



Testimony

Before the Subcommittee on Readiness
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AIR FORCE READINESS

Actions Needed to Rebuild Readiness and Prepare for the Future

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GAO Highlights

Highlights of [GAO-19-120T](#), a testimony before the Subcommittee on Readiness and Management Support, Committee on Armed Services, U.S. Senate

Why GAO Did This Study

The 2018 National Defense Strategy emphasizes that restoring and retaining readiness across the entire spectrum of conflict is critical to success in the emerging security environment. Air Force readiness has steadily declined primarily due to the persistent demand on a fleet that has aged and decreased in size since the 1990s. The Air Force is working to both rebuild the readiness of its forces and modernize its aging fleet to meet future threats. However, according to the Air Force, its readiness goals will take years to achieve as it continues to be challenged to rebuild readiness amid continued operational demands.

This statement provides information on Air Force (1) readiness and management challenges including personnel, equipment, training, and organization and utilization, and (2) plans to grow and modernize its force in the context of readiness recovery across DOD. Also, GAO summarizes recommendations to address these challenges and actions taken by the Air Force.

This statement is based on previously published work since 2016 related to Air Force readiness challenges, fighter pilot workforce requirements, weapon sustainment, aviation training, and force structure.

What GAO Recommends

GAO has made 14 recommendations in prior unclassified work described in this statement. DOD generally concurred with most of them and has implemented 1. Continued attention to these recommendations can assist and guide the Air Force moving forward as it seeks to rebuild the readiness of its forces.

View [GAO-19-120T](#). For more information, contact John Pendleton at (202) 512-3489 or pendletonj@gao.gov.

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What GAO Found

GAO's prior work has highlighted that the Air Force faces management and readiness challenges in four interrelated areas:

- **Personnel:** The Air Force has reported that pilot and aircraft maintainer shortfalls are a key challenge to rebuilding readiness. GAO found in April 2018 that the Air Force had fewer fighter pilots than authorizations for 11 of 12 years, from fiscal years 2006 through 2017. Even as unmanned aerial systems had become more prevalent and fighter pilot workloads had increased, the Air Force had not reevaluated fighter squadron requirements. GAO recommended that the Air Force reevaluate fighter pilot squadron requirements to ensure it has the pilots necessary for all missions.
- **Equipment:** Air Force aircraft availability has been limited by challenges associated with aging aircraft, maintenance, and supply support. GAO reported in September 2018 that, from fiscal year 2011 through 2016, the Air Force generally did not meet availability goals for key aircraft. Further, in October 2017 GAO found F-35 availability was below service expectations and sustainment plans did not include key requirements. GAO recommended that DOD revise F-35 sustainment plans to include requirements and decision points needed to implement the F-35 sustainment strategy.
- **Training:** The Air Force has identified the need to ensure its forces can successfully achieve missions to address a broad range of current and emerging threats. However, GAO reported in September 2016 that Air Force combat fighter squadrons did not complete annual training requirements due to aircraft availability and training range limitations, and had used the same underlying assumptions for its annual training requirements from 2012 to 2016. GAO recommended that the Air Force reassess its annual training requirements to ensure its forces can accomplish a full range of missions.
- **Organization and Utilization:** Air Force management of its force structure can also exacerbate readiness challenges. GAO found in July 2018 that the Air Force's organization of its small F-22 fleet had not maximized aircraft availability, and that its utilization of F-22s reduced opportunities for pilots to train for missions in high-threat environments. GAO found that unless the Air Force assesses the organization and use of its F-22s, F-22 units are likely to continue to experience aircraft availability and pilot training rates that are below what they could be. GAO recommended that the Air Force reassess its F-22 organizational structure to reduce risk to future operations.

Looking to the future, the Air Force will have to balance the rebuilding of its existing force with its desire to grow and modernize. To meet current and future demands, the Air Force has stated that it needs to have more squadrons. However, the costs of such growth are as yet unknown, and will have to compete with other military services looking to increase their force structure and recapitalize their forces. Even with growth, the Air Force would be dependent on the force of today for decades to come and will need to stay focused on rebuilding the readiness of existing forces. Addressing GAO's recommendations are necessary steps to meet current and future needs and can assist the Air Force moving forward.

Chairman Sullivan, Ranking Member Kaine, and Members of the Subcommittee:

Thank you for the opportunity to be here today to discuss issues related to Air Force readiness.

In June 2017, we issued a report highlighting five key mission challenges facing the Department of Defense (DOD).¹ In that report, we noted that the United States faces an extremely challenging national security environment at the same time it is grappling with addressing an unsustainable fiscal situation in which DOD accounts for approximately half of the federal government's discretionary spending. Within this environment, DOD is working to both rebuild the readiness of its current forces and modernize to meet future threats. Since we issued that report, the Department released a new National Defense Strategy in January 2018 that prioritizes the long-term challenges posed by highly capable adversaries and emphasizes the need to rebuild readiness. Additionally, Congress has passed appropriations to fund DOD's effort to restore military readiness.

This statement provides information on Air Force (1) readiness and management challenges in four interrelated areas of personnel, equipment, training, and organization and utilization, and (2) plans to grow and modernize its force in the context of rebuilding readiness across DOD. We also summarize our recommendations to address these Air Force challenges and their actions taken.²

This statement is based on our body of work issued from 2016 to 2018 examining Air Force readiness challenges, fighter pilot workforce requirements, weapon system sustainment, aviation training, and force structure.³ To perform our prior work, we analyzed Air Force readiness,

¹This included a detailed discussion of our priority recommendations to DOD. Since August 2015, we have identified priority recommendations in letters to the Secretary of Defense—recommendations that we have made to DOD that we believe the department should give a high priority to addressing. See GAO, *Department of Defense: Actions Needed to Address Five Key Mission Challenges*, [GAO-17-369](#) (Washington, D.C.: June 13, 2017). As of April 2018, 85 priority recommendations remained open.

²The status of our recommendations made in the work cited in this statement is provided in appendix I. Appendix I does not include recommendations made in classified reports.

³A list of related classified and unclassified GAO products is provided in Related GAO Products at the end of this statement.

personnel, maintenance, and training data, and interviewed cognizant Air Force officials involved in operations. The reports cited throughout this statement contain more details on the scope of the work and the methodology used to carry it out. We have also issued several classified reports since 2016 examining these issues and made recommendations to the Air Force; however this statement does not include that work.

We conducted the work on which this testimony is based 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

DOD has reported that more than a decade of conflict, budget uncertainty, and reductions in force structure have degraded military readiness; in response, the department has made rebuilding the readiness of the military forces a priority. The 2018 National Defense Strategy emphasizes that restoring and retaining readiness across the entire spectrum of conflict is critical to success in the emerging security environment. Nevertheless, DOD reported readiness of the total military force remains low and has remained so since 2013. Our work has shown that Air Force readiness, in particular, has steadily declined due to a persistent demand for forces, a decline in equipment availability and experienced maintenance personnel, the effect of high deployment rates on units' ability to conduct needed training, and a smaller inventory of aircraft.⁴ DOD has made department-wide progress in developing a plan to rebuild readiness of the military force.⁵ In August 2018, we reported that the Office of the Secretary of Defense has developed a Readiness Recovery Framework that the Department is using to guide the military

⁴The Air Force fleet has decreased in size since the 1990s. For example, the Air Force experienced a 58 percent decrease in the number of fighter and bomber squadrons from 1991 to 2015 while maintaining a persistent level of demand from the combatant commands for the use of its forces.

⁵In September 2016, we reviewed DOD and the military services' plans to rebuild readiness and reported that the efforts may be at risk without a department-wide plan for moving forward. We made five recommendations on implementing and overseeing readiness rebuilding efforts. See GAO, *Military Readiness: DOD's Readiness Rebuilding Efforts May Be at Risk without a Comprehensive Plan*, [GAO-16-841](#) (Washington, D.C.: Sept. 7, 2016).

services' efforts and plans to regularly assess, validate, and monitor readiness recovery.⁶ According to officials, the Office of the Secretary of Defense and the military services are currently revising readiness goals and accompanying recovery strategies, metrics, and milestones to align with the 2018 National Defense Strategy and Defense Planning Guidance. However, additional work remains to ensure that the actions DOD is taking will ultimately achieve overall readiness goals.⁷

DOD's readiness rebuilding efforts are occurring in a challenging context that requires the department to make difficult decisions regarding how best to address continuing operational demands while preparing for future challenges. An important aspect of this, across all of the military services, is determining an appropriate balance between maintaining and upgrading legacy weapon system platforms currently in operational use and procuring platforms able to overcome rapidly advancing future threats. Air Force leaders have stated that striking such a balance is exceptionally difficult. While each of the military services, including the Air Force, must grapple with these choices, senior leaders have called for immediate readiness rebuilding with particular focus on aviation. In a memorandum on September 17, 2018, the Secretary of Defense noted that DOD faces shortfalls in aviation squadrons across the force with the aviation inventory and supporting infrastructure suffering from systemic underperformance and unrealized capacity.⁸ In order to focus on meeting DOD's most critical priorities first, the Secretary of Defense emphasized the need to rebuild readiness. As such, the Secretary directed the Air Force to achieve a minimum of 80 percent mission capable rates for fiscal year 2019 for the F-35, F-22, and F-16, while simultaneously reducing

⁶GAO, *Military Readiness: Update on DOD's Progress in Developing a Readiness Rebuilding Plan*, [GAO-18-441RC](#) (Washington, D.C.: Aug. 10, 2018). The Readiness Recovery Framework identifies primary readiness issues that each of the military services face, actions to address identified issues, and milestones and metrics to assess progress in addressing identified issues.

⁷Section 333 of the John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub.L.No. 115-232 (2018), requires us to report annually until 2021 on the readiness of the armed forces to conduct full spectrum operations in the ground, sea, air, space, and cyber domains. This work is ongoing.

⁸Secretary of Defense Memorandum, *NDS Implementation-Mission Capability of Critical Aviation Platforms* (Sept. 17, 2018).

these platforms' operating and maintenance costs every year starting in fiscal year 2019.⁹

Air Force Faces Several Interrelated Management and Readiness Challenges

Our prior work has identified management and readiness challenges in four interrelated areas—personnel, equipment, training, and organization and utilization, and we have made recommendations to help the Air Force address rebuilding the readiness of its existing fleet.

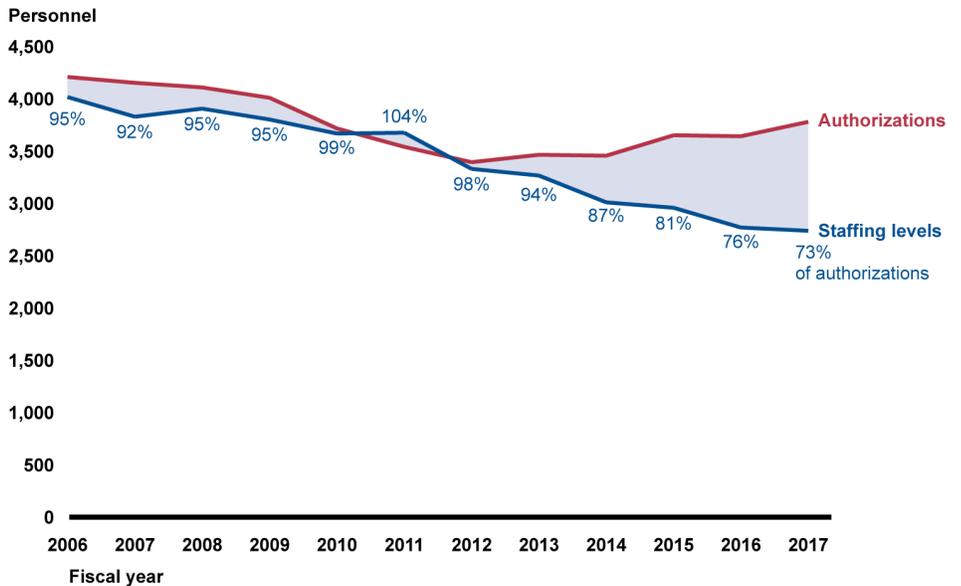
Personnel: Pilot and Aircraft Maintainer Shortfalls Have Impeded Readiness Recovery

The Air Force has reported that manpower shortfalls, particularly among skilled pilots and maintainers, are a primary challenge to rebuilding readiness. As we have previously reported, developing fighter pilots requires a significant investment of time and funding.¹⁰ According to Air Force officials, a fighter pilot requires approximately 5 years of training to be qualified to lead flights, at a cost of between about \$3 million to \$11 million depending on the specific type of aircraft. In April 2018, we reported that according to Air Force pilot staffing level and authorizations data for fiscal years 2006 through 2017, the Air Force had fewer fighter pilots than authorizations for 11 of those 12 years (see fig. 1). This gap grew from 192 fighter pilots (5 percent of authorizations) in fiscal year 2006, to 1,005 (27 percent) in fiscal year 2017. According to briefing documents prepared by the Air Force, this gap was concentrated among fighter pilots with fewer than 8 years of experience. The Air Force forecasted that the fighter pilot gap will persist over time, even as the Air Force takes steps to train more fighter pilots and improve retention.

⁹Secretary Mattis also directed the same mission capable and cost control goals for the Navy's F-35 and F-18 fleets.

¹⁰GAO, *Military Personnel: DOD Needs to Reevaluate Fighter Pilot Workforce Requirements*, [GAO-18-113](#) (Washington, D.C.: Apr. 11, 2018).

Figure 1: Air Force Active Component: Fighter Pilot Actual Staffing Levels Compared with Authorizations, Fiscal Years 2006-2017



Source: GAO analysis of Air Force data. | GAO-19-120T

Air Force officials identified multiple factors that led to low numbers of fighter pilots. For example, the military services trained fewer fighter pilots than targeted over the last decade. In fiscal years 2007 through 2016, the Air Force trained 12 percent fewer new fighter pilots than the targeted amount. In our April 2018 report, we found that the military services had not reevaluated squadron requirements to reflect increased fighter pilot workload and the emergence of unmanned aerial systems. Fighter pilots and squadron leaders from each of the military services we interviewed at the time consistently told us that the fighter pilot occupation has significantly changed in recent years due to changes in fighter aircraft tactics and technology, additional training requirements, and the removal of administrative support positions from squadrons. Without updating squadron requirements to reflect this growing administrative burden on fighter pilots, the currently identified differences between fighter pilot numbers and authorizations may be understated. By contrast, without updating future fighter pilot requirements to take into account changing roles and missions—in particular the increasing role of unmanned aerial systems in combat operations—forecasted fighter pilot gaps may be overstated. In short, we concluded that reevaluating fighter pilot requirements is a key first step to help the military services, including the Air Force, clearly determine the magnitude of the gaps and target

strategies to meet their personnel needs. In our April 2018 report, we recommended that the Air Force reevaluate fighter pilot squadron requirements to ensure it has the pilots necessary for all missions.¹¹ DOD concurred with this recommendation.

The Air Force is also trying to manage a shortage of aircraft maintainer personnel—both uniformed personnel and depot civilians. In September 2018, we found that the Air Force reported losing experienced maintainers, either to retirement or to other programs such as the F-35 Lightning II (F-35).¹² For example, we reported that the Air Force's C-17, which is a long-range, heavy logistics transport aircraft, requires depot modifications to keep it viable, but there was a shortage of depot maintainer personnel due to attrition, inability to retain skilled workers, and hiring freezes. The Air Force has several initiatives underway, including hiring additional maintainer personnel and temporarily transitioning active-duty maintenance units from some legacy aircraft. As of August 2018, the Air Force had requested an increased end strength of 8,000 personnel to fill critical personnel needs in maintenance and pilots. Officials stated that progress was being made in increasing end strength and hiring additional personnel, which should address these challenges. However, according to Air Force officials, it may take several years before newly hired maintainer personnel will have the training and experience they need to improve aircraft availability rates. We have work underway to examine the Air Force's management of its aircraft maintainer workforce and DOD depot skill gaps and plan to report on these issues over the next 6 months.¹³

¹¹In House Report 115-676 accompanying the John S. McCain National Defense Authorization Act for Fiscal Year 2019, the House Armed Services Committee noted that it was concerned about the Air Force's persistent pilot shortages and the effect of those shortages on the readiness of the Air Force, and directed the Secretary of the Air Force to address our recommendation to reevaluate requirements.

¹²GAO, *Weapon System Sustainment: Selected Air Force and Navy Aircraft Generally Have Not Met Availability Goals, and DOD and Navy Guidance Need to Be Clarified*, [GAO-18-678](#) (Washington, D.C.: Sept. 10, 2018).

¹³Our work on the Air Force's management of its aircraft maintainer workforce is focused on maintainer staff gaps, technical school training, and retention over the past 8 years.

Equipment: Aircraft Availability Has Been Limited by Aging Aircraft, Costly Maintenance, and Diminished Supply Support

Air Force aircraft availability has been limited by challenges associated with aging aircraft, maintenance, and supply support. According to the Air Force, the average age of the fleet is 28 years. The average ages of the B-52 strategic bomber and the KC-135 tanker each exceed 50 years, and the Air Force expects to continue to use these aircraft for decades. The Air Force spends billions of dollars each year to sustain its fixed-wing aircraft fleet—comprised of both legacy and new aircraft—which needs expensive logistics support, including maintenance and repair, to meet its availability goals. We reported in September 2018 that from fiscal year 2011 through 2016, the Air Force generally did not meet aircraft availability goals while it continued to accrue increased maintenance costs.¹⁴ Figure 2 summarizes the sustainment challenges we reported that face selected Air Force aircraft.

Figure 2: Sustainment Challenges Affecting Selected Air Force Fixed-Wing Aircraft

Aircraft	Aging aircraft		Maintenance		Supply support	
	 Delays in acquiring replacement aircraft	 Unexpected replacement of parts and repairs	 Delays in depot maintenance	 Shortage of depot maintainer personnel	 Parts obsolescence ^a	 Diminishing manufacturing source ^b
B-52		✓	✓		✓	✓
C-17		✓	✓			✓
E-8C		✓	✓		✓	✓
F-16	✓		✓			✓
F-22		✓	✓	✓		✓

Source: GAO analysis of Air Force data. | GAO-19-120T

^aObsolescence is a lack of availability of a part due to its lack of usefulness or it is no longer current or available for production.

^bDiminishing manufacturing sources is a loss or impending loss of manufacturers or suppliers of items.

¹⁴GAO, *Weapon System Sustainment: Selected Air Force and Navy Aircraft Generally Have Not Met Availability Goals, and DOD and Navy Guidance Need to Be Clarified*, [GAO-18-678](#) (Washington, D.C.: Sept. 10, 2018).

Sustainment challenges are not just an issue for older aircraft, but represent an enduring challenge for the Air Force. The F-35—which is intended to replace a variety of legacy fighter aircraft in the Air Force and more broadly represents the future of tactical aviation for DOD—has projected sustainment costs of over \$1 trillion over a 60-year life cycle.¹⁵ In October 2017, we reported that DOD’s projected operating and support costs estimate for the F-35 rose by 24 percent from fiscal year 2012 to fiscal year 2016 and are not fully transparent to the military services.

In October 2017, we also reported that the F-35 fleet faced sustainment challenges that pose risks to its ability to meet current and future warfighter readiness requirements.¹⁶ The Air Force planned to procure more than 1,700 F-35 aircraft and, as the largest participant in the F-35 program, its readiness could be disproportionately affected by the sustainment challenges facing this program. In particular, DOD’s capabilities to repair F-35 parts at military depots were 6 years behind schedule, which resulted in average part repair times of 172 days—twice that of the program’s objective. These repair backlogs have contributed to significant F-35 spare parts shortages—from January to August 7, 2017, F-35 aircraft were unable to fly 22 percent of the time because of parts shortages. As a result, the Air Force had generally not met its aircraft availability goals for its fielded F-35 aircraft (See fig. 3 for Air Force personnel performing maintenance on the F-35).

¹⁵In 2014, we reported that DOD officials considered the program to be unaffordable, and recommended that DOD establish affordability targets linked to the services budgets to determine what the services could afford. See GAO, *F-35 Sustainment: Need for Affordable Strategy, Greater Attention to Risks, and Improved Cost Estimates*, [GAO-14-778](#) (Washington, D.C.: Sept. 23, 2014). While some steps have been taken to create affordability targets for the program, work remains to ensure that the Air Force can afford to sustain the aircraft it plans to purchase.

¹⁶GAO, *F-35 Aircraft Sustainment: DOD Needs to Address Challenges Affecting Readiness and Cost Transparency*, [GAO-18-75](#) (Washington, D.C.: Oct. 26, 2017).

Figure 3: Air Force Maintenance on F-35



Source: Defense Visual Information Distribution Service. | GAO-19-120T

Our work has shown that these challenges are largely the result of sustainment plans that do not fully include key requirements or timely and sufficient funding. In our October 2017 report, we recommended, among other things, that DOD revise sustainment plans to ensure that they include the key requirements and decision points needed to fully implement the F-35 sustainment strategy and align funding plans to meet those requirements. DOD concurred with this recommendation and DOD officials report that they are focusing actions and resources toward achieving key production, development and sustainment objectives by 2025. In addition, the conference report accompanying a bill for fiscal year 2019 defense appropriations directed a higher appropriation amount for the Air Force's aircraft procurement than DOD requested in its budget.¹⁷ This appropriation may create more demand on the already strained sustainment enterprise for which DOD has not always provided timely funding (for example, funding for spare parts).¹⁸

¹⁷H.R. Conf. Rep. No. 115-952 (2018).

¹⁸GAO, *F-35 Aircraft Sustainment: DOD Needs to Address Challenges Affecting Readiness and Cost Transparency*, [GAO-18-75](#) (Washington, D.C.: Oct. 26, 2017).

Training: Units Are Challenged To Achieve Full Spectrum Readiness

The Air Force has identified the need to ensure a full-spectrum capable force that can successfully perform missions addressing a broad range of current and emerging threats; however, the Air Force has had difficulty training for full spectrum readiness. For more than a decade, the Air Force focused its training on supporting operations in the Middle East, including Iraq and Afghanistan. Commanders established training requirements that they deemed necessary to prepare aircrews to conduct missions in these locations—such as close air support-to-ground forces—limiting training for other missions. In September 2016, based on our analysis of data on the completion of annual training, we found that combat fighter squadrons were generally able to complete mission training requirements for ongoing contingency operations, but were unable to meet annual training requirements across the full range of missions.¹⁹ Wing and squadron commanders we interviewed at the time cited several common limitations related to the challenges discussed in this testimony that affected the ability of their squadrons to complete training across the full range of missions including the maintenance unit's ability to provide adequate numbers of aircraft for training, adversary air tasking, and manpower shortfalls in the squadrons.²⁰

We also reported in September 2016 that F-22 and F-35 squadrons faced training range limitations. F-22 squadron commanders told us that the airspace available limits their ability to train for their more complex missions, including offensive counter air and defensive counter air missions. Additionally, the commanders we interviewed at the time for squadrons flying F-22 and F-35 aircraft told us that limits in training range capabilities, such as threat replicators and targets, affected the training completed at smaller regional training ranges, as well as at larger training ranges such as the Utah Test and Training Range and the Nevada Test and Training Range. According to these officials, the training ranges lacked many of the more advanced threat replication systems that can challenge F-35 and F-22 capabilities and provide effective training across their full range of missions.

The 2018 National Defense Strategy cites, as the department's principal priority, the need to prepare for threats from advanced adversaries due to

¹⁹GAO, *Air Force Training: Further Analysis and Planning Needed to Improve Effectiveness*, [GAO-16-864](#) (Washington, D.C.: Sept. 19, 2016).

²⁰Adversary air or "red air" missions are those in which the aircrews play the role of an adversary threat in support of aircrews flying a "blue" (U.S. and allied force) training sortie.

the magnitude of the threat they pose. Further, the Air Force reports that it will confront an increasingly complex security environment in the coming years that will demand a wider range of skill sets and different capabilities than are currently being employed. For example, aircrews may be called upon to conduct missions that require freedom of maneuver in highly-contested air spaces. However, in our September 2016 report, we found that the Air Force has used the same underlying assumptions to establish its annual training requirements from 2012 through 2016, which may not reflect current and emerging training needs. Specifically, the total annual live-fly training sorties by aircraft, the criteria for designating aircrews as experienced or inexperienced, and the mix between live and simulator training remained the same from 2012 through 2016.²¹ We concluded that without fully reassessing the assumptions underlying its training requirements, the Air Force could not be certain that its annual training plans are aligned with its stated goals to ensure a full-spectrum capable force that can successfully achieve missions across a broad range of current and emerging threats. We recommended that the Air Force reassess its annual training requirements and make any appropriate adjustments to its future training plans to ensure that its forces can accomplish a full range of missions. The Air Force has a number of efforts under way to study or address some of the factors that limit the ability of fighter squadrons to meet annual training requirements.

²¹Section 351 of the National Defense Authorization Act for Fiscal Year 2017 Pub. L. No. 114-328 (2016), directed the Secretary of the Air Force to enter into a contract with an independent entity to conduct a review of the Air Force Ready Aircrew Program, including an assessment of the assumptions underlying the annual continuation training requirements of the Air Force and the overall effectiveness of the Aircrew Program, and make recommendations for the improved management of such training requirements. The Air Force was also directed to report on this review and assessment to the defense committees. On August 30, 2018, the Air Force submitted its report, entitled *Independent Review and Assessment of the Air Force Ready Aircrew Program*, to the Senate and House Committees on Armed Services. Section 351 also included a provision for us to review the Air Force's report and examine (1) the extent to which the Air Force report addressed the elements described in the Act, (2) the adequacy and completeness of the assumptions reviewed to establish the annual training requirements of the Air Force, and (3) any actions the Air Force plans to carry out to incorporate the results of the report into annual training documents. Our review is currently ongoing.

Organization and Utilization: Air Force Management of Its Forces Can Diminish Existing Capability

The Air Force's management of its limited force structure can also exacerbate some of the problems discussed above, as we found for the F-22 fleet. The F-22, widely regarded as the best air superiority fighter aircraft in the world, is an integral part of the U.S. military's ability to defeat high-end adversaries (See fig. 4 for an image of the F-22).

Figure 4: Air Force F-22



Source: GAO. | GAO-19-120T

To meet its assigned air superiority responsibility, the Air Force is to provide the combatant commanders with both mission capable aircraft and pilots who are trained to fly those aircraft in the expected threat environments. However, in July 2018, we found that Air Force organization and utilization of its small fleet of F-22s has reduced its ability to provide these two elements, thereby further limiting this important capability.²²

²²GAO, *Force Structure: F-22 Organization and Utilization Changes Could Improve Aircraft Availability and Pilot Training*, [GAO-18-190](#) (Washington, D.C.: July 19, 2018).

Specifically, we found that the Air Force's organization of its small F-22 fleet has not maximized the availability of these 186 aircraft. Availability was constrained by maintenance challenges and unit organization. For example, maintaining the stealth coating on the outside of the F-22 aircraft was time consuming and significantly reduced the aircraft's availability for missions. Maintenance availability challenges were exacerbated by the Air Force's decision to organize the F-22 fleet into small units of 18 or 21 aircraft per squadron and one or two squadrons per wing. Traditional fighter wings have three squadrons per wing, with 24 aircraft in each squadron, which creates maintenance efficiencies because people, equipment, and parts can be shared, according to Air Force officials. Further, the Air Force organized F-22 squadrons to operate from a single location. However, it generally deployed only a part of a squadron, and the remaining part struggled to keep aircraft available for missions at home.²³ Larger, traditional Air Force squadrons and deployable units provide a better balance of equipment and personnel, according to service officials. The Air Force had not reassessed the structure of its F-22 fleet since 2010 and may be foregoing opportunities to improve the availability of its small yet critical F-22 fleet, and better support combatant commander air superiority needs in high threat environments.

Further, we found that the Air Force's utilization of its F-22 fleet limited pilot opportunities to train for air superiority missions in high threat environments. To complete the annual training requirements for air superiority missions, F-22 pilots must train almost the entire year. However, F-22 pilots were not meeting their minimum yearly training requirements for air superiority missions, according to Air Force training reports and service officials. Moreover, using F-22s for exercises and operational missions that do not require the F-22's unique capabilities interrupted pilot training and led to reduced proficiency. For example, F-22 units were often directed to participate in partnership building exercises. However, during these exercises, F-22 pilots may be restricted

²³The deployment of partial squadrons occurs not just with F-22 squadrons, but across the Air Force and with similar effects on squadron operations. Further, although the Air Force has not deployed a complete flying squadron to meet operational requirements since the late 1990s, it continues to provide readiness information to DOD and Congress at the squadron level. In our June 2018 report, we recommended, among other things, that the Air Force analyze and report the readiness data to DOD and Congress of the small pieces of the squadrons that are deploying. GAO, *Air Force Readiness: Changes to Readiness Reports Could Help Stakeholders Take More Informed Actions*, [GAO-18-65C](#) (Washington, D.C.: June 13, 2018).

from flying the F-22 the way they would fly it in combat—due to security concerns about exposing the F-22's unique capabilities. These restrictions not only limited the value of the exercises, but also could result in pilots developing bad habits, according to Air Force officials. The Air Force also uses F-22s to support alert missions—that is, a mission that requires certain bases to have jets ready at all times to respond to threats from civil or military aviation. The alert mission does not require the advanced capabilities of the F-22, but we reported that because there are no other operational Air Force fighter squadrons based at the F-22 locations in Alaska and Hawaii, the alert mission fell on the F-22 units. Pilots and aircraft assigned to the alert mission could not be used for any other purposes, limiting opportunities for pilots to enhance air superiority skills. Unless the Air Force takes steps to assess and make necessary adjustments to the current organization and use of its F-22s, F-22 units are likely to continue to experience aircraft availability and pilot training rates that are below what they could be. As a result, the Air Force may incur increased risks in future operations in high threat areas. In July 2018, we recommended that the Air Force reassess its F-22 organizational structure and identify ways to increase F-22 pilot training opportunities for high-end missions to reduce risk to future operations. DOD concurred with both recommendations.

Air Force Will Need to Balance Near-term Readiness Recovery with Plans to Grow and Modernize the Force

In September 2018, the Secretary of the Air Force described the need to grow the number of Air Force squadrons from 312 to 386—a 24 percent increase—between fiscal years 2025 and 2030 in order to meet persistent operational demands and address the challenges identified in the National Defense Strategy.²⁴ However, the details and costs of such growth are as yet unknown and will have to compete with other military services looking to increase their force structure and major defense capabilities that require recapitalization. For example, over the next three decades, the Navy plans to grow its fleet by nearly 25 percent—at an estimated cost of about \$800 billion—and modernizing and maintaining the nation's nuclear arsenal could cost \$1.2 trillion over the same

²⁴As of September 2018, the Air Force reported it has 312 operational squadrons to execute its core missions consisting of fighters, bombers, airlift, intelligence/surveillance/reconnaissance, command and control, special operations, space, cyber, missile, and personnel recovery squadrons.

timeframe.²⁵ All of these investments would need to be made amid a deteriorating national fiscal picture.²⁶

Even if it grows, the Air Force will be dependent on the force of today for decades to come and will need to stay focused on rebuilding its readiness. Many of the Air Force's fourth generation fighters will be part of the force structure for the next decade or more, and the Air Force plans to retain the F-22 aircraft until 2060. In addition, the Air Force proposed divesting the A-10 to make budgetary room for more modern aircraft. However, as we reported in August 2016, the Air Force did not fully examine the implications of this course of action and could not demonstrate how it would meet the multiple missions being performed by the aging A-10.²⁷ Therefore, focusing on rebuilding the existing force will be crucial to positioning the Air Force for the future. While these challenges are particularly acute in the Air Force, the Air Force is not alone among the military services. Given persistently low readiness levels across the military, we have called for a comprehensive readiness rebuilding plan for the entire Department of Defense to guide rebuilding efforts, including setting clear goals and identifying resources required to meet those goals for all services, including the Air Force.²⁸

In sum, as it plans for the future, the Air Force will need to balance the rebuilding of its existing force with its desire to grow and modernize. We have made a number of recommendations—with which the Air Force have generally concurred with but most have not yet been implemented—that provide a partial roadmap to address important readiness challenges. Implementing our recommendations to reevaluate fighter pilot squadron requirements, revise F-35 sustainment plans, reassess annual training requirements, and examine how the Air Force organizes and utilizes its F-22 organizational structure are necessary steps to meet current and

²⁵These are Congressional Budget Office estimates. See Congressional Budget Office, *Costs of Building a 355-Ship Navy*, (Washington, D.C.: Apr. 2017) and Congressional Budget Office, *Approaches for Managing the Costs of U.S. Nuclear Forces, 2017 to 2046*, (Washington, D.C.: Oct. 2017).

²⁶GAO, *The Nation's Fiscal Health: Action Is Needed to Address the Federal Government's Fiscal Future*, [GAO-18-299SP](#) (Washington, D.C.: June 21, 2018).

²⁷GAO, *Force Structure: Better Information Needed to Support Air Force A-10 and Other Future Divestment Decisions*, [GAO-16-816](#) (Washington, D.C.: Aug. 24, 2016).

²⁸GAO, *Military Readiness: DOD's Readiness Rebuilding Efforts May Be at Risk without a Comprehensive Plan*, [GAO-16-841](#) (Washington, D.C.: Sept. 7, 2016).

future needs and can assist the Air Force moving forward. In addition, sustained management attention and continued congressional oversight will be needed to ensure that the Air Force demonstrates progress in addressing its personnel, equipment, training, and organization and utilization challenges.

Chairman Sullivan, Ranking Member Kaine, and Members of the Subcommittee, this concludes my prepared statement. I would be pleased to respond to any questions you may have at this time.

GAO Contact and Staff Acknowledgments

If you or your staff have questions about this testimony, please contact John Pendleton, Director, Defense Capabilities and Management at (202) 512-3489 or pendletonj@gao.gov.

Contact points for our offices of Congressional Relations and Public Affairs may be found on the last page of this statement. GAO staff who made key contributions to this testimony are Chris Watson, Assistant Director; Nick Cornelisse, Amie Lesser, Shari Nikoo, Michael Silver, Nicole Volchko, and Lillian Yob.

Appendix I: Implementation Status of Key Prior GAO Recommendations Related to Air Force Readiness

Over the past three years, we issued several reports related to Air Force readiness that are cited in this statement. Table 1 summarizes the status of our key recommendations related to Air Force readiness since 2016; a total of 14 recommendations. The Department of Defense (DOD) has implemented 1 of these recommendations. For each of the reports, the specific recommendations and their implementation status are summarized in tables 2 through 7.

Table 1: Status of Key GAO Recommendations Related to Air Force Readiness Since 2016

Product date	Product title and number	Number of recommendations	
		Open	Implemented
September 10, 2018	<i>Weapon System Sustainment: Selected Air Force and Navy Aircraft Generally Have Not Met Availability Goals, and DOD and Navy Guidance Need to Be Clarified (GAO-18-678)</i>	1 ^a	0
July 19, 2018	<i>Force Structure: F-22 Organization and Utilization Changes Could Improve Aircraft Availability and Pilot Training (GAO-18-190)</i>	2	0
April 11, 2018	<i>Military Personnel: DOD Needs to Reevaluate Fighter Pilot Workforce Requirements (GAO-18-113)</i>	1 ^a	0
October 26, 2017	<i>F-35 Aircraft Sustainment: DOD Needs to Address Challenges Affecting Readiness and Cost Transparency (GAO-18-75)</i>	4	0
September 19, 2016	<i>Air Force Training: Further Analysis and Planning Needed to Improve Effectiveness (GAO-16-864)</i>	2	1
August 24, 2016	<i>Force Structure: Better Information Needed to Support Air Force A-10 and Other Future Divestment Decisions (GAO-16-816)</i>	3	0
Total		13	1

Source: GAO analysis of DOD information. | GAO-19-120T

Note: This table does not include recommendations made in classified reports.

^aThis report also included recommendations directed to the Secretary of the Navy, which are not counted here.

Table 2: Status of Recommendations from *Weapon System Sustainment: Selected Air Force and Navy Aircraft Generally Have Not Met Availability Goals, and DOD and Navy Guidance Need to Be Clarified (GAO-18-678)*

Recommendation #1:	
The Secretary of Defense should ensure that the Under Secretary of Defense for Acquisition and Sustainment updates or issues new policy clarifying the requirements for documenting sustainment strategies for legacy weapon systems, including fixed-wing aircraft.	Status: Open
	Concurrence: Yes
	Comments: We will monitor DOD's efforts to address this recommendation.

Source: GAO analysis. | GAO-19-120T

Note: This table does not include a recommendation that was directed to the Secretary of the Navy and did not relate to the Air Force.

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Table 3: Status of Recommendations from *Force Structure: F-22 Organization and Utilization Changes Could Improve Aircraft Availability and Pilot Training* (GAO-18-190)

Recommendation #1:	
<p>The Secretary of the Air Force should conduct a comprehensive assessment of the F-22 organizational structure that identifies and assesses alternative approaches to organizing F-22 squadrons. The assessment could at a minimum assess the following two alternatives: consolidating the fleet into larger squadrons and/or wings in order to improve aircraft availability, and revising the design of the deployable units in squadrons to better support current deployment practices and future operational concepts.</p>	<p>Status: Open</p> <p>Concurrence: Yes</p> <p>Comments: We will monitor DOD's efforts to address this recommendation.</p>
Recommendation #2:	
<p>The Secretary of the Air Force should identify and assess actions to increase F-22 pilot training opportunities for the high-end air superiority missions. This effort could consider alternatives such as: reducing exercise events that do not contribute to F-22 pilot high-end air superiority training, increasing external adversary air support so all F-22 pilots can use their available limited sorties to conduct high-end air superiority training rather than having a significant portion of the F-22 pilots providing training support, and finding alternatives to using F-22 units for alert missions, and other missions that do not require the jet's unique capabilities or prepare F-22 pilots for their primary missions.</p>	<p>Status: Open</p> <p>Concurrence: Yes</p> <p>Comments: We will monitor DOD's efforts to address this recommendation.</p>

Source: GAO analysis. | GAO-19-120T

Table 4: Status of Recommendations from *Military Personnel: DOD Needs to Reevaluate Fighter Pilot Workforce Requirements* (GAO-18-113)

Recommendation #1:	
<p>The Secretary of the Air Force should ensure that the Director of Operations and the Air Force Manpower Analysis Agency reevaluate fighter pilot squadron requirements, to include updating current assumptions of fighter pilot workload, and assessing the impact of future incorporation of unmanned aerial systems platforms into combat aviation.</p>	<p>Status: Open</p> <p>Concurrence: Yes</p> <p>Comments: We will monitor DOD's efforts to address this recommendation.</p>

Source: GAO analysis. | GAO-19-120T

Note: This table does not include two recommendations that were directed to the Secretary of the Navy and did not relate to the Air Force.

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Table 5: Status of Recommendations from F-35 Aircraft Sustainment: DOD Needs to Address Challenges Affecting Readiness and Cost Transparency (GAO-18-75)

Recommendation #1:	
The Under Secretary of Defense for Acquisition, Technology, and Logistics, in coordination with the F-35 Program Executive Officer, should revise sustainment plans to ensure that they include the key requirements and decision points needed to fully implement the F-35 sustainment strategy and align funding plans to meet those requirements.	<p>Status: Open</p> <p>Concurrence: Yes</p> <p>Comments: As of June 2018, officials from the Office of the Under Secretary of Defense for Acquisition and Sustainment (USD (A&S)) said that USD(A&S) and the F-35 Program Executive Officer (PEO) are focusing actions and resources towards achieving key production, development, and sustainment objectives by 2025. We will continue to monitor the DOD's efforts, but it is too soon to determine the extent to which these efforts—when completed—will address the concerns that we identified our report.</p>
Recommendation #2:	
The Under Secretary of Defense for Acquisition, Technology, and Logistics, in coordination with the F-35 Program Executive Officer, should re-examine the metrics that it will use to hold the contractor accountable under the fixed-price, performance-based contracts to ensure that such metrics are objectively measurable, are fully reflective of processes over which the contractor has control, and drive desired behaviors by all stakeholders.	<p>Status: Open</p> <p>Concurrence: Yes</p> <p>Comments: As of June 2018, officials from the Office of the Under Secretary of Defense for Acquisition and Sustainment (USD (A&S)) stated that the F-35 Program Executive Officer (PEO) re-examines sustainment metrics every year to allow the department to objectively measure and hold the contractor accountable for delivering increased availability and reduced cost, and to align sustainment processes and deliverables to those which the contractor controls. We recognize the department's progress related to this recommendation, but the key metrics being used by the F-35 program to incentivize the contractor remain a concern as they are not fully reflective of processes over which the contractor has control. This could make it difficult to hold the contractor accountable under performance based contracts, as we reported. We will continue to monitor DOD's efforts in this area.</p>
Recommendation #3:	
The Under Secretary of Defense for Acquisition, Technology, and Logistics, in coordination with the F-35 Program Executive Officer, should, prior to entering into multi-year, fixed-price, performance-based contracts, ensure that DOD has sufficient knowledge of the actual costs of sustainment and technical characteristics of the aircraft after baseline development is complete and the system reaches maturity.	<p>Status: Open</p> <p>Concurrence: Yes</p> <p>Comments: As of June 2018, officials from the Office of the Under Secretary of Defense for Acquisition and Sustainment (USD (A&S)) stated that the F-35 Program Executive Officer (PEO) is overseeing a Sustainment Actual Cost Working Group. Until DOD has a full understanding of the actual costs of sustainment and technical characteristics of the aircraft at system maturity, it may not be well positioned to enter into a long-term, fixed-price, performance-based contract. We will continue to monitor DOD's efforts in this area.</p>

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Recommendation #4:

The Under Secretary of Defense for Acquisition, Technology, and Logistics, in coordination with the F-35 Program Executive Officer, should take steps to improve communication with the services and provide more information about how the F-35 sustainment costs they are being charged relate to the capabilities received.

Status: Open

Concurrence: Yes

Comments: As of June 2018, officials from the Office of the Under Secretary of Defense for Acquisition and Sustainment (USD (A&S)) stated that USD(A&S) is currently undertaking a study on F-35 Sustainment Affordability and Transparency. The study examines affordability and transparency issues between the services and the F-35 Joint Program Office, which inhibit the services' visibility into expected F-35 costs versus budgets, what they are paying for in sustainment, and what they are getting for that money. Officials said that USD (A&S) expects to deliver a final report to the congressional defense committees by September 2018. We will review DOD's report, once completed, to determine the extent to which DOD's efforts address our recommendation.

Source: GAO analysis. | GAO-19-120T

Table 6: Status of Recommendations from *Air Force Training: Further Analysis and Planning Needed to Improve Effectiveness* (GAO-16-864)

Recommendation #1:

To ensure that annual training plans are aligned with the Air Force's stated goals to ensure that its forces can successfully achieve missions across a broad range of current and emerging threats, the Secretary of Defense should direct the Secretary of the Air Force to comprehensively reassess the assumptions underlying its annual training requirements—including, but not limited to, the total annual training requirements by aircraft, the criteria for designating aircrews as experienced or inexperienced, and the mix between live and simulator training—and make any appropriate adjustments in future training plans.

Status: Open

Concurrence: No

Comments: Although DOD did not concur with this recommendation, as of August 2018, the Air Force has taken steps to address it. The Air Force has completed one study on its fighter aircrew annual training requirements and is currently evaluating the results of another. The studies are intended to help the Air Force ensure that fighter aircrew training plans are aligned to achieve a range of missions for current and emerging threats, as recommended by us.

Recommendation #2:

To improve the Air Force's ability to consistently monitor training results and better position it to allocate resources to address factors that limit the effectiveness of training, the Secretary of Defense should direct the Secretary of the Air Force to establish desired learning objectives and training support elements needed to accomplish the training expectations in its annual Ready Aircrew Program tasking memorandums, and develop a process to collect data to assess the effectiveness of annual training against these features.

Status: Open

Concurrence: No

Comments: DOD stated that that the Air Force's Ready Aircrew Program training differs significantly from other syllabus-directed courses of instruction and that desired learning objectives for this training are set at the squadron level in accordance with current Air Force guidelines. As of August 2018, DOD did not plan to take any further additional actions to address this recommendation.

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Recommendation #3:

To improve the Air Force's ability to develop the capabilities needed to meet its virtual training needs, the Secretary of Defense should direct the Secretary of the Air Force to continue to refine its planning for virtual training to incorporate the desirable characteristics of a comprehensive strategy, including developing a risk-based investment strategy that identifies and prioritizes capability needs and includes a time line for addressing them.

Status: Implemented

Concurrence: Yes

Comments: In September 2017, the Air Force issued the Air Force Operational Training Infrastructure 2035 Flight Plan, which describes the Air Force's vision for a realistic and integrated operational training environment and incorporates the desirable characteristics of a comprehensive strategy, as recommended by GAO. One of the 13 lines of effort included in the plan called for the development of a funding strategy for operational training infrastructure capabilities. That funding strategy was issued in December 2017.

Source: GAO analysis. | GAO-19-120T

Table 7: Status of Recommendations from *Force Structure: Better Information Needed to Support Air Force A-10 and Other Future Divestment Decisions* (GAO-16-816)

Recommendation #1:

To ensure that senior leaders have the quality information on which to base future force structure decisions, the Secretary of Defense should develop and promulgate department-wide guidance that establishes specific informational requirements to be met before proposing divestment of major weapon systems that have not reached the end of their expected service lives.

Status: Open

Concurrence: No

Comments: DOD stated that the department already has guidelines and robust procedures in place to provide senior leaders with quality information with which to make divestment decisions, including through its budgeting and acquisition process. As of August 2018, DOD has not taken action to address this recommendation.

Recommendation #2:

To make a well-informed decision about the future of its A-10 aircraft, before again recommending divestment of the A-10, the Secretary of the Air Force should: (1) Develop quality information that fully identifies gaps in capacity or capability that would result from A-10 divestment, including the timing and duration of any identified gaps, and the risks associated with those gaps; and (2) Use that information to develop strategies to mitigate any identified gaps.

Status: Open

Concurrence: No

Comments: The Air Force stated that it had sufficient understanding of the risks and the capability gaps when deciding to divest the A-10. As of August 2018, the Air Force has not taken action to address this recommendation.

Recommendation #3:

To further inform decisions about the future of the A-10, the Secretary of the Air Force should, in considering divestment, develop a high-quality, reliable cost estimate utilizing best practices.

Status: Open

Concurrence: No

Comments: The Air Force stated that it used programming and sustainment data to inform their cost estimate. As of August 2018, the Air Force has not taken action to address this recommendation.

Source: GAO analysis. | GAO-19-120T

Related GAO Products

Report numbers with a C or RC suffix are classified. Report numbers with a SU suffix are sensitive but unclassified. Classified and sensitive but unclassified reports are available to personnel with the proper clearances and need to know, upon request.

Weapon System Sustainment: Selected Air Force and Navy Aircraft Generally Have Not Met Availability Goals, and DOD and Navy Guidance Need to Be Clarified. [GAO-18-678](#). Washington, D.C.: September 10, 2018.

Military Readiness: Air Force Plans to Replace Aging Personnel Recovery Helicopter Fleet. [GAO-18-605](#). Washington, D.C.: August 16, 2018.

Military Aviation Mishaps: DOD Needs to Improve Its Approach for Collecting and Analyzing Data to Manage Risks. [GAO-18-586R](#). Washington, D.C.: August 15, 2018.

Military Readiness: Update on DOD's Progress in Developing a Readiness Rebuilding Plan. [GAO-18-441RC](#). Washington, D.C.: August 10, 2018. (SECRET)

Force Structure: F-22 Organization and Utilization Changes Could Improve Aircraft Availability and Pilot Training. [GAO-18-190](#). Washington, D.C.: July 19, 2018.

Military Personnel: Collecting Additional Data Could Enhance Pilot Retention Efforts. [GAO-18-439](#). Washington, D.C.: June 21, 2018.

Air Force Readiness: Changes to Readiness Reports Could Help Stakeholders Take More Informed Actions. [GAO-18-65C](#). Washington, D.C.: June 18, 2018. (SECRET)

Force Structure: Changes to F-22 Organization and Utilization Could Improve Aircraft Availability and Pilot Training. [GAO-18-120C](#). Washington, D.C.: April 27, 2018. (SECRET//NOFORN)

Military Readiness: Clear Policy and Reliable Data Would Help DOD Better Manage Service Members' Time Away from Home. [GAO-18-253](#). Washington, D.C.: April 25, 2018.

Warfighter Support: DOD Needs to Share F-35 Operational Lessons Across the Military Services. [GAO-18-464R](#). Washington, D.C.: April 25, 2018.

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Military Personnel: DOD Needs to Reevaluate Fighter Pilot Workforce Requirements. [GAO-18-113](#). Washington, D.C.: April 11, 2018.

Military Aircraft: F-35 Brings Increased Capabilities, but the Marine Corps Needs to Assess Challenges Associated with Operating in the Pacific. [GAO-18-79C](#). Washington, D.C.: March 28, 2018. (SECRET)

F-35 Aircraft Sustainment: DOD Needs to Address Challenges Affecting Readiness and Cost Transparency. [GAO-18-75](#). Washington, D.C.: October 26, 2017.

Department of Defense: Actions Needed to Address Five Key Mission Challenges. [GAO-17-369](#). Washington, D.C.: June 13, 2017.

Air Force Training: Further Analysis and Planning Needed to Improve Effectiveness. [GAO-16-864](#). Washington, D.C.: September 19, 2016.

Military Readiness: DOD's Readiness Rebuilding Efforts May Be at Risk without a Comprehensive Plan. [GAO-16-841](#). Washington, D.C.: September 7, 2016.

Force Structure: Better Information Needed to Support Air Force A-10 and Other Future Divestment Decisions. [GAO-16-816](#). Washington, D.C.: August 24, 2016.

Air Force Training: Further Analysis and Planning Needed to Improve Effectiveness. [GAO-16-635SU](#). Washington, D.C.: August 16, 2016.

Force Structure: Better Information Needed to Support Air Force A-10 and Other Future Divestment Decisions. [GAO-16-525C](#). Washington, D.C.: July 12, 2016. (SECRET//NOFORN)

Military Readiness: DOD's Readiness Rebuilding Efforts May Be at Risk without a Comprehensive Plan. [GAO-16-534C](#). Washington, D.C.: June 30, 2016. (SECRET)

Air Force: Service Faces Challenges to Rebuilding Readiness. [GAO-16-482RC](#). Washington, D.C.: May 25, 2016. (SECRET)

Force Structure: Performance Measures Needed to Better Implement the Recommendations of the National Commission on the Structure of the Air Force. [GAO-16-405](#). Washington, D.C.: May 6, 2016.

F-35 Sustainment: DOD Needs a Plan to Address Risks Related to Its Central Logistics System. [GAO-16-439](#). Washington, D.C.: April 14, 2016.

F-35 Sustainment: Need for Affordable Strategy, Greater Attention to Risks, and Improved Cost Estimates. [GAO-14-778](#). Washington, D.C.: September 23, 2014.

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