Source: U.S. Air Force/Tech. Sgt. Natasha Stannard. | GAO-21-101SP

Program Essentials

Manufacturer: Lockheed Martin and Pratt & Whitney (engines)

Sustainment: Lockheed Martin provides sustainment support. Ogden Air Logistics Complex, Utah, provides depot maintenance. Air Force maintainers provide field maintenance.

Program Office: Wright-Patterson Air Force Base, Ohio

Fiscal Year 2019 Data

Average age: 12 years

Average lifetime flying hours: 1,866 hours per aircraft

Depot maintenance activity and squadron locations:

Source: GAO. | GAO-21-101SP

Sustainment Challenges and Mitigation Actions

The F-22 faces challenges with its low-observable system and spare parts. The Air Force is contracting to increase low observable repair capacity and securing additional funding for spare parts.

F-22 Raptor Sustainment Quick Look

Common Name: F-22

Lead Service: Air Force

Background

The F-22 Raptor is one of the newest Air Force aircraft. The F-22 performs air-to-air and air-to-ground missions and is designed to attack enemy aircraft and ground targets at great distances.

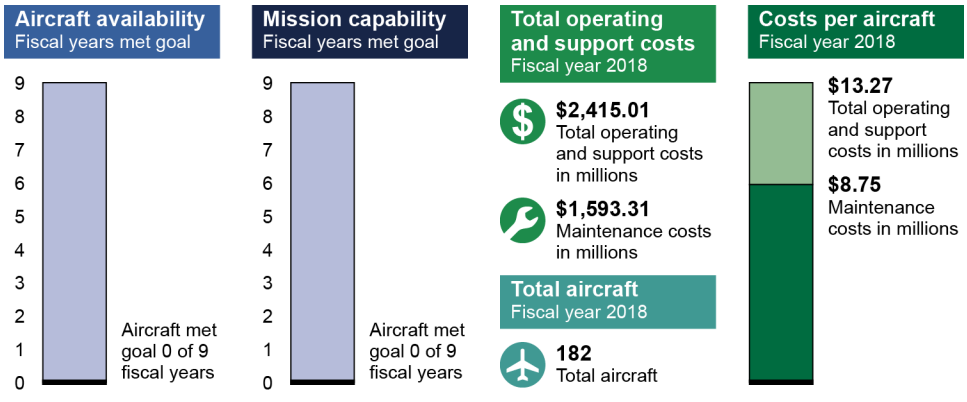
Life Cycle of the F-22

Source: GAO analysis of Air Force data. | GAO-21-101SP

Overview

The F-22 fleet did not meet its annual aircraft availability or mission capable goals for any year from fiscal years 2011 through 2019 and did not meet the Department of Defense's mission capable goal for fiscal year 2019. Both the F-22's aircraft availability and mission capable rates decreased during the nine year period. Total operating and support (O&S) costs increased from about $2.34 billion in fiscal year 2011 to about $2.42 billion in fiscal year 2018. Furthermore, maintenance costs—the largest share of O&S costs—increased by a total of $556.21 million during this period. Total O&S costs per aircraft decreased from $14.34 million in fiscal year 2011 to $13.27 million in fiscal year 2018 and an average of about 54 percent was dedicated to maintenance costs.

F-22 Sustainment Status



Source: GAO analysis of Air Force data. | GAO-21-101SP

Sustainment Strategy

- The 2017 F-22 Life-Cycle Management Plan, in conjunction with the Engine Life Management Plan, codifies the sustainment strategy for the F-22 program. It guides logistics sustainment and modernization strategy execution within the F-22 program and support organizations, and communicates the strategy to Air Force leadership.

- The F-22 program office has a performance-based logistics contract with Lockheed Martin for overall aircraft sustainment. The Air Force conducts depot maintenance under a public/private partnership agreement with Lockheed Martin. Pratt & Whitney provides engine sustainment at Tinker Air Force Base, Oklahoma.

- The program office has various initiatives to support sustainment, such as maintaining a comprehensive diminishing manufacturing sources program and proactively supporting the continued sustainment of component parts of the aircraft through various replacement programs, such as the F-22 Reliability and Maintainability Program. This initiative is an ongoing effort to drive continuous improvement in availability.

Availability and Condition

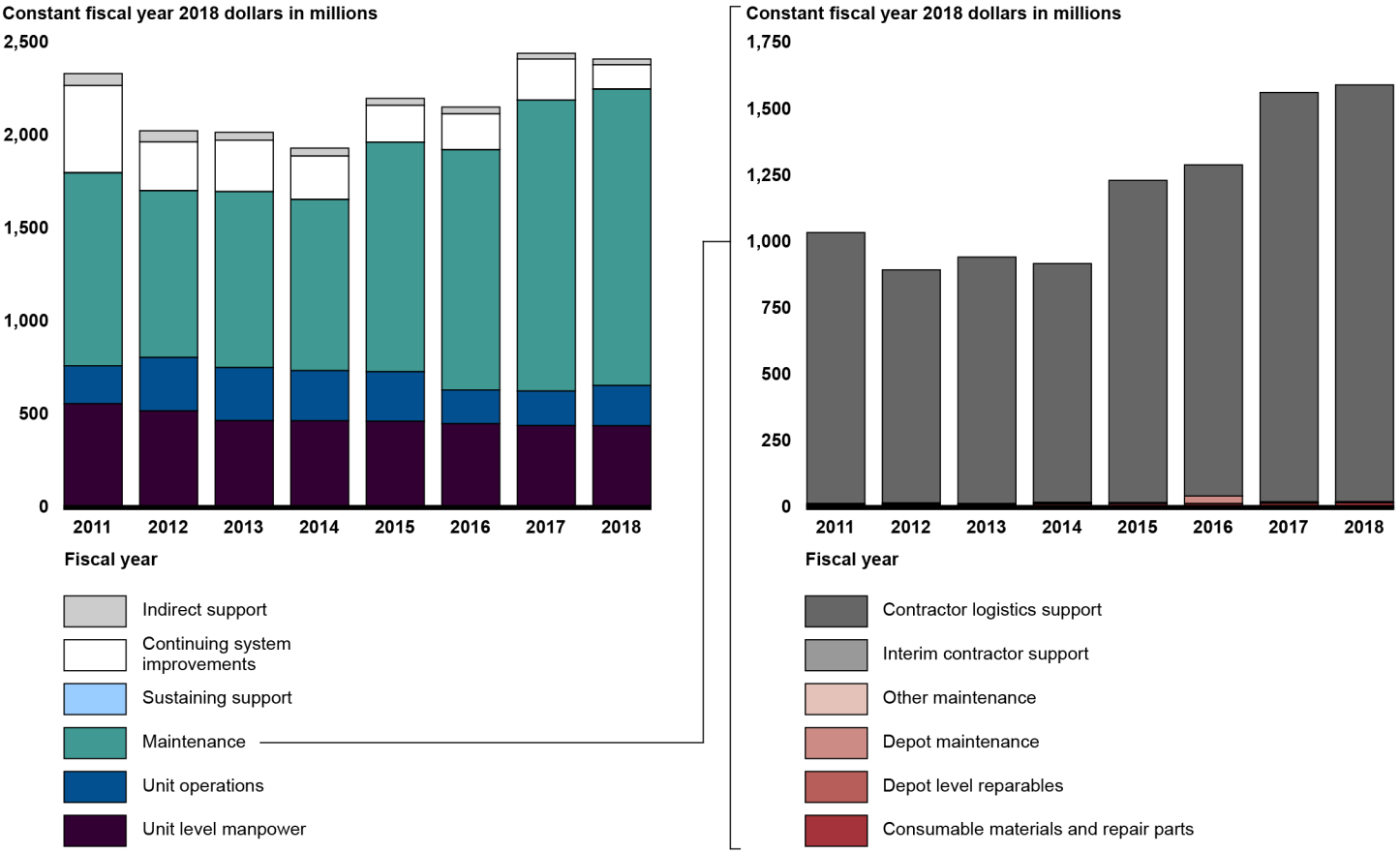
The F-22 fleet did not meet its annual goals for either the aircraft availability or mission capable rate for any year from fiscal year 2011 through fiscal year 2019, including the Department of Defense's 80 percent mission capable goal for fiscal year 2019. Both the F-22's aircraft availability and mission capable rates decreased during the nine year period. According to program officials, the F-22's low aircraft availability and mission capable rates were tied to degradation of the aircraft's low-observable system coating, supply shortages, and execution of higher-than-budgeted flying hours. Officials stated that after 2017 the Air Force devoted additional funding for the F-22 to help procure time-sensitive spares, repairs, and consumable parts.

From fiscal year 2011 through fiscal year 2019, the rates increased slightly for not mission capable maintenance (NMCM) and not mission capable supply (NMCS), while the not mission capable both (NMCB) maintenance and supply rate decreased slightly. According to program officials, the NMCM rate increased in part due to quality control issues in the low-observable system inspection process and low-observable maintenance continues to drive the NMCM rate. Program officials also stated that the devastation caused by Hurricane Michael to Tyndall Air Force Base, Florida—the primary location for F-22 pilot training—and the F-22's supply chain, maintenance and flying operations, increased the NMCM rate. Specific details on mission capable and not mission capable rates were omitted because the information was deemed by DOD to be sensitive.

Operating and Support Costs

Total O&S costs increased from about $2.34 billion in fiscal year 2011 to about $2.42 billion in fiscal year 2018. According to program office officials, this increase in O&S costs was due to increased flying-hour execution and scheduled engine depot inductions. Maintenance costs—the largest share of O&S costs during the time period—increased from $1.04 billion to $1.59 billion. From fiscal year 2015 through fiscal year 2018 there was a constant increase in maintenance costs due to increases in contractor logistics support costs.

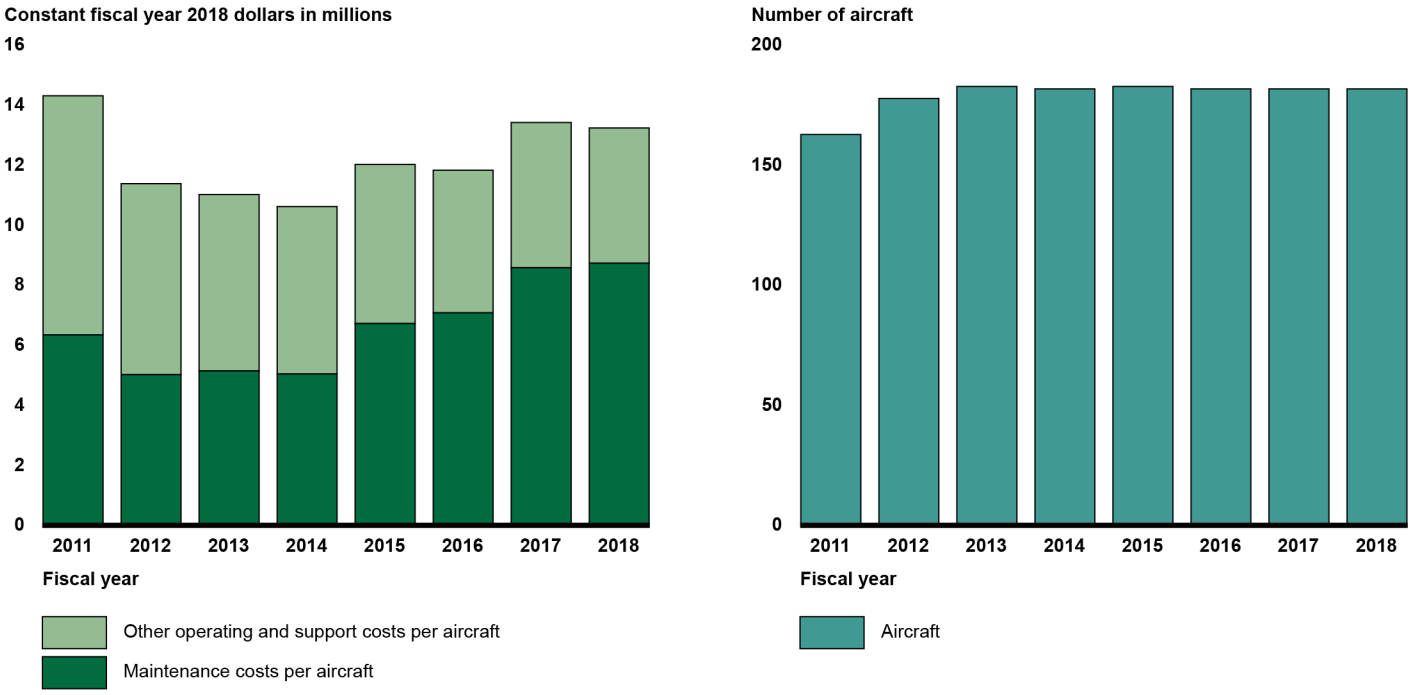
F-22 Total Operating and Support Costs



Source: GAO analysis of Air Force data. | GAO-21-101SP

From fiscal year 2011 through fiscal year 2018, the total O&S costs per F-22 aircraft varied. The highest O&S costs per aircraft was about $14.34 million in fiscal 2011 and the lowest O&S costs per aircraft was $10.64 million in fiscal year 2014. In fiscal year 2018, the total O&S costs per aircraft was $13.27 million. While the number of aircraft in the F-22 fleet remained fairly stable since fiscal year 2014, there was an increase in O&S costs per aircraft since 2014 due to the consistent increase in the maintenance costs per aircraft during this same period. Since fiscal year 2014, maintenance costs increased from $5.06 million per aircraft to $8.75 million in fiscal year 2018 and accounted for about 59 percent of the total O&S costs per aircraft. According to program officials, the increase in maintenance costs per aircraft was due to a 30 to 50 percent increase in flying hours during this period.

F-22 Operating and Support Costs per Aircraft and Fleet Size



Source: GAO analysis of Air Force data. | GAO-21-101SP

Sustainment Challenges and Mitigation Actions

Aging and Maintenance: As the F-22 ages, it requires additional maintenance for repairs related to corrosion and the aging of its low-observable coating. Program officials stated that the low-observable coating degradation began expanding to areas of the aircraft at a faster pace than unit maintenance could control, driving a major spike in maintenance required to preserve the overall health of the aircraft. Program officials told us that the Air Force has ongoing and planned actions to counter (1) corrosion, by identifying all parts that need to be repaired and replaced during the inspection phase; and (2) the low observable issue, by depot reversion repair and opening an additional repair line facility to handle the increased number of unplanned inlet coating repairs. Program officials added that the Air Force has been piloting a robotic solution to apply the low-observable coating that has been working well and has helped address their skilled worker shortage.

Supply Support: According to program officials, the F-22 experienced shortages of parts from 2014 through 2018 because flying operations exceeded allocated budgets in 4 of 5 years and vendors that supply parts did not have lay-in materiel to address the magnitude of increased flying hours. Program officials noted when major unplanned changes occur in forecasted flying hours, it creates negative effects on the supply networks. Program officials told us they are (1) maintaining a comprehensive diminishing manufacturing sources program to minimize material shortages and (2) receiving out-of-cycle supply funding increases to improve supply issues. Further, program officials stated that the fundamental shift from a cost-plus-fixed fee to cost-plus-incentive fee contract for supply services will yield cost savings through 2022.

Program officials also stated that they are implementing efforts to improve the F-22 mission capable rate by the end of fiscal year 2019, including improving spare-parts management; increasing maintenance capacity to accelerate needed aircraft repairs; and enhancing training and proficiency to improve the generation of mission-ready aircraft.

Program Office Comments

In commenting on a draft of this assessment, the program office provided technical comments, which we incorporated where appropriate.