

Highlights of [GAO-12-524](#), a report to the Subcommittee on Defense, Committee on Appropriations, U.S. Senate

Why GAO Did This Study

The Air Force expects to invest a total of \$9.7 billion in F-22A modernization through 2023. The Air Force and Navy have modernized many of their fighter and attack aircraft over the past several decades. Given this historical experience and concerns about the mounting cost of F-22A modernization, GAO was asked to examine the history of the modernization programs of the F-15, F-16, and F/A-18, and compare those legacy programs with the F-22A modernization program.

To identify differences and similarities between the F-22A modernization program and those of the selected legacy programs, GAO reviewed official service history documents and current and historical program documents; analyzed program cost, schedule, performance, and quantity data; and spoke with current and former Air Force, Navy, and contractor officials.

DOD reviewed a draft of this report and had no formal written comments.

View [GAO-12-524](#). For more information, contact Michael Sullivan at (202) 512-4841 or sullivanm@gao.gov.

TACTICAL AIRCRAFT

Comparison of F-22A and Legacy Fighter Modernization Programs

What GAO Found

The F-22A and legacy modernization programs GAO reviewed were rooted in different development strategies. The F-22A began as a single-step program and did not anticipate the need for future modernization, while the legacy programs each began with the expectation that their aircraft would be incrementally upgraded over time. F-22A modernization began in reaction to a major shift in the aircraft's basic mission, which required the development of new capabilities that had not been planned for as part of the initial development program. In contrast, the legacy modernization programs made planned incremental improvements to existing mission capabilities. All of the modernization programs began at about the same time in development and procurement. The F-22A program is developing and retrofitting new capabilities onto a complex stealth aircraft, which is costly—currently estimated at \$9.7 billion total. Legacy modernization programs were less complex, and thus less costly, and incorporated mature technologies onto new production aircraft. Accurately identifying and comparing the total cost of each modernization program is difficult. Each of the programs, including the F-22A, initially managed and funded modernization as a continuation of its baseline program, so modernization costs and funding were not clearly identified in selected acquisition reports or budget documents.

Comparison of the Differences and Similarities among Modernization Programs

Legacy aircraft	F-22A
Differences	
Initial development was incremental with plans to increase capabilities over time	Initial development was single-step with no plans for future incremental upgrades
Initial development took 5 to 7 years	Initial development took 14 years
Ultimately procured thousands of aircraft	Ultimately procured 179 aircraft
Proactively modernized as requirements evolved and new technologies matured	Reactively modernized when a new mission was added
Incorporated upgrades into production lines and delivered new upgraded aircraft	Retrofitting upgrades into fielded aircraft because production has ended
Conventional aircraft designs and federated avionics reduced complexity and costs	Stealth aircraft design and integrated avionics make retrofits complex and costly
Similarities	
Began modernizing with more than 85 percent of estimated development costs funded	
Began modernizing with less than 33 percent of estimated procurement costs funded ^a	
Began modernizing with less than 20 percent of estimated procurement aircraft purchased ^a	
Managed modernization as a continuation of the original development program ^b	
Began modernizing while in production and around the time of initial operating capability	

Source: GAO.

^aThe F-15 program was further into procurement when it began modernizing.

^bLater increments of the F/A-18 program were funded and managed as distinct acquisition efforts, and the F-22A is planning to fund and manage Increment 3.2B as its own acquisition effort.