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UNMANNED AERIAL SYSTEMS

Air Force and Army Should Improve Strategic Human Capital Planning for Pilot Workforces

GAO-17-53

GAO Highlights

Highlights of GAO-17-53, a report to congressional committees

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UNMANNED AERIAL SYSTEMS

Air Force and Army Should Improve Strategic Human Capital Planning for Pilot Workforces

Why GAO Did This Study

The demand for UAS combat operation support has grown dramatically in the last decade. Since 2008, the Air Force has more than quadrupled its requirements for UAS pilots but faced challenges meeting the requirements due to UAS pilot shortages. Meanwhile, a 2015 Army review found that Army UAS units' mishap rate was higher than for other aircraft and Army officials stated that training shortfalls had contributed to the mishaps.

Senate Report 114-49 included a provision that GAO review Air Force and Army UAS personnel strategies. GAO assesses the extent to which the Air Force and the Army have (1) applied key principles of effective strategic human capital planning for managing UAS pilots and (2) evaluated the workforce mix to meet UAS pilot requirements. GAO compared its previously developed key principles of effective strategic human capital planning with Air Force and Army actions. GAO analyzed data on required and actual Air Force UAS pilots and data on Army UAS training.

What GAO Recommends

GAO's11 recommendations include that the Air Force tailor its strategy to address UAS pilot shortages; the Army revise its strategy to address UAS training shortfalls; and that both services evaluate their workforce mix for UAS pilot positions and conduct analysis to ensure cost effectiveness of workforce decisions. DOD concurred with 2 recommendations and partially concurred with 9, noting actions that it believed addressed the intent of GAO's recommendations. GAO continues to believe that DOD needs to take actions to fully address the recommendations.

View GAO-17-53. For more information, contact Brenda S. Farrell at (202) 512-3604 or farrellb@gao.gov.

What GAO Found

The Air Force and the Army have not fully applied four of the five key principles for effective strategic human capital planning for managing pilots of unmanned aerial systems (UAS) that are important for resolving the Air Force's pilot shortages and the Army's training shortfalls (see table below). Consistent with the first principle, the Air Force involved top senior leaders, UAS pilots, and stakeholders to develop a plan to resolve its UAS pilot shortages—including reassigning UAS workload to Air National Guard units and supporting training and operations with contractors. The Air Force partially applied the second principle to tailor its strategy to address gaps, or shortages, in UAS pilots, such as by using temporary personnel. As of March 2016, 37 percent of the personnel filling UAS pilot positions are temporarily assigned manned-aircraft pilots. Air Force headquarters personnel stated that no other career field in the Air Force relies on temporarily assigned personnel to this extent. Without tailoring its strategy to provide more permanently assigned pilots, the Air Force risks losing the experience that temporarily assigned manned-aircraft pilots have acquired. The Army partially applied the second principle because its strategy is not fully tailored to address its shortages in unit training. The Army experienced training shortfalls—61 of 73 UAS units flew fewer than half of the 340-flight-hour per unit annual minimum training goal in fiscal year 2015. A Senior Army official acknowledged the continued training shortfalls was a concern for the Army. Without revising its strategy to address the remaining training shortfalls, the Army risks that its UAS units may continue to train at levels below Army goals.

Extent to Which the Air Force and the Army Applied Key Principles of Effective Strategic Human Capital Planning

Key principle	Air Force	Army
Involve Top Senior Leaders, Employees, and Stakeholders	●	◒
Develop Strategies Tailored to Address Gaps in Critical Skills and Competencies	◒	◒
Monitor Progress toward Meeting Human Capital Goals	◒	●
Build Capability to Support Human Capital Strategies by Using Flexibilities	◒	◒
Determine the Critical Skills and Competencies Needed	◒	◒

Legend: Applied ● Partially applied ◒ Not applied ○

Source: GAO key principles (GAO-04-39); GAO analysis of Air Force and Army data. | GAO-17-53

The Air Force and the Army have not evaluated their workforce mix—that is the mix of military, federal civilian, and private sector contractor personnel—to determine the extent to which these personnel sources could be used to fly UAS. Furthermore, although neither the Air Force nor the Army have evaluated how and to what extent federal civilians could be used as UAS pilots, both services are using private sector contractors to fly some UAS. Without evaluating their workforce mix, the Air Force and the Army do not have information on alternatives for meeting UAS pilot personnel requirements to meet mission needs. In addition, although the Air Force and the Army decided to use private sector contractors to meet mission needs, they did not conduct cost analyses to inform this decision. Without such an analysis, the Air Force and the Army may not be using the most cost-effective workforces to achieve UAS missions.

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Abbreviations

DOD	Department of Defense
GOCO	government-owned, private sector contractor operated
Personnel and Readiness	Under Secretary of Defense for Personnel and Readiness
UAS	unmanned aerial system

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The demand for unmanned aerial system (UAS) has grown dramatically in the last decade to support combat operations. In response to the increased demand for UAS, over the last 8 years the Air Force has more than quadrupled the number of UAS pilots that it requires,[1] from about 400 in 2008 to close to 1,650 in 2016. However, the Air Force has faced challenges meeting its UAS pilot requirements.[2] The Commanding General of the Air Force's Air Combat Command testified before the Senate Armed Services Committee's Subcommittee on Airland in March 2016 that the Air Force had a shortage of about 200 UAS pilots.[3] Meanwhile, the Army has faced a different challenge in managing its UAS pilot workforce—keeping the UAS pilots trained. A March 2015 Army review found that UAS mishaps were occurring at a rate higher than for other types of Army aircraft and Army officials stated that training shortfalls had contributed to these mishaps.[4]

The Air Force and the Army primarily rely on military servicemembers to serve as UAS pilots, although both services augment their UAS pilot workforce with contractors. In the last 2 decades, Air Force and Army UAS platform capabilities and missions have evolved.

For example, the Air Force initially used the MQ-1 Predator to perform intelligence, surveillance, and reconnaissance missions before adding

[1]For the purposes of our report, we use the term "UAS pilots" to refer to the position that the Air Force refers to as a "remotely piloted aircraft pilot" and that the Army refers to as an "unmanned aircraft systems operator." The Air Force assigns various types of officers who are pilots to serve in this position including (1) temporarily reassigned manned-aircraft pilots, (2) manned-aircraft pilots and other Air Force aviation officers who have converted to the UAS pilot career field permanently, (3) graduates of manned-aircraft pilot training on their first assignment, and (4) pilots who specialize in flying UAS with limited manned-aircraft experience.

[2]GAO, *Air Force: Actions Needed to Strengthen Management of Unmanned Aerial System Pilots*, GAO-14-316 (Washington, D.C.: Apr. 10, 2014).

[3]*Army Unmanned Aircraft Vehicle and Air Force Remotely Piloted Aircraft Enterprises: Hearing Before the Subcommittee on Airland of the Senate Committee on Armed Services*, 114th Cong. (2016) (statement of Gen. Herbert J. Carlisle, Commander of Air Combat Command).

[4]Army Training and Doctrine Command, *UAS Holistic Review* (March 2015).

weapons to the Predator and acquiring the MQ-9 Reaper, which can perform strikes, combat search and rescue, and close air support, among other missions and tasks.[5]

We have previously reported on the challenges that the Air Force and the Army have faced managing their UAS pilot workforce. In April 2014, we found that the Air Force had UAS pilot shortages and as a result its UAS pilots had experienced a high work load and had limited time for training and development activities.[6] We recommended, among other things, that the Air Force use feedback from UAS pilots to develop its approach to managing challenges related to the recruiting, retention, training, and development of UAS pilots, and that the Air Force evaluate the viability of using enlisted or federal civilian personnel as UAS pilots. The Air Force generally concurred with the seven recommendations we made in 2014 and has implemented two of them. In addition, while data show that the Army did not face shortages between fiscal years 2012 and 2015,[7] in May 2015 we reported that the Army unit status reports did not require UAS pilot training information, and thus the Army did not know the extent to which pilots had been trained and were ready to deploy.[8] We recommended that the Army require unit status reports to include UAS pilot readiness information, among other things. The Army concurred with this recommendation as well as with one additional recommendation and has taken action to address them since we issued our report, but the Army has not fully implemented these recommendations. Further in March 2016, we testified that the Air Force and the Army had taken steps in response to our recommendations that made in the April 2014 and May 2015 reports but that further action was needed to fully address these workforce challenges.[9] See appendix I for the status of actions taken on

[5]The Air Force's MQ-1 Predator, established in 1996, was weaponized in 2002 with hellfire missiles that added precision-strike capabilities. In 2007, the Air Force added the MQ-9 Reaper, a larger and more capable UAS compared with the MQ-1 Predator.

[6]GAO, *Air Force: Actions Needed to Strengthen Management of Unmanned Aerial System Pilots*, GAO-14-316 (Washington, D.C.: Apr. 10, 2014).

[7]According to data from the Army Human Resources Command, the Army has staffed its UAS pilot position at over 100 percent from fiscal year 2012 to fiscal year 2015.

[8]GAO, *Unmanned Aerial Systems: Actions Needed to Improve DOD Pilot Training*, GAO-15-461 (Washington, D.C.: May 14, 2015).

[9]GAO, *Unmanned Aerial Systems: Further Actions Needed to Fully Address Air Force and Army Pilot Workforce Challenges*, GAO-16-527T (Washington, D.C.: Mar 16, 2016).

the recommendations that we made in the April 2014 and May 2015 reports.

A Senate report accompanying a bill for the National Defense Authorization Act for Fiscal Year 2016 included a provision for us to review the Department of Defense's (DOD) personnel strategies for UAS.[10] This report assesses the extent to which the Air Force and the Army have (1) applied key principles of effective strategic human capital planning in the actions taken to address challenges with managing UAS pilots and (2) evaluated the workforce mix to meet UAS pilot requirements.[11]

For our first objective, we compared criteria that we previously developed on key principles of effective strategic human capital planning with actions the Air Force and the Army have taken to address challenges that each has faced with managing the UAS pilot workforce.[12] In our prior work, we found that strategic human capital planning is an important component of an agency's effort to develop long-term strategies for acquiring, developing, and retaining staff needed for an agency to achieve its goals and of an agency's effort to align human capital activities with the agency's current and emerging mission. Specifically, we have found that an agency's efforts to conduct strategic human capital planning should be characterized by five key principles: (1) involving top senior leaders, employees, and other stakeholders in developing, communicating, and implementing strategic workforce plans; (2) developing strategies tailored to address gaps in critical skills and competencies that need attention; (3) monitoring and evaluating progress toward meeting workforce planning goals; (4) building the capability needed to address administrative,

[10]S. Rep. No. 114-49, at 129 (2015).

[11]We focused our review on UAS programs of the Air Force and the Army because these services have significantly more UAS pilots than the Navy and the Marine Corps.

[12]GAO, *Human Capital: Key Principles for Effective Strategic Workforce Planning*, GAO-04-39 (Washington, D.C.: Dec. 11, 2003). To identify strategic workforce planning principles, we reviewed our own guidance, reports, and testimonies on federal agencies' workforce planning and human capital management efforts and guidance available from leading human capital periodicals, such as the *Workforce Planning Resource Guide for Public Sector Human Resource Professionals*. We also met with officials from organizations with governmentwide responsibilities for or expertise in workforce planning, such as the Office of Personnel Management and the National Academy of Public Administration, to identify additional guidance. We synthesized the information we collected and derived principles that appeared most important to effective strategic workforce planning.

educational, and other requirements important to supporting workforce strategies; and (5) determining the critical skills and competencies needed to achieve goals.[13]

To identify the extent to which the Air Force and the Army have applied these key principles in actions to address challenges with managing UAS pilots, we reviewed Air Force and Army documentation related to those services' challenges and the actions taken to address those challenges. These documents include data on the number of required and actual UAS pilots in the Air Force for fiscal year 2016, Air Force data on the number of personnel filling UAS pilot instructor positions as of July 2016, Air Force data on the number of hours that UAS pilots and manned-aircraft pilots fly on average per year from fiscal year 2015. These documents also included Army data on the number of personnel filling UAS pilot positions as of May 2016 and the average number of training hours completed by certain UAS units for fiscal year 2013 through the third quarter of fiscal year 2016. We assessed the reliability of these data by reviewing related documentation and interviewing agency officials knowledgeable about the data. We determined that these data were sufficiently reliable for the purposes of our reporting objectives. We determined that the services "applied" a key principle for strategic human capital planning when their actions generally demonstrated the characteristics specified in the principle; we determined that the services "partially applied" a key principle for strategic human capital planning when their actions explicitly demonstrated at least one characteristic of the principle; and we determined that the services did "not apply" a key principle for strategic human capital planning when their actions did not demonstrate any characteristics of the principle.

For our second objective, we compared Air Force and Army efforts to determine the type of personnel to use for UAS pilots positions to criteria in DOD Directive 1100.4, Guidance for Manpower Management, articulating DOD policy that assigned missions shall be accomplished using the least costly mix of military, federal civilian, and contract personnel consistent with military requirements and other needs of the department and DOD Instruction 1100.22, Policy and Procedures for Determining Workforce Mix, establishing the workforce mix decision process, which includes the consideration of cost as a deciding factor in

[13]A "competency" is an observable, measurable pattern of knowledge, abilities, skills, and other characteristics that individuals need to perform work roles or occupational functions successfully.

workforce mix decisions and states that manpower authorities consider all available personnel when determining the workforce mix, including active military, federal civilians, and contractors.[14] We also reviewed documentation and data on the use of additional sources of personnel, such as performance work statements for contractors and hours flown for some contractors. In addition, we requested documentation on efforts to reevaluate personnel determinations for UAS pilot positions and interviewed knowledgeable officials.

For both objectives, we interviewed officials from the Office of the Under Secretary of Defense for Personnel and Readiness; the Headquarters Air Force Office of the Deputy Chief of Staff for Manpower, Personnel, and Services; the Headquarters Air Force Office of the Deputy Chief of Staff for Operations; the Air Combat Command; the Air Education and Training Command; the Air Force Personnel Center; the Air Force Academy; the Air Force Reserve Officer Training Corps program; the Air Force Recruiting Service; the Headquarters Army Deputy Chief of Staff for Operations; the Headquarters Army Deputy Chief of Staff for Personnel; the Army Research Institute; the Army Aviation Center of Excellence; and the Army Human Resources Command. We provide further details on our scope and methodology in appendix II.

We conducted this performance audit from June 2015 to January 2017 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Unmanned Aerial Systems

DOD defines "UAS" as systems whose components include the necessary equipment, networks, and personnel to control unmanned aircraft—that is, aircraft that do not carry human operators and are capable of flight under remote control or autonomous programming.[15] The

[14]DOD Directive 1100.4, Guidance for Manpower Management (Feb. 12, 2005); DOD Instruction 1100.22, Policy and Procedures for Determining Workforce Mix (Apr. 12, 2010).

[15]Joint Chiefs of Staff, Joint Pub. 3-30, *Command and Control of Joint Air Operations* (Feb. 10, 2014).

components of a UAS include an unmanned aircraft ground control station from which a UAS pilot flies an aircraft, a communications terminal that receives signals from the aircraft and relays these signals to the ground control station, sensors installed on the aircraft that collect data and images that are then sent to the ground control station, and weapons that are attached to some unmanned aircraft.

DOD classifies its UAS into five groups on the basis of their weight and capabilities, including airspeed and operating altitude. For example, group one UAS weigh fewer than 20 pounds, whereas group five UAS weigh more than 1,320 pounds.[16] The Air Force UAS pilots fly three types of UAS in groups four and five5: the MQ-1 Predator, the MQ-9 Reaper, and the larger RQ-4 Global Hawk. The Army UAS pilots fly two types of UAS in groups three and four: the RQ-7B Shadow and the MQ-1C Gray Eagle.

UAS Pilot Staffing Strategies

Servicemembers in the Air Force and the Army who operate the larger and more capable UAS in group three or above are either manned-aircraft pilots or pilots specializing in flying UAS. In contrast, personnel who operate the less capable UAS that are classified in groups one and two generally operate UAS as an additional duty. The Air Force and the Army use different strategies to assign personnel to this position. The Air Force assigns four different types of officers to this position: (1) temporarily re-assigned manned-aircraft pilots, (2) manned-aircraft pilots and other Air Force aviation officers who have converted to this career field permanently, (3) graduates of manned-aircraft pilot training on their first assignment, and (4) pilots who specialize in flying UAS with limited manned-aircraft experience. The Army assigns enlisted personnel to this position and they receive no training on how to fly a manned-aircraft.

Demand for UAS

Over the past decade, the size, sophistication, and cost of DOD's UAS have grown to rival DOD's portfolio of traditional manned-aircraft systems and UAS have become integral to warfighter operations.[17] However, the demand for UAS has outpaced the Air Force's ability to produce UAS pilots using the existing training pipeline. To meet the demand for UAS pilots, the Air Force has relied on support from the Air National Guard and

[16]Chairman of the Joint Chiefs of Staff Instruction 3255.01, *Joint Unmanned Aircraft Systems Minimum Training Standards* 4 (July 17, 2009) (incorporating change 1, Oct. 31, 2011) (current as of Sept. 4, 2012).

[17]DOD, *Unmanned Systems Integrated Roadmap, 2013 – 2038*.

has pursued efforts to increase the number of UAS pilots. For example, the Air Force trained traditional manned-aircraft pilots to fly UAS and placed graduates of manned-aircraft pilot training into UAS training rather than in advanced manned-aircraft training. In 2010, the Air Force created a dedicated UAS pilot career field and developed a training program for pilots who specialize in flying UAS. As of 2015, the Secretary of Defense had tasked the Air Force to provide 60 "combat lines" to combatant commanders, which is the measure of the capability to provide near-continuous 24-hour presence of a UAS over a specific region on Earth. At the same time, in March 2016, the Chief of Staff of the Air Force testified that the DOD-wide requirement is 90 combat lines and in addition to the Air Force, DOD is relying on the Army and private sector contractors, among others, to help meet this increased requirement.[18]

Roles and Responsibilities Related to UAS

Various offices within the Air Force, the Army, and the Office of the Secretary of Defense have roles and responsibilities to evaluate the UAS pilot "workforce mix," which is the mix of military, federal civilian, and contractors that might be used to fill UAS pilot positions.

Air Force and Army: Section 129a of title 10 establishes that the Secretaries of the Air Force and the Army have overall responsibility for the requirements determination, planning, programming, and budgeting for policies and procedures for determining their most appropriate and cost-effective mix of personnel. DOD Directive 1100.4 directs the services to designate an individual with full authority for manpower management, and DOD Instruction 1100.22 directs the heads of DOD components to require their designated manpower authority to issue implementing guidance requiring the use of the instruction when determining the workforce mix for current, new, or expanded missions. DOD Instruction 7041.04 requires the component heads to use the business rules in the instruction when estimating the full costs of a workforce in support of force structure decisions and when performing a cost benefit analysis, an economic analysis, or a business analysis in support of workforce mix decisions—including when determining the workforce mix of new and expanding mission requirements not exempt from private-sector performance and when deciding whether to use federal civilians to perform functions that are being performed by contractors.

[18]*Hearing on Unmanned Aircraft Vehicles* (2016).

Office of the Secretary of Defense: According to Section 129a of Title 10 of the United States Code, which governs DOD's general policy for total force management, the Secretary of Defense is required to establish policies and procedures for determining the most appropriate and cost efficient mix of military, federal civilian, and contractor personnel to perform the missions of the department. The statute also requires that, within the Office of the Secretary of Defense, the Under Secretary of Defense for Personnel and Readiness has overall responsibility for guidance to implement such policies and procedures.[19] DOD policies also establish roles and responsibilities for the Office of the Secretary of Defense:

- DOD Directive 1100.4 establishes DOD policy concerning manpower management. The directive also establishes multiple responsibilities for the Office of the Under Secretary of Defense for Personnel and Readiness, including that the office review the personnel management guidelines and practices of DOD components for compliance with established policies and guidance.[20]
- DOD Instruction 1100.22 implements policy set forth under DOD Directive 1100.4 and establishes policy, assigns responsibilities, and prescribes procedures for determining the appropriate mix of military, federal civilian, and contractor personnel. The instruction assigns to the Under Secretary of Defense for Personnel and Readiness the responsibility for overseeing programs that implement the instruction for working with the heads of DOD components to ensure that they establish policies and procedures consistent with this instruction.[21]
- DOD Instruction 7041.04 states that the Under Secretary of Defense for Personnel and Readiness, the Comptroller, and with the Director of Cost Assessment and Program Evaluation are responsible for developing a cost model applicable DOD-wide to employ business

[19]10 U.S.C. § 129a.

[20]DOD Directive 1100.4, Guidance for Manpower Management (Feb. 12, 2005). This directive defines "DOD components" as the Office of the Secretary of Defense, the military departments, the Chairman of the Joint Chiefs of Staff, the combatant commands, the Office of the Inspector General of the Department of Defense, the defense agencies, the DOD field activities, and all other organizational entities in DOD.

[21]DOD Instruction 1100.22, Policy and Procedures for Determining Workforce Mix (Apr. 12, 2010).

rules for estimating and comparing the full costs of DOD manpower and contract support.[22]

The Air Force and the Army Have Not Fully Applied Most of the Key Principles for Effective Strategic Human Capital Planning for UAS Pilots to Resolve Key Challenges in Managing UAS Pilots

The Air Force and the Army have not fully applied four of the five key principles for effective strategic human capital planning in the actions taken to resolve the challenges that each faces in managing its UAS pilot workforce (see table 1 for a summary of our assessment).[23] The Air Force has continued to experience challenges staffing its UAS pilot career field, and the Army has continued to experience challenges ensuring that units that operate the RQ-7B Shadow UAS conduct homestation training to address UAS unit readiness concerns.[24]

Table 1: Extent to Which the Air Force and the Army Applied Key Principles of Effective Strategic Human Capital Planning

Key Principle	Air Force	Army
Involve Top Senior Leaders, Employees, and Stakeholders in Human Capital Planning	●	◒
Develop Strategies Tailored to Address Gaps in Critical Skills and Competencies that Need Attention	◒	◒
Monitor Progress toward Meeting Human Capital Goals and Extent Achieving those Goals Contributes to Achieving Programmatic Goals	◒	●
Build Capability to Support Human Capital Strategies by Using Flexibilities	◒	◒
Determine the Critical Skills and Competencies Needed	◒	◒

Legend: Applied ●; Partially applied ◒; Not applied ○

Source: GAO key principles (GAO-04-39); GAO analysis of Air Force and Army data. | GAO-17-53

[22]DOD Instruction 7041.04, Estimating and Comparing the Full Costs of Civilian and Active Duty Military Manpower and Contract Support (July 3, 2013).

[23]GAO-04-39.

[24]GAO-14-316 and GAO-15-461. In 2014 and 2015 we reported on UAS pilot shortages and in 2015 we reported on training shortfalls.

The Air Force Has Involved Senior Leaders, Stakeholders, and UAS Pilots Serving in Units in Strategic Human Capital Planning Efforts to Address UAS Pilot Shortfalls, but the Army Has Not Involved UAS Pilots Serving in Units in Such Efforts

One key principle for effective strategic human capital planning is that organizations can benefit from ensuring that top leadership sets the overall direction and goals of human capital planning and that organizations can also benefit from including employees and stakeholders in developing and implementing human capital plans.[25]

Air Force—applied. We determined that the Air Force applied this principle in the actions taken to address UAS pilot shortages because the Air Force has involved top senior Air Force leaders, stakeholder offices, and UAS pilots in UAS units to develop a strategy (i.e., the Get Well Plan) to address UAS pilot shortages. In documentation of the Get Well Plan the Air Force describes its UAS pilot shortage, the plan's goals, and initiatives to address the shortages, such as by reassigning some of the UAS workload to Air National Guard units and by supporting training and operations through the use of contractors.[26] According to Air Force headquarters officials, in 2015 top senior Air Force leaders developed the Get Well Plan, and the Secretary of the Air Force and other top senior leadership helped develop the plan's two goals to staff 100 percent of the positions for (1) instructors at the UAS pilot school and (2) combat UAS pilots. Further, stakeholder offices such as the Air Combat Command and the Air Force Special Operations Command participated in developing the plan, according to headquarters Air Force officials. In addition, the Air Combat Command's Culture and Process Improvement Program Office surveyed and interviewed UAS pilots in UAS units from August 2015 through September 2015 to identify any challenges the pilots and units faced and subsequently developed over 150 initiatives to address these challenges.[27] For example, according to a draft report of this effort, UAS pilots reported that their morale was low and some attributed this to the isolated locations of UAS bases. In response, the Air Force announced that it would establish new UAS units at up to two existing Air Force bases in possible locations that include Arizona, Georgia, and Idaho.

[25]GAO-04-39.

[26]The Air Force documented its Get Well Plan in documents including a March 2015 memorandum from the Air Force Director of Operations and Readiness, a July 2015 memorandum from the Chief of Staff of the Air Force, and briefing slides.

[27]By surveying and interviewing UAS pilots, the Air Force implemented a recommendation that we made in 2014. In GAO-14-316 we reported that the Air Force had not incorporated feedback from its UAS pilots to address human capital-related challenges faced by those in the UAS pilot career field. We recommended that the Air Force collect feedback from the UAS pilots on addressing these challenges and the Air Force concurred with this recommendation.

Army—partially applied. Top senior Army leaders and stakeholders developed a strategy to address UAS unit training shortfalls and UAS unit readiness issues including UAS mishaps that the Army identified in 2015, but we determined that the Army had partially addressed this principle because the Army did not involve UAS pilots serving in UAS units in this effort. According to senior officials from the Army Aviation Center of Excellence, the Army's top senior leaders, stakeholders from the Army Combat Readiness Center, and other organizations prepared a briefing in March 2015 that documented findings about UAS training shortfalls, UAS mishaps, and an Army strategy to address UAS training shortfalls. [28] The strategy included initiatives to (1) increase the amount of flight training that UAS pilots conduct at their homestations, (2) issue guidance on UAS training requirements, and (3) establish a system to report the amount of training that UAS units complete to higher level commands. According to Army officials, by addressing UAS unit training shortfalls, the Army could address those UAS mishaps that are due to human error.

Army officials told us that the Army had involved three senior enlisted UAS pilots serving in management support positions at the Army Aviation Center of Excellence. These three UAS pilots, who supported top senior leaders who developed the strategy communicated with UAS units to verify the amount of training that they had completed and collect information on unit needs, among other things, according to senior officials at the Aviation Center of Excellence. However, this approach does not constitute involving employees in developing a strategy to address UAS training shortfalls and mishaps. The senior enlisted UAS pilots involved in developing the Army's strategy are not currently serving in UAS units but instead serve in a support role to senior leadership that oversee Army UAS programs. However, the Army was experiencing training shortfalls within UAS units, not at higher level commands that oversee these units. Without soliciting input directly from UAS pilots in UAS units, such as by conducting focus groups or surveys, the Army is not able to capture and incorporate the unique perspective of employees who are conducting the day-to-day work of serving as UAS pilots. Had it done so the Army may have been able to identify any challenges that these pilots might face in completing their training or in avoiding mishaps. By collecting input from personnel serving as unit-level UAS pilots, the Army could help ensure that any strategy developed might address root causes of training shortfalls and mishaps that top leadership and other

[28]Army Training and Doctrine Command, *UAS Holistic Review* (March 2015).

stakeholders might not be aware of. For example, as discussed above, the Air Force involved UAS pilots in its planning to address quality-of-life challenges that those pilots face and these pilots were uniquely suited to identify those challenges. Responding to those challenges, the Air Force developed an initiative to establish additional UAS bases to address the low morale that was attributed to serving in the isolated locations of some UAS bases.

The Air Force and the Army Have Developed Strategies to Address Gaps in Critical Skills and Competencies for UAS Pilots but Have Not Fully Tailored the Strategies to Address Persistent Gaps

Another key principle for effective strategic human capital planning is that it is important for organizations to develop human capital strategies that are tailored to organizations' unique needs and these strategies can be used to address human capital conditions that need attention such as gaps, or shortages, in critical skills and competencies.[29]

Air Force—partially applied. The Air Force has developed a strategy designed to address UAS pilot shortfalls and the Air Force has increased the staffing levels of UAS pilots; however, we determined that the Air Force partially applied this principle because its strategy is not fully tailored to address persistent gaps such as continuing to rely on manned-aircraft pilots, limitations in cadet interest in the UAS pilot career field, and the high workload of UAS pilots.

Since we reported on UAS pilot shortages in April 2014, the Air Force has developed a personnel strategy designed to help improve the staffing level of the UAS pilot career field. For example, the Air Force's UAS workload was reduced when the Secretary of Defense reduced the number of UAS combat lines that Air Force military units fly from 65 to 60 and the active-duty UAS pilot workload was also reduced when the Air Force reassigned 3 combat lines from active-duty units to Air National Guard units. The Air Force also extended the assignments of manned-aircraft pilots who were serving as temporary UAS pilots and increased the number of UAS pilot candidates that it brought in to the Air Force. The Air Force as of July 2016 had met the goal in the Get Well Plan to staff 100 percent of the UAS pilot positions needed for combat. The Air Force has also made progress in achieving the second goal in the Get Well Plan, to staff 100 percent of the instructor pilot positions, staffing 93 percent of these positions as of July 2016. Further, the Air Force improved the overall staffing level of the UAS pilot career field staffing 90

[29]GAO-04-39.

percent of the total number of required UAS pilot positions with pilots who specialize in flying UAS with temporarily assigned manned-aircraft pilots as of March 2016. This is an improvement from the 85 percent of these positions that the Air Force had filled when we reported on UAS pilot shortages in 2014.[30]

However, we determined that the Air Force partially applied this principle because the Air Force has not developed human capital strategies that are fully tailored to address issues that the Air Force has to eliminate remaining shortfalls. For example, the Air Force continues to rely on a significant number of manned aircraft pilots who are temporarily reassigned to fly UAS. As of March 2016, 37 percent of the personnel filling UAS pilot positions were temporarily assigned manned-aircraft pilots. Air Force Headquarters officials told us that no other career field in the Air Force relies on temporary personnel to the extent that the UAS pilot career field does. Manned-aircraft pilots who are temporarily serving as UAS pilots acquire experience in flying UAS and the unique needs of how UAS operate in operational settings. When these manned aircraft pilots leave the UAS pilot career field and return to assignments flying manned aircraft, the UAS pilot career field loses that experience. Without developing strategies and tools that are more fully tailored to address this gap, the Air Force's UAS pilot workforce will continue to lose the experience that temporarily assigned manned aircraft pilots have acquired.

Further, the Air Force strategy is not fully tailored to address the issue of a lack of cadet interest in the UAS pilot career field at the Air Force Academy and in the Reserve Officer Training Corps, and Air Force headquarters officials told us that this is a challenge for the Air Force. Air Force officials at the Air Force Academy and Reserve Officer Training Corps told us that most cadets who join the Air Force express limited interest in becoming a UAS pilot and instead want to become a manned-aircraft pilot. Air Force headquarters officials told us that the Air Force has taken some steps to address this issue, including headquarters personnel visits to some Reserve Officer Training Corps units at several universities

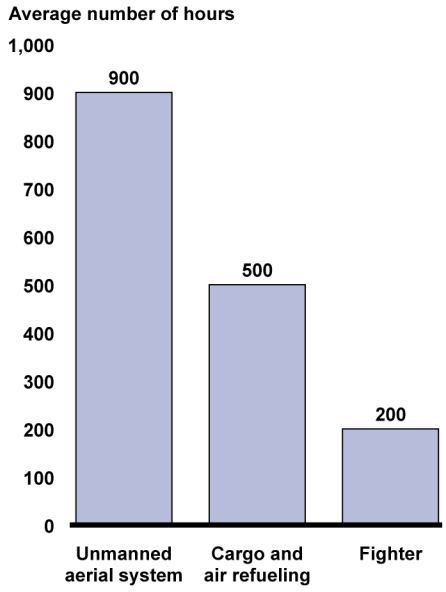
[30]GAO-14-316.

to discuss with cadets the merits of the UAS pilot career field. [31] However, the Air Force's strategies are not tailored to address the lack of cadet interest in the UAS pilot career field.

In addition, the Air Force's strategy has not been tailored to address the high workload of UAS pilots. For example, the Air Force estimates that its UAS pilots fly their aircraft in operations much more than other pilots in the Air Force. In particular, the Air Force estimates that UAS pilots fly an average of 900 hours annually, while fighter pilots fly an average of 200 hours annually, and pilots of cargo and air refueling tankers fly an average of 500 hours annually. Further, Air Force headquarters officials told us that most of the hours that fighter pilots fly are to conduct training exercises while virtually all of the hours that UAS pilots fly are to conduct operations (see fig. 1).

[31] GAO-14-316. In our 2014 report, we found that without a more tailored approach to recruiting UAS pilots that increases the appeal of the new career field to potential recruits the Air Force risks perpetuating personnel shortages. We recommended that the Air Force develop a recruiting and retention strategy that is tailored to the specific needs and challenges of UAS pilots. While the Air Force has taken some action related to our recommendation, the Air Force has not yet developed a UAS pilot recruiting and retention strategy as we recommended.

Figure 1: Average Number of Hours Flown by Unmanned Aerial System, Cargo and Air Refueling Tanker, and Fighter Pilots in the Air Force, in fiscal year 2015.



Source: GAO analysis of Air Force data. | GAO-17-53

Air Force officials stated that it is difficult to compare the number of hours that different types of pilots fly and draw conclusions about the comparative effects of differing workloads. However, as we reported in 2015, the amount of time that Air Force UAS pilots work leaves them little time to train.[32]

Air Force headquarters officials agreed with our assessment that UAS pilot shortages remain a significant challenge for the Air Force and called attention to the comments made by the Chief of Staff of the Air Force acknowledging these challenges in August 2016.[33] Officials told us that the shortages in the UAS pilot and fighter pilot careers are the two areas of greatest concern regarding the Air Force operations career fields. In addition, an Air Force headquarters official told us that the Air Force has not advocated for providing additional personnel to fill the remaining unmet UAS pilot requirements because the Air Force would not be able to

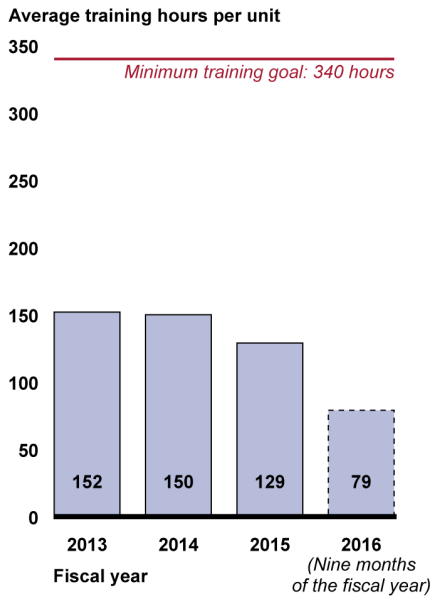
[32]GAO-15-461.

[33]National Public Radio, *New Chief of Staff Outlines Global Challenges Faced by the Air Force*, (Aug. 29, 2016).

provide enough personnel to fully meet them. Without tailoring its strategy to address this shortfall between all UAS pilot position requirements and the actual positions filled, the Air Force risks continuing to not meet its requirements.

Army—partially applied. The Army developed a strategy to address shortfalls in UAS unit training, but we determined that the Army partially applied this principle because its strategy is not fully tailored to address its issues such as a lack of adequate facilities and access to airspace, resulting in the Army experiencing considerable training shortfalls for UAS pilots. As discussed earlier, the Army's strategy for addressing training shortfalls includes a number of initiatives: (1) increasing the amount of flight training that UAS pilots conduct at their homestation, (2) issuing guidance on UAS training requirements, and (3) establishing a system to report the amount of training that UAS units complete to higher level commands. However, according to data provided by the Army Aviation Center of Excellence, in fiscal year 2015 61 of the 73 RQ-7B Shadow units that were training at their homestation flew an average of 129 hours of the 340-hour unit goal, and as of the end of the third quarter in fiscal year of 2016, 68 of the 78 RQ-7B Shadow units flew an average of 79 hours of the 340-hour unit goal (see fig. 2). A senior Army official acknowledged that continued UAS unit training shortfalls is a concern for the Army.

Figure 2: Average Number of Training Hours Flown by Nondeployed Army RQ-7B Shadow Units, in fiscal years 2013 through the third quarter of fiscal year 2016.



Source: GAO analysis of Army data. | GAO-17-53

Note: Fiscal year 2016 data include the first 3 quarters of the fiscal year.

According to Army officials, a lack of adequate facilities, lack of access to airspace, and the inability to fly more than one UAS at a time contributed to the lack of progress toward improving UAS homestation training. Without revising its strategy to address root causes of training shortfalls to address these contributing factors, the Army risks that its Shadow units may continue to train at levels that are well below Army requirements.

The Air Force and the Army Have Monitored and Evaluated Progress toward Meeting Strategic Human Capital Planning Goals, but the Air Force Has Not Monitored Whether Progress Made Achieving Goals Has Improved UAS Programs

Another key principle for effective strategic human capital planning is that organizations should periodically measure (1) their progress toward achieving their human capital goals, and (2) the extent to which achieving those goals helps the organization achieve programmatic goals.

Air Force—partially applied. Air Force officials at headquarters, Air Combat Command, Air Force Special Operations Command, and the Air National Guard monitor and evaluate progress toward meeting the human capital goals in the Get Well Plan. In particular, Air Force documentation shows that headquarters officials collect data from the Air Force Personnel Center on the extent to which positions for combat UAS pilots and instructors are filled—the two goals in the Air Force's Get Well Plan.

Officials in this headquarters office then provide these data to officials within the Air Combat Command, the Air Force Special Operations Command, the Air National Guard, and the Air Force Reserve Command, which also monitor these human capital goals according to an Air Force official. For example, officials from the Air Combat Command headquarters told us that they provide updates to the leadership of the Air Combat Command on the status of the Air Force Get Well Plan. In addition, officials at Air Combat Command told us that they use data from the Get Well Plan updates that show which units are more fully staffed to identify those that can support training personnel on any new equipment that the Air Force deploys while maintaining combat operations.

However, we determined that the Air Force partially applied this principle because the Air Force does not monitor the extent to which achieving the human capital goals in its Get Well Plan helps it to achieve programmatic goals. According to headquarters Air Force officials, the Air Force has three program goals that are related to addressing UAS pilot shortfalls: to (1) meet combat demand, (2) staff enough personnel to UAS units to allow UAS pilots time to train and take part in development activities, and (3) provide surge UAS combat capabilities when needed. When we asked Air Force officials how the Air Force measures the extent that achieving goals in the Get Well Plan helps it to achieve its three programmatic goals, these officials provided documentation that shows the Air Force monitors the sequencing of requirements that it needs in its various UAS units. However, this approach does not constitute an approach to measure how achieving goals in its Get Well Plan helps it to achieve its three programmatic goals. For example, the documentation does not address how achieving goals it the Get Well Plan will help the Air Force provide UAS pilots time to train or help the Air Force provide surge UAS capabilities. Until the Air Force begins monitoring the extent to which achieving the human capital goals in its Get Well Plan helps it to achieve programmatic goals, the Air Force will not know whether its strategies are having the effect that the Air Force intends regarding its program goals.

Army—applied. The Army Forces Command initiated a monthly aviation readiness review in May 2016 that is overseen by the Commanding General of the Army Forces Command to monitor the extent to which the Army is achieving its goal to increase UAS unit training, according to Army officials. During these monthly reviews, the Commanding General reviews the amount of training hours that UAS units have flown, according to Army officials. In addition, through weekly meetings senior Army officials including general officers from organizations that are stakeholders to UAS readiness, monitor progress regarding the extent to

which the initiatives of the strategy are helping the Army to achieve its program goal for UAS units, which is to increase UAS unit readiness. During these meetings, Army officials monitor the status of the initiatives in the Army's strategy, the status of UAS unit training, and the status of UAS unit readiness, according to Army officials.

The Air Force and the Army Have Taken Some Steps to Incorporate Flexibilities into Their Strategies, but It Is Too Early to Assess the Effectiveness of these Flexibilities and the Air Force Has Not Explored Additional Flexibilities to Meet Future Expected Needs

Another key principle for effective strategic human capital planning is that organizations should ensure that flexibilities are part of the overall human capital strategy to ensure effective workforce planning.[34] Human capital flexibilities are any policies, practices or adjustments to existing policies and practices that an agency has the authority to implement and that it uses to manage its workforce to accomplish its mission. For example, agencies may implement policies related to recruiting, retention, work-life policies, and training, among other things.

Air Force—partially applied. The Air Force has taken some steps to incorporate two flexibilities into its strategy to address UAS pilot shortages; however, we determined that the Air Force partially applied this principle because it is too early to assess whether these steps will result in effective workforce planning that reduces the Air Force UAS pilot shortages and the Air Force has not explored additional flexibilities that it may need to use to address additional requirements for UAS pilots. First, the Air Force is working on an initiative that would enable it to provide UAS pilots with "dwell time"—a time during which servicemembers are at their homestation during which they are able to take leave, attend training, and recuperate. As part of its Culture and Process Improvement effort, Air Force UAS pilots recommended that the Air Force provide them dwell time. Because most Air Force UAS pilots remotely operate UAS from Air Force bases in the United States they can live at home. However, the Secretary of the Air Force noted in January 2015 that UAS pilots fly 6 days in a row and work 13 to 14 hour days on average.[35] The Secretary noted that an average manned-aircraft pilot flies between 200 and 300 hours per year. The Air Force provides dwell time to

[34]GAO-04-39. "Human capital flexibilities" are the policies and practices that an agency has the authority to implement in managing its workforce to accomplish the missions and achieve goals. Flexibilities include actions related to recruitment, retention, compensation, position classification, incentive awards and recognition, training and development, performance management and appraisals, and work-life policies.

[35]Secretary of the Air Force and Chief of Staff of the Air Force, "State of the Air Force" (press briefing on Jan. 15, 2015).

servicemembers who return from certain overseas deployments. In particular, an Air Force policy states that for every 1 year an active duty servicemember is deployed to certain overseas locations, they are required to be assigned for 2 years at their homestation. However, this requirement does not apply to UAS pilots because most operate their UAS remotely from the United States. In October 2016, the Commanding General of the Air Combat Command drafted a request to the Chief of Staff of the Air Force to provide dwell time to UAS pilots. According to a draft memorandum of the request, for every month that an Air Force UAS unit spends performing a combat role the personnel in that unit would subsequently receive half a month to focus solely on training. As of October 2016, the Air Force had not implemented this initiative and the Commanding General of the Air Force's Air Combat Command testified before the Senate Armed Services Committee's Subcommittee on Airland in March 2016 that to implement dwell time for UAS pilots the Air Force would need to increase the size of its UAS capability by 25 to 30 percent.[36]

Second, in September 2016, the Air Force increased the maximum annual retention pay for UAS pilots from $25,000 to $35,000, the maximum amount allowed under the authority provided in the National Defense Authorization Act for Fiscal year 2016.[37] It is too early to assess the effectiveness of this flexibility in addressing the persistent UAS pilot shortages, because this flexibility was only recently incorporated and might be followed by a corresponding bonus for manned-aircraft pilots. Earlier in an April 2016 letter that the Secretary of the Air Force sent to the Chairman of the Senate Armed Services Committee, the Secretary expressed the need to ensure equity in the amount of retention bonuses that the Air Force pays UAS pilots and manned-aircraft pilots. However, during the course of our review, Air Force officials acknowledged that in March 2016 and April 2016 the Air Force had indicated to Congress the need to authorize an increase to the maximum annual amount of retention bonus that the Air Force pays to manned-aircraft pilots to $60,000 per year—about 70 percent more than the amount that the Air Force will pay UAS pilots. While the Air Force has taken some steps to incorporate the dwell time and retention pay flexibilities into its strategy to address UAS pilot shortages, it is too early to tell whether these steps will

[36]*Hearing on Unmanned Aircraft Vehicles* (2016).

[37]Pub. L. No. 114-92, div. A, title VI, § 617 (Nov. 25, 2015).

result in effective workforce planning outcomes that reduce Air Force UAS pilot shortages.

While the Air Force has taken steps to implement flexibilities to its strategy, Air Force requirements for the number of UAS pilots it needs may underrepresent those needs and Air Force leadership expect demand for UAS pilots to grow, but the Air Force has not explored additional flexibilities to meet these needs. In 2014, we found that the Air Force had conducted a study in 2008 to determine the required number of UAS pilots in UAS units, but the study did not account for all tasks those units perform.[38] Air Force officials stated that, as a result, the requirement was probably too low. We recommended that the Air Force update its requirement for UAS units and the Air Force concurred with our recommendation. However, since we issued our report, the Air Force has not updated its requirement, although it conducted a new study in 2015. In addition, in March 2016, the Chief of Staff of the Air Force testified that he expected that the Air Force will continue to experience growth in the demand for UAS capabilities in the long term, and that to meet this expected growth, the Air Force would need more personnel.[39] Updating the requirement for the number of UAS pilots in a unit and growth in future demand for Air Force UAS capabilities could both result in an increase in the number of UAS pilots that the Air Force needs. However, the Air Force has not explored the potential of adding flexibilities related to recruiting, such as recruiting bonuses or other recruitment incentives according to an Air Force official. Without exploring additional flexibilities that the Air Force may need in the future, the Air Force may not be poised to meet future needs for additional pilots.

Army—partially applied. The Army has taken some steps to incorporate flexibilities into its strategy to address UAS unit training shortfalls; however we determined that the Army partially applied this principle because it is too early to assess whether these steps will result in effective workforce planning that reduces Army UAS training shortfalls. As we noted earlier, Army officials told us that Army UAS units continue to face training shortfalls due to inadequate facilities and shortfalls in airspace. To address these factors, some Army units are implementing

[38]GAO-14-316.

[39]*Fiscal Year 2017 Budget Request for the Air Force: Hearing on H.R. 5293 Before the House Comm. on Appropriations' Subcomm. on Defense*, 114th Cong. (March 2, 2016) (testimony of Gen. Mark A. Welsh).

flexibilities to overcome these factors at their installations, according to Army officials. For example, to overcome airspace restrictions, a unit at Joint Base Lewis-McChord, Washington, travels to the Yakima Training Center in Washington where there is more available airspace to conduct training. In addition, personnel at the National Training Center at Fort Irwin, California launch UAS and then transfer control of the aircraft to UAS pilots at Fort Hood, Texas, which increases the opportunities for the pilots at Fort Hood to train. However, as we noted earlier, the Army continues to experience training shortfalls and, as of the end of the third quarter in fiscal year of 2016, 68 of the 78 RQ-7B Shadow units that were not deployed flew an average of 79 hours of the 340-hour minimum identified by the Army in its UAS Holistic Review.[40] While the Army has taken steps to incorporate flexibilities into its strategy to address UAS unit training shortfall, it is too early to tell whether these steps will result in effective workforce planning outcomes that reduce these shortfalls.

The Air Force and the Army Have Determined Some, but Not All of the Critical Skills and Competencies That UAS Pilots Need to Achieve Their Missions and Goals

A final key principle for effective strategic human capital planning is that organizations should determine the skills and competencies that are critical to successfully achieving missions and goals.[41]

Air Force—partially applied. The Air Force has determined some competencies that UAS pilots need; however, we determined that the Air Force partially applied this principle because a multiservice research team identified additional competencies important for UAS pilots that the Air Force has not fully incorporated into its method to assess the competencies of its UAS pilot candidates.[42] However, the Air Force has taken steps to ensure that its assessment approach is valid and the Air Force is working to incorporate findings from relevant research into the methods it uses to assess the competencies of UAS pilot candidates, according to Air Force researchers.

The Air Force uses selection criteria to identify candidates who are more apt to succeed in UAS pilot training and perform well as a UAS pilot. To make its selections, the Air Force assesses whether candidates for UAS

[40]U.S. Army, *UAS Holistic Review* (Mar. 24, 2015).

[41]GAO-04-39.

[42]As noted earlier, a "competency" is an observable, measurable pattern of knowledge, abilities, skills, and other characteristics that individuals need to perform work roles or occupational functions successfully.

pilot training display a certain amount of aptitude in competencies such as instrument comprehension, time sharing, and spatial orientation.[43] The Air Force evaluates whether UAS pilot candidates display these competencies to a sufficient degree using aptitude tests that are also used to assess the competencies of manned-aircraft pilot candidates including the Air Force Officer Qualification Test, the Test of Basic Aviation Skills, and the Multi-Tasking Test. Officials at the Air Force Personnel Center told us that their research has found that UAS pilots and manned-aircraft pilots need many of the same competencies to be successful. Air Force researchers told us that because the Air Force adopted the manned-aircraft pilot selection method to select UAS pilots, Air Force researchers conducted validation research to ensure that this approach was sound and found that this method is a valid predictor of whether UAS pilot candidates will successfully complete UAS training.[44] According to the Society for Industrial Organizational Psychology—a professional organization of researchers devoted to the conduct and application of workplace research including personnel selection—validation is the most important consideration when developing a procedure to select employees because it provides evidence to provide sound scientific basis for organizations to interpret scores that candidates achieve on aptitude assessment tests.

However, researchers have identified additional competencies that are important for UAS pilots to possess and the Air Force has not incorporated an assessment for all of these competencies into its method to select UAS pilots. Specifically, the Office of Naval Research initiated a multiphased research project in May 2014 to improve the processes of selecting, training, and equipping UAS pilots across the services and identified 78 competencies that are "moderately," "highly," or "extremely important" for UAS pilots. The team found that the Air Force tests measure 45 of the 78 important competencies, including some of the most important ones such as spatial orientation and time sharing. However, the team found other important competencies that are not

[43]"Instrument comprehension" is the ability to determine the position of an airplane in flight from reading instruments. "Time sharing" is the ability to shift back and forth between two or more activities or sources of information. "Spatial orientation" is the ability to determine where one is located in relation to an object or to determine where an object is located in relation to one's self.

[44]See for example, Carretta,T.R. "Predictive Validity of Pilot Selection Instruments for Remotely Piloted Aircraft Training Outcome," *Aviation, Space, and Environmental Medicine* 84; 47–53 (2013).

measured by the Air Force's tests, such as attention to detail.[45] Air Force Personnel Center researchers told us that, while the Air Force has no measures that focus specifically on measuring attention to detail, another Air Force test partially measures attention to detail. The researchers noted that some of the competencies that Air Force tests do not specifically measure are related to other competencies that the Air Force tests do measure and that when two competencies are related, the Air Force may only need to assess if a candidate has aptitude for one of those competencies. Moreover, they told us that the Air Force's tests do not measure all of the competencies that are important for UAS pilots. For example, they told us that the Air Force does not have a test to measure oral comprehension and listening that focuses on understanding messages similar in complexity to those that must be processed by UAS pilots.

Air Force researchers acknowledge that Air Force tests do not measure all of the competencies that are important for UAS pilots. However, the Air Force has taken a number of positive steps to determine the skills and competencies important to UAS pilots. It has updated its personnel selection methods to incorporate findings from research it has conducted, and has efforts underway to improve the ability to select the best UAS pilot candidates, including by conducting additional research and testing a tool that measures multitasking ability, a competency important for UAS pilots, according to Air Force researchers.

Army—partially applied. The Army has determined some competencies that UAS pilots need; however, we determined that the Army partially applied this principle because the multiservice research team we mentioned earlier identified additional competencies important for UAS pilots that the Army has not incorporated into its method to select UAS pilot candidates. In addition, an Army-funded research project recommended that the Army supplement the test the Army currently uses to select UAS pilot candidates with additional, existing tests that the Army does not use, but the Army has not taken action to implement this recommendation. In addition, the Army could not provide evidence that it has validated that its personnel selection method has utility in predicting the success of the UAS pilot candidates in training or on the job.

[45]The team defined "attention to detail" as the ability to pay close attention to the details of one's work, ensure that it is accurate and complete, and carefully review and scrutinize it.

The Army uses selection criteria to identify candidates that are more apt to succeed in UAS pilot training and perform well as a UAS pilots and to make its selections, the Army assesses whether candidates for UAS pilot training display a certain amount of aptitude in four competencies:

- Verbal expression: the ability to obtain information from written passages, select the correct meaning of words presented in context, and identify the best synonym for a given word;
- Arithmetic reasoning: the ability to solve arithmetic word problems;
- Auto and shop information: the knowledge of automobile technology, tools, and shop terminology and practices; and
- Mechanical comprehension: knowledge of mechanical and physical principles.

Since at least 2002 the Army has evaluated whether UAS pilot candidates can display these competencies to a sufficient degree using the Armed Services Vocational Aptitude Battery, which is a test that measures the competencies of people who apply to join the military services as enlisted personnel.[46] Officials at the Army Aviation Center of Excellence were not able to provide information to explain how the Army determined that its UAS pilots needed to possess these particular competencies because they told us that these actions took place over a decade ago when Army UAS were organized under the military intelligence branch of the Army.

However, as we noted earlier, researchers from a multiservice research team have identified additional competencies that are important for UAS pilots to possess and the Army has not incorporated an assessment for most of these competencies into its method to select UAS pilots. Specifically, the Armed Services Vocational Aptitude Battery measures just 3 of the 78 competencies that the multiservice research team determined are “moderately,” “highly,” or “extremely important” for UAS pilots. We note, however, that the research team also reported that the battery may still be a valuable indicator of UAS pilot aptitude.

In addition, researchers funded by the Army Research Institute found additional competencies that are important for Army UAS pilots to possess and recommended that the Army supplement the Armed Services Vocational Aptitude Battery with additional, existing measures to

[46]The Army uses the surveillance and communication composite of the Armed Services Vocational Aptitude Battery.

assess these important competencies. Specifically, the researchers reported in 2007 that the competencies that Army UAS pilots need had likely changed based on a change in the missions, operations, and the organization of Army UAS when responsibility for UAS training was reassigned from the Army's Military Intelligence Branch to the Army's Aviation Branch.[47] The researchers identified 49 competencies that are critical for UAS pilots and recommended that the Army use existing tests that the Army and Navy use to measure additional competencies. However, the Army has not implemented this recommendation. An official at the Aviation Center of Excellence told us that senior officials in the Army decided not to use this test because the Army did not have any had not identified any problems in selecting UAS pilots using the Armed Services Vocational Aptitude Battery.

However, Army officials could not provide evidence that the Army has validated that the Armed Services Vocational Aptitude Battery is a valid predictor of the training performance or job performance of UAS pilot candidates. According to the Society for Industrial Organizational Psychology, validation is the most important consideration when developing a procedure to select employees because it provides evidence to provide sound scientific basis for organizations to interpret scores that candidates achieve on aptitude assessment tests. However, officials we spoke with at Army headquarters, the Army Aviation Center of Excellence, and the Army Research Institute were not able to determine whether the Army had conducted such validation research to determine that the Armed Services Vocational Aptitude Battery is an effective predictor of success of UAS pilot candidates in training or job performance. Army officials told us that the Army is satisfied with its approach to selecting candidates for its UAS pilot training because UAS pilot candidates perform well in training and in operational units. However, other Army officials told us that senior Army leaders pressure officials at the schoolhouse to ensure that UAS pilot candidates make it through training, in some cases to provide enough personnel UAS units.

Without validating that the Armed Services Vocational Aptitude Battery is an effective predictor of UAS candidate performance in UAS pilot training and job performance, the Army may not be basing decisions to select individuals for the UAS pilot career field on sound evidence. In addition,

[47]K.T. Bruskiewicz, J.S. Houston, S.A. Hezlett, and K.L. Ferstl Personnel Decisions Research Institute *Development of a Selection Instrument for Unmanned Aerial System (UAS) Operators*, Technical Report No. 580 (Minneapolis, Minn: October 2007).

without incorporating findings from research that has identified additional, important UAS pilot competencies, the Army may not be taking advantage of key benefits associated with effective personnel selection that could include reducing training costs, improving job performance, and enhancing the effectiveness of the Army's UAS organizations.

The Air Force and the Army Have Not Evaluated the Workforce Mix of Personnel to Fly UAS and Have Not Conducted Workforce Cost Analyses

The Air Force and the Army have not evaluated their workforce mix—that is the mix of military, federal civilian, and private sector contractor personnel—to determine the extent to which these personnel sources could be used to fly UAS. Furthermore, although neither the Air Force nor the Army has evaluated how and to what extent federal civilians could be used as UAS pilots, both services are using private sector contractors to fly some UAS. DOD Directive 1100.4 Guidance for Manpower Management articulates DOD policy that assigned missions shall be accomplished using the least costly mix of military, federal civilian and private sector contractor personnel consistent with military requirements and other needs of the department. Moreover, the Air Force and the Army have conducted limited analysis to determine whether federal civilians or private sector contractors would perform UAS pilot functions at a more efficient cost. DOD Instruction 1100.22 Policy and Procedures for Determining Workforce Mix establishes the workforce mix decision process, which includes the consideration of cost as a deciding factor in workforce mix decisions. DOD Instruction 1100.22 directs that among other considerations when establishing a workforce mix, DOD components shall conduct a cost analysis to determine the low-cost provider for all current, new or expanding mission requirements and for functions that have been contracted for but could be performed by federal civilian employees.[48]

[48]DOD Instruction 1100.22 refers to cost analyses as "cost comparisons" but based on input from Office of the Secretary of Defense officials, we are using the term cost analysis. According to an OSD official, the term cost comparison is understood to refer to a specific type of comparison described in Office of Management and Budget Circular A-76, "Performance of Commercial Activities" For the purposes of our report, we are using the term cost analysis to refer to the cost comparisons, the completion of which DOD Instruction 7041.04, Estimating and Comparing the Full Costs of Civilian and Active Duty Military Manpower and Contract Support (July 3, 2013) provides specific guidance.

The Army and the Air Force Have Not Evaluated Their UAS Pilot Workforce

Over time, the Air Force and Army UAS platform capabilities have evolved, but neither the Air Force nor the Army has evaluated its current UAS pilot workforce mix to determine an effective and efficient mix of personnel for meeting mission needs. The Air Force and Army UAS pilot workforces are primarily made up of military personnel–both active duty and National Guard and Reserve–for positions to fly UAS because the UAS pilot position includes functions that are designated for military personnel, such as direction and control of combat situations and laser designation of targets. As stated previously, the Air Force primarily uses officers to fly its UAS and the Army uses enlisted personnel to perform this function.[49] In addition, both the Air Force and the Army use private sector contractors as UAS pilots in government-owned, private sector contractor operated (GOCO) units. According to Air Force and Army officials, the GOCO units only fly intelligence, surveillance, and reconnaissance missions on unarmed UAS.

Air Force and Army UAS capabilities have evolved over time, but neither service has evaluated its UAS pilot workforce mix. For example, the MQ-1 Predator UAS was established in 1996 as a reconnaissance aircraft and was weaponized in 2002 with hellfire missiles, adding new capabilities such as precision-strike. In 2007 the Air Force added the MQ-9 Reaper UAS, which is similar to but larger and more powerful than the MQ-1 Predator UAS. DOD Instruction 1100.22 tasks the heads of DOD components to issue implementing guidance requiring the use of the instruction's policies and procedures for workforce mix when determining the appropriate mix for current, new, or expanded missions. Despite the changes in capabilities and usage to both MQ-1 Predator and MQ-9 Reaper UAS, the Air Force has not evaluated its current workforce mix for UAS pilots as described in DOD Instruction 1100.22. According to an Air Force headquarters official, the Air Force has been focused on

[49]GAO-14-316. In 2014, we recommended that the Air Force evaluate the viability of using alternative personnel populations as UAS pilots, including enlisted personnel. The Air Force took action toward implementing this recommendation by evaluating and planning to use enlisted personnel to fly the unarmed RQ-4 Global Hawk UAS, which is an unarmed, high-altitude, long-endurance UAS that is the largest of all Air Force UAS. It is used for intelligence, surveillance, and reconnaissance missions. In July 2016, the Air Force selected its first enlisted members for the program. In March 2016, the Commanding General of Air Combat Command testified that the Air Force did not have plans to use enlisted personnel to fly the MQ-1 Predator or the MQ-9 Reaper, which are used to conduct the majority of the Air Force's UAS operations, because it wants to first monitor and learn from the use of enlisted personnel as RQ-4 Global Hawk pilots. *Hearing on Unmanned Aircraft Vehicles* (2016).

addressing its pilot shortages but agreed that it should also evaluate its workforce mix for UAS pilots.

Army headquarters officials told us that a change in mission or a new airframe could trigger an evaluation. Since the Army first established a UAS pilot specialty in 1990, the Army has acquired new UAS platforms with additional mission capabilities, and has expanded its use of UAS. For example, when the Army UAS pilot career specialty was first established in 1990, the Army flew the RQ-2A Pioneer UAV, which performed missions such as reconnaissance, surveillance, and battle damage assessment. In contrast, some Army UAS pilots currently fly the MQ-1C Gray Eagle, which is a larger, weaponized UAS with longer endurance and additional mission capabilities, including attack capabilities. In addition, in 2003, the Army transferred its UAS program from its Military Intelligence Branch to the Aviation Branch. According to a 2007 Army Research Institute study on the selection of Army UAS pilots, with that shift there was also an increase in the number and types of UAS employed by the Army and changes in UAS missions and operations.[50] Like the Air Force, despite changes to its UAS platforms and organization, the Army has not evaluated its UAS pilot workforce mix because, according to Army headquarters officials, its current workforce is working and meets mission requirements. However, evaluating its UAS pilot workforce mix could help the Army ensure that it is using the minimum personnel resources organized and employed to provide the maximum effectiveness and combat power, which DOD articulates as the guiding principle of DOD manpower management.[51]

The Air Force and the Army have not used federal civilians as UAS pilots or evaluated how and to what extent federal civilians may be used in the future, even though both services are using private sector contractors to

[50]K.T. Bruskiewicz, J.S. Houston, S.A. Hazlett and K.L. Ferstl Personnel Decisions Research Institute *Development of a Selection Instrument for Unmanned Aerial System (UAS) Operators*, Technical Report No. 580 (Minneapolis, Minn: October 2007).

[51]DOD Directive 1100.4, Guidance for Manpower Management (Feb. 12, 2005).

fly UAS in GOCO units.[52] DOD Directive 1100.4 articulates DOD policy that manpower shall be designated as federal civilian except when military personnel are required for such reasons as law, command and control of crisis situations, combat readiness, or when military-unique knowledge and skills are required for successful performance of the duties, among other reasons. Air Force headquarters officials stated that the Air Force had not evaluated the use of federal civilians as UAS pilots, but agreed that the Air Force should consider how federal civilians may be used for UAS pilot positions.

During the course of our review, the Air Force began to take initial steps to evaluate the use of federal civilians to fly its UAS, providing a response in May 2016 and then again in July 2016 to a congressional inquiry regarding DOD's plans to replace contracted UAS pilots with military UAS pilots. Specifically, in May 2016 the Air Force issued a 3-page response comprising fiscal year 2018 estimates for personnel, initial investment, and sustainment costs associated with using military, federal civilian, or private sector contractor personnel to fly 8 UAS combat lines and totaling the estimates for a period of 5 years.[53] In July 2016, the Air Force updated the May 2016 response, issuing a 4-page document revising the cost estimates so that they included the respective personnel, initial investment, and sustainment costs for calendar year 2017, instead of for the 5-year time frame. The July 2016 document also included additional assumptions that the Air Force had used to inform its development of the cost estimates, such as assumptions related to the Air Force's decision to exclude certain costs from the estimates when those costs were assumed to be common across the three personnel groups, and the assumptions regarding costs to acquire equipment for private sector contractor units

[52]According to Air Force officials, the Air Force has used government-owned, contractor-operated (GOCO) UAS since at least 2011. The Air Force is in the process of establishing additional GOCO units to support 10 combat lines. Air Force officials stated that the decision to use private sector contractors was based on direction from the Under Secretary of Defense for Acquisition, Technology, and Logistics to help meet demand. In addition, the Army has used private sector contractors to fly government-owned UAS in the Middle East since 2008. According to Army headquarters officials, the Army began using private sector contractors to help meet personnel demands when UAS equipment was being produced more quickly than the units needed to operate that equipment were being established.

[53]The Air Force refers to costs associated with personnel as operational manpower costs, which include the salaries for UAS pilots, squadron leadership, and administration support, among others. According to the Air Force, initial investment and sustainment costs include construction of new facilities, additional equipment, and sustainment of equipment.

and build facilities for military or federal civilian personnel. The Air Force headquarters official who provided us the documents said he was not aware of any plans to take additional steps to evaluate the use of federal civilians to fly UAS.

The Air Force and the Army stated that federal civilians are limited in the UAS pilot functions that they can perform, but both services use private sector contractors to augment their UAS pilot personnel and private sector contractors are further restricted when compared with federal civilians. In its July 2016 congressional inquiry response, the Air Force stated that both federal civilians and private sector contractors would be limited to intelligence, surveillance, and reconnaissance missions. Army headquarters officials stated that the Army has not used federal civilians as UAS pilots because of limitations on the functions that federal civilians can perform that are needed for some Army UAS missions. For example, combat operations are designated as an "inherently governmental" activity that may only be performed by military personnel specifically.[54] Private sector contractors are further restricted from performing any inherently governmental activities, such as federal procurement activities performed in operational environments, which federal civilians are permitted to perform. Army headquarters officials stated that the disadvantage to using private sector contractors is that GOCO units are less capable with respect to functions they may perform and more expensive than military units, but according to these officials, the Army continues to use them due to limits set by the administration on the number of uniformed personnel that can be used in conflicts in the Middle East. Similarly, one Air Force official we spoke with indicated that in some cases, these limitations on private sector contractors performing certain activities may impact the mission. An Air Force official who oversaw GOCO units operating overseas, which is similar to Army UAS GOCO units, stated that there were occasions when targets were lost because the private sector contractor operated units could not assist with pinpointing the target locations since private sector contractors are prohibited by regulation from using laser designators.

[54]An inherently governmental activity is a function so intimately related to the public interest as to require performance by federal government personnel. For example, operational control of combat, combat support and combat service support units; armed fighting or use of force deemed necessary for national defense; some aspects of security provided to protect resource and operations in hostile or volatile areas; and intelligence and counterintelligence operations performed in operational environments are inherently governmental activities.

The Under Secretary of Defense for Personnel and Readiness (Personnel and Readiness) is responsible for issuing guidance for the DOD components regarding manpower management and reviewing the DOD components' manpower management guidelines and practices for compliance with established policies and guidance. DOD Instruction 1100.22, Policy and Procedures for Determining Workforce Mix, elaborates on the responsibilities of Personnel and Readiness, directing that the Under Secretary shall work with the heads of DOD components to ensure that the components establish policies and procedures consistent with the instruction and require the use of specific policies and procedures when determining the workforce mix for current, new, or expanded missions.

Personnel and Readiness has made efforts to identify additional personnel options for UAS pilots. In June 2016, the Institute for Defense Analysis published a study commissioned by Personnel and Readiness and other Office of the Secretary of Defense entities on alternative staffing strategies to enable DOD to accomplish UAS-related missions more cost-effectively. The study found that using DOD federal civilians may be an option for realizing cost savings. Personnel and Readiness also sponsored a RAND Corporation study examining effective ways to convert military positions to positions filled by federal civilian personnel, referred to as military-to-civilian conversions. The study was published in June 2016 and recommended changes to statutes, policies, and business practices to facilitate military-to-civilian conversions.[55] According to Personnel and Readiness officials, they have discussed implementing the RAND Corporation's recommendations on developing guidance on the process to implement military-to-civilian conversions but have not yet done so. Personnel and Readiness has not directed the services to conduct an evaluation of their workforce mix and of using federal civilians for positions required to fly UAS. Personnel and Readiness officials stated that doing so would not be standard practice for Personnel and Readiness because such an evaluation is an activity that the services would typically initiate based on their authority to organize, train, and

[55]The RAND Corporation is a nonprofit institution that conducts public policy research and analysis. This report was conducted within the RAND National Defense Research Institute, a federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Staff, the United Combatant Commands, the Navy, the Marine Corps, the defense agencies, and the defense intelligence community. RAND Corporation, *U.S. Department of Defense Experiences with Substituting Government Civilian Employees for Military Personnel* (Santa Monica, CA: 2016)

equip their own forces.[56] However, the officials also stated that Personnel and Readiness can direct such an evaluation. DOD Instruction 1100.22 also directs component heads to provide sufficient oversight to ensure compliance with the instruction through periodic reviews of the component's workforce. Without evaluating the workforce mix, the Air Force and the Army risk using a UAS pilot workforce mix that may not efficiently meet their mission needs. Without specifically evaluating how and to what extent federal civilians could be used as UAS pilots, the Air Force lacks information on another population that may be able to help address its UAS pilot shortages. In addition, the Army lacks information on a personnel population that may be able to help address the limitations on the use of military personnel due to force management levels.

The Air Force and the Army Have Conducted Limited Cost Analyses to Inform Workforce Decisions and Ensure Efficiency and Cost Effectiveness

The Air Force has conducted limited analysis and the Army has conducted no analysis to ensure the efficiency and cost effectiveness of the UAS workforce mix, particularly in light of evolving UAS platform capabilities. DOD Instruction 1100.22 directs that DOD components shall conduct a cost analysis to determine the low-cost provider for all new or expanding mission requirements and for functions that have been contracted but could be performed by federal civilians. Neither service provided evidence that they had completed cost analyses prior to securing contracts for UAS pilots to determine whether federal civilians or private sector contractors would perform UAS pilot functions at a lower cost, a process that is part of ensuring an efficient use of personnel for new or expanded missions.

Air Force officials stated that the Air Force has not analyzed the costs of its GOCO units as compared with the costs of using federal civilians prior to securing its contracts because it does not have a cadre of federal civilians trained to fly UAS. The Air Force began establishing the GOCO units for its 10 private sector contractor-supported combat lines in fiscal year 2014 and Air Force headquarters officials told us they anticipate it will not finish establishing those units until the end of fiscal year 2018. As mentioned above, in its July 2016 congressional inquiry response, the Air Force included cost estimates for active duty, federal civilian, and private sector contractor personnel and determined that using private sector contractors is the option with the lowest cost for calendar year 2017 for the additional 10 combat lines to help meet the DOD-wide 90 combat line

[56]This authority is articulated in 10 U.S.C. §§ 3013, § 5013, § 8013.

requirement. The Air Force conclusion was based in part on the assumption that active duty and federal civilian personnel would increase long-term costs such as an enduring increase in force structure that private sector contractors would not similarly require. However, according to an Office of the Secretary of Defense official, federal civilians can be hired on a short-term basis. In addition, the Air Force response to the congressional inquiry assumes that the private sector contractors will be used only to meet a temporary increase in demand and as such includes cost estimates for one calendar year. However, in March 2016, the Secretary of the Air Force and the Chief of Staff of the Air Force testified that demand for UAS capabilities will likely continue to increase, calling into question whether the 10 private sector contractor-supported combat lines will remain temporary.[57] While the use of private sector contractors might be a viable solution in the short-term, without a more in-depth cost analysis, the Air Force will lack information on the most cost-effective options in the long-term, particularly if the demand for UAS increases.

Army headquarters officials said the Army has not completed a cost analysis of private sector contractors and federal civilians because its use of GOCO units was intended to be a short-term solution to meet mission needs. According to these officials, hiring federal civilians as UAS pilots would be a permanent action that would require a permanent personnel structure. However, as noted above, there are options for hiring federal civilians to meet short-term needs. In addition, while Army headquarters officials say the Army's use of private sector contractors began as a short-term need, private sector contractors have been flying Army UAS for 8 years because of ongoing conflict in the Middle East. Completing a cost-analysis could better inform decision-making on the workforce, including continuing to rely on private sector contractors instead of exploring other options, such as using federal civilians. Without conducting a cost analysis, both the Air Force and the Army may not know whether they are using the most cost effective workforce mix for meeting mission needs.

Conclusions

The demand for UAS capabilities has grown considerably in recent years to support combat operations, as has the demand for a sufficient number of trained UAS pilots needed to provide those capabilities. The Air Force has experienced challenges providing the required number of UAS pilots

[57] *Hearing on Unmanned Aircraft Vehicles* (2016).

to meet that demand. In addition, the Army has experienced challenges in providing its goal number of training hours to its UAS pilots when not deployed. Both the Air Force and the Army have, in most cases, partially addressed strategic human capital planning principles to help them address those challenges. However, by not taking actions consistent with certain elements of the principles, the Air Force and the Army could hinder their ability to address their personnel challenges. For example, because the Army had not involved UAS pilots in UAS units in developing its strategy to address training shortfalls, it may have missed an opportunity to gain valuable information and insight from UAS pilots that may help address root causes of training shortfalls and mishaps. In addition, if the Air Force and the Army do not revise their strategies to fully tailor them to address remaining issues with gaps, the Air Force risks continuing to not meet its requirements and the Army risks continuing to train at levels that are below Army requirements. Moreover, because the Air Force has not monitored the extent to which achieving the human capital goals it has set also helps it achieve its programmatic goals, the Air Force may be limited in its understanding whether its goals and strategies are having their intended effects. Further, while the Air Force has taken steps to incorporated flexibilities into its human capital strategies, without exploring the potential to use additional flexibilities, such as recruiting bonuses or other recruitment incentives, it may not be poised to meet future needs for UAS pilots. For the Army, because it has not incorporated additional, important UAS pilot competencies in its UAS pilot candidate selection method and validated that selection method, it may be missing opportunities to improve its personnel selection and realize associated benefits, such as reduced training costs.

The Air Force and the Army primarily use military personnel to fill UAS pilot positions and have also used contractors to fly UAS, yet neither service has evaluated its workforce mix for UAS pilot positions, including specifically evaluating the use of federal civilians, because the Office of the Secretary of Defense for Personnel and Readiness has not directed the services to conduct such an evaluation as part of its oversight responsibilities. Evaluating the workforce mix would help to ensure that the Air Force and the Army are using the mix of personnel best suited to meeting mission needs and would provide information on options for addressing shortages and limitations on using military personnel. In addition, the Air Force and Army did not inform their workforce decisions with cost analyses that would provide information on the most cost-effective workforce for meeting mission needs.

Recommendations for Executive Action

We are making 11 recommendations to the Secretary of Defense to improve the strategic human capital planning of the Air Force's and the Army's UAS pilot workforces.

To help the Air Force in its effort to address UAS pilot shortfalls, we are making the following 3 recommendations related to three of the five principles for effective strategic human capital planning.

- To help ensure that the Air Force strategies to address UAS pilot shortages are tailored to address remaining issues, such as the significant amount of pilots who are temporarily assigned to the UAS pilot career, the limited amount of cadet interest in the UAS pilot career, and the workload of UAS pilots, we recommend that the Secretary of Defense direct the Secretary of the Air Force to revise the Get Well Plan to address these issues.
- To help the Air Force ensure that its strategies are having the intended effects, we recommend that the Secretary of Defense direct the Secretary of the Air Force to monitor the extent to which that achieving the human capital goals in its strategy helps the Air Force achieve its programmatic goals.
- To help the Air Force ensure that it is poised to meet future needs for UAS pilots, we recommend that the Secretary of Defense direct the Secretary of the Air Force to explore the potential use of additional flexibilities that would enable it to increase the number of UAS pilots in its workforce.

To help the Army in its effort to address UAS unit training shortfalls, we are making the following 6 recommendations related to three of the five principles for effective strategic human capital planning.

- To help the Army identify challenges that UAS pilots face in completing their training, we recommend that the Secretary of Defense direct the Secretary of the Army to
  - collect feedback from UAS pilots in UAS units, such as by surveying, or conducting focus groups with them and
  - incorporate such feedback into the Army's strategy to address UAS training shortfalls.
- To help ensure that Army Shadow units meet minimum training requirements, we recommend that the Secretary of Defense direct the Secretary of the Army to revise its strategy to address UAS training shortfalls to ensure that it is fully tailored to address training issues

and address factors such as lack of adequate facilities, lack of access to airspace, and the inability to fly more than one UAS at a time.

- To help the Army ensure that it is basing its decisions to select individuals for UAS pilot training on sound evidence and to help it take advantage of the key benefits associated with effective personnel selection that could include reducing training costs, improving job performance, improving retention of qualified personnel, enabling leadership development, and enhancing organizational effectiveness, we recommend that the Secretary of Defense direct the Secretary of the Army to
  - validate that the Armed Services Vocational Aptitude Battery is an effective predictor of UAS pilot candidate performance in UAS pilot training and job performance;
  - assess existing research that has been performed that identifies UAS pilot competencies; and
  - incorporate relevant findings from such research into the Army's approach for selecting UAS pilot candidates, as appropriate.

To help address personnel shortages and meet mission needs cost effectively, we are making two recommendations that the Office of the Secretary of Defense, through the Under Secretary of Defense (Personnel & Readiness) direct the Air Force and the Army to:

- evaluate the workforce mix and the use of federal civilians for UAS pilot positions; and
- conduct cost analyses consistent with DOD guidance to inform their workforce decisions and ensure cost effectiveness of the UAS pilot workforce mix.

Agency Comments and Our Evaluation

We provided a draft of this report to DOD for comment. In its written comments, DOD partially concurred with nine recommendations and concurred with two recommendations. For the nine recommendations with which DOD partially concurred, DOD noted actions that it had been taken that DOD believed addressed the intent of our recommendations. DOD's comments are summarized below and reprinted in their entirety in appendix III.

DOD partially concurred with our recommendation that the Air Force revise the Get Well Plan to help ensure that the Air Force strategies to address UAS pilot shortages are tailored to address the significant amount of pilots who are temporarily assigned to the UAS pilot career, the

limited amount of cadet interest in the UAS pilot career, and the workload of UAS pilots. In its comments, DOD stated that it does not disagree with our recommendation. However, DOD believes that the Get Well Plan addresses these issues and significant steps have already been taken to fulfill the intent of our recommendation; therefore, no further direction is needed in response to our recommendation. We disagree. The Get Well Plan has two stated goals: to staff 100 percent of the positions for (1) instructors at the UAS pilot school; and (2) combat UAS pilots, and does not address the three issues we discuss in this recommendation. We continue to believe that the Air Force needs to take action to help ensure that its strategy is fully tailored to address the challenges we identified and that the Air Force acknowledged existed.

DOD also partially concurred with our recommendation that the Air Force monitor the extent to which achieving the human capital goals in its strategy helps the Air Force achieve its programmatic goals. DOD stated that it agrees that continuous monitoring of the Air Force Get Well Plan is critical and noted that the Air Force provides regular updates to the senior leadership of the department on the goals and status of the Get Well Plan. DOD also stated that based on those updates, the Office of the Secretary of Defense will provide additional direction as necessary and appropriate. As we noted in the report, the Air Force does not measure how achieving goals in its Get Well Plan helps it to achieve its three programmatic goals: (1) meeting combat demand, (2) staffing enough personnel to UAS units to allow UAS pilots time to train and take part in development activities, and (3) providing surge UAS combat capabilities when needed. For example, the Air Force's current monitoring does not address how achieving goals in the Get Well Plan will help the Air Force provide UAS pilots time to train or help the Air Force provide surge UAS capabilities. We continue to believe that until the Air Force develops such an approach and begins monitoring the extent to which achieving the human capital goals in its strategy helps the Air Force achieve its programmatic goals, the Air Force will not know whether its strategies are having the intended effect on its program goals.

DOD partially concurred with our recommendation that the Air Force explore the potential use of additional flexibilities to enable it to increase the number of UAS pilots in its workforce to meet future needs. DOD stated that the Air Force is exploring additional measures with the potential to increase the number of pilots in the UAS pilot workforce. It stated that, as needed, the Air Force will engage with the Office of the Secretary of Defense to secure authorities necessary to implement desired measures relating to the workforce, but that further direction from

the Secretary of Defense is not necessary at this time. As we stated in the report, the Air Force has taken some steps to incorporate two flexibilities—providing “dwell time” and retention bonuses—into its strategy to address UAS pilot shortages. We continue to believe that exploring the use of additional flexibilities to increase the number of UAS pilots is important given that current Air Force requirements for the number of UAS pilots it needs may underrepresent those needs, and Air Force leadership expects demand for UAS pilots to grow.

DOD partially concurred with our recommendations that the Army (1) collect feedback from pilots in UAS units to help the Army identify challenges faced in completing their training and (2) incorporate such feedback into the Army’s strategy to address UAS training shortfalls. DOD stated that incorporating feedback from the field is already an element of the Army’s strategy for improving the sustainability, maturity, and health of its UAS workforce. DOD stated that our findings will reinforce the importance of using feedback to improve and refine the Army's overall strategy. DOD also stated that it does not believe that further direction is necessary. We disagree that additional direction is not necessary for addressing UAS training shortfalls. While it is encouraging that the Army is incorporating feedback from the field to improve the sustainability, maturity, and health of its UAS workforce, we specifically address training shortfalls in UAS units in our findings, which the Army does not discuss in its response to this recommendation. As noted in our report, we believe that by collecting input through focus groups or surveys of UAS pilots serving in UAS units, the Army could identify the root causes of chronic training shortfalls in RQ-7B Shadow units and use its findings to shape its strategy to address its documented training shortfalls.

DOD partially concurred with our recommendation that the Army revise its strategy to address UAS training shortfalls to ensure that it is fully tailored to address training issues and address factors such as lack of adequate facilities, lack of access to airspace, and the inability to fly more than one UAS at a time. DOD stated that the Army has already taken steps to continuously improve its training strategy and that our findings will underline the importance of those initiatives, but that additional direction related to our recommendation is not necessary. We disagree. We acknowledge in our report that the Army has taken steps to overcome some of its training challenges. For example, to overcome airspace restrictions, a unit at Joint Base Lewis-McChord, Washington, travels to the Yakima Training Center in Washington where there is more available airspace to conduct training. However, these steps have not resulted in Army RQ-7B Shadow units meeting homestation training goals since at

least 2013. Given this, we believe that the Army needs to revise its strategy to more fully tailor it to address the barriers to help it address these training shortfalls.

DOD partially concurred with our recommendation that the Army validate that the Armed Services Vocational Aptitude Battery is an effective predictor of UAS pilot candidate performance in UAS pilot training and job performance. DOD stated that it believes that the current graduation rate of soldiers from its UAS pilot school of 98 percent is an indication that the existing personnel resource predictors and practices are sufficient. It also stated that periodic re-validation is prudent, but specific direction to do so is not necessary. We disagree. Regarding the Army's graduation rate of personnel attending UAS pilot training, Army officials told us that senior Army leaders pressure officials at the Army UAS pilot schoolhouse to ensure that UAS pilot candidates make it through training. As a result, this statistic may not provide the Army with reliable evidence that its approach to selecting personnel to serve as UAS pilots is providing the Army with personnel who have the aptitude for this career. Validating that the Armed Services Vocational Aptitude Battery is an effective predictor of training and job performance of UAS pilot is an important step that would help the Army ensure that it is basing its decisions to select individuals for the UAS pilot career field on sound evidence.

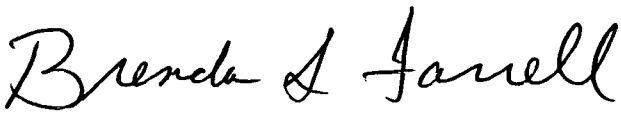
DOD partially concurred with our recommendations that the Army (1) assess existing research that has been performed that identifies UAS pilot competencies and (2) incorporate relevant findings from such research into the Army's approach for selecting UAS pilot candidates, as appropriate. DOD stated that incorporating findings regarding UAS pilot competencies is already an integral part of both workforce and community management and that effective and efficient resource management, as well as force shaping and management processes, will help ensure that the Army's selection of candidates is consistent with the findings of existing research in this area. DOD stated that it does not believe it is necessary to provide additional direction or guidance to the Army to leverage existing research that identifies UAS pilot competencies. We disagree. As we noted in our report, the Army has used the same approach to assess the competencies of UAS pilot candidates since at least 2002 and has not incorporated findings from scientific research, such as results from an Army Research Institute study conducted in 2007, on UAS pilot candidates. We believe that by assessing existing research that identifies UAS pilot competencies and incorporating relevant findings from such research into the Army's approach for selecting UAS pilot candidates that the Army could take advantage of the benefits associated

with effective personnel selection. Assessing and incorporating such findings may allow the Army to reduce training costs, improve job performance, improve retention of qualified personnel, enable leadership development, and enhance organizational effectiveness.

Finally, DOD concurred with our two recommendations that the Air Force and the Army evaluate the UAS workforce mix and the use of federal civilians for their UAS pilot positions and that the Air Force and Army conduct cost analyses consistent with DOD guidance to inform their workforce decisions and ensure cost effectiveness of their UAS pilot workforce mix.

We are sending copies of this report to appropriate congressional committees; the Secretary of Defense; the Secretaries of the Air Force and the Army; and the Under Secretary of Defense for Personnel and Readiness. In addition, the report is available at no charge on the GAO website at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-3604 or farrellb@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix IV.



Brenda S. Farrell
Director, Defense Capabilities and Management

List of Committees

Chairman
Ranking Member
Committee on Armed Services
United States Senate

Chairman
Ranking Member
Committee on Armed Services
House of Representatives

Appendix I: Actions Taken by the Air Force, the Army, and the Office of the Secretary of Defense to Address Our Recommendations

In April 2014, we found that the Air Force had shortages of pilots of unmanned aerial systems (UAS) and faced challenges to recruit, develop, and retain pilots and build their morale.[1] We also found that Air Force UAS pilots experienced potentially challenging working conditions and were promoted at lower rates than personnel in other career fields. In particular, we found that the Air Force (1) had operated below its optimum crew ratio, which is a metric used to determine the personnel needs for Air Force aviation units; (2) had not developed a minimum crew ratio; (3) had not tailored its recruiting and retention strategy to align with the specific needs and challenges of UAS pilots; (4) had not considered the viability of using personnel other than officers such as enlisted or civilians as UAS pilots; (5) had not incorporated feedback from UAS pilots into efforts to manage the career field; (6) had not fully analyzed the effects of being deployed-on-station on UAS pilots' quality of life; and (7) had not analyzed the effect of being a UAS pilot on the chances for promotion. We made seven recommendations related to these findings. Since we issued our report in April 2014, the Air Force has fully implemented two of the recommendations, taken action on three recommendations, and has not taken action on two others.

In May 2015, we found that the Air Force and the Army faced challenges ensuring that their UAS pilots completed their required training.[2] We also found that Army unit status reports did not require UAS pilot training information and that the Army had not fully addressed the risks of using less experienced instructor pilots. We made three recommendations related to these findings. Since we issued our report in May 2015, the Army and the Office of the Under Secretary of Defense for Personnel and Readiness have taken actions to address the three recommendations but have not fully implemented any of the recommendations.

In table 2, we list the seven recommendations that we made in the April 2014 report and the three recommendations that we made in the May 2015 report and summarize the actions that the Air Force, the Army, and the Office of the Under Secretary of Defense for Personnel and Readiness have taken to address those recommendations.

[1]GAO, Air Force: *Actions Needed to Strengthen Management of Unmanned Aerial System Pilots*, GAO-14-316 (Washington, D.C.: Apr 10, 2014).

[2]GAO, *Unmanned Aerial Systems: Actions Needed to Improve DOD Pilot Training*, GAO-15-461 (Washington, D.C.: May 14, 2015).

Table 2: Actions Taken by the Air Force, the Army, and the Office of the Under Secretary of Defense for Personnel and Readiness to Address GAO Report Recommendations Related to Unmanned Aerial Systems (UAS) Personnel Challenges

Recommendations from GAO-14-316 to the Air Force	Actions taken/recommendation status
Update crew ratios for UAS units to help ensure that the Air Force establishes a more accurate understanding of the required number of UAS pilots needed in its units.	**Actions taken, but recommendation not implemented.** As of November 2016, the Air Force was working on formally updating its UAS unit crew ratio. In November 2016, Air Force officials stated that the Air Force had completed a personnel requirements study designed to update the UAS unit crew ratio, which is a measure the Air Force uses to determine the personnel needs for Air Force aviation units. In November 2016, the officials also stated that the Air Force had approved a crew ratio based on the study but was still waiting to resolve stakeholder comments. Without an updated crew ratio, the Air Force lacks information needed to accurately identify the number of Air Force UAS pilots it requires and may need additional pilots.
Establish a minimum crew ratio in Air Force policy below which UAS units cannot operate without running unacceptable levels of risk to accomplishing the mission and ensuring safety.	**Recommendation implemented.** The Air Force has established a minimum crew ratio. In February 2016, the Air Force Deputy Chief of Staff of Operations directed that the Air Force use the 10:1 crew ratio as the minimum
Develop a recruiting and retention strategy that is tailored to the specific needs and challenges of UAS pilots to help ensure that the Air Force can meet and retain required staffing levels to meet its mission.	**Actions taken, but recommendation not implemented.** Previously, Air Force cadets who were preparing to join the Air Force and applying for undergraduate flying training volunteered for any of the four careers, including the manned-aircraft pilot career, the UAS pilot career, or two other aviation-related careers. According to Air Force officials, nearly all of the cadets applied for the manned-aircraft pilot career and few applied for any of the other careers. In fiscal year 2014, the Air Force began requiring these cadets to volunteer to serve in any of the four careers. This process allows the Air Force to assign these cadets to any of the four careers based on a number of factors including the cadet's performance and Air Force needs. An Air Force headquarters official confirmed that in fiscal year 2016, the Air Force met 357 of their 386 UAS pilot accessions goal, or the Air Force's goal for the number of cadets who graduate from Air Force officer schools and agree to serve as UAS pilots. Regarding retention of UAS pilots, in January 2015, the Air Force increased the Assignment Incentive Pay for UAS pilots who are reaching the end of their 6 year service commitment to $1500/month. In September 2016, the Air Force increased the maximum annual retention pay for UAS pilots from $25,000 to $35,000. However, the Air Force does not have a recruiting and retention strategy that is tailored to UAS pilots. Rather, according to Air Force officials, the Air Force recruits UAS pilots using the same strategies employed for all rated career fields.

Evaluate the viability of using alternative personnel populations including enlisted or civilian personnel as UAS pilots to identify whether such populations could help the Air Force meet and sustain required UAS pilot staffing levels.	Actions taken, but recommendation not implemented. As of November 2016, the Air Force had made progress implementing but had not fully implemented our recommendation. Specifically, the Air Force had begun to use enlisted personnel and had begun to take initial steps to evaluate using federal civilian personnel as UAS pilots, as we recommended. In commenting on our recommendation, the Air Force noted that the responsibilities of piloting UAS were commensurate with the rank of officers, but in the fall of 2014, the Chief of Staff of the Air Force directed headquarters Air Force staff to evaluate the potential of using enlisted personnel as UAS pilots. According to the Secretary of the Air Force and Chief of Staff of the Air Force, the goal of evaluating the use of enlisted personnel is to provide an additional avenue for capability growth. In July 2016, the Air Force reported that it had selected its first enlisted personnel for the program. However, without also evaluating the use of federal civilian personnel, the Air Force may lack valuable information on whether additional options exist for meeting personnel requirements.
Incorporate feedback from UAS pilots by using existing mechanisms or by collecting direct feedback from UAS pilots.	**Recommendation implemented.** The Air Combat Command's Culture and Process Improvement Program Office surveyed UAS Air Force pilots from August through September 2015 to identify the challenges that they face and subsequently developed over 150 initiatives to address these challenges.
Analyze the effects of being deployed-on-station to determine whether there are resulting negative effects on the quality of life of UAS pilots and take responsive actions as appropriate.	**No action taken to implement recommendation.** In response to a request from the Department of Defense's Office of the Inspector General for information about this recommendation, the Air Force reported that it has ample data showing the effects of UAS pilots being deployed-on-station over the last 9 years. The Air Force reported that it had identified the stressors related to being deployed-on-stations and that these stressors likely could be addressed with personnel solutions to increase the number of personnel in UAS units. The Department of Defense's Office of Inspector General considers this recommendation to be closed, indicating the Air Force will likely not take further action. In addition, as of November 2016, the Air Force had not provided information that responded to our request for evidence that the Air Force had fully analyzed whether being deployed-on-station had negative effects on quality of life that are not attributable to the stressors that are related to personnel shortages.
Include the career field effect of being an UAS pilot into AFPC's analysis to determine whether and how being an UAS pilot is related to promotions and determine whether the factors AFPC identified in its analysis of Line of the Air Force officers are also related to UAS pilot promotions.	**No actions taken or planned to implement recommendation.** In October 2016, Air Force headquarters officials stated that while the Air Force Personnel Center continues to monitor and analyze promotion trends for UAS pilots, an independent variable that indicates where someone has UAS experience is not included in the regression model. The Air Force Personnel Center official stated that such a variable would not provide actionable data and would not be an important factor. In addition, the Department of Defense Office of Inspector General had closed this recommendation, according to a Department of Defense Office of Inspector General recommendation follow up report dated June 2016, indicating the Air Force will likely not take further action.

Recommendations from GAO-15-461 to the Army	Action taken/recommendation status
Require unit status reports to include information on the readiness levels of UAS pilots in UAS units.	**Actions taken, but recommendation not implemented.** Army Headquarters officials stated that the Army updated its table on individual and crew qualification criteria as an addendum to the Department of the Army Pamphlet 220-1. For example, the Gray Eagle UAS that was not previously included was added to the table. These officials also stated that the Army updated the unit status reporting software to enable units to comply with the update to the Army pamphlet table. In addition, the Army officials stated that the Army is pursuing an Army-wide initiative to improve readiness reporting and visibility. The officials stated that the effort's initial operating concept is expected to be completed in March or April of 2017. However, as of November 2016, the Army still does not require unit status reports to include the readiness levels of UAS pilots in UAS units.
Take additional steps to mitigate potential risks posed by its waiver of course prerequisites for less experienced UAS pilots attending the course to become instructors, such as by providing additional preparation for current and future instructors who do not meet one or more course prerequisites to enhance their ability to successfully provide training.	**Actions taken, but recommendation not implemented.** In October 2016, Army Headquarters officials stated that the Army had taken additional steps to mitigate potential risks posed by waiving course prerequisites for less experienced UAS pilots attending the course to become instructors. Specifically, by the end of fiscal year 2016, the Army had put 50 of 106 planned Universal Mission Simulators in place for active duty units, reduce the number of waivers granted for three of four course prerequisites. Army officials also provided documentation to show that the number of waivers granted had decreased in fiscal year 2016. However, an Army official from the Training and Doctrine Command stated that the Army had not provided additional training or preparation for instructors who had previously received a waiver of one of the course prerequisites to attend the instructor course as we had recommended.
Recommendation from GAO-15-461 to the Office of the Under Secretary of Defense for Personnel and Readiness	**Action taken/recommendation status**
Secretary of Defense should direct the Under Secretary of Defense for Personnel and Readiness to address how the services should coordinate with one another in the strategy on UAS pilot training that the Office of the Under Secretary of Defense for Personnel and Readiness is current drafting.	Actions taken, but recommendation not implemented. As of October 2016, some coordination was occurring among the services with respect to UAS pilot training but the Department of Defense had not yet developed a department-wide UAS training strategy. In March 2016, the Director of Force Training in the Office of the Assistant Secretary of Defense (Readiness) stated that DOD had not yet published the department-wide UAS training strategy but that the strategy was in the final drafting phase. The Director stated that the office held a summit in October 2015 with each of the services and during this summit representatives from each of the services discussed the draft strategy and how to incorporate our recommendation into the strategy. In October 2016, the Director stated that RAND had completed the draft strategy and that the Office of the Assistant Secretary of Defense (Readiness) had begun revising the strategy. An Office of the Assistant Secretary of Defense (Readiness) official working on the revisions stated that the strategy would address our recommendation and coordination among the services. However, as of October 2016, the Office of the Assistant Secretary of Defense (Readiness) had not yet issued the department-wide UAS training strategy.

Source: GAO analysis | GAO-17-53

Appendix II: Scope and Methodology

We focused our review on the personnel programs for unmanned aerial system (UAS) pilots in the Army and the Air Force. We focused our review on the Army and the Air Force programs because these services have significantly more UAS pilots than the Navy and the Marine Corps. We also included efforts that the Office of the Under Secretary of Defense for Personnel and Readiness had taken because that office is responsible for developing guidance to implement policies and procedures for determining the most appropriate and cost efficient mix of military, civilian, and contractor personnel to perform the missions of the department.

To assess the extent to which the Air Force and the Army have applied key principles of effective strategic human capital planning in the actions taken to address challenges with managing UAS pilots, we compared criteria that we previously developed on key principles of effective strategic human capital planning with actions the Air Force and the Army have taken to address challenges that each has faced with managing the UAS pilot workforce.[1] In our prior work, we found that strategic human capital planning is an important component of an agency's effort to develop long-term strategies for acquiring, developing, and retaining staff needed for an agency to achieve its goals and of an agency's effort to align human capital activities with the agency's current and emerging mission. Specifically, we have found that an agency's efforts to conduct strategic human capital planning should be characterized by five key principles: (1) involving top senior leaders, employees, and other stakeholders in developing, communicating, and implementing strategic workforce plans; (2) developing strategies tailored to address gaps in critical skills and competencies that need attention; (3) monitoring and evaluating progress toward meeting workforce planning goals; (4) building the capability needed to address administrative, educational, and other requirements important to supporting workforce strategies; and (5) determining the critical skills and competencies needed to achieve goals.

[1]GAO, *Human Capital: Key Principles for Effective Strategic Workforce Planning*, GAO-04-39 (Washington, D.C.: Dec. 11, 2003). To identify strategic workforce planning principles, we reviewed our own guidance, reports, and testimonies on federal agencies' workforce planning and human capital management efforts, and guidance available from leading human capital periodicals, such as the Workforce Planning Resource Guide for Public Sector Human Resource Professionals. We also met with officials from organizations with governmentwide responsibilities for or expertise in workforce planning, such as the Office of Personnel Management and the National Academy of Public Administration, to identify additional guidance. We synthesized the information we collected and derived principles that appeared most important to effective strategic workforce planning.

To identify the extent to which the Air Force and the Army have implemented these key principles in actions to address challenges with managing UAS pilots, we reviewed Air Force and Army documentation related to these services challenges and the actions taken to address those challenges. These documents include data on the number of required and actual UAS pilots in the Air Force for fiscal year 2016, Air Force data on the number of personnel filling UAS pilot instructor positions as of July 2016, and Air Force data on the number of hours that UAS pilots and manned-aircraft pilots fly on average per year from fiscal year 2015. These documents also included Army data on the number of personnel filling UAS pilot positions as of May 2016 and the average number of training hours completed by certain UAS units for fiscal year 2013 through the third quarter of fiscal year 2016. We assessed the reliability of these data by reviewing related documentation and interviewing agency officials knowledgeable about the data. We determined that these data were sufficiently reliable for the purposes of our reporting objectives. We determined that the services "applied" a key principle for strategic human capital planning when their actions generally demonstrated the characteristics specified in the principle, we determined that the services "partially applied" a key principle for strategic human capital planning when their actions explicitly demonstrated at least one characteristic of the principle, and we determined that the services did "not apply" a key principle for strategic human capital planning when their actions did not demonstrate any characteristics of the principle.

To assess the extent to which the Air Force and the Army have evaluated the workforce mix to meet UAS pilot requirements, we compared Air Force and Army efforts to determine the type of personnel to use for UAS pilots positions with criteria in Department of Defense (DOD) Directive 1100.4 Guidance for Manpower Management which articulates DOD policy that assigned missions shall be accomplished using the least costly mix of military, civilian, and contract personnel consistent with military requirements and other needs of the department and DOD Instruction 1100.22 Policies and Procedures for Determining Workforce Mix, which establishes the workforce mix decision process, including the consideration of cost as a deciding factor in workforce mix decisions, and states that manpower authorities consider all available personnel when determining the workforce mix, including active military, federal civilians,

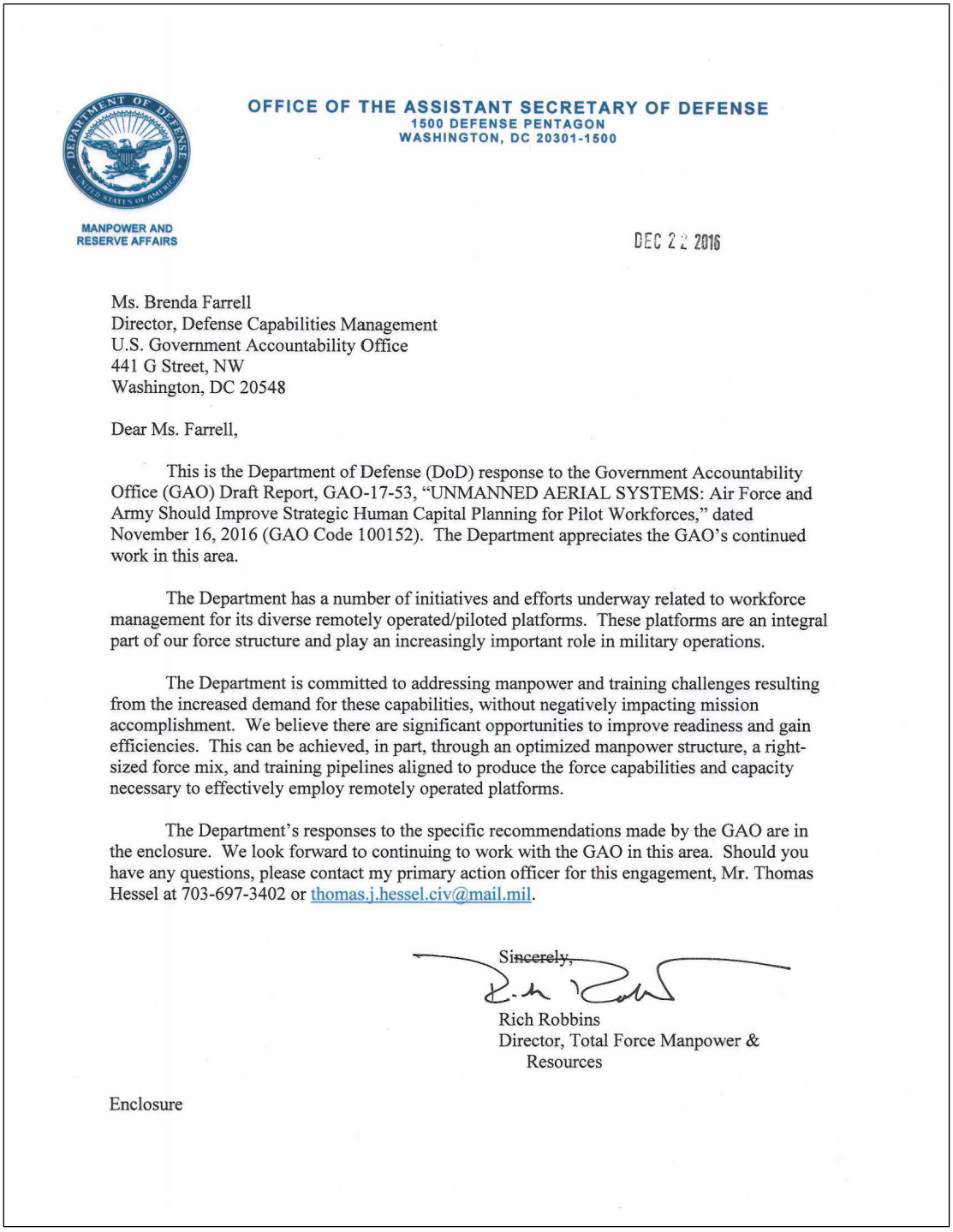
and contractors.[2] We also reviewed documentation and data on the use of additional sources of personnel, such as performance work statements for contractors and hours flown for some contractors. In addition, we requested documentation on efforts to reevaluate personnel determinations for UAS pilot positions and interviewed knowledgeable officials. We compared the documentation, or lack thereof, and information obtained from the officials to criteria in DOD Instruction 1100.22, which directs component heads to provide sufficient oversight to ensure compliance with the Instruction through periodic reviews of the component's workforce.

For both objectives, we interviewed officials from the Office of the Under Secretary of Defense for Personnel and Readiness; the Headquarters Air Force Office of the Deputy Chief of Staff for Manpower, Personnel, and Services; the Headquarters Air Force Office of the Deputy Chief of Staff for Operations; the Air Combat Command; the Air Education and Training Command; the Air Force Personnel Center, the Air Force Academy, the Air Force Reserve Officer Training Corps program; the Air Force Recruiting Service, the Headquarters Army Deputy Chief of Staff for Operations; the Headquarters Army Deputy Chief of Staff for Personnel; the Army Research Institute, the Army Aviation Center of Excellence; and the Army Human Resources Command.

We conducted this performance audit from June 2015 to December 2017 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

[2]DOD Directive 1100.4, Guidance for Manpower Management (Feb. 12, 2005) and DOD Instruction 1100.22, Policy and Procedures for Determining Workforce Mix (Apr. 12, 2010).

Appendix III: Comments from the Department of Defense



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MANPOWER AND
RESERVE AFFAIRS

DEC 22 2016

Ms. Brenda Farrell
Director, Defense Capabilities Management
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Ms. Farrell,

This is the Department of Defense (DoD) response to the Government Accountability Office (GAO) Draft Report, GAO-17-53, "UNMANNED AERIAL SYSTEMS: Air Force and Army Should Improve Strategic Human Capital Planning for Pilot Workforces," dated November 16, 2016 (GAO Code 100152). The Department appreciates the GAO's continued work in this area.

The Department has a number of initiatives and efforts underway related to workforce management for its diverse remotely operated/piloted platforms. These platforms are an integral part of our force structure and play an increasingly important role in military operations.

The Department is committed to addressing manpower and training challenges resulting from the increased demand for these capabilities, without negatively impacting mission accomplishment. We believe there are significant opportunities to improve readiness and gain efficiencies. This can be achieved, in part, through an optimized manpower structure, a right-sized force mix, and training pipelines aligned to produce the force capabilities and capacity necessary to effectively employ remotely operated platforms.

The Department's responses to the specific recommendations made by the GAO are in the enclosure. We look forward to continuing to work with the GAO in this area. Should you have any questions, please contact my primary action officer for this engagement, Mr. Thomas Hessel at 703-697-3402 or thomas.j.hessel.civ@mail.mil.

Sincerely,

Rich Robbins
Director, Total Force Manpower &
Resources

Enclosure

GAO Draft Report Dated November 16, 2016
GA0-17-53 (GAO CODE 100152)

"UNMANNED AERIAL SYSTEMS: AIR FORCE AND ARMY SHOULD IMPROVE STRATEGIC HUMAN CAPITAL PLANNING FOR PILOT WORKFORCES"

DEPARTMENT OF DEFENSE COMMENTS TO THE GAO'S RECOMMENDATIONS

RECOMMENDATION 1: To help ensure that the Air Force strategies to address UAS pilot shortages are tailored to address remaining issues, such as the significant amount of pilots who are temporarily assigned to the UAS pilot career, the limited amount of cadet interest in the UAS pilot career, and the workload of UAS pilots, GAO recommends that the Secretary of Defense direct the Secretary of the Air Force to revise the Get Well Plan to address these issues.

DoD RESPONSE: Partially concur. The Department believes the Air Force's Get Well Plan addresses these issues and further direction is not needed. The Get Well Plan is a series of evolving increments that build off of each other; progress against each is regularly briefed to the Department's senior leadership. The GAO's recommendations are already being taken into consideration throughout the incremental implementation of the Get Well Plan. While the Department does not disagree with the recommendation, we believe that significant steps have already been taken to fulfill its spirit and intent with respect to accessions, assignments, and manning; workload and impacts on both quality of life and service; training and production pipelines; and cadet interest.

RECOMMENDATION 2: To help the Air Force ensure that its strategies are having the intended effects, GAO recommends that the Secretary of Defense direct the Secretary of the Air Force to monitor the extent that achieving the human capital goals in its strategy helps it achieve its programmatic goals.

DoD RESPONSE: Partially concur. The Department agrees that continuous monitoring and, if/when necessary, refinement of the Air Force Get Well Plan is critical to ensuring that it achieves its intended outcomes. Accordingly, the Air Force provides regular updates to the senior leadership of the Department, including the Deputy Secretary of Defense, on the goals and status of the Get Well Plan. Based on those updates, the Office of the Secretary of Defense will provide additional direction as necessary and appropriate.

RECOMMENDATION 3: To help the Air Force ensure that it is poised to meet future needs for UAS pilots, GAO recommends that the Secretary of Defense direct the Secretary of the Air Force to explore the potential use of additional flexibilities that would enable it to increase the number of UAS pilots in its workforce.

DoD RESPONSE: Partially concur. The Air Force is working aggressively to build a remotely piloted aircraft force to meet future needs. To that end, as part of its Get Well Plan, the Air Force is already exploring additional measures with the potential to increase the number of pilots in the remotely piloted aircraft workforce; further direction from the Secretary of Defense is not necessary. As needed, the Air Force will engage with the

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Office of the Secretary of Defense to secure authorities necessary to implement desired measures relating to the workforce.

RECOMMENDATION 4: To help the Army identify challenges that UAS pilots face in completing their training, GAO recommends that the Secretary of Defense direct the Secretary of the Army to collect feedback from UAS pilots in UAS units such as by surveying them or conducting focus groups with them.

DoD RESPONSE: Partially concur. The Department believes that the collection of feedback is important to improving and rectifying challenges in the training pipeline. The Army currently has a number of processes and systems in place to assess the safety, operations, training, maintenance, and readiness of remotely piloted aircraft units and operators. These processes are under continuous refinement, and those efforts will be bolstered by the GAO's report and recommendations. However, the Department does not believe that further direction is necessary.

RECOMMENDATION 5: To help the Army identify challenges that UAS pilots face in completing their training, GAO recommends that the Secretary of Defense direct the Secretary of the Army to incorporate such feedback [from UAS pilots] into its strategy to address UAS training shortfalls.

DoD RESPONSE: Partially concur. The Department does not believe specific direction is necessary, as utilizing and incorporating feedback received from the field is already a core element of the Army's overall strategy for improving the sustainability, maturity, and health of its remotely piloted aircraft workforce. The GAO's assessment, which highlighted the Army's work in this area, will reinforce the importance of using the feedback received to improve and refine the Army's overall strategy.

RECOMMENDATION 6: To help ensure that Army Shadow units meet minimum training requirements, GAO recommends that the Secretary of Defense direct the Secretary of the Army to revise its strategy to address UAS training shortfalls to ensure that it is fully tailored to address training issues and address factors such as lack of adequate facilities, lack of access to airspace, and the inability to fly more than one UAS at a time.

DoD RESPONSE: Partially concur. The Army has already undertaken a series of steps to continuously improve upon its training strategy and the recommendations and findings of the GAO will underline the importance of those initiatives. The Department does not feel additional direction or specific guidance is necessary.

RECOMMENDATION 7: To help the Army ensure that it is basing its decisions to select individuals for UAS pilot training on sound evidence and to help it take advantage of the key benefits associated with effective personnel selection that could include reducing training costs, improving job performance, improving retention of qualified personnel, enabling leadership development, and enhancing organizational effectiveness, GAO recommends that the Secretary of Defense direct the Secretary of the Army to validate that the Armed Services Vocational Aptitude is an effective predictor of UAS pilot candidate performance in UAS pilot training and job performance.

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DoD RESPONSE: Partially concur. The Department believes that the current graduation rate of 98% is an indication that the existing personnel resource predictors and practices are sufficient. While periodic re-validation is prudent, specific direction to do so is not necessary.

RECOMMENDATION 8: To help the Army ensure that it is basing its decisions to select individuals for UAS pilot training on sound evidence and to help it take advantage of the key benefits associated with effective personnel selection that could include reducing training costs, improving job performance, improving retention of qualified personnel, enabling leadership development, and enhancing organizational effectiveness, GAO recommends that the Secretary of Defense direct the Secretary of the Army to assess existing research that has been performed that identifies UAS pilot competencies.

DoD RESPONSE: Partially concur. The Department does not believe it is necessary to provide additional direction or guidance to the Army to leverage existing research. Incorporating findings regarding remotely piloted aircraft competencies is already an integral part of both workforce and community management.

RECOMMENDATION 9: To help the Army ensure that it is basing its decisions to select individuals for UAS pilot training on sound evidence and to help it take advantage of the key benefits associated with effective personnel selection that could include reducing training costs, improving job performance, improving retention of qualified personnel, enabling leadership development, and enhancing organizational effectiveness, GAO recommends that the Secretary of Defense direct the Secretary of the Army to incorporate relevant findings from such [existing] research into the Army's approach for selecting UAS pilot candidates, as appropriate.

DoD RESPONSE: Partially concur. The Department does not believe specific direction is necessary from the Secretary of Defense. Effective and efficient resource management, as well as force shaping and management processes, will help ensure that the Army's selection of candidates is consistent with the findings of existing research in this area. Tthe GAO's findings will serve to highlight the importance of such resource management.

RECOMMENDATION 10: To help address personnel shortages and meet mission needs cost effectively, GAO recommends that the Office of the Secretary of Defense, through the Undersecretary of Defense (Personnel & Readiness) direct the Army and the Air Force to evaluate the workforce mix and the use of federal civilians for UAS pilot positions.

DoD RESPONSE: Concur. The Department believes that opportunities exist to assess the force mix associated with remotely piloted aircraft capabilities.

RECOMMENDATION 11: To help address personnel shortages and meet mission needs cost effectively, GAO recommends that the Office of the Secretary of Defense, through the Undersecretary of Defense (Personnel & Readiness) direct the Army and the Air Force to conduct cost analyses consistent with DOD guidance to inform their workforce decisions and ensure cost effectiveness of the UAS pilot workforce mix.

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DoD RESPONSE: Concur. The Department believes that assessments of force mix should, where appropriate and consistent with existing policies, consider the cost of performance.

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Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact:

Brenda S. Farrell, (202) 512-3604 or farrellb@gao.gov

Staff Acknowledgments:

In addition to the contact named above, key contributors to this report were Lori Atkinson, Assistant Director; Mae Jones, James P. Klein, Amie Lesser, Kelly Liptan, Felicia Lopez, Shari Nikoo, and Mike Silver.