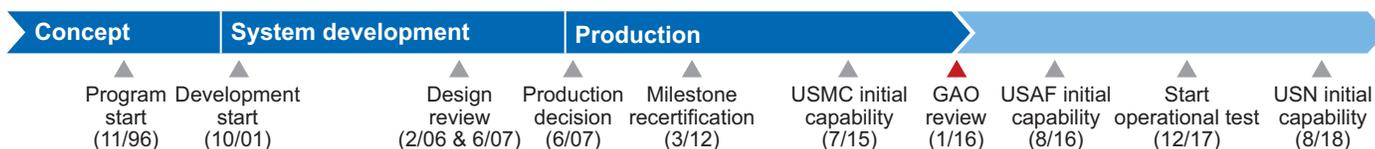


F-35 Lightning II Program (F-35)

DOD's F-35 program is developing a family of stealthy, strike fighter aircraft for the Navy, Air Force, Marine Corps, and U.S. allies, with the goal of maximizing commonality to minimize life-cycle costs. The carrier-suitable variant will complement the Navy F/A-18E/F. The Air Force variant is expected to replace the air-to-ground attack capabilities of the F-16 and A-10, and complement the F-22A. The short take-off and vertical landing (STOVL) variant is expected to replace the Marine Corps' F/A-18 and AV-8B aircraft.



Source: © Lockheed Martin.



Program Essentials

Prime contractor: Lockheed Martin, Pratt and Whitney
 Program office: Arlington, VA
 Funding needed to complete:
 R&D: \$2,915.6 million
 Procurement: \$225,107.1 million
 Total funding: \$230,649.6 million
 Procurement quantity: 2,226

Program Performance (fiscal year 2016 dollars in millions)

	As of 10/2001	Latest 12/2014	Percent change
Research and development cost	\$41,817.7	\$62,882.7	50.4%
Procurement cost	\$185,525.6	\$272,943.7	47.1%
Total program cost	\$229,285.3	\$339,996.9	48.3%
Program unit cost	\$80.002	\$138.379	73.0%
Total quantities	2,866	2,457	-14.3%
Acquisition cycle time (months)	175	237	35.4%

All of the program's critical technologies are now considered fully mature. One former critical technology, which had not been fully matured, has now been deferred to follow-on development. The next-generation helmet has completed initial testing and is being delivered to operators. Developmental testing is progressing, but, with the most complex testing remaining, more design changes are likely. Although the aircraft designs were not stable at their critical design reviews in 2006 and 2007, all baseline engineering drawings have since been released. Manufacturing efficiency is steady, and processes are considered in control. The program is planning a Block 4 upgrade to address capability deferrals, upgrade existing capabilities, and introduce additional weapons.

Attainment of Product Knowledge

As of January 2016

Resources and requirements match	
• Demonstrate all critical technologies in a relevant environment	●
• Demonstrate all critical technologies in an operational environment	●
• Complete preliminary design review	●
Product design is stable	
• Release at least 90 percent of design drawings	●
• Test a system-level integrated prototype	●
Manufacturing processes are mature	
• Demonstrate critical processes are in control	●
• Demonstrate critical processes on a pilot production line	●
• Test a production-representative prototype	●

Knowledge attained
 Knowledge not attained
 Information not available
 Not applicable

F-35 Program

Technology and Design Maturity

All of the program's critical technologies are considered fully mature. One technology previously identified as critical and not fully matured, the prognostics and health management system a part of the Autonomic Logistics Information System (ALIS) and critical to fleet operations, has been deferred to follow-on development. In addition, the prognostic system specific to the engine has yet to be incorporated into ALIS. The program has completed initial testing of the next-generation helmet, which is expected to enhance night vision and optical performance, and it is currently being delivered to operators.

Although the aircraft designs were not stable at their critical design reviews in 2006 and 2007, all baseline engineering drawings have since been released. The program continues to test the aircraft and introduce design changes to address deficiencies discovered in testing concurrent with production. Design changes to fix issues with the bulkhead, engine, and arresting hook have been identified and planned for introduction into production. Although the total number of design changes generally continues to fall, with the most complex developmental testing remaining, the program faces the risk of further design changes.

Production Maturity

Aircraft manufacturing deliveries remain steady, and the contractor has delivered 154 aircraft as of December 2015. Since the start of production, the contractor's production processes have continued to mature, and program officials stated that they are now at a manufacturing readiness level that indicates they are in control. To continue making improvements and to increase quality, the contractor tracks statistical process control data and other quality indicators. Production part shortages remain a risk as suppliers will face additional pressures of balancing an increased production rate and simultaneously sustaining a growing operational fleet.

Other Program Issues

In July 2015, the Marine Corps declared initial operational capability with all but eight of the capabilities expected including capabilities centered on sensor fusion, electronic warfare, and

communication. Marine Corps officials stated that these shortcomings do not interfere with their mission set. Program officials also stated that these capabilities will be available for the initial operational capability of the Air Force and Navy.

In August 2015, the Under Secretary of Defense for Acquisition, Technology, and Logistics approved the program's plan for follow-on development, beginning with Block 4, as part of the F-35's current baseline development program. Block 4 is expected to consist of four increments, alternating from primarily software in the first and third increments to hardware and software upgrades in the second and fourth increments. Program officials stated that Block 4 is expected to enhance capabilities and introduce new weapons. Block 4 will also incorporate capabilities and technologies that have been deferred from the baseline program, such as the prognostics health management downlink capability. The program estimates that Block 4 development will take about 10 years to complete.

Program Office Comments

In addition to providing technical comments, the program office noted that it appreciates GAO's reviews in assisting the program by identifying areas for improvement. According to the program office, the F-35 program is executing well across the entire spectrum of acquisition, to include development, flight test, production, fielding and base stand-up, sustainment of fielded aircraft, and building a global sustainment enterprise. The program is at a pivot point where it is moving from slow and steady progress to a rapidly growing and accelerating program. This transition is not without risks and challenges. The completion of mission systems software development, ALIS development, and fuel system and ejection seat deficiencies are the most prominent, current technical risks. The ability to standup four separate reprogramming labs, and our ability to complete all weapons envelope testing for Block 3F, and start operational test on time, constitute major schedule risks. The program remains confident that we will be able to deliver the full F-35 capability as promised.