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F-35 JOINT STRIKE FIGHTER

Problems Completing Software Testing May Hinder Delivery of Expected Warfighting Capabilities

Why GAO Did This Study

The F-35 Lightning II, also known as the Joint Strike Fighter, is DOD's most costly and ambitious acquisition program. The program seeks to develop and field three aircraft variants for the Air Force, Navy, and Marine Corps and eight international partners. The F-35 is integral to U.S. and international plans to replace existing fighter aircraft and support future combat operations. Total U.S. planned investment in the F-35 program is approaching $400 billion to develop and acquire 2,457 aircraft through 2037, plus hundreds of billions of dollars in long-term spending to operate and maintain the aircraft.

The National Defense Authorization Act for Fiscal Year 2010 mandated that GAO review the F-35 acquisition program annually for 6 years. In this, GAO's fifth annual report on the F-35, GAO assesses the program's (1) ongoing development and testing, (2) long-term affordability, and (3) manufacturing progress.

GAO reviewed and analyzed manufacturing data through December 2013, program test plans, and internal DOD analyses, and spoke with DOD, program, and contractor officials.

What GAO Recommends

GAO recommends that DOD assess and identify the specific capabilities that realistically can be delivered to the military services to support their respective initial operational capabilities, and share its findings with the Congress and military services prior to July 2015. DOD concurred with this recommendation.

View GAO-14-322. For more information, contact Mike Sullivan at (202) 512-4841 or sullivanm@gao.gov.

What GAO Found

Delays in developmental flight testing of the F-35's critical software may hinder delivery of the warfighting capabilities the military services expect. F-35 developmental flight testing comprises two key areas: mission systems and flight sciences. Mission systems testing verifies that the software-intensive systems that provide critical warfighting capabilities function properly and meet requirements, while flight sciences testing verifies the aircraft's basic flying capabilities. Challenges in development and testing of mission systems software continued through 2013, due largely to delays in software delivery, limited capability in the software when delivered, and the need to fix problems and retest multiple software versions. The Director of Operational Test and Evaluation (DOT&E) predicts delivery of warfighting capabilities could be delayed by as much as 13 months. Delays of this magnitude will likely limit the warfighting capabilities that are delivered to support the military services' initial operational capabilities—the first of which is scheduled for July 2015—and at this time it is not clear what those specific capabilities will be because testing is still ongoing. In addition, delays could increase the already significant concurrency between testing and aircraft procurement and result in additional cost growth. Without a clear understanding of the specific capabilities that will initially be delivered, Congress and the military services may not be able to make fully informed resource allocation decisions. Flight sciences testing has seen better progress, as the F-35 program has been able to accomplish nearly all of its planned test flights and test points. Testing of the aircraft's operational capabilities in a realistic threat environment is scheduled to begin in 2015. The program has continued to make progress in addressing some key technical risks.

To execute the program as planned, the Department of Defense (DOD) will have to increase funds steeply over the next 5 years and sustain an average of $12.6 billion per year through 2037; for several years, funding requirements will peak at around $15 billion. Annual funding of this magnitude clearly poses long-term affordability risks given the current fiscal environment. The program has been directed to reduce unit costs to meet established affordability targets before full-rate production begins in 2019, but meeting those targets will be challenging as significant cost reductions are needed. Additionally, the most recent cost estimate for operating and supporting the F-35 fleet is more than $1 trillion, which DOD officials have deemed unaffordable. This estimate reflects assumptions about key cost drivers the program can control, like aircraft reliability, and those it cannot control, including fuel costs, labor costs, and inflation rates. Reliability is lower than expected for two variants, and DOT&E reports that the F-35 program has limited additional opportunities to improve reliability.

Aircraft manufacturing continued to improve in 2013, and management of the supply chain is evolving. As the number of aircraft in production has increased, critical learning has taken place and manufacturing efficiency has improved. For example, the prime contractor has seen reductions in overall labor hours needed to manufacture the aircraft, as expected. In 2013, the contractor delivered 35 aircraft to the government, 5 more than it delivered in 2012 and 26 more than it delivered in 2011. The prime contractor has put in place a supplier management system to oversee key supplier performance.

_____ **United States Government Accountability Office**