.** While the path to an IT position in the past has been a four-year degree, times and qualifications have changed and degrees may not be as important as languages and credentials.

9. Aircraft Mechanic

An Overview of the Occupation

The OPM *Handbook of Occupational Groups and Families* (2018b) defines the Aircraft Mechanic (WG-8852) occupational series as

all nonsupervisory jobs involved in the maintenance, troubleshooting, repair, overhaul, and modification of fixed and rotary wing aircraft systems, airframes, components and assemblies, where the work requires substantive knowledge of the airframe and aircraft mechanical, pneumatic, and/or electrical systems and their interrelationships. Some work situations within this series may require varying levels of electronics knowledge. (OPM, 2018b, p. 199)

The Aircraft Mechanic occupational series is not currently an Air Force MCO, and it is not included in the MCO list for the other DoD Components (e.g., the Army, Navy, and Fourth Estate). Based on sponsor feedback, the Aircraft Mechanic occupational series is included in this study given that the Air Force currently faces an overall shortage of aircraft mechanics, which are vital to its mission. In the words of one Air Force interviewee at the AFPC, “maintenance is a dying career in the U.S., not only in the Air Force, and it touches all of the trades and all locations.” Moreover, the current aircraft maintenance workforce is aging, with the average age being 52 and 65 percent of assigned personnel eligible to retire by 2021 (AFPC, 2018d).¹

As of March 2019, Air Force personnel records indicate that there are a total of 4,377 civilian personnel in the Aircraft Mechanic occupational series within the Air Force (including dual-status military/civilian technicians in the AFR and ANG). This represents roughly 44 percent of all aircraft mechanic personnel within the federal government, with June 2018 FedScope data indicating that there are a total of 10,031 federal positions (OPM, 2019d).

As Table 9.1 shows, the majority of Air Force aircraft mechanic personnel are concentrated under AFMC (59 percent), with the largest number of positions located at Tinker AFB (1,158 authorized positions) and Robins AFB (797 authorized positions; see Figure 9.1). Twenty-one percent of Air Force civilian personnel in these positions are also dual-status civilian/military technicians under AFRC.

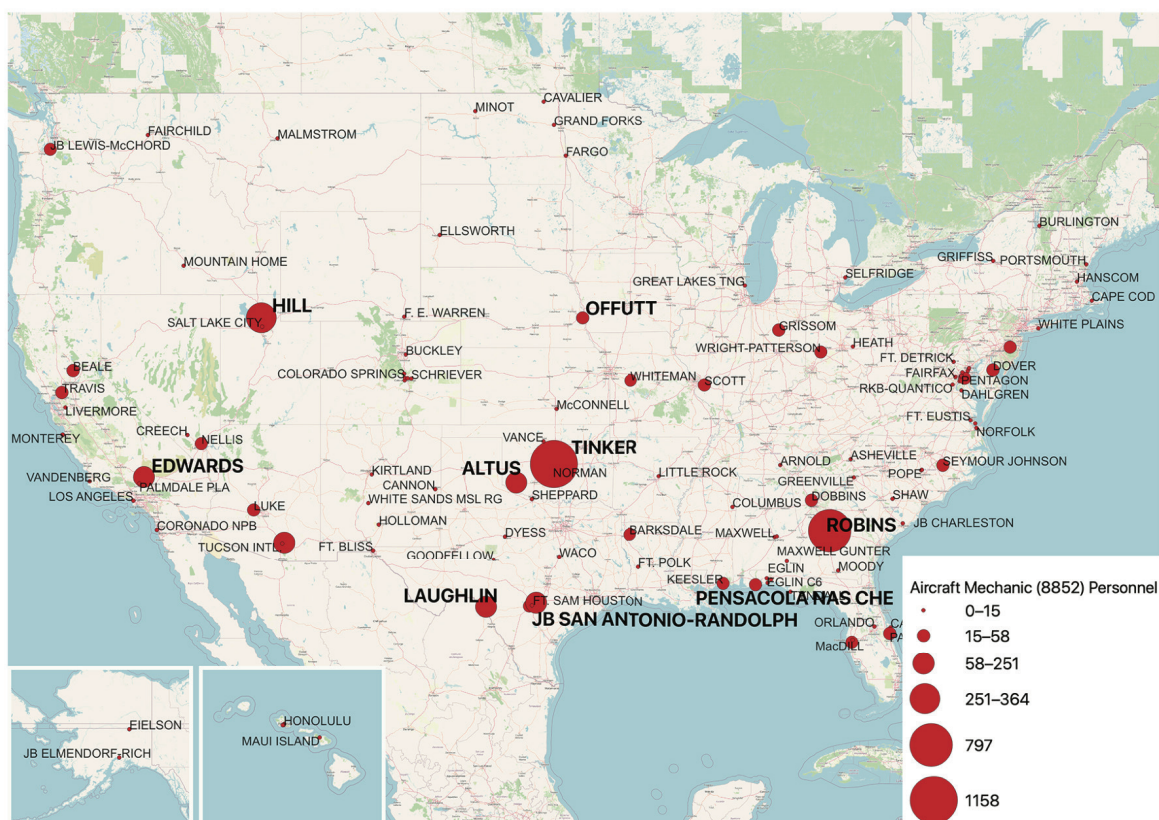
¹ This is more than twice the rate for the aviation technician population, which stands at 30 percent being at or near retirement age (“Aviation Industry Urges Full Funding for Aviation Workforce Grant Programs,” 2019).

Table 9.1. Civilian Aircraft Mechanic Personnel, by Air Force Organization

Air Force Organization	Number of Civilian Personnel	Percentage of Total Civilian Personnel
AFGSC	1	<1
AFSOC	2	<1
ACC	54	1
AETC	712	16
AFMC	2,593	59
AMC	81	2
AFRC	927	21
ANG	2	<1
Pacific Air Force	3	<1
U.S. Transportation Command	2	<1

SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

Figure 9.1. Location of Air Force Civilian Aircraft Mechanic Personnel Across the United States



SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

Aircraft Mechanic Compensation

Unlike the four other occupational series included in this report, aircraft mechanic positions are part of the federal wage system. As Table 9.2 shows, within the Air Force, the majority of aircraft mechanic personnel hold WG-10 positions (63 percent).

Table 9.2. Air Force Civilian Aircraft Mechanic Personnel, by Pay Grade

Pay Grade	Number of Civilian Personnel	Percentage of Total Civilian Personnel
WG-7	<10	<1
WG-8	271	7
WG-9	36	1
WG-10	2,336	63
WG-11	366	10
WG-12	103	3
WG-13	<10	<1
WL-8	<10	<1
WL-9	30	1
WL-10	256	7
WL-11	39	1
WL-12	28	1
WS-7	<10	<1
WS-8	<10	<1
WS-9	20	1
WS-10	101	3
WS-11	51	1
WS-12	<10	<1
WS-13	12	<1
WS-14	14	<1
WS-15	23	1
WS-16	<10	<1

SOURCE: RAND calculations from Air Force civilian personnel data files, March 2019.

NOTE: WG designates worker pay grades, WL designates leader pay grades, and WS designates supervisor pay grades.

Special Rates

Special rate pay is authorized under Title 5, Section 5341, for federal wage system employees based on recruitment or retention difficulties. There are 32 special rate tables for DoD aircraft maintenance positions issued by the DCPAS. Each table has been developed for a specific wage area based on wage surveys performed by the Wage and Salary Division of the DCPAS. The tables cover wage grade, wage leader, and wage supervisor positions. A full list of special rates tables for aircraft mechanic positions is provided in Appendix E.

Use of Recruitment, Relocation, and Retention Incentives

As with other occupations, installations are able to use 3R incentives for aircraft mechanics if needed for hard-to-fill positions and if funding is available at the local level. Air Force civilian personnel data indicate that the use of recruiting incentives has recently increased compared with other years, being used for 12 positions in FY 2018 compared with only two positions in FY 2017 and one in FY 2016. All recruitment incentives have been used by AFMC and at a single installation (Edwards AFB), with no other installations utilizing recruitment incentives in the last five years. Across the Air Force, retention incentives have not been used at all in the last five years, and relocation bonuses have been used only once in the last five years (in FY 2018 by AETC at Altus AFB).²

In addition to traditional 3R incentives, another area where the Air Force has trouble competing with the commercial sector is in reimbursement for tuition. According to our interviews with Air Force program specialists, commercial aviation often pays for licensing, which can cost an average of \$500 and needs to be renewed every two years. There was confusion among those interviewed as to whether or not tuition could be paid for certification and training at vocational schools. Not paying for these programs could hinder Air Force recruitment and retention of aircraft mechanics.

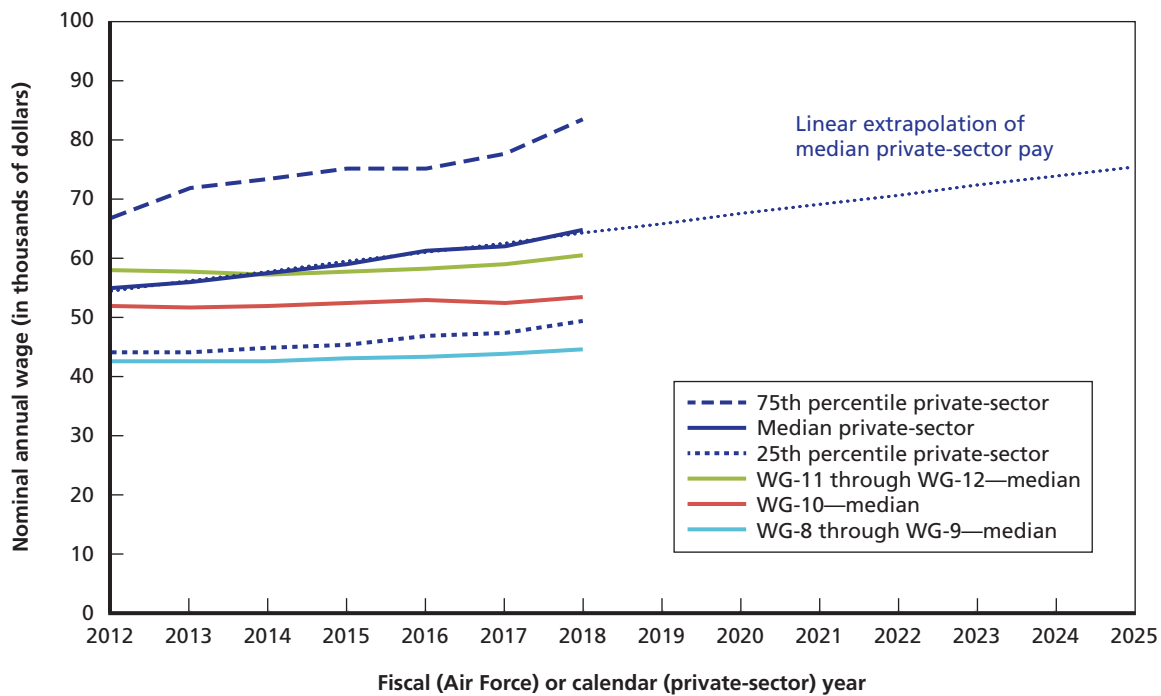
A Comparison of Air Force Compensation with That of the Private Sector

In this section we explore how current Air Force pay compares with pay in the private sector to identify what, if any, gaps in pay exist that could affect retention and recruiting and to determine the size of those gaps. There is a direct analogue to this MCO in the SOC system: SOC code 49-3011, Aircraft Mechanics and Service Technicians, whose responsibilities are to “diagnose, adjust, repair, or overhaul aircraft engines and assemblies, such as hydraulic and pneumatic systems. Includes helicopter and aircraft engine specialists” (BLS, 2018b).

We compare private-sector aircraft mechanic pay from the OES with civilian Air Force aircraft mechanic pay in Figure 9.2. Across the private-sector pay distribution, there was a general increase in pay from 2012 to 2018, while Air Force civilian pay has stayed relatively unchanged. Although private-sector pay exceeded comparable Air Force pay in 2012, these differential trends have widened the differences. For example, median private-sector pay exceed median WG-10 pay by just over \$3,000 in 2012, but by 2018 this difference had grown to over \$10,000, and a simple linear extrapolation indicates that *if this growth rate continues as it has in*

² Our data only provided the total number of incentives used in a particular year. We were not able to assess the percentage of eligible personnel who were offered these incentives and who then chose to take these incentives.

Figure 9.2. Annual Pay for Air Force Civilian Aircraft Mechanics (8852), Including Base Pay, Locality Pay, and Special Rates, and Private-Sector Aircraft Mechanics (49-3011), by Pay Grade and Percentile



SOURCES: RAND calculations. Statistics for private-sector cybersecurity specialists from ACS microdata; Air Force civilian pay from the DCPDS.

NOTE: Linear extrapolation is based on ordinary least squares fit of 2012–2018 median private-sector pay, extended to 2025.

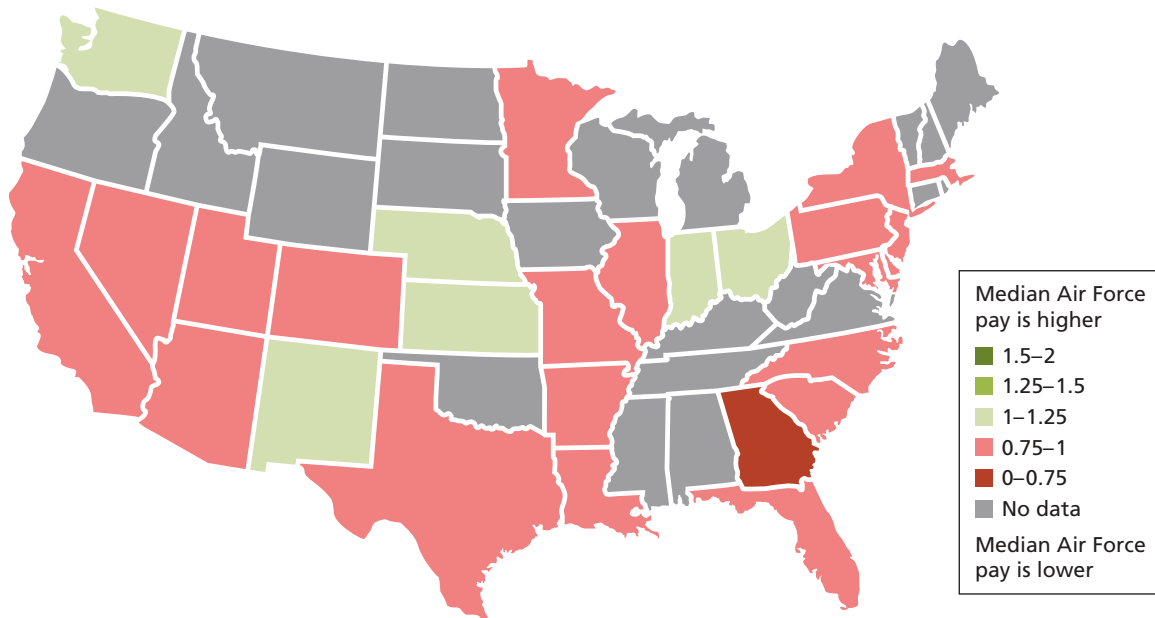
the recent past, the gap will widen even further. Similarly, seventy-fifth percentile pay exceeds WG-11/12 pay by nearly \$10,000 in 2012, but by over \$23,000 in 2018.³

As Figure 9.3 shows, this gap does not just hold nationally: for all but six states with available data, all aircraft mechanic pay exceeds Air Force civilian aircraft mechanic pay, and in these six states, civilian Air Force pay only slightly matches all aircraft mechanic pay.

Table 9.3 provides even more detail, with estimates of aircraft mechanic pay by LPA. Similar to the examination of MCOs in earlier chapters, there is substantial variation by LPA, with some areas having both high levels and trends (e.g., the Denver-Aurora LPA, with median pay exceeding \$80,000, having grown more than 24 percent since 2012), some having both low levels and recent decreases (e.g., the Indianapolis-Carmel-Muncie LPA, with median pay under \$47,000, down 32.1 percent since 2012), and other combinations thereof.

³ Unfortunately, the inability to directly observe in-field experience or specific training or certification results in ACS-based pay estimates that are extremely volatile from one year to the next, and as such, these estimates are not statistically reliable.

Figure 9.3. Median Annual Pay for WG-10 Air Force Civilian Aircraft Mechanics, Including Base Pay, Locality Pay, and Special Rates, Relative to All Aircraft Mechanics, by State, 2018



SOURCES: RAND calculations. Median private-sector aircraft mechanic pay from BLS OES; median Air Force civilian aircraft mechanic pay from the DCPDS, which includes base salary, locality pay, and special rates.
NOTE: States without published OES data for this occupation or states without a sufficient number of civilian Air Force employees result in a lack of an estimated ratio.

Table 9.3. Average Annual Pay, by Occupational Employment Statistics or Air Forces Civilian Pay Grade

LPA	Civilian Annual Salary				Air Force Civilian Annual Pay, Including Base Pay, Locality Pay, and Special Rates		
	All OES, 2012	All OES, 2018	Percentage Growth	95-Percent Confidence Interval of Percentage Growth	WG-8/9, 2018	WG-10, 2018	WG-11/12, 2018
Alaska	62,870	67,400	7.2	(1.1, 13.3)		68,747	79,260
Albany–Schenectady, NY-MA	59,100	53,720	–9.1	(–19.0, 0.8)			
Albuquerque–Santa Fe–Las Vegas, NM	55,530	58,630	5.6	(–10.1, 21.0)		59,460	
Atlanta–Athens–Clarke County–Sandy Springs, GA-AL		83,370				62,781	71,660
Austin–Round Rock, TX	54,270	64,610	19.1	(4.6, 33.5)			
Birmingham–Hoover–Talladega, AL		56,830					
Boston–Worcester–Providence, MA-RI-NH-ME	60,109	65,714	9.3	(–6.2, 24.5)			

LPA	Civilian Annual Salary				Air Force Civilian Annual Pay, Including Base Pay, Locality Pay, and Special Rates		
	All OES, 2012	All OES, 2018	Percentage Growth	95-Percent Confidence Interval of Percentage Growth	WG-8/9, 2018	WG-10, 2018	WG-11/12, 2018
Buffalo–Cheektowaga, NY	60,090	61,970	3.1	(–10.7, 15.5)		58,058	62,772
Burlington–South Burlington, VT	54,960	60,430	10.0	(–2.1, 21.8)			
Charlotte–Concord, NC-SC		75,320					
Chicago–Naperville, IL-IN-WI	64,510	64,950	0.7	(–16.5, 16.8)			
Cleveland–Akron–Canton, OH	49,210	67,908	38.0	(15.0, 61.0)			
Colorado Springs, CO	54,740	61,580	12.5	(–3.2, 27.8)		64,732	66,830
Dallas–Fort Worth, TX-OK	55,646	69,190	24.3	(7.0, 41.6)		53,736	62,460
Davenport–Moline, IA-IL		67,460					
Dayton–Springfield–Sidney, OH	50,750	54,120	6.6	(–5.0, 18.3)	48,940	58,837	64,180
Denver–Aurora, CO	63,690	80,510	26.4	(13.5, 39.3)		67,490	
Detroit–Warren–Ann Arbor, MI	56,640	68,205	20.4	(2.9, 38.0)			
Harrisburg–Lebanon, PA	53,000	59,693	12.6	(–4.8, 28.5)			
Hartford–West Hartford, CT-MA	56,310	66,830	18.7	(–6.5, 42.8)		68,988	75,160
Hawaii	62,710	65,260	4.1	(–5.6, 12.6)			74,826
Houston–The Woodlands, TX	65,690	63,190	–3.8	(–22.2, 14.2)			
Huntsville–Decatur–Albertville, AL	54,130	57,840	6.9	(–4.7, 17.0)			
Indianapolis–Carmel–Muncie, IN	68,830	46,740	–32.1	(–47.4, –18.4)			
Kansas City–Overland Park–Kansas City, MO-KS		60,050				61,230	68,150
Las Vegas–Henderson, NV-AZ	63,610	78,460	23.3	(11.8, 34.9)		58,182	63,540
Los Angeles–Long Beach, CA	60,890	69,670	14.4	(5.8, 23.0)		71,306	66,994
Miami–Fort Lauderdale–Port St. Lucie, FL	47,878	61,100	27.6	(13.1, 42.1)		63,401	71,800
Milwaukee–Racine–Waukesha, WI	56,100	62,300	11.1	(–5.1, 27.0)			
Minneapolis–St. Paul, MN-WI	57,830	63,510	9.8	(–1.0, 20.6)		60,460	66,880
New York–Newark, NY-NJ-CT-PA	60,634	70,090	15.6	(8.8, 22.4)		64,420	66,780
Omaha–Council Bluffs–Fremont, NE-IA	49,650	45,900	–7.6	(–22.5, 6.4)			
Palm Bay–Melbourne–Titusville, FL	77,950	57,920	–25.7	(–47.8, –6.8)		54,406	61,760
Philadelphia–Reading–Camden, PA-NJ-DE-MD	52,375	66,357	26.7	(17.6, 35.8)	56,375	61,087	65,120
Phoenix–Mesa–Scottsdale, AZ	52,930	65,290	23.4	(8.5, 38.2)		56,165	
Pittsburgh–New Castle–Weirton, PA-OH-WV		79,580				53,675	61,740
Portland–Vancouver–Salem, OR-WA	56,104	63,052	12.4	(1.2, 23.5)			
Raleigh–Durham–Chapel Hill, NC	53,170	52,440	–1.4	(–20.3, 16.9)		50,475	55,930
Richmond, VA	53,580	54,790	2.3	(–7.5, 11.0)			

LPA	Civilian Annual Salary				Air Force Civilian Annual Pay, Including Base Pay, Locality Pay, and Special Rates		
	All OES, 2012	All OES, 2018	Percentage Growth	95-Percent Confidence Interval of Percentage Growth	WG-8/9, 2018	WG-10, 2018	WG-11/12, 2018
Sacramento–Roseville, CA-NV	57,250	69,420	21.3	(7.4, 35.1)		57,348	61,370
San Antonio–New Braunfels–Pearsall, TX	43,890	52,240	19.0	(8.1, 30.0)			
San Diego–Carlsbad, CA	56,470	65,660	16.3	(9.7, 22.8)			
San Jose–San Francisco–Oakland, CA	64,598	66,070	2.3	(–14.9, 17.6)		68,704	76,620
Seattle–Tacoma, WA	58,190	69,470	19.4	(5.8, 32.9)		66,084	69,009
St. Louis–St. Charles–Farmington, MO-IL	54,880	64,660	17.8	(6.7, 28.9)		58,089	64,527
Tucson–Nogales, AZ	51,040	56,270	10.2	(2.1, 18.4)	53,208	55,186	59,990
Virginia Beach–Norfolk, VA-NC	54,560	66,770	22.4	(13.7, 31.1)			
Washington–Baltimore–Arlington, DC-MD-VA-WV-PA	59,448	72,611	22.1	(10.3, 34.0)		74,589	75,227

SOURCES: RAND calculations. Civilian statistics from BLS OES; Air Force civilian pay from the DCPDS.

NOTE: Cells are missing where data were not published for the year and area in question, or if there were too few Air Force employees; 95-percent confidence intervals that include zero indicate that the data are insufficiently precise to determine whether pay increased or decreased from 2012 to 2018.

The Air Force Cost of Matching Private-Sector or Other Government Agency Pay

National-level statistics indicate that the Air Force’s pay for civilian aircraft mechanics is lagging behind the substantial wage growth that private-sector aircraft mechanics are experiencing. For example, if one considers the differences between the annual pay percentiles and the annual pay for Air Force civilian pay grades in Figure 9.2 as representative of a pay gap, then closing this gap at each pay grade of aircraft mechanic given Air Force employment levels would require \$38,839,192 annually. However, this national-level pay gap narrative belies substantial variation at the LPA level that should be accounted for in compensation decisions at the local level, as should nonsalary forms of compensation that may differ between Air Force civilian employment and private-sector employment.

Additional Recruiting and Retention Issues Related to Compensation

According to representatives we interviewed, the Air Force currently has difficulties attracting candidates for civilian aircraft mechanic positions, with areas farther from larger metropolitan areas (e.g., Altus, Columbus, and Laughlin AFBs) facing greater difficulties than

others. In addition to compensation issues, our interviews highlighted several other potential barriers related to recruitment and retention of aircraft mechanics.

First, because aircraft mechanics in the Air Force work on very specific types of airframes, it is usually not possible to hire individuals from the commercial sector into higher-level wage grade positions unless they come from active duty and have previous experience working on heavy aircraft. Therefore, the Air Force primarily focuses on hiring individuals directly from vocational or technical schools, where they are hired at WG-5 or WG-8 levels and work their way up. Most aircraft mechanics cap out at WG-10, however, given limited supervisory positions at each location. Thus, if individuals want to increase their compensation, they usually need to search for employment in the private sector.

As already noted, prior active duty personnel represent a key potential pool of aircraft mechanics for these civilian positions. Yet in interviews with Air Force HR specialists, we were told that the current 180-day waiting period requirement (U.S. Congress, 2016) restricting the hiring of retired military members into civilian positions creates challenges in bringing these individuals into positions in a timely manner (AFPC, 2018d). The installation can submit a waiver for the 180-day rule, but according to Air Force HR specialists, this process can also be very time consuming. We were told by specialists that in many cases, potential candidates decided to move on to other positions given the length of time to get hired.

To help address current challenges, in spring 2019 the Air Force received direct hire authority for all aircraft maintenance positions, which provides general flexibility in making tentative job offers. According to Air Force HR specialists the RAND team interviewed, since this direct hire authority went in effect, the Air Force has witnessed the highest position fill-out rate for aircraft mechanics, at 90 percent, while previously it was in the low eightieth percentile.

To summarize, higher levels of compensation in the private sector, the lack of understanding in the field regarding what the Air Force can pay for as regards licensing and vocational training, and the 180-day waiver restriction represent a few extra impediments that need to be tackled in order to solve the recruitment and retention issues for aircraft mechanic positions across the Air Force.

A Review of Air Force Vacancies

In an effort to identify additional barriers that may exist to recruitment in aircraft mechanic positions, our team compared current Air Force job listings with listings from other federal agencies and from the private sector. (For an overview of the methodology, see Appendix C.) We synthesized findings across two domains: (1) content (information contained within the listing) and (2) structure (how information is organized and displayed).

Compared with other Air Force vacancies, job titles within the Aircraft Mechanic occupational series were fairly consistent, simply listing “Aircraft Mechanic.” Similar to open vacancies for occupational series, open vacancy direct hire listings that were for multiple positions and/or locations in this category were vague—advertising roles across entire pay

scale ranges (i.e., WG-1 through WG-15) and listing the starting salary at the lowest level, even though the majority of worker positions in this series are at the WG-10 level. Listings within the Army appeared to be more specific, only recruiting for specific positions and pay grades (e.g., WG-10). None of the listings suggested that relocation assistance might be available to applicants. In contrast, similar postings across the private sector did not include compensation information at all.

Air Force vacancies did not explicitly list aircraft maintenance-specific qualifications and instead only listed general requirements and conditions of employment (e.g., “Must be a U.S. Citizen”). Similar to aircraft operations positions, these vacancies utilized boilerplate language that listed general OPM qualification standards (e.g., “Applicants will be rated in accordance with the OPM Qualification Standard Handbook X-118C”) and provided a link to the FWS qualification guide. When compared with other federal vacancies in this series, Air Force positions were more likely to include boilerplate language in the qualifications section. Similar vacancies across the Army were more likely to include boldfaced sections that were role specific (e.g., “experience or training installing, adjusting, aligning . . . mechanic and pneudraulic systems on an aircraft”). All private-sector comparison positions included specific requirements that signaled role fitness (e.g., “Ability to read wiring diagrams and trouble shoot A/C systems including electrical and avionics”).

Finally, in terms of the structure of the postings, we found that similar to other federal listings, Air Force job postings for this series included neither an organizational culture or mission statement nor specific benefits information. Instead, the benefits section included a link to a page on USAJobs that outlines general federal employee benefits. In contrast, one private-sector vacancy had an embedded benefits section while others had separate employee benefits areas on their career sites. Federal vacancies also tended to rely on blocks of text over concise, bulleted lists.

Options for Developing More Competitive Compensation and Benefits

The Aircraft Mechanic occupational series is not currently an Air Force MCO. It is included in this study, however, given that the Air Force currently faces an overall shortage of aircraft mechanics, which are vital to its mission. Our study identified several potential avenues the Air Force may want to explore to improve their compensation competitiveness to help attract and retain aircraft mechanics.

What the Air Force Can Approach on Its Own

- **Ensure that installations are using all incentives available to them to recruit and retain talent.** Air Force representatives indicated that positions located in sparsely populated areas are particularly hard to fill. Ensuring that recruitment and relocation incentives are used to the fullest may help alleviate some of these challenges. The Air Force might also consider establishing a central fund for payment of 3R incentives.

- **Educate and provide internal communications on what the Air Force can pay for as regards certification and vocational training.** There is clearly a lack of understanding about what the Air Force can and cannot pay for in terms of FWS employees. Specifying what training and certification reimbursement is authorized will help with recruitment and retention of aircraft mechanics.
- **Update vacancy announcements to ensure that they are more applicant friendly and provide more specific and accurate information regarding compensation and benefits.** Requirements should be clearly defined instead of using boilerplate language. Open, continuous Air Force vacancy announcements that cover multiple positions and/or locations should provide more specific potential pay grades and associated salaries instead of listing the full pay grade range (e.g., WG-1 to WG-15) and the lowest possible starting salary.
- **Add the Aircraft Mechanics occupational series to the Air Force's list of MCOs.** Based on the information gathered during interviews, it is clear that there is difficulty recruiting and retaining aircraft mechanics. Adding this occupational series to the Air Force's MCO list will place additional emphasis on the needs of the occupation.
- **Collaborate with technical schools.** The Air Force should review the ongoing collaboration efforts between AFBs and technical schools to identify best practices, expand collaboration efforts, and provide a larger pool of qualified applicants.

What Requires Department of Defense Coordination

- **Explore the need to increase wages in select locations.** National-level statistics indicate that the Air Force's pay for civilian aircraft mechanics is lagging behind the substantial wage growth that private-sector aircraft mechanics are experiencing, but with substantial variation at the LPA level. The Air Force should explore the requirements of Title 5, C.F.R., Prevailing Rate Systems, and collaborate with the DCPAS to address these pay disparities.

10. Overarching Recommendations

The objective of the current project was to examine the constraints the Air Force must operate under in comparison with alternative compensation and benefit structures found in other federal agencies and in the private sector and to provide recommendations on actions the Air Force can take to improve the competitiveness of its compensation and benefits packages to better recruit and retain top-tier civilian talent. The study focused specifically on the following five occupations identified by the Air Force as priorities because they are either designated as mission critical or they are particularly hard to fill: Aircraft Operations (GS-2181), Air Traffic Control (GS-2152), Human Resources Management (GS-0201), Information Technology Management (Cyber) (GS-2210), and Aircraft Mechanic (WG-8852).

Although each of the occupations included in this study faces its own unique challenges, we identified several areas of action that are relevant across multiple occupations, with the goal of improving the competitiveness of compensation and benefits to help recruiting and retention within these occupations. It is important to note, however, that compensation and benefits are only a part of individual employment and retention decisions. It is beyond the scope of the current study to assess anything beyond compensation and benefits, but the Air Force should ensure that other HR and situational elements (e.g., work environment, treatment from leaders, and work-life balance) are considered in conjunction with the recommendations contained in this report as they make improvements to address current recruiting and retention challenges. In addition we found that, for some occupations, Air Force representatives reported that there were no current issues with recruiting and retention even with the existence of pay discrepancies in certain locations. Therefore, it may not be necessary for the Air Force to address pay discrepancies for these occupations if it is able to recruit and retain top talent already. Alternatively, the Air Force may still wish to ensure that compensation is on par with other organizations from an equality perspective or may wish to address pay discrepancies to ensure that they do not become a factor in future recruiting and retention.

Here we outline potential actions the Air Force could explore to improve the recruitment and retention of civilians in the occupations considered in this study. Some of these initiatives are actions the Air Force can pursue directly. Others would require OPM or legislative changes, however, making them more difficult to achieve. Many of these actions may also be relevant to other mission critical or hard-to-fill civilian occupational series. Occupation-specific recommendations are contained at the end of Chapters 5–9 and in a summary table in Appendix G.

What the Air Force Can Approach on Its Own

Develop a clear policy and approach for determining and addressing MCOs. At the time of this study, the Air Force had not yet developed an internal, standardized written procedure for determining MCOs. Any policy developed should, at a minimum, establish thresholds and specific criteria for the identification, revalidation, and/or removal of MCOs. DoD does not provide explicit guidelines for its components regarding the MCO process. As a result, individual DoD components and functional communities are responsible for establishing their own methods, procedures, and processes for the determination and revalidation of MCOs.

Clear definitions of MCOs would also contribute to a stronger Air Force MCO policy. The Air Force should consider making a distinction between occupations that are mission critical and those that are not mission critical but for which it faces a shortage of competency or personnel. Both MCOs and non-MCO series can be assessed as being at risk of failure when there are shortages of competencies, personnel, or both. This distinction is especially important as—according to current Air Force practice—MCOs remain on the MCO list for as long as the respective occupational series remain critical to the Air Force’s mission (irrespective of the level of risk), while non-MCO series will cease to be considered as at risk of failure once the shortage of competencies or personnel has been addressed.

The Air Force is generally following DoD’s MCO policy guidelines, but there is a difference regarding the circumstances under which the Air Force adds and removes occupational series from its own MCO list. Current DoD practice is to add occupations to the MCO list and to then remove them once the shortage in competencies or personnel has been addressed, with the shortage criterion taking de facto precedence over the occupational series’ contribution to mission requirements.

The Air Force might also consider including in its policy specific criteria that an MCO needs to meet to be declared an at-risk series. The presence of clear criteria and thresholds, together with the monitoring of the level of the respective thresholds, would help the Air Force detect in a timely manner which MCOs become at risk, take action to remedy the situation before it becomes aggravated, and discern various levels of risk. The presence and monitoring of specific criteria and thresholds would also signal to the Air Force when an MCO has become “healthy” again and can be removed from the at-risk list, with resources becoming available for reallocation to address other pressing issues or to MCOs that have meanwhile become at risk.

Currently, at the DoD level it is unclear why occupational series declared as mission critical by only one of the military departments (i.e., a physical therapist for the Navy) make it on the DoD MCO list, while occupational series declared mission critical for two or three departments (e.g., ATCs for the Air Force and the Army) do not make it on the DoD MCO list, even when they are vital to the mission of at least one military service (in this case, the Air Force). The Air Force might benefit from documenting its understanding of criteria used by DoD in determining which occupational series make it to the overall DoD MCO list if that is not already documented in DoD policy.

The Air Force would also benefit from an MCO policy that clearly states the entire set of flexibilities that the department has at its disposal (e.g., special salary rates, 3R incentives, student loan repayment, etc.) and makes reference to existing policies on the use of these flexibilities. If there is no clearly stated policy evident, it would be helpful to identify the circumstances under which each flexibility is to be used, and what the alternative tools are that the Air Force can use when the existing flexibilities are insufficient to address recruitment and retention issues. Based on the interviews that the RAND team conducted with Air Force personnel, better internal communication and awareness of the full spectrum of flexibilities available to reduce the level of risk for MCOs would be desirable.

Explore whether special salary rates need to be established or updated for MCOs and hard-to-fill occupations and localities. For several occupations, our analysis shows that current pay in the Air Force is significantly lower than in the private sector. However, there is often substantial state- and LPA-level variation, which needs to be taken into account when recruiting and hiring in local labor markets. The Air Force should explore the need for special salary rate increases for certain occupations and locations and respond accordingly to OPM's annual survey and/or consider requesting new special salary rate schedules by submitting the information and data specified in OPM regulations. To ensure that the Air Force continues to be proactive on these issues, we suggest that it develop a policy and associated time frame for reviewing, preparing, and updating any necessary special salary rate requests to OPM. This recommendation has the additional benefit of helping to educate the Air Force field staff on the availability of a particular flexibility, how to request assistance in obtaining a special salary rate for targeted occupations, and how to coordinate requests throughout the department.

Establish Air Force-level data collection standards and an analysis plan for incentive use and examine the feasibility of establishing central funding for 3R incentives and PCS funds for MCOs and hard-to-fill occupations. This study ran into data limitations in examining the extent to which 3R incentives were being used, finding that the data are primarily maintained only at the local level. To provide oversight of the use of these incentives, the Air Force should establish standards for data collection and analysis across an occupational series. This can help identify when incentives may be needed but funding is not available versus incentives not being used because they are not needed.

Based on interviews with HR specialists, it is our understanding that the Air Force manages a central PCS fund, but only for positions at the GS-12 level and above; PCS funding for GS-11 and lower positions is left to the local base or activity. In interviews we were told that limited availability of funding at the local level has had a negative impact on recruitment for at-risk MCOs and especially for those positions at hard-to-fill locations. The Air Force might consider making PCS funds available from the central fund for GS-11 and lower positions as soon as it has been determined that a particular MCO is at medium or high risk of failure. Once the MCO becomes healthy, use of the central PCS fund for the lower grades would be stopped.

Along similar lines, the Air Force might consider establishing a central fund for payment of 3R incentives for at-risk MCOs until their status improves. Designing and implementing a system that allows for the use of central funding might avoid the shortages that have resulted in an MCO being assessed as at risk of failure.

Update vacancy announcements to ensure that they are more applicant friendly and provide more specific, accurate, and enticing information regarding compensation and benefits. Job titles and position descriptions and requirements should be clearly defined instead of using boilerplate language or referring prospective applicants to review general OPM qualification standards to determine their qualifications for the position. The Air Force should also explore options for providing more concise, bulleted listings instead of using large, dense blocks of text. In addition, even open Air Force vacancy announcements that cover multiple positions and/or locations should provide more specific information regarding promotion potential (e.g., from GS-11 to GS-13) and associated salaries instead of listing the full pay grade range (e.g., GS-1 to GS-15) and the lowest possible starting salary. It may also be helpful to provide an overview of benefits instead of simply providing a link to a page on USAJobs that outlines general federal employee benefits, or—at minimum—pointing out benefits in which the Air Force typically exceeds the private sector. Finally, the Air Force should think about including more specific culture and mission statements as part of its postings to help distinguish a civilian career in the Air Force from other jobs.

Establish Air Force-wide communities of practice for recruiting and retaining MCOs and hard-to-fill occupations. The Air Force might consider improving internal communication regarding military personnel retiring or leaving their uniformed jobs and the availability of civilian positions within the Air Force at installations that require people with the skill sets of those retiring or leaving the service. In information gathered during our interviews, we were told that some bases are very good at ensuring that they have a pipeline of former uniformed members to fill civilian positions that require military experience. At other installations, the pipeline is limited to knowing who is leaving the military. The existence of an effective internal communication channel that would allow the Air Force to match real-time supply with demand for needed skills to individuals leaving uniform service could help ensure that these individuals consider applying for Air Force civilian jobs before they accept competing offers from the private sector. This approach is likely to result in improved retention of individuals in which the Air Force has already invested many years—many of whom might want to remain within the Air Force family because they support and appreciate the mission and the organizational culture. The Air Force may also want to consider development of an internal website with information specific to the occupation and best practices to assist with recruitment and retention activities for those Air Force installations with hard-to-fill occupations or MCOs.

Use Transition Assistance Programs to help fill jobs. The Air Force should ensure that Transition Assistance Programs at installations advertise potential MCO or other key civilian job opportunities to military members who are separating from active duty. This will help provide a direct pipeline of potentially trained candidates for Air Force civilian jobs.

What Requires Department of Defense Coordination

Petition OPM to review classification and qualification standards and update them as necessary to reflect current Air Force occupational requirements. For several of the occupations in our review, current OPM classification and/or qualification standards did not reflect current operating procedures or job demands. At the time of this study, the Air Force already had efforts underway to address these inconsistencies. The department should continue those efforts. In addition, to ensure that it continues to be proactive on these issues, we suggest that the Air Force develop a policy and associated time frame for reviewing, preparing, and coordinating any required information or submission necessary for supplements to OPM classification and qualification standards for all MCOs.

What Requires Legislation

Explore the potential implications of raising the salary pay cap for aircraft operations and ATC positions, which require higher special salary rates. Currently, 5 U.S.C. 5305(a) and 5 C.F.R. 530.304(a) set special salary rate pay limitations such that the minimum rate may not exceed 30 percent of the maximum rate for grade, and the maximum rate may not exceed Level IV of the Executive Schedule. Although that is not an issue for all occupations, we found that in certain locations for aircraft operations and ATCs, this pay cap can depress the ability to pay more as the pay grade increases. For example, as indicated in Chapter 6 for the ATCs, the FAA's pay for its ATCs cannot exceed Level II of the Executive Schedule.

Pursue the ability of the Air Force to establish and use pay bands for MCOs or hard-to-fill occupations. Although it is beyond the scope of this study to analyze the impact of pay bands on recruiting and retention of the five occupations included herein, the Air Force may want to assess the extent to which the utilization of pay bands could help address some of its compensation issues and explore trying to establish pay banding for MCOs or hard-to-fill occupations. When looking at employee pay in the occupations targeted for this study—those that are classified in the GS system against the same occupations that are currently covered under Air Force authorized demonstration projects that fully employ the benefits of a pay banding system—the employees covered by pay banding systems have the potential to receive higher pay to combat the pay disparities found between the Air Force and the private sector or other federal agencies using the pay banding systems. Further, there is some evidence from previous studies on the AcqDemo plan (e.g., Guo, Hall-Partyka, and Gates, 2014; Lewis et al., 2017) that there are additional benefits in retaining employees under these plans. Therefore, establishing pay bands for MCOs or hard-to-fill occupations could provide the Air Force with greater flexibility in compensation.

Conclusions

There are a number of initiatives that the Air Force can pursue internally and others that will require statutory change. Funding will be needed to implement some of the more aggressive approaches designed to address pay gaps to help level the recruitment and retention playing field between the Air Force and its main competitors for talent. On the other hand, initiatives such as improving vacancy announcements and establishing Air Force–wide communities of practice for recruiting and retaining personnel are directly in the Air Force’s control with limited costs, although they do not directly address compensation gaps. We believe that approaching the recruiting and retention challenges with a multipronged attack is the most effective way of enacting change.

Appendix A. Interview Methodology

The RAND team interviewed a total of 28 participants through 11 different interview sessions. We conducted interviews with key Air Force representatives who had expertise in compensation and benefits and in civilian recruiting; we also interviewed career field managers and representatives from major commands (e.g., AETC and AFMC) who oversee the occupational series examined in our review. We received contact information from our sponsor's office and from the interviewees themselves, who often suggested other representatives we should speak with as part of the study. We sent out email invitations for voluntary participation in our study interviews and gave potential interviewees some brief background on the project and the option to share dates and times that would work best for them.

We conducted both in-person and telephone interviews with participants between February and April of 2019. Each interview consisted of one or two interviewers and a notetaker, both from the RAND team, and one to seven Air Force participants. The interviews were semistructured, utilizing a predeveloped protocol to ensure that important topics were all covered, but allowing interviewees to speak freely about what was most relevant from their perspective.

Three different protocols were developed to address the varying backgrounds of the participants. Two of the interviews followed the protocol developed for recruiters, seven followed the protocol developed for career program managers, and two followed the protocol developed for representatives from commands that hire the employees covered under the MCOs in question. In addition to these semistructured interviews, we also held two informal discussions on special salary rates with subject matter experts who could speak to the technical aspects of how the Air Force requests special salary rates from OPM.

Recruiter Protocol

The protocol for recruiters focused on their experience with and approach to recruiting for the five MCOs discussed in this report, including recruitment pools, changes in approach, issues that might arise, and feedback they have received on the recruitment process. Recruiters were also asked about how they utilize the compensation and benefits available for these MCOs to attract potential candidates. The specific questions included in the protocol are listed below.

Recruiter Questions

1. For which MCOs do you recruit?
2. Could you share a bit about your role and your experience recruiting for these MCOs?
3. How do you approach recruitment for these MCOs?
4. From where do you recruit to fill billets in these MCOs?

5. Is there anything different about your approach to recruiting for these MCOs compared with other MCOs?
6. Has anything changed in your approach to recruiting for these MCOs in the last five to ten years? Why?
7. Do you foresee any changes to how you approach recruitment for these MCOs in the next five to ten years? Why?
8. What do you see as issues that might arise in the next five to ten years in recruiting and retaining people in these MCOs?
9. Do you work with anyone (schools, associations) outside the Air Force to recruit for the target MCOs?
10. Do you attend job fairs? If so, what kind?
11. Is having Air Force military experience critical for applicants for jobs in the target MCOs?
12. Have you received any feedback from candidates regarding the recruitment process?
 - a. What feedback have you received and analyzed from candidates about the reasons they either chose or did not choose to join the Air Force for these MCOs?

Compensation and Benefits Questions

13. What, if any, information do you provide to potential candidates on the compensation and benefits or incentives they would receive in these MCOs?
14. What is the typical entry level and salary for these MCOs? Is that consistent with the entry level/salary they would receive in other services or federal agencies for these occupations?
15. Are there certain types of incentives you advertise or use for recruiting and hiring candidates into these MCOs?
16. What type of feedback do you get from candidates regarding the compensation and benefits packages offered for these MCOs?
17. Are there specific barriers created by the personnel, benefits, or compensation systems (for example, lack of direct hire, restricted pay levels, etc.) that make it difficult to attract and hire personnel into these MCOs?

Career Program Manager Protocol

During interviews with career program managers, the RAND team asked questions about their experience managing the career programs related to the relevant MCOs, types of career paths for the MCOs, retention and recruiting, and issues that might arise. Similar to the protocol developed for recruiters, this protocol also included questions related to compensation and benefits for the relevant MCOs. Specific questions that made up the protocol are listed below.

Career Program Manager Questions

1. Could you share a bit about your role and your experience managing career programs related to these MCOs?
2. Which training/education backgrounds and career paths tend to result in the greatest success in these MCOs?
3. Are there established career paths for these MCOs that people should follow? Do people follow them?

4. Are there sufficient funds for training and development?
5. Are employees given the time to attend training or development?
6. Is there a retention issue for these MCOs? Do you have exit survey data or other information on reasons for attrition?
7. Are you aware of any barriers to recruiting and retaining people in these MCOs?
8. What do you see as issues that might arise in the next five to ten years in recruiting and retaining people in these MCOs?

Compensation and Benefits Questions

9. What is the grade structure for positions in these MCOs?
10. What level and salary do candidates typically start at for these MCOs? Is that consistent with the other services or federal agencies for these occupations?
11. What is the highest grade employees in these MCOs can achieve at different command levels?
12. Are there certain types of incentives used to recruit and retain personnel in these MCOs?
13. What type of feedback do you get from personnel regarding the compensation and benefits packages offered for these MCOs?
14. Are there specific barriers created by the personnel, benefits, and compensation systems (for example, lack of direct hire, restricted pay levels, etc.) that make it difficult to attract and hire personnel into these MCOs?

Major Command Representative Protocol

Representatives from major commands that hire employees in the relevant MCOs were interviewed to gather information on the process of filling positions in the MCOs, including whether or not they are hard to fill, the typical time it takes to fill the positions, their approach to hiring, and changes in this approach. The team also asked about the quality of candidates they see for these positions and issues related to recruiting and retaining people in these MCOs. As with the previous two protocols, compensation- and benefits-related questions were also asked. Specific questions that comprised the protocol are listed below.

Major Command Representative Questions

1. Which of these MCOs are found in your command?
2. Could you share a bit about your role and your experience hiring for these MCOs?
3. Are positions for these MCOs truly hard to fill? Are you able to fill vacant positions as they arise?
4. What is the typical “time to fill” for a position in these MCOs? Which part of the process is the most time-consuming?
5. What differs in your approach to hiring for these MCOs compared with other MCOs?
6. Do you conduct workforce planning for the MCOs under your command? If so, can you share the workforce plan?
7. Has anything changed in your approach to hiring for these MCOs in the last five to ten years? Why?

8. Do you foresee any changes in your approach to hiring for these MCOs in the next five to ten years? Why?
9. What kind of assistance do you receive from the AFPC or command recruiters in trying to fill positions in these MCOs? Is there additional assistance you would request?
 - a. What role do managers and supervisors have in helping fill these positions?
 - b. Do you feel there is sufficient collaboration with recruiters to fill positions in these MCOs?
 - c. Do you consult with the recruiters, and particularly those without a background in the desired MCO, to discuss where to find potential recruits?
10. Do you get qualified candidates on your certificates? Is there a sufficient quantity of them? If not, what are the candidates typically lacking?
11. Are you aware of any factors or barriers to recruiting or retaining people in these MCOs?
12. What do you see as issues that might arise in the next five to ten years in recruiting and retaining people in these MCOs?
13. Are there any union implications on the recruitment process for these MCOs, and does it affect the recruitment hiring incentives that can be offered?

Compensation and Benefits Questions

14. What is the typical entry level and salary for these MCOs? Is that consistent with the entry level/salary they would receive in other services or federal agencies for these occupations?
15. What is the highest grade employees in these MCO can achieve in your command?
16. Are there pay or other incentives used to recruit and retain personnel in these MCOs? Could you describe them?
17. What type of feedback do you receive regarding the compensation and benefits packages offered for these MCOs?
18. Are there specific barriers created by the personnel, benefits, or compensation systems (for example, lack of direct hire, restricted pay levels, etc.) that make it difficult to attract and hire personnel into these MCOs?
19. Do employees in these occupations receive benefits that are different from employees in other occupations? Describe them, please.

Appendix B. Data Sources for National and Regional Compensation Comparisons and Additional Comparisons with the Federal Aviation Administration

In this appendix we provide more detail on the data sources for our compensation comparisons presented in Chapters 5–9. We then provide some additional comparisons regarding separations among ATCs for the FAA and Air Force civilian employees.

Data Sources for Compensation Comparisons

Bureau of Labor Statistics Occupational Employment Statistics

The most statistically reliable source for estimates of monetary compensation by occupation is the BLS’s OES. The BLS produces annual updates to the OES with national estimates for both the average monetary compensation for over 800 detailed occupations, as well as specific points in the earnings distribution (i.e., the median and the tenth, twenty-fifth, seventy-fifth, and ninetieth percentiles, given appropriate sample sizes for statistical reliability and confidentiality). These occupations are grouped according to SOC codes, with 22 major occupational groupings and statistics on four-digit SOC codes within those groupings. Pay is elicited from firms on a rolling three-year sample window, providing accurate estimates of pay of non-self-employed, nonfarm workers in the United States; however, this rolling three-year sample window prevents accurate estimation of precise year-over-year changes. Instead, the published statistics reflect wages and salaries reported by firms for each occupation over the course of the past three years. As such, care should be taken in extrapolating any patterns from single-year changes, instead focusing on general, multiyear trends.

Moreover, the BLS produces national-level estimates across industry, allowing for statistical comparison focusing on specific industries, such as the private-sector statistics displayed in this report. Given sufficient sample sizes, estimates are also provided at the state and MSA levels. However, given variability in sample sizes, these estimates are not provided for each occupation in each year. Even when provided, these estimates, particularly at the MSA level, are provided with relative standard errors to permit construction of confidence intervals. We use these standard errors for the LPA-level estimate itself, and assuming independence of sample construction between 2012 and 2018, construct standard errors around the change in LPA-level estimates using the delta method. We then provide 95-percent confidence intervals for the growth rate from 2012 to 2018—that is, if the BLS were to conduct the same sampling operation to estimate occupational salary, we would expect the true growth rate to fall within this interval 95 percent of the time.

The chief shortcoming of using OES data for providing comparable compensation estimates is that these estimates are for the entire labor pool in that occupation for that industry, state, or MSA in a given year. Separate estimates of educational attainment, veteran status, age, or in-field experience are not available.

The Census Bureau's American Community Survey

To address the shortcomings in the BLS data, we use the Census Bureau's ACS, an annual cross-sectional survey of one in 40 households, resulting in over a million prime-working-age respondents per year. Because the ACS is a household survey, it contains extensive sociodemographic measures—most notably, age and educational attainment. It also asks workers, whether currently employed or not, about their current or most recent occupation, at a similar level of detail as the OES. Although not specifically designed to provide occupation-specific calculations of pay, the ACS's sampling strategy and sample size allows for statistically accurate calculations, depending on the specific occupation, geographic level, and demographic restriction. We limit our calculations of annual salaries in the ACS among the occupations we study to full-time (50-plus or more weeks per year, and forty or more hours per week), non-self-employed workers. To correct for systematic underreporting of salaries in the ACS, we calculate correction factors for the years 2012–2017 based on the average ratio of national median salary for each given occupation in each of these years in the ACS and OES, then scale up all ACS-based statistics with this correction factor.

Since ACS respondents report their age and educational attainment, we construct measures of experience as the difference between age and the year of highest educational achievement, allowing for a range of two years for this year of achievement (e.g., ages 22–24 for a bachelor's degree, or ages 18–20 for high school graduates). For example, to measure the pay of a “low experience” HR workers (those who are comparable with personnel in the GS-9 through GS-11 pay grades), we need to measure the annual pay of those with bachelor's degrees and two to four years' experience or high school graduates with five to seven years' experience. As such, this category includes respondents with bachelor's degrees ranging from age 24 (age 22, plus two years' experience) to age 28 (age 24, plus four years' experience), as well as high school graduates from age 23 (age 18, plus five years' experience) to age 27 (age 20, plus seven years' experience).

Air Force Compensation Data

Our comparisons using civilian Air Force pay at the national, state, and local levels are facilitated using records from Air Force civilian personnel files that include information on salary rates.

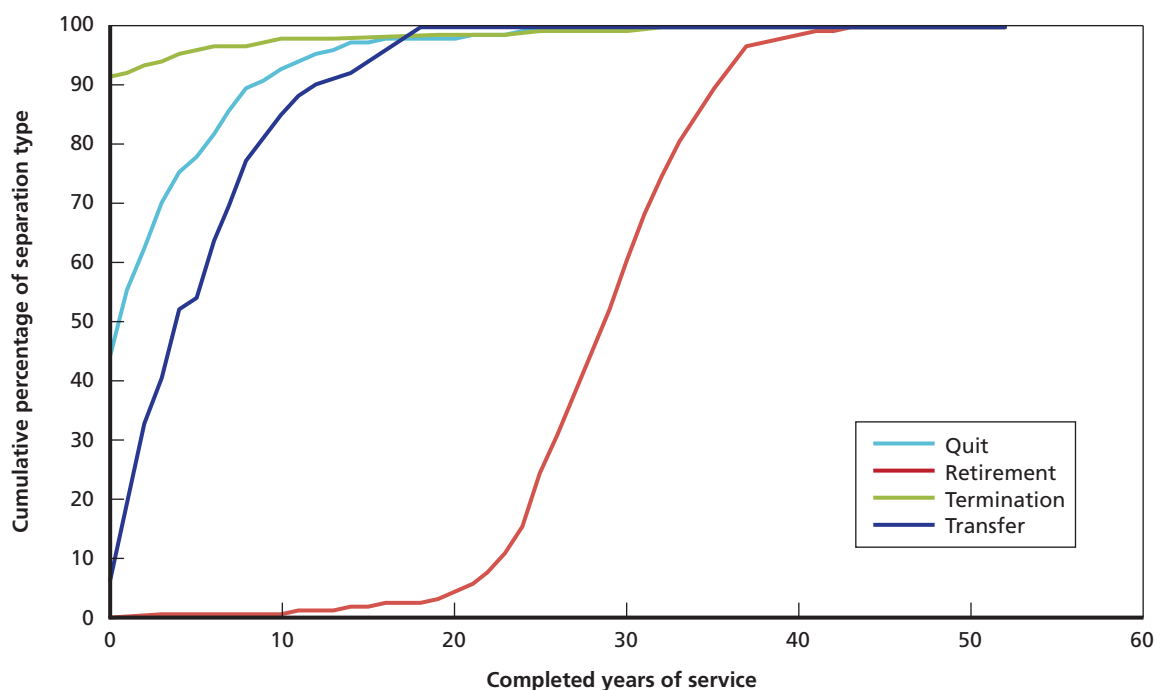
Federal Agency Compensation Data

Finally, through Federal Workforce data (FedScope) and Data.gov, OPM releases quarterly public use data on every civilian federal employee, as well as six-year spans of accessions (i.e., hires) and separations for these employees. These files contain detailed information on employees' salary, age, educational status, agency of employment, occupations, length of service, state of employment, reasons for separation, dates of separation, and dates of hire. We use these data for comparisons with those of other federal agencies—most notably, financial regulatory agencies and the Federal Aviation Administration.

Additional Comparisons of Separations Among Air Traffic Controllers for the Federal Aviation Administration and Air Force Civilian Employees

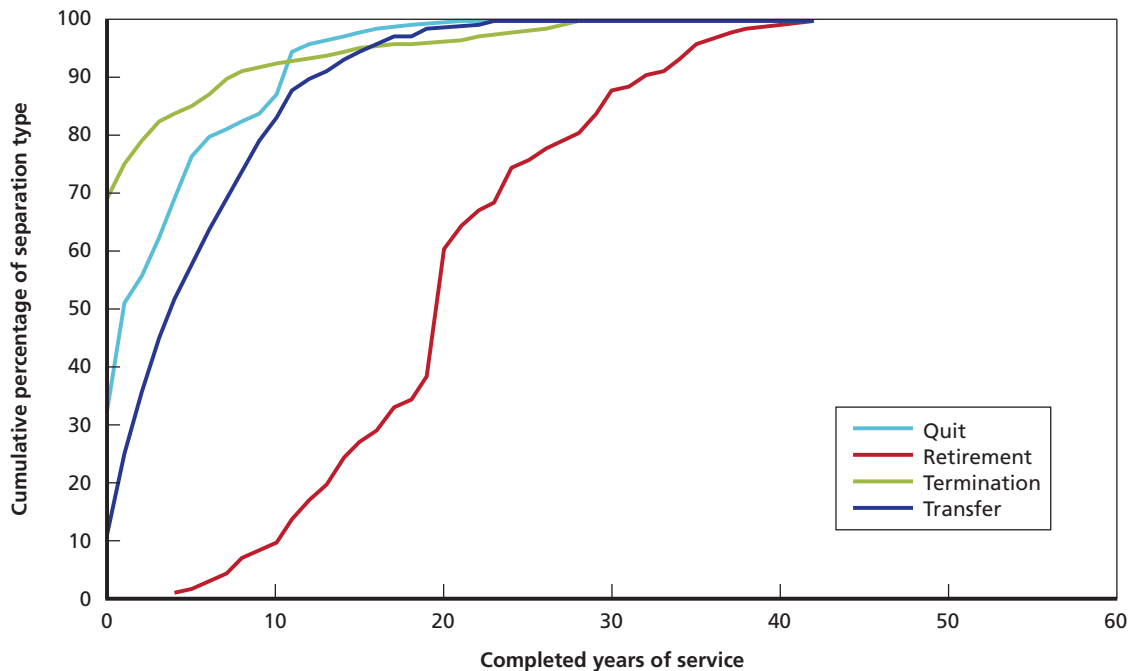
To examine whether there are differences across the FAA and Air Force when separations occur, Figures B.1 and B.2 show, for each separation type, how these separations accrue across length of service of ATCs. The figures show the cumulative fraction of separations, so as one moves from zero to greater years of service, the fraction of separations goes from zero to one.

Figure B.1. Cumulative Percent of Each Separation Type, by Length of Service, Federal Aviation Administration Air Traffic Controllers



SOURCE: RAND calculations. Statistics for FAA from OPM Federal Workforce Data (FedScope).

Figure B.2. Cumulative Percent of Each Separation Type, by Length of Service, Air Force Civilian Air Traffic Controllers



SOURCE: RAND calculations. Air Force civilian statistics from the DCPDS.

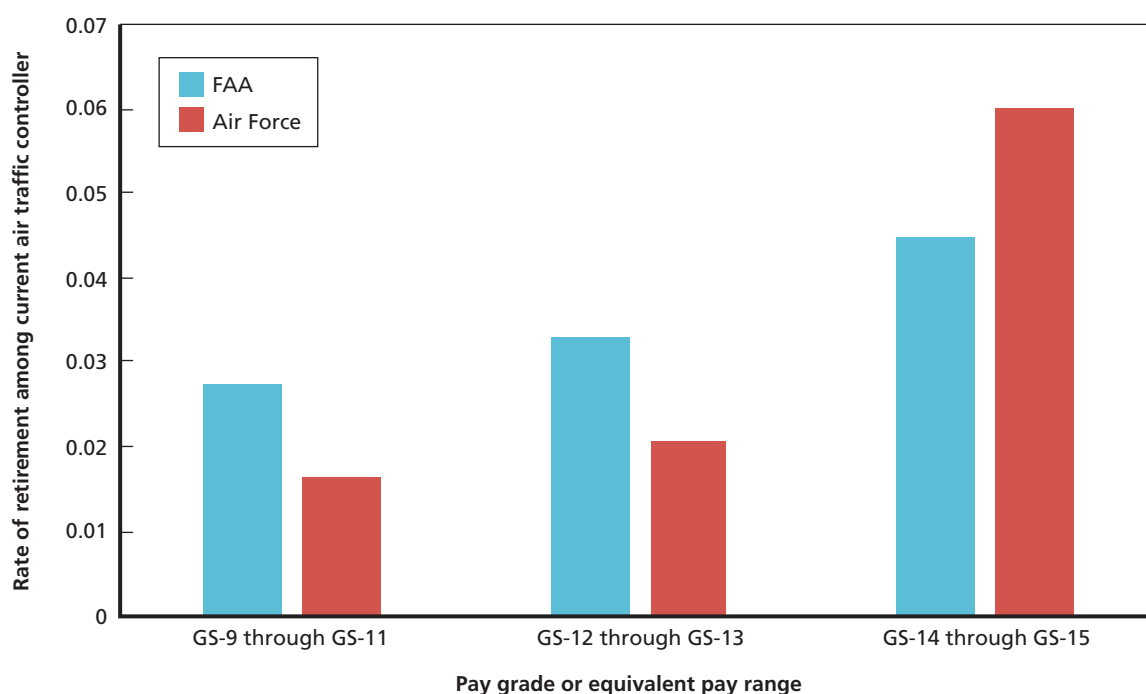
For example, terminations tend to be an early-career type of separation, with over 90 percent of terminations accounted for by those with less than one full year of service in the FAA, and 70 percent among Air Force civilian ATCs. In contrast, over 50 percent of retirements are accounted for by those with 29 or more years of service in the FAA and 20 or more years of service in the Air Force. The same relative patterns hold across these two agencies: terminations skew toward the fewest years of service, followed by quits, then transfers, with retirements skewing toward the most years of service. However, there are differences between agencies—most notably with regard to quits and retirements. Quits in the FAA tend to occur much earlier than among Air Force civilian ATCs, and retirements tend to occur later.

To examine the extent to which these rates can be accounted for by pay disparities, we compare rates of retirement and quitting as a fraction of currently employed ATCs in each agency by pay grade. However, the FAA does not use the GS pay grade system for its ATCs, as discussed in Appendix F; below we examine the extent to which we can compare pay for FAA ATCs and Air Force civilian ATCs. But first we construct analogous comparison groups to determine whether separation rates vary by similarly paid ATCs across these two agencies. To do so we define FAA ATCs as GS-9 through GS-11 if their pay is between the minimum and maximum observed pay for civilian Air Force ATCs with a pay grade of GS-9 through GS-11,

with similar designations for GS-12 through GS-13 and GS-14 through GS-15. Since pay ranges are quite wide, some FAA ATCs are assigned to multiple pay grade pay ranges.

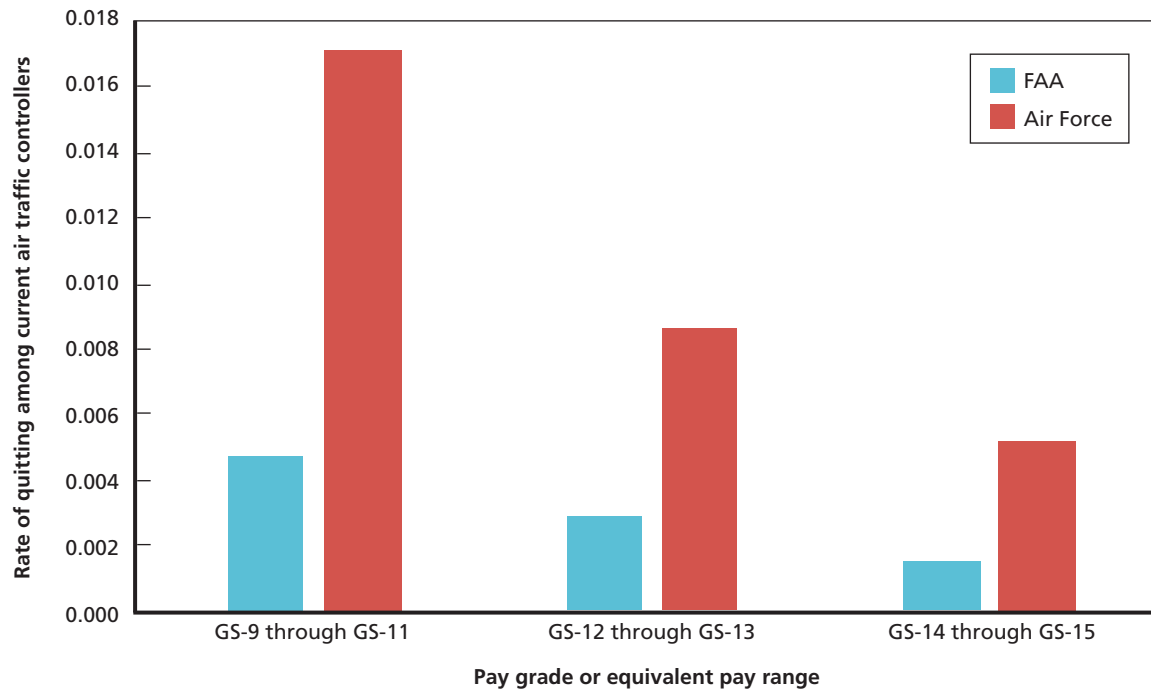
Figure B.3 shows that rates of retirement increase at higher pay grades, regardless of agency. But retirement rates are higher in the FAA in lower pay ranges, whereas retirement rates are higher for GS-14/15 Air Force civilian ATCs than similarly paid FAA ATCs. That is, the higher earlier retirements found in Figure B.2 are driven by this highest pay grade category. Figure B.4 illustrates the analogous separation rates for quits, with a reverse pattern: quits are much more common among lower pay grades, with a substantially higher rate at every pay grade for the Air Force. Similar comparisons, not shown here given the small number of FAA separations, hold for transfers and terminations: rates of these separation types are substantially higher for the Air Force than for the FAA, although they decline with higher pay grades, with no observed terminations among those in the GS-14 and GS-15 pay grades, and transfers fall from 3 percent of GS-9 through GS-11 Air Force civilian ATCs to 1 percent of GS-14 through GS-15 ATCs.

Figure B.3. Rate of Air Traffic Controller Retirement Among Current Workers, by General Schedule Pay Grade Pay Range and Agency, 2011–2017



SOURCES: RAND calculations. Statistics for FAA from OPM Federal Workforce Data (FedScope); Air Force civilian statistics from the DCPDS.

Figure B.4. Rate of Air Traffic Controller Quits Among Current Workers, by General Schedule Pay Grade Pay Range and Agency, 2011–2017



SOURCES: RAND calculations. Statistics for FAA from OPM Federal Workforce Data (FedScope); Air Force civilian statistics from the DCPDS.

Appendix C. An Approach to Reviewing Job Vacancy Announcements

To help identify whether there may be improvements in how current job openings for the five occupational series examined in this report are described in postings, we conducted a three-phase review of a snapshot of current postings on USAJobs for each of the series:

1. we reviewed and compared postings across Air Force organizations
2. we compared Air Force postings with other federal departments postings for the same occupational series (including other branches of DoD)
3. we compared Air Force postings with job opening announcements in the private sector for similar occupations.

For Phases 1 and 2, we utilized publicly available application programming interfaces from USAJobs to retrieve open competitive (public) vacancies for civilian positions within each of the five relevant occupational series. Our snapshot of data is from September 2019. For our current purposes, we focused on jobs that are open to the public and did not include jobs that required membership in the AFR or ANG. Given the unique policies and processes for recruiting dual-status military/civilian technicians, AFR and ANG positions were beyond the scope of the current study. Table C.1 provides an overview of the total number of job openings listed on USAJobs for each occupational series and then shows the total number that were open to the public, and then the total number of public job postings that did not require membership in the AFR or ANG. The far-right column represents the final number of job postings for each occupational series that met our criteria and were included in our review. As the table shows, for some operational series there were a limited number of postings available to include in our review.

In Phase 1, for each occupational series we reviewed and compared current Air Force job listings across sponsoring organizations to determine if there were differences within the Air

Table C.1. Job Openings Across Occupational Series

Occupational Series Code	Total Number of Job Postings	Number of Job Postings Open to the Public	Number of Public Job Postings and No National Guard and Reserve Membership
Aircraft Operations (GS-2181)	21	18	12
Air Traffic Control (GS-2152)	10	5	2
Human Resources Management (GS-0201)	31	11	7
Information Technology Management (Cyber) (GS-2210)	68	29	5
Aircraft Mechanic (WG-8852)	53	15	4

Force itself. In Phase 2 we compiled all job listings within the five occupational series across other federal departments and agencies by retrieving all current job listings across these departments and agencies for each series. For aircraft-related positions (GS-2181, GS-2152, and WG-8852), the departments and agencies only had a small number of postings. Therefore, for those occupations, we included all the postings in our comparison. Due to the high volume of postings for non-aircraft-related positions (GS-2210, GS-0201), we initially sampled 10 percent of public listings. We then pulled all listings from the five non-DoD departments with the greatest number of listings per series to ensure that we were not missing any important information. Once we were no longer seeing anything new as part of our comparisons, we concluded that we had reached a saturation point and did not pull any additional postings to use in our review. Table C.2 provides an overview of the total number of postings we included in our review from other federal departments and agencies.

Table C.2. Total Number of Job Postings Included from Other Federal Departments and Agencies

Occupational Series Code	Federal Department/Agency	Number of Job Postings Included in Our Review
Aircraft Operations (GS-2181)	Army	1
	Department of Transportation	3
	Navy	1
Air Traffic Control (GS-2152)	FAA	4
Human Resources Management (GS-0201)	Army	7
	Navy	1
	NASA	2
	Department of the Treasury	8
	Department of Health and Human Services	1
	Department of Homeland Security	2
	Department of the Interior	1
	Department of Veterans Affairs	2
Information Technology Management (Cyber) (GS-2210)	Army	11
	Navy	4
	Department of Homeland Security	3
	Department of the Treasury	7
	Department of Veterans Affairs	3
	General Services Administration	2
	Judicial Branch	4
Aircraft Mechanic (WG-8852)	Army	8

SOURCE: RAND calculations from job postings at USAJobs, September 2019.

In Phase 3 we pulled analogous job listings from three job websites (Glassdoor, Google Jobs, and Indeed) and grouped them based on relevance to each of the five occupational series. We excluded air traffic control postings in this phase of comparison, as the FAA is the primary employer of ATCs, and they were already included as part of our Phase 2 analysis. The resulting 20 vacancies (five per occupational series) were compared with all Air Force vacancies pulled from Phase 1.

In comparing job postings in each phase, each job listing was parsed into tables, and listings with similar job titles were grouped together for easier comparison. A RAND team member then went through each group of listings to qualitatively compare key features and differences across the 16 relevant domains shown in Table C.3. Findings were summarized and organized based on content (information contained within the posting) and structure (how the information was organized and displayed).

Table C.3. Job Posting Characteristics Reviewed in Analysis

Domain	Example
Title	Supervisory Human Resources Specialist (Military)
Department	Department of the Army
Agency	U.S. Army Accession Command
Pay scale and grade	GS-11
Salary	\$62,720 to \$81,542 per year; salary includes applicable locality pay
Appointment type	Temporary—1 Year
Location	Fort Benjamin Harrison, Indiana (1 vacancy)
Relocation	No
Telework eligible	Yes, as determined by agency policy
Summary statement	About the Position: The position is located at the U.S. Army Accessions Command, 3rd Brigade, U.S. Army Recruiting Battalion—Indianapolis, Administration/Logistics Division, Indianapolis Description of the working environment: Work is performed in an office setting
Travel	Occasional travel: The business travel requirement is 15 percent
Promotional potential	None
Security clearance	Not required
Drug test	No
Responsibilities	Review personnel actions to ensure accuracy and compliance with policies and procedures; implement procedures to improve the operating effectiveness of the organization; initiate and recommend actions to provide optimum personnel support
Conditions of employment	Appointment may be subject to a suitability or fitness determination, as determined by a completed background investigation

SOURCE: Sample RAND calculation from job postings at Glassdoor, Google Jobs, and Indeed, September 2019.

Limitations

It is important to note that there are limitations to our review and the insight we are able to provide from this analysis. First, we were limited in the total number of federal job listings we were able to sample, since we used a snapshot of postings available at the time. In subsequent

studies, USAJobs application programming interfaces could be used to perform a search of all archived job postings from a specific period (e.g., 2012–2019), providing a more complete sample. Second, we do not have data on the extent to which changes in the characteristics we included in our analysis would actually increase the number of applicants that decide to apply for a particular position. A more detailed experimental study would need to be conducted to identify the true impact of any changes in job postings.

Appendix D. Mission Critical Operations Lists Across Various Components

Table D.1. List of Air Force Mission Critical Occupations as of January 2019

No.	Occupational Series	OPM Title	Strategic	Core
1.	0017	Explosives Safety		X
2.	0018	Safety and Occupational Health Management Technician	X	
3.	0080	Security Administration	X	
4.	0081	Fire Protection and Prevention		X
5.	0130	Foreign Affairs	X	
6.	0131	International Relations	X	
7.	0132	Intelligence	X	
8.	0201	Human Resources Management		X
9.	0391	Telecommunications	X	
10.	0501	Financial Administration and Program	X	
11.	0510	Accounting	X	
12.	0511	Auditing	X	
13.	0560	Budget Analysis	X	
14.	0801	General Engineering		X
15.	0810	Civil Engineering		X
16.	0819	Environmental Engineering		X
17.	0830	Mechanical Engineering		X
18.	0850	Electrical Engineering	X	
19.	0855	Electronics Engineering	X	
20.	0896	Industrial Engineering		X
21.	1035	Public Affairs		X
22.	1102	Contracting	X	
23.	1515	Operations Research	X	
24.	1550	Computer Science	X	
25.	1811	Criminal Investigating		X
26.	2010	Inventory Management		X
27.	2101	Transportation Specialist		X
28.	2130	Traffic Management		X
29.	2152	Air Traffic Control	X	
30.	2181	Aircraft Operation		X
31.	2210	Information Technology Management (Cyber)	X	
32.	6641	Ordnance Equipment Mechanic	X	
33.	6652	Aircraft Ordnance Systems Mechanic	X	
34.	6656	Special Weapons Systems Mechanic	X	

SOURCE: AF/A1C, 2019b.

Table D.2. Comparison of Office of Personnel Management, Department of Defense, and Military Departments Mission Critical Occupations

MCO	DoD FY					
	OPM	2019	Air Force	Army	Navy	Fourth Estate
Explosives Safety (0017)		√	√	√	√	
Safety and Occupational Health (0018)		√	√	√	√	√
Environmental Protection (0028)					√	
Security Administration (0080)		√	√	√	√	√
Fire Protection and Prevention (0081)		√	√	√	√	
Police (0083)		√		√	√	√
Security Guard (0085)			√			
Emergency Management (0089)						
Economist (0110)	√			√		
Foreign Affairs (0130)		√	√	√	√	
International Relations (0131)		√	√	√	√	
Intelligence (0132)		√	√	√	√	
Psychology (0180)		√			√	
Social Work (0185)		√			√	
HR Specialist (0201)	√	√	√		√	√
Logistics Management (0346)		√		√	√	√
Telecommunications (0391)		√	√		√	
Financial Administration (0501)		√	√		√	
Financial Management (0505)			√			
Accounting (0510)		√	√	√	√	√
Auditor (0511)	√	√	√	√	√	
Budget Analysis (0560)		√	√	√	√	√
General Health Science (0601)						
Medical Officer (0602)		√		√	√	
Physician Assistant (0603)		√		√	√	
Nurse (0610)		√		√	√	
Practical Nurse (0620)		√		√	√	
Nursing Assistant (0621)			√			
Physical Therapist (0633)		√			√	
Health Aid and Technician (0640)					√	
Nuclear Medicine Technician (0642)			√			
Diagnostic Radiologic Technologist (0647)			√			
Pharmacist (0660)		√	√			
Pharmacy Technician (0661)						
Optometrist (0662)			√			
Speech Pathology and Audiology (0665)			√			
Medical Records Administration (0669)						
Health System Administration (0671)						
Medical Records Technician (0675)						

MCO	OPM	DoD FY 2019	Air Force	Army	Navy	Fourth Estate
Dental Officer (0680)			√			
Dental Assistant (0681)			√			
Dental Hygiene (0682)			√			
Industrial Hygiene (0690)						
Veterinary Medical Science (0701)			√			
General Engineering (0801)			√	√		√
Technical Engineering (0802)			√			
Safety Engineering (0803)		√		√	√	√
Civil Engineering (0810)			√	√	√	
Environmental Engineering (0819)			√	√	√	
Mechanical Engineering (0830)			√		√	
Electrical Engineering (0850)			√	√	√	
Computer Engineering (0854)			√			
Electronics Engineering (0855)			√	√	√	
Aerospace Engineering (0861)			√			
Chemical Engineering (0893)			√			
Industrial Engineering (0896)			√			
General Attorney (0905)			√			
Public Affairs (1035)		√	√		√	
Language Specialist (1040)			√			
Contracting (1102)	√	√	√	√	√	
Industrial Property Management (1103)						
Purchasing (1105)						
Procurement Clerical and Technician (1106)						
Grants Management (1109)						
General Physical Sciences (1301)						
Physics (1310)						
Chemistry (1320)						
Oceanography (1360)						
Operations Research (1515)			√	√	√	
Mathematics (1520)						
Computer Science (1550)	√	√	√	√	√	√
Equipment Facilities and Services (1601)					√	
Equipment Services (1670)		√			√	
Criminal Investigating (1811)		√	√		√	√
Quality Assurance (1910)		√			√	√
General Supply (2001)		√				
Inventory Management (2010)			√		√	
Transportation Specialist (2101)			√	√		
Traffic Management (2130)		√	√	√	√	
Transportation Operations (2150)			√			
Air Traffic Control (2152)			√	√		

MCO	OPM	DoD FY 2019	Air Force	Army	Navy	Fourth Estate
Aircraft Operations (2181)			√			
IT Management (2210)	√	√	√	√	√	√
Electrician (2805)						
Air Conditioning Equipment Mechanic (5306)					√	
Ordnance Equipment Mechanic (6641)			√			
Aircraft Ordnance Systems Mechanic (6652)			√			
Special Weapons Systems Mechanic (6656)			√			
SOURCES: AF/A1C, 2019b, pp. 10, 12; Cobert, 2016b; DCPAS, 2019, p. 15.						

Appendix E. Special Rate Tables, 2019

Table E.1. Special Rate Table Descriptions, 2019

Table Number	Agencies Covered	Location(s)
GS-2181, Aircraft Operator^a (requires piloting an aircraft)		
0759	Air Force, Department of Energy, Department of State, FBI, NASA, U.S. Marshals Service	San Jose–San Francisco–Oakland, CA LPA
0760	Air Force, Department of Energy, Department of State, FBI, NASA, U.S. Marshals Service	New York–Newark, NY-NJ-CT-PA LPA
0761	Air Force, Department of Energy, Department of State, FBI, NASA, U.S. Marshals Service	Houston–The Woodlands, TX LPA Los Angeles–Long Beach, CA LPA
0762	Air Force, Department of Energy, Department of State, FBI, NASA, U.S. Marshals Service	Boston–Worcester–Providence, MA-RI-NH-ME LPA Chicago–Naperville, IL-IN-WI LPA Hartford–West Hartford, CT-MA LPA San Diego–Carlsbad, CA LPA Washington–Baltimore–Arlington, DC-MD-VA-WV-PA LPA
0763	Air Force, FBI, U.S. Air Force, Department of Energy, Department of State, FBI, NASA, U.S. Marshals Service	Denver–Aurora, CO LPA Detroit–Warren–Ann Arbor, MI LPA Philadelphia–Reading–Camden, PA-NJ-DE-MD LPA Sacramento–Roseville, CA-NV LPA Seattle–Tacoma, WA LPA
0764	Air Force, Department of Energy, Department of State, FBI, NASA, U.S. Marshals Service	Dallas–Fort Worth, TX-OK LPA Miami–Fort Lauderdale–Port St. Lucie, FL LPA Minneapolis–St. Paul, MN-WI LPA Portland–Vancouver–Salem, OR-WA LPA
0765	Air Force, Department of Energy, Department of State, FBI, NASA, U.S. Marshals Service	Atlanta–Athens–Clarke County–Sandy Springs, GA-AL LPA Buffalo–Cheektowaga, NY LPA Cincinnati–Wilmington–Maysville, OH-KY-IN LPA Cleveland–Akron–Canton, OH LPA Milwaukee–Racine–Waukesha, WI LPA Phoenix–Mesa–Scottsdale, AZ LPA Raleigh–Durham–Chapel Hill, NC LPA
0766	Air Force, Department of Energy, Department of State, FBI, NASA, U.S. Marshals Service	Columbus–Marion–Zanesville, OH LPA Dayton–Springfield–Sidney, OH LPA Huntsville–Decatur–Albertville, AL LPA Laredo, TX LPA Pittsburgh–New Castle–Weirton, PA-OH-WV LPA
0767	Air Force, Department of Energy, Department of State, FBI, NASA, U.S. Marshals Service	Albany–Schenectady, NY-MA LPA Albuquerque–Santa Fe–Las Vegas, NM LPA All Portions of the Rest of U.S. LPA Within the Contiguous U.S. Austin–Round Rock, TX LPA

Table Number	Agencies Covered	Location(s)
		Birmingham–Hoover–Talladega, AL LPA Burlington–South Burlington, VT LPA Charlotte–Concord, NC-SC LPA Colorado Springs, CO LPA Corpus Christi–Kingsville–Alice, TX LPA Davenport–Moline, IA-IL LPA Harrisburg–Lebanon, PA LPA Indianapolis–Carmel–Muncie, IN LPA Kansas City–Overland Park–Kansas City, MO-KS LPA Las Vegas–Henderson, NV-AZ LPA Omaha–Council Bluffs–Fremont, NE-IA LPA Palm Bay–Melbourne–Titusville, FL LPA San Antonio–New Braunfels–Pearsall, TX LPA St. Louis–St. Charles–Farmington, MO-IL LPA Tucson–Nogales, AZ LPA Virginia Beach–Norfolk, VA-NC LPA
558A	Air Force, Department of Energy, Department of State, FBI, NASA, U.S. Marshals Service	Alaska
558H	Air Force, Department of Energy, Department of State, FBI, NASA, U.S. Marshals Service	Hawaii
558P	Air Force, Department of Energy, Department of State, FBI, NASA, U.S. Marshals Service	Puerto Rico
GS-2181, Simulator Instructor (applies to simulator instructors and their supervisors)		
0769	Air Force	Laughlin AFB, TX
GS-2152, Air Traffic Control		
0565 Employees must perform radar approach control duties.	Air Force, Army, Navy	Albany–Schenectady, NY-MA LPA Albuquerque–Santa Fe–Las Vegas, NM LPA All Portions of the Rest of U.S. LPA Within the Contiguous U.S. Atlanta–Athens–Clarke County–Sandy Springs, GA-AL LPA Austin–Round Rock, TX LPA Birmingham–Hoover–Talladega, AL LPA Boston–Worcester–Providence, MA-RI-NH-ME LPA Buffalo–Cheektowaga, NY LPA Burlington–South Burlington, VT LPA Charlotte–Concord, NC-SC LPA Chicago–Naperville, IL-IN-WI LPA Cincinnati–Wilmington–Maysville, OH-KY-IN LPA Cleveland–Akron–Canton, OH LPA Colorado Springs, CO LPA Columbus–Marion–Zanesville, OH LPA Corpus Christi–Kingsville–Alice, TX LPA Dallas–Fort Worth, TX-OK LPA Davenport–Moline, IA-IL LPA Dayton–Springfield–Sidney, OH LPA Denver–Aurora, CO LPA Detroit–Warren–Ann Arbor, MI LPA

Table Number	Agencies Covered	Location(s)
		Harrisburg–Lebanon, PA LPA Hartford–West Hartford, CT-MA LPA Huntsville–Decatur–Albertville, AL LPA Indianapolis–Carmel–Muncie, IN LPA Kansas City–Overland Park–Kansas City, MO-KS LPA Laredo, TX LPA Las Vegas–Henderson, NV-AZ LPA Miami–Fort Lauderdale–Port St. Lucie, FL LPA Milwaukee–Racine–Waukesha, WI LPA Minneapolis–St. Paul, MN-WI LPA Omaha–Council Bluffs–Fremont, NE-IA LPA Palm Bay–Melbourne–Titusville, FL LPA Philadelphia–Reading–Camden, PA-NJ-DE-MD LPA Phoenix–Mesa–Scottsdale, AZ LPA Pittsburgh–New Castle–Weirton, PA-OH-WV LPA Portland–Vancouver–Salem, OR-WA LPA Raleigh–Durham–Chapel Hill, NC LPA Richmond, VA LPA Sacramento–Roseville, CA-NV LPA San Antonio–New Braunfels–Pearsall, TX LPA San Diego–Carlsbad, CA LPA Seattle–Tacoma, WA LPA St. Louis–St. Charles–Farmington, MO-IL LPA Tucson–Nogales, AZ LPA Virginia Beach–Norfolk, VA-NC LPA Washington–Baltimore–Arlington, DC-MD-VA-WV-PA LPA
0566 Employees must perform nonradar approach control duties.	Army, Navy, Air Force	Albany–Schenectady, NY-MA LPA Albuquerque–Santa Fe–Las Vegas, NM LPA All Portions of the Rest of U.S. LPA Within the Contiguous U.S. Atlanta–Athens–Clarke County–Sandy Springs, GA-AL LPA Austin–Round Rock, TX LPA Birmingham–Hoover–Talladega, AL LPA Buffalo–Cheektowaga, NY LPA Burlington–South Burlington, VT LPA Charlotte–Concord, NC-SC LPA Cincinnati–Wilmington–Maysville, OH-KY-IN LPA Cleveland–Akron–Canton, OH LPA Colorado Springs, CO LPA Columbus–Marion–Zanesville, OH LPA Corpus Christi–Kingsville–Alice, TX LPA Dallas–Fort Worth, TX-OK LPA Davenport–Moline, IA-IL LPA Dayton–Springfield–Sidney, OH LPA Harrisburg–Lebanon, PA LPA Huntsville–Decatur–Albertville, AL LPA Indianapolis–Carmel–Muncie, IN LPA Kansas City–Overland Park–Kansas City, MO-KS LPA Laredo, TX LPA Las Vegas–Henderson, NV-AZ LPA Miami–Fort Lauderdale–Port St. Lucie, FL LPA Milwaukee–Racine–Waukesha, WI LPA Minneapolis–St. Paul, MN-WI LPA Omaha–Council Bluffs–Fremont, NE-IA LPA Palm Bay–Melbourne–Titusville, FL LPA Phoenix–Mesa–Scottsdale, AZ LPA Pittsburgh–New Castle–Weirton, PA-OH-WV LPA Portland–Vancouver–Salem, OR-WA LPA Raleigh–Durham–Chapel Hill, NC LPA

Table Number	Agencies Covered	Location(s)
		Richmond, VA LPA San Antonio–New Braunfels–Pearsall, TX LPA St. Louis–St. Charles–Farmington, MO-IL LPA Tucson–Nogales, AZ LPA Virginia Beach–Norfolk, VA-NC LPA
565A Employees must perform radar approach control duties.	Air Force, Army, Marine Corps	Alaska
565F Employees must perform radar approach control duties.	Air Force, Army, Marine Corps	Foreign areas
565H Employees must perform radar approach control duties.	Air Force, Army, Marine Corps	Hawaii
566A Employees must perform nonradar approach control duties.	Air Force, Army, Marine Corps	Alaska
566F Employees must perform nonradar approach control duties.	Air Force, Army, Marine Corps	Foreign areas
566H Employees must perform nonradar approach control duties.	Air Force, Army, Marine Corps	Hawaii
GS-2210, Information Technology Management (Cyber)^b		
999B	All federal government agencies	Albany–Schenectady, NY-MA LPA Albuquerque–Santa Fe–Las Vegas, NM LPA All Portions of the Rest of U.S. LPA Within the Contiguous U.S. Atlanta–Athens–Clarke County–Sandy Springs, GA-AL LPA Austin–Round Rock, TX LPA Birmingham–Hoover–Talladega, AL LPA Buffalo–Cheektowaga, NY LPA Burlington–South Burlington, VT LPA Charlotte–Concord, NC-SC LPA Cleveland–Akron–Canton, OH LPA Colorado Springs, CO LPA Corpus Christi–Kingsville–Alice, TX LPA

Table Number	Agencies Covered	Location(s)
		Davenport–Moline, IA-IL LPA Dayton–Springfield–Sidney, OH LPA Harrisburg–Lebanon, PA LPA Huntsville–Decatur–Albertville, AL LPA Indianapolis–Carmel–Muncie, IN LPA Kansas City–Overland Park–Kansas City, MO-KS LPA Laredo, TX LPA Las Vegas–Henderson, NV-AZ LPA Milwaukee–Racine–Waukesha, WI LPA Omaha–Council Bluffs–Fremont, NE-IA LPA Palm Bay–Melbourne–Titusville, FL LPA Phoenix–Mesa–Scottsdale, AZ LPA Pittsburgh–New Castle–Weirton, PA-OH-WV LPA Raleigh–Durham–Chapel Hill, NC LPA Richmond, VA LPA San Antonio–New Braunfels–Pearsall, TX LPA St. Louis–St. Charles–Farmington, MO-IL LPA Tucson–Nogales, AZ LPA Virginia Beach–Norfolk, VA-NC LPA
999C	All federal government agencies	Cincinnati–Wilmington–Maysville, OH-KY-IN LPA Columbus–Marion–Zanesville, OH LPA Dallas–Fort Worth, TX-OK LPA Miami–Fort Lauderdale–Port St. Lucie, FL LPA Minneapolis–St. Paul, MN-WI LPA Philadelphia–Reading–Camden, PA-NJ-DE-MD LPA Portland–Vancouver–Salem, OR-WA LPA Sacramento–Roseville, CA-NV LPA San Diego–Carlsbad, CA LPA Seattle–Tacoma, WA LPA Washington–Baltimore–Arlington, DC-MD-VA-WV-PA LPA
999D	All federal government agencies	Boston–Worcester–Providence, MA-RI-NH-ME LPA Chicago–Naperville, IL-IN-WI LPA Denver–Aurora, CO LPA Detroit–Warren–Ann Arbor, MI LPA Hartford–West Hartford, CT-MA LPA
999E	All federal government agencies	Houston–The Woodlands, TX LPA Los Angeles–Long Beach, CA LPA New York–Newark, NY-NJ-CT-PA LPA
999F	All federal government agencies	San Jose–San Francisco–Oakland LPA
99AA	All federal government agencies	Alaska
99AF	All federal government agencies	Foreign areas
99AG	All federal government agencies	Guam
99AH	All federal government agencies	Hawaii
99AP	All federal government agencies	Puerto Rico
99AV	All federal government agencies	Virgin Islands

Table Number	Agencies Covered	Location(s)
WG-8852, Aircraft Maintenance and Support		
A010	Air Force	Tucson, AZ
A011	Air Force	Little Rock, AR
A012	Air Force, Army, Navy	Fresno, CA
A014	Air Force	Sacramento, CA
A016	Air Force	San Bernardino–Riverside–Ontario, CA
A017	Navy	San Diego, CA
A018	Air Force	San Francisco, CA
A024	Air Force, Army	New Haven–Hartford, CT
A031	Air Force	Miami, FL
A040	Air Force, Army	Columbus, GA
A061	Air Force, Army, Navy	New Orleans, LA
A067	Air Force	Hagerstown–Martinsburg–Chambersburg, MD
A069	Air Force, Army	Central and Western MA
A076	Air Force, Army	Biloxi, MS
A087	Air Force	Portsmouth, NH
A094	Air Force, Army	New York, NY
A095	Air Force, Army	Northern NY
A124	Air Force	Memphis, TN
A135	Air Force	San Antonio, TX
A140	Air Force, Army, Navy	Norfolk–Portsmouth–Newport News–Hampton, VA
A223	Air Force	Southern CO
A269	Army	Central and Western MA
A535	Air Force, Army	San Antonio, TX
B025	Army	New London, CT
B066	Air Force	Baltimore, MD
B068	Air Force	Boston, MA
B118	Air Force, Army	Narragansett Bay, RI
B138	Air Force	Wichita Falls, TX–Southwestern OK
C022	Air Force, Army	Denver, CO
C027	Air Force, Army	Washington, DC
C222	Army	Denver, CO

SOURCES: DCPAS, undated; OPM, 2019e.

NOTES:

^a The section also covers the following occupations: 0018, Safety and Occupational Health Management; 301, Miscellaneous Administration and Program Management; 0340, Program Management; 0343, Management and Program Analyst; 0346, Logistics Management Specialist; 0861, Aerospace Engineer; 1601, Equipment, Facilities and Services; and 2101, Transportation Specialist.

^b The section also covers the following occupations: GS-0854, Computer Engineer; and GS-1550, Computer Science Specialist.

Appendix F. The Federal Aviation Administration Air Traffic Control Compensation System

In 1996 the Department of Transportation Appropriations Act gave the FAA the authority to create a personnel system that was not restricted to certain Title 5 provisions. Using these new flexibilities, the FAA developed six different pay plans based on its employees' job categories. The FAA developed the Air Traffic Compensation Plan to cover employees under the Air Traffic Control occupational series. The plan is not governed by the GS system, and utilizes a pay banding system that compensates employees based on their job category and level of responsibility (FAA, 2019). The pay banding system has nine levels, ranging from ATC Level 4 to ATC Level 12. Within the different grades, pay is determined by facility complexity, the level of training completed, and the air traffic at each facility. The lowest level in the pay system is compensated at roughly the same level of a GS-8 in the traditional federal system. As ATCs receive more training, or work in more complex facilities, the compensation gradually increases. At the highest levels of training and facility complexity, ATCs can earn more than the highest salary possible at the GS-15 level. ATC employees earn locality pay, and the pay rate is capped by law at the rate for Level II of the Executive Schedule, which is currently \$192,300 (Public Law 104-264). The pay rate for GS employees, however, may not exceed Level IV of the Executive Schedule for GS employees, which is currently \$166,500 (Executive Order No. 13866). In addition to the differences in salary, FAA ATCs are able to contribute more to their retirement. While FAA ATCs use the same FERS as personnel in the rest of the federal government, the ATCs' contribution is 4.9 percent, as opposed to the 4.4 percent found in the GS system.

There are three components within the Air Traffic Compensation Plan, with each component covering different types of air traffic employees. The first component covers air traffic control specialists and traffic management coordinators/specialists. These FAA employees conduct roles similar to those of Air Force air traffic control specialists. The next component covers air traffic managers, supervisors, and operations and support employees. These positions are in line with Air Force watch supervisors and senior controllers. The final component covers flight service specialists. Each of these components follows the same pay banding system, but the pay varies based on position. For instance, air traffic managers earn more than air traffic control specialists at the same level within the pay band.

Compensation for ATCs is also dependent on the type of facility they work in and the difficulty of their work in the facility. The FAA calculates a facility pay level (FPL) for each of its facilities, which calculates an adjustment of pay based on the difficulty and complexity of the work needed for the facility. The FPL is influenced by a number of factors, including the types of aircrafts that use the facilities, the proximity of other airports, the terrain, and whether or not the facility interacts with foreign countries. These factors, along with a measure of

how many aircraft use the facility (known as the Traffic Count Index), affect employees' compensation. Each facility is given an FPL, ranging from 4 to 12, and the higher the level, the more employees are paid. Basic pay for employees is increased by 6 percent for each level. If a facility's FPL increases, or an employee transfers to a facility with a higher level, compensation will increase. However, if the FPL decreases, or an employee transfers to a facility with a lower level, employees will retain the previous higher-level pay for two years from the date of the decrease. If the employee's basic pay exceeds the new maximum for pay at the facility, he or she will receive 50 percent of the annual increase as a lump-sum payment. The employee will also receive 50 percent of the annual increase as an adjustment to his or her basic pay (FAA, 2016).

The FAA's calculations for determining compensation are similar to the classification standard calculations for Air Force ATC positions. For the Air Force, grade levels are determined by the complexity of the control environment and the knowledge, skills, and abilities needed to effectively complete the duties of the job. Like the FAA's FPL, the Air Force determines the complexity of the facility based on air traffic density, the number of hourly instrument operations, and the number of radar positions that need to operate throughout the day. The more complex the radar terminal, the higher the grade level of the ATCs. GS-11 radar controllers work at the lowest level of terminal complexity, while GS-13 controllers work at the highest level (U.S. Air Force 88 Operations Support Squadron [OSS]/Operational Support Squadron Air Traffic Control [OSAT], 2006). As was noted in Chapter 6, however, Air Force representatives are concerned that current OPM classification standards do not accurately take into account the complexity of the operating environment in which Air Force ATCs work.

Along with basic pay and locality pay, air traffic employees are also eligible to receive premium and differential pay based on various guidelines. These employees earn cost-of-living allowances that depend on location. Employees also earn holiday and overtime premiums. FAA ATCs receive their base pay, along with an additional 50 percent for all overtime work. In addition, employees earn an additional 25 percent of their hourly rates for working on Sunday, and ATCs receive an additional rate of 10 percent of their hourly rates for working between 6:00 p.m. and 6:00 a.m. FAA ATCs are also eligible for hazardous duty pay, which is also true of the corresponding policy found in the GS system.

While Air Force ATCs receive all of these premium pay opportunities, there are several premium pay options that are unique to the FAA. Unlike the Air Force, the FAA provides an affordability differential, which is designed to offset issues related to commuting or the affordability of the location of the ATCs' workplace. The affordability differential is either 10 percent of the employee's base rate or the difference between the duty location's locality rate and the corresponding locality area as defined by the FAA, whichever is greater. The FAA also features Controller-in-Charge premium pay, wherein specialists earn an additional 10 percent for time spent assigned to supervisory duties when a supervisor is not available. Remote site pay is

another premium pay option unique to the FAA and is used for employees who are permanently assigned to certain stations identified by the FAA. These employees receive 10 percent of their base pay. FAA ATCs providing on-the-job training also receive an additional 10 percent. While the Air Force is allowed to give this premium pay to on-the-job training instructors, the payment is currently not officially authorized.

Appendix G. An Overview of Occupation-Specific Recommendations

In this appendix we provide an overview of each of the occupation-specific recommendations described in Chapters 5–9.

Aircraft Operations

What the Air Force Can Approach on Its Own

- **Ensure that installations are using all incentives available to them to recruit and retain talent.** Previous Air Force efforts examining incentive use show that incentives are employed inconsistently across installations. Ensuring that recruitment and relocation bonuses are used to the fullest may help alleviate some of these challenges. Along similar lines, the Air Force might consider establishing a central fund for payment of 3R incentives for MCOs at risk until their status improves. Designing and implementing a system that allows for the use of central funding might help to address the shortages that have resulted in an MCO being assessed as at risk of failure.
- **Explore the need for potential updates in special salary rates for certain locations.** Our analysis found that although the Air Force still pays at levels at or above private-sector pay for comparable experience groups, these private-sector pay increases have narrowed this gap. And for the most experienced pilots, the private sector now pays substantially more. However, there is significant regional variation in both the current level and recent growth in pay for airline pilots, indicating that local labor market conditions for this occupation must be explored. For example, at the time of this study, there was only one simulator instructors Special Salary Rate Table covering Laughlin AFB. There are other locations with simulator instructors, and the Air Force would benefit from a systematic review of all locations with these instructors to determine if special salary rate request packages should be submitted.
- **Update vacancy announcements to ensure that they are more applicant friendly and provide more specific and accurate information regarding compensation and benefits.** Requirements should be clearly defined instead of using boilerplate language or referring prospective applicants to review general OPM qualification standards to determine their qualifications for the position. Even open Air Force vacancy announcements that cover multiple positions and/or locations should provide more specific potential pay grades (e.g., GS-11 to GS-13) and associated salaries instead of listing the full pay grade range (e.g., GS-1 to GS-15) and the lowest possible starting salary.

What Requires Department of Defense Coordination

- **Continue to pursue coverage of simulator instructors under the Aircraft Operations occupational series, where they would be eligible for special salary rates.** At the time of this study, the Air Force was preparing a package proposing that OPM require coverage of simulator instructors under the Aircraft Operations series rather than the

General Education and Training series to help address the discrepancy. The Air Force should continue to pursue this approach.

- **Continuing to pursue changes to current OPM classification and qualification standards to better match the current operational environment and training platforms.** Current OPM classification standards were published in 1988 and do not reflect the current operating environment for pilots, which influences the potential pay grades associated with these positions. At the time of this study, the Air Force was in the process of writing a draft of proposed revisions to classification standards for submission to OPM to help address this issue. Additionally, at the time of this study, the Air Force had also already drafted a supplement to the OPM qualification standards recommending a reduction in the number of required flying hours, as well as inclusion of simulator time as flight hours. This can help broaden the pool of eligible talent for aircraft operations positions.

What Requires Legislation

- **Explore the potential implications of raising the pay cap for MCOs that require higher special salary rates.** Currently, 5 U.S.C. 5305(a) and 5 C.F.R. 530.304(a) set special salary rate pay limitations such that the minimum rate may not exceed 30 percent of the maximum rate for grade, and the maximum rate may not exceed Level IV of the Executive Schedule. In certain locations, this cap can significantly depress the ability to pay more as the GS grades increase.

Air Traffic Control

What the Air Force Can Approach on Its Own

- **Explore whether special salary rates need to be updated for certain localities.** Understanding that there is considerable variability across local labor markets, the Air Force should explore whether special salary rates need to be increased and respond accordingly to OPM's annual survey.
- **Update vacancy announcements to ensure that they are more applicant friendly and provide more specific and accurate information regarding compensation and benefits.** Follow the lead provided by the FAA on how it advertises its position vacancies. Requirements should be clearly defined instead of using boilerplate language or referring prospective applicants to review general OPM qualification standards to determine their qualifications for the position. Even open Air Force vacancy announcements that cover multiple positions and/or locations should provide more specific potential pay grades (e.g., GS-11 to GS-12) and associated salaries instead of listing the full pay grade range (e.g., GS-1 to GS-15) and the lowest possible starting salary. Describe compensation and benefits in an enticing manner to interest applicants. Emphasize the Air Force mission on the vacancy announcement and emphasize the importance of being a full member of the Air Force team.

What Requires Department of Defense Coordination

- **Develop a package to have OPM update its classification standard.** As noted in this chapter, the current OPM ATC standard was developed in 1977 and does not reflect the current complexity of Air Force ATC positions. As a result, this has implications for the grade level assigned to positions within this occupational series.

What Requires Legislation

- **Explore the potential implications of raising the salary pay cap.** Similar to the Aircraft Operations occupational series, current special salary rate pay limitations suppress the final pay for higher grades in certain locations, potentially making these positions less competitive. The Air Force may wish to explore the potential implications of raising the salary caps on recruiting and retention.
- **Explore the potential to receive the same pay authorities as the FAA.** While the FAA has the ability to pay more to its ATCs, the Air Force will be fighting to retain the staff needed to support its mission. Requesting and receiving statutory authority for pay parity in all areas—to include headquarters and staff personnel, premium pays, salaries, and a higher pay cap—can help the Air Force to recruit and retain the staff it needs to man its towers and train military ATCs (which is also part of a civilian Air Force ATC’s job).

Human Resources Management

What the Air Force Can Approach on Its Own

- In the Washington, D.C., area, where the majority of the FIRREA HR jobs are located, if the Air Force finds that personnel are leaving for the FIRREA agencies to receive higher pay, it could consider using retention incentives to retain its staff in the local area.
- Although it is beyond the scope of the current study, based on our interviews the Air Force may also wish to explore how it could modify the training and education of HR specialists to ensure that there are sufficient developmental opportunities for individuals, as well as strengthening the cohort across the Air Force in order to support an HR community that can contribute to the mission.
- Although there were no broad recruiting and retention issues currently identified for this occupation, in anticipation of upcoming potential challenges the Air Force should look to ensuring that installations will be aware of and prepared to use all available incentives to recruit and retain talent.
- The Air Force should also explore ways to update its vacancy announcements to ensure that they are more applicant friendly, provide specific information regarding compensation and benefits, and include language regarding the Air Force culture and mission to help differentiate the Air Force from other federal departments and agencies.

Information Management Technology

What the Air Force Can Approach on Its Own

- **Explore the need for special salary rate increases for certain locations and respond accordingly to OPM’s annual survey.** Our analysis found that Air Force civilian cybersecurity employees receive higher compensation than do similarly experienced private-sector cybersecurity specialists. However, there is substantial state- and LPA-level variation that needs to be taken into account to hire in local labor markets.
- **Update vacancy announcements to ensure that they are more applicant friendly and provide more specific and accurate information regarding compensation and benefits.** Position titles, descriptions, and requirements should be clearly defined instead

of using generic or boilerplate language. Open, continuous Air Force vacancy announcements that cover multiple positions and/or locations should provide more specific potential pay grades and associated salaries instead of listing the full pay grade range and the lowest possible starting salary. The Air Force may also benefit from including clear mission and culture statements to distinguish the type of work someone in the cybersecurity field can do compared with other jobs.

- **Explore options for providing an unclassified holding pen or temporary work for candidates who awaiting security clearances.** In order to expand the pool of potential candidates, the Air Force would benefit from finding ways for candidates who are awaiting security clearances to be given meaningful work until their clearances are available.
- **Expand data collection.** Collect data to see how often applicants find other jobs after tentative selection pending security clearances.

What Requires Department of Defense Coordination

- **Work with OPM to review and update both the classification standard and qualifications standards.** While the path to an IT position in the past has been a four-year degree, times and qualifications have changed and degrees may not be as important as languages and credentials.

Aircraft Mechanic

What the Air Force Can Approach on Its Own

- **Ensure that installations are using all incentives available to them to recruit and retain talent.** Air Force representatives indicated that positions located in sparsely populated areas are particularly hard to fill. Ensuring that recruitment and relocation incentives are used to the fullest may help alleviate some of these challenges. The Air Force might also consider establishing a central fund for payment of 3R incentives.
- **Educate and provide internal communications on what the Air Force can pay for as regards certification and vocational training.** There is clearly a lack of understanding about what the Air Force can and cannot pay for in terms of FWS employees. Specifying what training and certification reimbursement is authorized will help with recruitment and retention of aircraft mechanics.
- **Update vacancy announcements to ensure that they are more applicant friendly and provide more specific and accurate information regarding compensation and benefits.** Requirements should be clearly defined instead of using boilerplate language. Open, continuous Air Force vacancy announcements that cover multiple positions and/or locations should provide more specific potential pay grades and associated salaries instead of listing the full pay grade range (e.g., WG-1 to WG-15) and the lowest possible starting salary.
- **Add aircraft mechanics to the Air Force's list of MCOs.** Based on the information gathered during interviews, it is clear that there is difficulty recruiting and retaining aircraft mechanics. Placing this occupational series on the Air Force's MCO list will place additional emphasis on the needs of the occupation.

- **Collaborate with technical schools.** The Air Force should review the ongoing collaboration efforts between AFBs and technical schools to identify best practices, expand collaboration efforts, and provide a larger pool of qualified applicants.

What Requires Department of Defense Coordination

- **Explore the need to increase wages in select locations.** National-level statistics indicate that the Air Force's pay for civilian aircraft mechanics is lagging behind the substantial wage growth that private-sector aircraft mechanics are experiencing, but with substantial variation at the LPA level. The Air Force should explore the requirements of Title 5, C.F.R., Prevailing Rate Systems, and collaborate with the DCPAS to address these pay disparities.

References

- 123ATC, “Air Traffic Controller Salaries,” web database, undated. As of July 8, 2020:
<https://123atc.com/salary>
- AF/A1C—See U.S. Air Force Directorate of Civilian Force Management.
- AFPC—See U.S. Air Force Personnel Center.
- Air Force Association, “USAF Almanac 2018: Major Commands and Reserve Components,” *Air Force Magazine*, Vol. 101, No. 6, June 2018a, pp. 58–70.
- , “USAF Almanac 2018: The Air Force in Facts & Figures,” *Air Force Magazine*, Vol. 101, No. 6, June 2018b, pp. 36–56.
- Air Force Civilian Service, “About,” webpage, undated. As of September 17, 2019:
<https://www.afciviliancareers.com/about.php>
- Air Force Instruction 36-802, *Pay Setting*, Washington, D.C.: U.S. Department of the Air Force, July 24, 2012.
- American Student Assistance, “Young Workers and Student Debt Survey Report,” survey results, February 2017. As of August 26, 2019:
https://file.asa.org/wp-content/uploads/2018/08/14141823/asa_young_worker_and_student_debt_survey_report-1.pdf
- “Aviation Industry Urges Full Funding for Aviation Workforce Grant Programs,” letter to U.S. Secretary of Transportation and Director of the Office of Management and Budget, February 5, 2019. As of July 2, 2020:
<https://www.rotor.org/Portals/0/Advisory/AviationWorkforceGrantProgramChaoMulvaneyCoalitionLetter-20190205.pdf>
- BLS—See Bureau of Labor Statistics.
- Bulger, Adam, “What Are the Laws Around Paternity Leave and Family Leave in the U.S.?” *Fatherly*, May 9, 2019. As of September 11, 2019:
<https://www.fatherly.com/love-money/paternity-leave-laws-state-us/>
- Bureau of Labor Statistics, “Standard Occupational Classification,” webpage, undated. As of July 7, 2020:
<https://www.bls.gov/soc/>
- , “Occupational Employment Statistics: Occupational Employment and Wages, May 2016: 15-1122 Information Security Analysts,” webpage, May 2016. As of September 13, 2019:
<https://www.bls.gov/oes/2016/may/oes151122.htm>

- , “Employee Benefits Survey: Paid Holidays: Number of Days Provided,” webpage, March 2017a. As of August 7, 2019:
<https://www.bls.gov/ncs/ebs/benefits/2017/ownership/private/table33a.htm>
- , “Employee Benefits Survey: Paid Sick Leave: Number of Annual Days by Service Requirement,” webpage, March 2017b. As of August 7, 2019:
<https://www.bls.gov/ncs/ebs/benefits/2017/ownership/private/table35a.htm>
- , “Employee Benefits Survey: Paid Vacations: Number of Annual Days by Service Requirement,” webpage, March 2017c. As of August 7, 2019:
<https://www.bls.gov/ncs/ebs/benefits/2017/ownership/private/table38a.htm>
- , “Occupational Employment Statistics: Occupational Employment and Wages, May 2017: 13-1071 Human Resources Specialists,” webpage, May 2017d. As of September 13, 2019:
<https://www.bls.gov/oes/2017/may/oes131071.htm>
- , “Occupational Employment Statistics: Occupational Employment and Wages, May 2017: 13-1075 Labor Relations Specialists,” webpage, May 2017e. As of September 13, 2019:
<https://www.bls.gov/oes/2017/may/oes131075.htm>
- , “Occupational Employment Statistics: Occupational Employment and Wages, May 2017: 15-1111 Computer and Information Research Scientists,” webpage, May 2017f. As of September 13, 2019:
<https://www.bls.gov/oes/2017/may/oes151111.htm>
- , “Occupational Employment Statistics: Occupational Employment and Wages, May 2017: 53-2021 Air Traffic Controllers,” webpage, May 2017g. As of September 13, 2019:
<https://www.bls.gov/oes/2017/may/oes532021.htm>
- , “Occupational Employment Statistics: Occupational Employment and Wages, May 2018: 15-1121 Computer Systems Analysts,” webpage, May 2018a. As of September 13, 2019:
<https://www.bls.gov/oes/current/oes151121.htm>
- , “Occupational Employment Statistics: Occupational Employment and Wages, May 2018: 49-3011 Aircraft Mechanics and Service Technicians,” webpage, May 2018b. As of September 13, 2019:
<https://www.bls.gov/oes/current/oes493011.htm>
- , “Occupational Employment Statistics: Occupational Employment and Wages, May 2018: 53-2011 Airline Pilots, Copilots, and Flight Engineers,” webpage, May 2018c. As of September 6, 2019:
<https://www.bls.gov/oes/current/oes532011.htm>

- , “Employee Benefits in the United States—March 2018,” news release, July 20, 2018d. As of August 26, 2019:
<https://www.bls.gov/news.release/pdf/ebs2.pdf>
- , “National Compensation Survey: Employee Benefits in the United States, March 2019,” Bulletin 2791, September 2019. As of December 19, 2019:
<https://www.bls.gov/ncs/ebs/benefits/2019/employee-benefits-in-the-united-states-march-2019.pdf>
- Business & Legal Resources, “Holidays: What You Need to Know,” webpage, undated. As of August 3, 2019:
<https://www.blr.com/Compensation/Benefits-Leave/Holidays>
- Claxton, Gary, Matthew Rae, Michelle Long, Anthony Damico, Bradley Sawyer, Gregory Foster, Heidi Whitmore, and Lindsey Schapiro, *Employer Health Benefits: 2016 Annual Survey*, Menlo Park, Calif., and Chicago: Kaiser Family Foundation and Health Research & Educational Trust, September 14, 2016. As of September 12, 2019:
<http://files.kff.org/attachment/Report-Employer-Health-Benefits-2016-Annual-Survey>
- Cobert, Beth F., “Guidance on Recruitment, Relocation, and Retention Incentives,” memorandum for chief human capital officers, Washington, D.C.: U.S. Office of Personnel Management, January 15, 2016a. As of September 9, 2019:
<https://www.chcoc.gov/content/guidance-recruitment-relocation-and-retention-incentives>
- , “Closing Skills Gaps: Strategy, Reporting and Monitoring,” memorandum for chief human capital officers, Washington, D.C.: U.S. Office of Personnel Management, April 15, 2016b. As of June 30, 2019:
<https://www.chcoc.gov/content/closing-skills-gaps-strategy-reporting-and-monitoring>
- , “Mission Critical Occupation Resource Charts Guidance and Submission Instructions,” memorandum for chief human capital officers, Washington, D.C.: U.S. Office of Personnel Management, September 6, 2016c. As of June 30, 2019:
<https://chcoc.gov/content/mission-critical-occupation-resource-charts-guidance-and-submission-instructions>
- , “Compensation Guidance for Recruiting and Retaining Cybersecurity Professionals,” memorandum for chief human capital officers, Washington, D.C.: U.S. Office of Personnel Management, November 29, 2016d. As of September 9, 2019:
<https://www.chcoc.gov/content/compensation-guidance-recruiting-and-retaining-cybersecurity-professionals>
- Code of Federal Regulations Title 5, Section 530.201, Purpose, May 13, 2005.
- Title 5, Section 575.310, Service Agreement Requirements, May 13, 2005.

Cole, William Todd, *Evaluation of the Legacy Science and Technology Reinvention Laboratories*, Washington, D.C.: Defense Civilian Personnel Advisory Service, 2012.

Congressional Budget Office, “Measuring Differences Between Federal and Private Pay,” working paper, Washington, D.C.: Congressional Budget Office, November 2002. As of August 7, 2019:
<https://www.cbo.gov/sites/default/files/107th-congress-2001-2002/reports/11-22-paydifferences.pdf>

———, *Comparing the Compensation of Federal and Private-Sector Employees, 2011–2015*, Washington, D.C.: Congressional Budget Office, April 2017. As of August 7, 2019:
<https://www.cbo.gov/system/files/115th-congress-2017-2018/reports/52637-federal-privatepay.pdf>

Control and Reporting Center, “Bullet Background Paper on Civilian Air Traffic Control Pay & Administrative Discrepancies,” working paper, Washington D.C.: U.S. Air Force, October 13, 2017.

Cournoyer, Caroline, “How Public Employee Benefits (Beyond Pensions and Health Care) Compare to Private Sector’s,” *Governing.com*, October 8, 2018. As of August 1, 2019:
<https://www.governing.com/topics/workforce/gov-private-versus-public-sector-employee-benefits.html>

DCPAS—*See* Defense Civilian Personnel Advisory Service.

Defense Civilian Personnel Advisory Service, “Federal Wage System (FWS) Special Salary Rate Schedules,” web database, undated. As of September 18, 2019:
<https://www.dcpas.osd.mil/BWN/FWSSpecialSchedules>

———, “Workforce Planning Advisory Group: MCO Determination & Revalidation Process,” internal briefing, February 21, 2019.

Department of Defense Instruction 1400.25, Volume 2006, *DoD Civilian Personnel Management System: DCIPS Compensation Administration*, Washington, D.C.: U.S. Department of Defense, March 3, 2012.

DoD—*See* U.S. Department of Defense.

Executive Order No. 13866, Adjustments of Certain Rates of Pay, March 28, 2019.

FAA—*See* Federal Aviation Administration.

Federal Aviation Administration, *Agreement Between the National Air Traffic Controllers Association AFL-CIO and the Federal Aviation Administration U.S. Department of Transportation*, Washington, D.C.: Federal Aviation Administration, July 2016.

———, “Pay & Benefits,” webpage, April 6, 2019. As of September 11, 2019:

https://www.faa.gov/jobs/working_here/benefits/

Federal Salary Council, “Level of Comparability Payments for January 2020 and Other Matters Pertaining to the Locality Pay Program,” memorandum, Washington, D.C., May 2, 2019. As of July 2, 2020:

<https://www.opm.gov/policy-data-oversight/pay-leave/pay-systems/general-schedule/federal-salary-council/recommendation18.pdf>

Ferrante, Mary Beth, “The Problem with 25% of Working Mother 100 Best Companies,”

Forbes, October 30, 2018. As of September 13, 2019:

<https://www.forbes.com/sites/marybethferrante/2018/10/30/the-problem-with-25-of-working-mother-100-best-companies/#18127c533134>

Frohlich, Thomas C., “7 Companies with Unlimited Vacation,” *USA Today*, December 19, 2015.

As of September 13, 2019:

<https://www.usatoday.com/story/money/business/2015/12/19/24-7-wall-st-companies-unlimited-vacation/77422898/>

FSC—See Federal Salary Council.

GAO—See U.S. Government Accountability Office.

Glassdoor, “20 Companies Offering Unlimited PTO,” January 17, 2020. As of April 29, 2020:

<https://www.glassdoor.com/blog/cool-companies-offering-unlimited-vacation/>

Go Government, “Federal Health, Retirement and Other Benefits,” webpage, undated. As of June 12, 2019:

<https://gogovernment.org/federal-health-retirement-and-other-benefits/>

Guo, Christopher, Philip Hall-Partyka, Susan M. Gates, *Retention and Promotion of High-Quality Civil Service Workers in the Department of Defense Acquisition Workforce*, Santa Monica, Calif.: RAND Corporation, RR 748, 2014. As of August 24, 2020:

https://www.rand.org/pubs/research_reports/RR748.html

Hardison, Chaitra M., Leslie Adrienne Payne, John A. Hamm, Angela Clague, Jacqueline Torres, David Schulker, and John S. Crown, *Attracting, Recruiting, and Retaining Successful Cyberspace Operations Officers: Cyber Workforce Interview Findings*, Santa Monica, Calif.: RAND Corporation, RR-2618-AF, 2019. As of August 15, 2019:

https://www.rand.org/pubs/research_reports/RR2618.html

Hosek, James, Beth J. Asch, Michael G. Mattock, and Troy D. Smith, *Military and Civilian Pay Levels, Trends, and Recruit Quality*, Santa Monica, Calif.: RAND Corporation, RR-2396-OSD, 2018. As of June 19, 2020:

https://www.rand.org/pubs/research_reports/RR2396.html

- Internal Revenue Service, “Tax Reform Brings Changes to Qualified Moving Expenses,” December 12, 2018. As of September 9, 2019:
<https://www.irs.gov/newsroom/tax-reform-brings-changes-to-qualified-moving-expenses>
- Kelly, Brian, “Air Force Working with OPM to Hire Civilians Faster,” interview with Scott Maucione, Federal News Network, June 25, 2018. As of September 13, 2019:
<https://federalnewsnetwork.com/dod-personnel-notebook/2018/06/air-force-working-with-opm-to-hire-civilians-faster/>
- Lebow, David, E., Raven E. Saks, and Beth Anne Wilson, “Downward Nominal Wage Rigidity: Evidence from the Employment Cost Index,” Finance and Economics Discussion Series Working Paper 99-31, Washington, D.C.: Federal Reserve, 1999.
- Lewis, Jennifer Lamping, Laura Werber, Cameron Wright, Irina Elena Danescu, Jessica Hwang, and Lindsay Daugherty, *2016 Assessment of the Civilian Acquisition Workforce Personnel Demonstration Project*, Santa Monica, Calif.: RAND Corporation, RR-1783-OSD, 2017. As of August 22, 2019:
https://www.rand.org/pubs/research_reports/RR1783.html
- Losey, Stephen, “Go Cyber: Airmen Can Earn Cash and Promotions, Get Set Up for Civilian Life,” *Air Force Times*, October 10, 2017. As of September 16, 2019:
<https://www.airforcetimes.com/news/your-air-force/2017/10/10/go-cyber-airmen-can-earn-cash-and-promotions-get-set-up-for-civilian-life/>
- , “Fewer Planes Are Ready to Fly: Air Force Mission-Capable Rates Decline amid Pilot Crisis,” *Air Force Times*, March 5, 2018. As of August 30, 2019:
<https://www.airforcetimes.com/news/your-air-force/2018/03/05/fewer-planes-are-ready-to-fly-air-force-mission-capable-rates-decline-amid-pilot-crisis/>
- Lotze, Kristen, “10 Tech Companies with Generous Parental Leave Benefits,” TechRepublic, February 15, 2019. As of September 13, 2019:
<https://www.techrepublic.com/article/10-tech-companies-with-generous-parental-leave-benefits/>
- Mattock, Michael G., James Hosek, Beth J. Asch, and Rita Karam, *Retaining U.S. Air Force Pilots When the Civilian Demand for Pilots Is Growing*, Santa Monica, Calif.: RAND Corporation, RR-1455-AF, 2016. As of August 2, 2020:
https://www.rand.org/pubs/research_reports/RR1455.html
- Mattock, Michael G., Beth J. Asch, James Hosek, and Michael Boito, *The Relative Cost-Effectiveness of Retaining Versus Accessing Air Force Pilots*, Santa Monica, Calif.: RAND Corporation, RR-2415-AF, 2019. As of August 30, 2019:
https://www.rand.org/pubs/research_reports/RR2415.html

- Montoya, Silvia, and John D. Graham, *Modernizing the Federal Government: Paying for Performance*, Santa Monica, Calif.: RAND Corporation, OP-213-PV/EMR, 2007. As of September 11, 2019:
https://www.rand.org/pubs/occasional_papers/OP213.html
- Nagele-Piazza, Lisa, “Paid-Sick-Leave Laws Continue to Give Employers Headaches,” Society for Human Resource Management, April 15, 2019. As of September 11, 2019:
<https://www.shrm.org/resourcesandtools/legal-and-compliance/state-and-local-updates/pages/paid-sick-leave-laws-continue-to-give-employers-headaches.aspx>
- National Credit Union Association, “Pay and Benefits,” webpage, January 29, 2018. As of July 2, 2020:
<https://www.ncua.gov/about-ncua/careers/pay-benefits>
- Newhouse, William, Stephanie Keith, Benjamin Scribner, and Greg Witte, *National Initiative for Cybersecurity Education (NICE), Cybersecurity Workforce Framework*, Washington, D.C.: National Institute of Standards and Technology, U.S. Department of Commerce, NIST Special Publication 800-181, August 2017. As of July 2, 2020:
<https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-181.pdf>
- OPM—See U.S. Office of Personnel Management.
- Pawlyk, Oriana, “Air Force F-16s Fly the Most Sorties Against ISIS, B-1s Drop Most Bombs,” *Air Force Times*, March 24, 2016. As of August 30, 2019:
<https://www.airforcetimes.com/news/your-air-force/2016/03/24/air-force-f-16s-fly-the-most-sorties-against-isis-b-1s-drop-most-bombs/>
- President’s Pay Agent, *Report on Locality-Based Comparability Payments for the General Schedule: Annual Report of the President’s Pay Agent for Locality Pay in 2019*, Washington, D.C.: The President’s Pay Agent, November 30, 2018. As of September 13, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/pay-systems/general-schedule/pay-agent-reports/2017report.pdf>
- Public Law 92-392, Federal Wage System, August 17, 1972.
- Public Law 101-509, Federal Employees Pay Comparability Act of 1990, Subchapter 9, Special Occupational Pay Systems, Section 5753(b), Recruitment and Retention Bonuses, November 5, 1990.
- Public Law 103-337, Subpart 2181, National Defense Authorization Act for Fiscal Year 1995, Subtitle E, Civilian Employees, Section 342(b), Defense Laboratories Personnel Demonstration Projects, October 5, 1994.
- Public Law 104-264, Federal Aviation Reauthorization Act of 1996, Subtitle II, FAA Reform, Section 253(c), Federal Aviation Administration Personnel Management System, October 9, 1996.

Public Law 109-163, National Defense Authorization Act for Fiscal Year 2006, S.1790, January 6, 2006.

Public Law 116-92, National Defense Authorization Act for Fiscal Year 2020, S.1790, December 20, 2019.

Risher, Howard, “The GS System Fails in Today’s Labor Markets,” *Government Executive*, February 5, 2019a. As of September 13, 2019:
<https://www.govexec.com/management/2019/02/gs-system-fails-todays-labor-markets/154649/>

———, “How the GS System Fails Federal Workers and Everyone Else,” *Government Executive*, February 26, 2019b. As of September 13, 2019:
<https://www.govexec.com/management/2019/02/how-gs-system-fails-federal-workers-and-everyone-else/155141/>

Robbert, Albert A., Anthony D. Rosello, C. R. Anderegg, John A. Ausink, James H. Bigelow, William W. Taylor, and James Pita, *Reducing Air Force Fighter Pilot Shortages*, Santa Monica, Calif.: RAND Corporation, RR-1113-AF, 2015. As of August 30, 2019:
https://www.rand.org/pubs/research_reports/RR1113.html

Salomon, Richard, “180-Day Civilian Hiring Restriction Reinstated for Military Retirees,” U.S. Air Force Personnel Center, March 7, 2017. As of August 30, 2019:
<https://www.afpc.af.mil/News/Article-Display/Article/1105235/180-day-civilian-hiring-restriction-reinstated-for-military-retirees/>

Schulker, David, and Tara L. Terry, *Evaluating the Impact of a Total Force Service Commitment Policy on Air Force Pilot Manning: An Exploratory Application of Inventory Modeling*, Santa Monica, Calif.: RAND Corporation, RR-2400-AF, 2018. As of August 30, 2019:
https://www.rand.org/pubs/research_reports/RR2400.html

SHRM—See Society for Human Resource Management.

Society for Human Resource Management, *SHRM Survey Findings: 2017 Holiday Schedules*, Alexandria, Va.: Society for Human Resource Management, October 17, 2016. As of August 3, 2019:
<https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/SHRM-Survey-Findings-2017-Holiday-Schedules.pdf>

———, *2017 Employee Benefits: Remaining Competitive in a Challenging Talent Marketplace*, Alexandria, Va.: Society for Human Resource Management, June 19, 2017. As of August 15, 2019:
<https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/2017%20Employee%20Benefits%20Report.pdf>

- , *SHRM Employee Benefits 2019: Family-Friendly and Wellness*, Alexandria, Va.: Society for Human Resource Management, June 2019a. As of August 15, 2019:
<https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/SHRM%20Employee%20Benefits%202019%20Family%20Friendly%20and%20Wellness.pdf>
- , *Healthcare and Health Services: SHRM Employee Benefits 2019*, Alexandria, Va.: Society for Human Resource Management, June 2019b. As of August 15, 2019:
<https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/SHRM%20Employee%20Benefits%202019%20Healthcare%20and%20Health%20Services.pdf>
- , *Investment and Retirement: SHRM Employee Benefits 2019*, Alexandria, Va.: Society for Human Resource Management, June 2019c. As of August 26, 2019:
<https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/SHRM%20Employee%20Benefits%202019%20Investment%20and%20Retirement.pdf>
- , *Leave and Flexible Working: SHRM Employee Benefits 2019*, Alexandria, Va.: Society for Human Resource Management, June 2019d. As of August 26, 2019:
<https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/SHRM%20Employee%20Benefits%202019%20Leave%20and%20Flexible%20Working.pdf>
- , *Programs and Services: SHRM Employee Benefits 2019*, Alexandria, Va.: Society for Human Resource Management, June 2019e. As of August 26, 2019:
<https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/SHRM%20Employee%20Benefits%202019%20Programs%20and%20Services.pdf>
- Stoltzfus, Eli R., “Access to Dependent Care Reimbursement Accounts and Workplace-Funded Childcare,” *Beyond the Numbers: Pay and Benefits*, Vol. 4, No. 1, Washington, D.C.: U.S. Bureau of Labor Statistics, January 2015. As of September 12, 2019:
<https://www.bls.gov/opub/btn/volume-4/pdf/access-to-dependent-care-reimbursement-accounts-and-workplace-funded-childcare.pdf>
- Thrift Savings Plan, “Types of Contributions,” webpage, undated. As of August 2, 2019:
<https://www.tsp.gov/PlanParticipation/EligibilityAndContributions/typesOfContributions.html>
- Tian, Gloria, “The Best Industries for Benefits: An Analysis of Glassdoor Benefits Reviews,” Glassdoor, May 12, 2016. As of August 2, 2019:
<https://www.glassdoor.com/research/studies/best-industries-for-benefits/>
- TSP—See Thrift Savings Plan.
- U.S. Air Force, “815 Recruitment Incentives,” form, Job Aid 127, November 30, 2015a.
- , “816 Relocation Incentives,” form, Job Aid 128, November 30, 2015b.
- , “827 Retention Incentives,” form, Job Aid 129, September 25, 2018a.

U.S. Air Force 88 Operations Support Squadron/Operational Support Squadron Air Traffic Control (OSS/OSAT), “Air Force Standard Core Personnel Document,” job announcement for air traffic control specialist, April 26, 2006.

U.S. Air Force Directorate of Civilian Force Management, “Waiver Request for the Office of Personnel Management (OPM) Qualification Standard Aircraft Operations Series, 2181,” memorandum for Defense Civilian Personnel Advisory Service, Washington, D.C., January 4, 2019a.

———, “Mission Critical Occupations,” internal briefing, Washington, D.C., January 31, 2019b.

U.S. Air Force Flight Standards Agency, “USAF Air Traffic Controller (2152) Brief,” Washington, D.C., December 10, 2018.

U.S. Air Force Manpower and Reserve Affairs, “Use of Direct and Expedite Hiring Authorities,” memorandum for Major Command commanders, Washington, D.C., March 27, 2018.

U.S. Air Force Personnel Center, “Student Loan Repayment Program Tax Exemption,” personnel legislation proposal, Universal City, Tex., undated.

———, “Air Force’s Personnel Center,” webpage, last updated June 2017. As of September 11, 2019:
<https://www.afpc.af.mil/About/>

———, “Foundations of Federal Hiring,” internal briefing, Universal City, Tex., March 13, 2018b.

———, “GS-2181 Challenges,” internal briefing, Universal City, Tex., March 13, 2018c.

———, “Bullet Background Paper on Updated Office Personnel Management (OPM) GS-2181 Classification Standards,” draft, Universal City, Tex., June 28, 2018d.

———, “Bullet Background Paper on Civilian Pilot Hiring Challenges,” Universal City, Tex., October 1, 2018e.

———, “Bullet Background Paper on Civilian Aircraft Maintenance Hiring Challenges,” Universal City, Tex., November 2, 2018f.

U.S. Code, Title 5, Section 5303, Annual Adjustments to Pay Schedules, November 5, 1990.

———, Title 5, Section 5305, Special Pay Authority, January 3, 2012.

———, Title 5, Section 5754, Retention Bonuses, December 16, 2016.

———, Title 5, Section 6103, Holidays, January 16, 1996.

———, Title 10, Section 1762, Demonstration Project Relating to Certain Acquisition Personnel Management Policies and Procedures, January 2011, amended 2015.

U.S. Congress, National Defense Authorization Act for Fiscal Year 2017, December 23, 2016.

- U.S. Department of Defense, “Fourth Estate Management Office Directorate,” webpage, undated. As of July 2, 2020:
<https://cmo.defense.gov/About-CMO/Organization/Fourth-Estate-Management/>
- , *FY 2006 Performance and Accountability Report*, Washington, D.C.: U.S. Department of Defense, November 15, 2006. As of May 3, 2019:
[https://comptroller.defense.gov/Portals/45/Documents/afr/fy2006/Entire_Document_\(7.8_MB\).pdf](https://comptroller.defense.gov/Portals/45/Documents/afr/fy2006/Entire_Document_(7.8_MB).pdf)
- , *Cyber Operations Personnel Report*, Washington, D.C.: U.S. Department of Defense, April 2011. As of June 30, 2019:
<https://www.nsci-va.org/CyberReferenceLib/2011-04-Cyber%20Ops%20Personnel.pdf>
- , *FY 2018–FY 2022 National Defense Business Operations Plan*, Washington, D.C.: U.S. Department of Defense, April 9, 2018a. As of September 9, 2019:
[https://cmo.defense.gov/Portals/47/Documents/Publications/NBDOP/TAB%20A%20FY18-22%20NDBOP%20\(CMO%20signed%2005_18_18\).pdf?ver=2018-05-25-131454-700](https://cmo.defense.gov/Portals/47/Documents/Publications/NBDOP/TAB%20A%20FY18-22%20NDBOP%20(CMO%20signed%2005_18_18).pdf?ver=2018-05-25-131454-700)
- , *FY 2018–FY 2019 Department of Defense Civilian Human Capital Operating Plan*, Washington, D.C.: U.S. Department of Defense, June 2018b. As of September 9, 2019:
<https://www.dcpas.osd.mil/Content/documents/PA/DoDCivilianHumanCapitalOperatingPlan31Jul18.pdf>
- U.S. Department of Labor, “Family and Medical Leave (FMLA),” webpage, undated. As of July 2, 2020:
<https://www.dol.gov/general/topic/benefits-leave/fmla>
- , “Fact Sheet #28: The Family and Medical Leave Act,” 2012. As of December 19, 2019:
<https://www.dol.gov/sites/dolgov/files/WHD/legacy/files/whdfs28.pdf>
- U.S. Department of Labor, Office of Workers’ Compensation Programs, “Division of Federal Employees’ Compensation,” webpage, undated. As of December 21, 2019:
<https://www.dol.gov/owcp/dfec/regs/compliance/ca-11.htm>
- U.S. General Services Administration, Federal Travel Regulation, Subchapter C—Permanent Change of Station (PCS) Allowances for Subsistence and Transportation Expenses Part 302-4—Allowances for Subsistence and Transportation, Section 302-4.1, What Is a Permanent Change of Station (PCS)? undated. As of December 22, 2019:
<https://www.gsa.gov/policy-regulations/regulations/federal-travel-regulation-fttr/i1186607>
- U.S. Government Accountability Office, *The Department of Defense’s Civilian Human Capital Strategic Plan Does Not Meet Most Statutory Requirements*, Washington, D.C.: U.S. Government Accountability Office, GAO-08-439R, February 6, 2008. As of September 6, 2019:
<https://www.gao.gov/new.items/d08439r.pdf>

- , *Human Capital: DOD Should Fully Develop Its Civilian Strategic Workforce Plan to Aid Decision Makers*, Washington, D.C.: U.S. Government Accountability Office, GAO-14-565, July 9, 2014a. As of September 4, 2019:
<https://www.gao.gov/assets/670/664697.pdf>
- , *Human Capital: OPM Needs to Improve the Design, Management, and Oversight of the Federal Classification System*, Washington, D.C.: U.S. Government Accountability Office, GAO-14-667, July 31, 2014b. As of September 13, 2019:
<https://www.gao.gov/assets/670/665200.pdf>
- , *Federal Workforce: OPM and Agencies Need to Strengthen Efforts to Identify and Close Mission-Critical Skills Gaps*, Washington, D.C.: U.S. Government Accountability Office, GAO-15-223, January 30, 2015. As of September 4, 2019:
<https://www.gao.gov/assets/670/668202.pdf>
- , *Federal Hiring: OPM Needs to Improve Management and Oversight of Hiring Authorities*, Washington, D.C.: U.S. Government Accountability Office, GAO-16-521, August 2, 2016. As of June 30, 2019:
<https://www.gao.gov/assets/680/678814.pdf>
- , *Progress on Many High-Risk Areas, While Substantial Efforts Needed on Others*, Washington, D.C.: U.S. Government Accountability Office, GAO-17-375T, February 15, 2017a. As of June 30, 2019:
<https://www.gao.gov/assets/690/682765.pdf>
- , *Federal Pay: Opportunities Exist to Enhance Strategic Use of Special Payments*, Washington, D.C.: U.S. Government Accountability Office, GAO-18-91, December 14, 2017b. As of July 2, 2020:
<https://www.gao.gov/assets/690/688867.pdf>
- U.S. House of Representatives, *Human Capital Management: A High Risk Area for the Department of Defense: Hearing Before the Committee on Armed Services*, Washington, D.C.: U.S. Government Printing Office, July 14, 2011. As of September 13, 2019:
<https://www.govinfo.gov/content/pkg/CHRG-112hhrg68159/html/CHRG-112hhrg68159.htm>
- U.S. Office of Personnel Management, “Aircraft Operation Series, 2181: Individual Occupational Requirements,” webpage, undated a. As of July 7, 2020:
<https://www.opm.gov/policy-data-oversight/classification-qualifications/general-schedule-qualification-standards/2100/aircraft-operation-series-2181/>
- , “Child Care & Parenting,” webpage, undated b. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/worklife/dependent-care/#url=Child-Care-Parenting>

- , “Elder & Adult Dependent Care,” webpage, undated c. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/worklife/dependent-care/#url=Elder-Adult-Dependent-Care>
- , “Employee Assistance Programs: Overview,” webpage, undated d. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/worklife/employee-assistance-programs/>
- , “Fact Sheet: Definitions Related to Family Member and Immediate Relative for Purposes of Sick Leave, Funeral Leave, Voluntary Leave Transfer, Voluntary Leave Bank, and Emergency Leave Transfer,” webpage, undated e. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/leave-administration/fact-sheets/definitions-related-to-family-member-and-immediate-relative-for-purposes-of-sick-leave/>
- , “Fact Sheet: Lump-Sum Payment for Annual Leave,” webpage, undated f. As of November 18, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/leave-administration/fact-sheets/lump-sum-payments-for-annual-leave/>
- , “Fact Sheet: Sick Leave for Adoption,” webpage, undated g. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/leave-administration/fact-sheets/sick-leave-for-adoption/>
- , “Fact Sheet: Sick Leave for Family Care or Bereavement Purposes,” webpage, undated h. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/leave-administration/fact-sheets/sick-leave-for-family-care-or-bereavement-purposes/>
- , “Fact Sheet: Sick Leave (General Information),” webpage, undated i. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/leave-administration/fact-sheets/sick-leave-general-information/>
- , “Fact Sheet: Voluntary Leave Bank Program,” webpage, undated j. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/leave-administration/fact-sheets/voluntary-leave-bank-program/>
- , “Fact Sheet: Voluntary Leave Transfer Program,” webpage, undated k. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/leave-administration/fact-sheets/voluntary-leave-transfer-program/>
- , “Fact Sheet: Annual Leave (General Information),” webpage, undated l. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/leave-administration/#url=Fact-Sheets>

- , “FEHB Handbook,” webpage, undated m. As of August 7, 2019:
<https://www.opm.gov/healthcare-insurance/healthcare/reference-materials/fehb-handbook/>
- , “FERS Information,” webpage, undated n. As of June 12, 2019:
<https://www.opm.gov/retirement-services/fers-information/>
- , “Flexible Spending Accounts,” webpage, undated o. As of June 12, 2019:
<https://www.opm.gov/healthcare-insurance/flexible-spending-accounts/>
- , “General Schedule Overview,” webpage, undated p. As of January 5, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/pay-systems/general-schedule/>
- , “GS-2210: Information Technology Management Series,” webpage, undated q. As of September 10, 2019:
<https://www.opm.gov/policy-data-oversight/classification-qualifications/general-schedule-qualification-standards/0300/gs-2210-information-technology-management-series/>
- , “Handbook on Alternative Work Schedules: Compressed Work Schedules,” webpage, undated r. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/reference-materials/handbooks/alternative-work-schedules/#Comp>
- , “Handbook on Alternative Work Schedules: Flexible Work Schedules (FWS),” webpage, undated s. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/reference-materials/handbooks/alternative-work-schedules/#Flex>
- , “Handbook on Alternative Work Schedules: Introduction,” webpage, undated t. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/reference-materials/handbooks/alternative-work-schedules>
- , “Healthcare,” webpage, undated u. As of June 12, 2019:
<https://www.opm.gov/healthcare-insurance/healthcare/>
- , “Healthcare & Insurance,” undated v. As of September 1, 2020:
<https://www.opm.gov/healthcare-insurance/healthcare/reference-materials/reference/eligibility-for-health-benefits/>
- , “Internship Program,” webpage, undated w. As of September 10, 2019:
<https://www.opm.gov/policy-data-oversight/hiring-information/students-recent-graduates/#intern>
- , “Life Insurance,” webpage, undated x. As of June 12, 2019:
<https://www.opm.gov/healthcare-insurance/life-insurance/>

- , “Life Insurance,” webpage, undated y. As of September 1, 2020:
<https://www.opm.gov/healthcare-insurance/life-insurance/reference-materials/publications-forms/feglihandbook.pdf>
- , “Long Term Care,” webpage, undated z. As of June 12, 2019:
<https://www.opm.gov/healthcare-insurance/long-term-care>
- , “Overview: Family & Dependent Care,” webpage, undated aa. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/worklife/dependent-care/#url=Overview>
- , “Special Rates Requests,” webpage, undated ab. As of August 30, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/pay-systems/special-rates-requests/>
- , “Special Salary Rate Request Form: OPM Form 1397,” PDF, undated ac. As of September 10, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/pay-systems/special-rates-requests/opm1397.pdf>
- , “Special Rate Table Number 0565, Effective Date: First Day of the Applicable Pay Period Beginning After 01/01/2019,” webpage, undated ad. As of September 16, 2020:
<https://apps.opm.gov/SpecialRates/2019/table056501012019.aspx>
- , “Special Rate Table Number 0566, Effective Date: First Day of the Applicable Pay Period Beginning After 01/01/2019,” webpage, undated ae. As of September 16, 2020:
<https://apps.opm.gov/SpecialRates/2019/table056601012019.aspx>
- , “Special Rate Table Number 0759, Effective Date: First Day of the Applicable Pay Period Beginning After 01/01/2019,” webpage, undated af. As of September 16, 2020:
<https://apps.opm.gov/SpecialRates/2019/table075901012019.aspx>
- , “Special Rate Table Number 0767, Effective Date: First Day of the Applicable Pay Period Beginning After 01/01/2019,” webpage, undated ag. As of September 16, 2020:
<https://apps.opm.gov/SpecialRates/2019/Table076701012019.aspx>
- , “Special Rate Table Number 0769, Effective Date: First Day of the Applicable Pay Period Beginning After 01/01/2019,” webpage, undated ah. As of September 16, 2020:
<https://apps.opm.gov/SpecialRates/2019/table076901012019.aspx>
- , “Student Loan Repayment: Best Practices and Lessons Learned,” webpage, undated ai. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/student-loan-repayment/#url=Best-Practices>
- , “Student Loan Repayment: Overview,” webpage, undated aj. As of June 12, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/student-loan-repayment/>

- , “Student & Recent Graduate Hiring,” webpage, undated ak. As of September 10, 2019:
<https://www.opm.gov/about-us/careers-at-opm/students-recent-graduates/>
- , “Subchapter S8: Pay Administration,” in *Appropriated Funds Operating Manual*, Washington, D.C.: U.S. Office of Personnel Management, undated al. As of September 10, 2019:
<https://www.opm.gov/policy-data-oversight/pay-leave/pay-systems/federal-wage-system/appropriated-fund-operating-manual/subchapter8.pdf>
- , “Talent Development Glossary: Mission-Critical Occupations,” webpage, undated am. As of September 10, 2019:
<https://www.opm.gov/wiki/training/Talent-Development-Glossary.ashx#M>
- , “The Federal Flexible Spending Account Program (FSAFEDS): Flexible Spending Accounts,” flyer, undated an. As of June 12, 2019:
<https://www.opm.gov/healthcare-insurance/flyers/flexible-spending-account-overview.pdf>
- , *Position Classification Standard for Air Traffic Control Series, GS-2152*, Washington, D.C.: U.S. Office of Personnel Management, TS-31, June 1978. As of August 30, 2019:
<https://www.opm.gov/policy-data-oversight/classification-qualifications/classifying-general-schedule-positions/standards/2100/gs2152.pdf>
- , *Position Classification Standard for Aircraft Operation Series, GS-2181*, Washington, D.C.: U.S. Office of Personnel Management, TS-84, January 1988. As of September 10, 2019:
<https://www.opm.gov/policy-data-oversight/classification-qualifications/classifying-general-schedule-positions/standards/2100/gs2181.pdf>
- , *Alternative Pay Progression Strategies: Broadbanding Applications*, Washington, D.C.: U.S. Office of Personnel Management, Performance Management Series, PMD-05, April 1996. As of January 11, 2019:
https://www.opm.gov/policy-data-oversight/performance-management/reference-materials/more-topics/alternative_pay.pdf
- , FERS Federal Employees Retirement System (An Overview of Your Benefits), April 1998. As of December 23, 2020:
<https://www.opm.gov/retirement-services/publications-forms/pamphlets/ri90-1.pdf>
- , *Alternative Personnel Systems in the Federal Government: A Status Report on Demonstration Projects and Other Performance-Based Pay Systems*, Washington, D.C.: U.S. Office of Personnel Management, December 2007. As of September 10, 2019:
<https://apps.dtic.mil/dtic/tr/fulltext/u2/a476623.pdf>

- , *Guide to Telework in the Federal Government*, Washington, D.C.: U.S. Office of Personnel Management, 2011. As of June 12, 2019:
<https://www.telework.gov/guidance-legislation/telework-guidance/telework-guide/guide-to-telework-in-the-federal-government.pdf>
- , *Handbook on Leave and Workplace Flexibilities for Childbirth, Adoption, and Foster Care*, Washington, D.C.: U.S. Office of Personnel Management, April 15, 2015.
- , Classification Appeal Decision: OPM Decision Number C-2152-10-01, October 4, 2018a.
- , *Handbook of Occupational Groups and Families*, Washington, D.C.: U.S. Office of Personnel Management, December 2018b. As of September 10, 2019:
<https://www.opm.gov/policy-data-oversight/classification-qualifications/classifying-general-schedule-positions/occupationalhandbook.pdf>
- , “General Schedule Locality Pay Areas,” *Federal Register*, Vol. 83, No. 235, December 7, 2018c.
- , “General Schedule Rest of US Salary Table for 2019 without Locality,” webpage, January 2019a. As of September 16, 2020:
<https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/salary-tables/pdf/2019/RUS.pdf>
- , “General Schedule Salary Table for 2019 without Locality,” webpage, January 2019b. As of September 16, 2020:
<https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/salary-tables/pdf/2019/GS.pdf>
- , “Special Rates: 2019,” webpage, January 2019c. As of September 10, 2019:
<https://apps.opm.gov/SpecialRates/2019/AllSRTables.aspx>
- , Federal Workforce Data, web database, last revised June 2019d. As of July 3, 2020:
<https://www.fedscope.opm.gov/>
- , “2019 Index to Title 5 Special Rate Tables by Occupation,” webpage, 2019e. As of September 17, 2019:
<https://apps.opm.gov/SpecialRates/2019/IndexByOccupations.aspx>
- USAGov, “Benefits and Insurance for People with Disabilities,” webpage, last updated March 6, 2020. As of July 3, 2020:
<https://www.usa.gov/disability-benefits-insurance>
- United Benefit Advisors, *The Standard for Benefit Plan Comparison & Strategic Cost Management: 2018 Benefit Plan Design & Cost Benchmarking Key Findings*, Chicago: United Benefit Advisors, 2018. As of August 3, 2019:
https://cdn2.hubspot.net/hubfs/182985/pdf/2018_HPS_Executive_Summary.pdf

Weiss, Elaine, Griffin Murphy, and Leslie I. Boden, *Workers' Compensation: Benefits, Costs, and Coverage*, Washington, D.C.: National Academy of Social Insurance, October 2019.

Whittle, Richard, "Flying the Osprey Is Not Dangerous, Just Different: Veteran Pilots," *Breaking Defense*, September 5, 2012. As of August 30, 2019:

<https://breakingdefense.com/2012/09/flying-the-osprey-is-not-dangerous-just-different-veteran-pilo/>

Wright-Patterson Air Force Base, "AFRL—Air Force Laboratory Personnel Demonstration Project," webpage, December 6, 2019. As of July 3, 2020:

<https://www.wpafb.af.mil/Welcome/Fact-Sheets/Display/Article/831901/afrl-air-force-laboratory-personnel-demonstration-project/>

Yoder, Eric, "Federal Employees Lag Behind Private Sector Workers in Salaries by 32 Percent on Average, Report Says," *Washington Post*, April 11, 2018.

Zintl, Amy, "Maternity Leave by State: Learn Your Rights," *Parents*, undated. As of September 11, 2019:

<https://www.parents.com/pregnancy/my-life/maternity-paternity-leave/how-does-your-state-measure-up-on-maternity-leave/>



The U.S. Department of the Air Force has approximately 200,000 civilian employees working in 600 different occupations and professions. This includes approximately 170,000 appropriated fund civilians and more than 16,000 civilian employees who work in specialized research facilities and laboratories in 22 different locations across the United States.

A critical tool in recruiting and retaining top-tier civilian talent is the compensation and benefits package offered. However, a recent study by the Congressional Budget Office found that the competitiveness of federal wages in general varies widely depending on educational attainment.

The Air Force Directorate of Civilian Force Management asked Project AIR FORCE to conduct a study to help address concerns regarding the Air Force's ability to compete with private-sector compensation and benefits, particularly for hard-to-fill and mission critical occupations (MCOs). This report documents the constraints the Air Force must operate under in comparison with compensation and benefit structures found in other federal agencies and the private sector. It provides recommendations to improve the competitiveness of Air Force compensation and benefits packages to better recruit and retain top-tier civilian talent.

Given the large number of civilian occupations within the Air Force, the authors focus specifically on five occupational fields identified as priorities because they are either designated as mission critical or are particularly hard to fill: Aircraft Operations, Air Traffic Control, Human Resources Management, Information Technology Management (Cyber), and Aircraft Mechanic.

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