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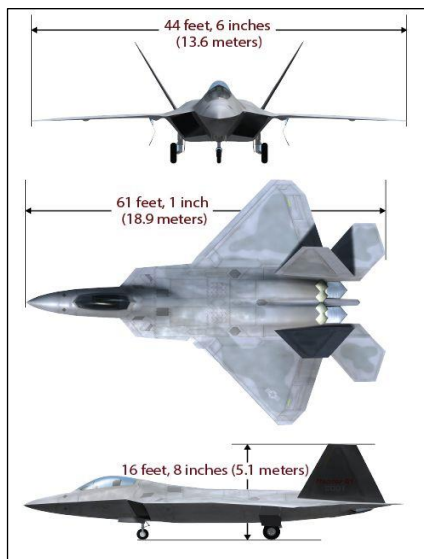
U.S. Air Force Next-Generation Air Dominance (NGAD) Fighter

Background

U.S. Air Force officials paused a planned contract award for the Next-Generation Air Dominance (NGAD) to rethink the aircraft's requirements. NGAD is an advanced fighter jet intended to replace the stealthy F-22 Raptor (see **Figure 1**). According to the Air Force, NGAD is also a “family of systems,” enabling air superiority, defined as the ability to operate without threat of attack, even in highly contested environments. The NGAD family or system of systems includes the NGAD fighter program, as well as the Collaborative Combat Aircraft (CCA) program to develop variants of uncrewed, semiautonomous aircraft that could fly as “loyal wingmen” with the NGAD fighter or other fighter aircraft. (See CRS In Focus IF12740, *U.S. Air Force Collaborative Combat Aircraft (CCA)*.) The Biden Administration requested \$2.75 billion for research and development for an Air Force NGAD platform and \$557 million for CCA in FY2025. Congress may decide to accept, reject, or modify this request.

F-22 Raptor

Figure 1. F-22



Source: U.S. Air Force, <https://www.defenceaviation.com/lockheed-martin-f-22-raptor>.

The Air Force's current air dominance fighter, the F-22 Raptor, entered service in 2005. Prime contractor Lockheed Martin designed the F-22 with a suite of advanced technologies featuring stealth, supercruise, maneuverability, and integrated avionics. The combination of new technology and advanced sensors allowed the F-22 to identify, track, shoot, and kill a threat before being

detected. In 2009, then-Defense Secretary Robert Gates truncated the purchase of F-22s from 750 to 187 aircraft.

Since then, China's long-range air defense systems and electronic warfare systems have grown more sophisticated. China also has reportedly test flown a new combat aircraft. On September 16, 2024, Air Force Secretary Frank Kendall said he no longer refers to China as a “future” threat: “China is a threat today.” Some analysts note that in a fight against China, where islands off its coast are separated by hundreds of miles, the F-22 may be constrained by its 460-nautical mile range and 2,000-pound payload capacity. For greater range, the F-22 relies on U.S. aerial refueling tankers such as the KC-46 and KC-135, which may be vulnerable to attack. For at least a decade, the Air Force has studied F-22 replacements that could confront such a threat.

The Path to NGAD

In 2014, Kendall—then the Under Secretary of Defense for Acquisition, Technology, and Logistics—issued terms of reference for a Defense Science Board (DSB) study that he would sponsor on how to maintain air dominance in 2025-2035. Air dominance, the study's executive summary said, “implies sufficient force capacity and capability to reign supreme against the defined threat.” Released in 2016, the study found that dominance of an entire battlespace was not affordably achievable in an anti-access, area denial environment. The study's executive summary said the United States should pursue a strategy that creates “an integrated and resilient high-capacity battle management command, control, and communications network to address asymmetries in long-range intelligence, surveillance, and reconnaissance.”

In 2016, an Air Force Air Superiority 2030 Flight Plan argued for the need for a family of integrated and networked “stand-off” (weapons launched from a distance) and “stand-in” (weapons that penetrate adversary territory and strike close to targets) forces. The plan sought a “Penetrating Counter Air” capability that would “maximize tradeoffs between range, payload, survivability, lethality, affordability, and supportability.” The Air Force launched a 2017 analysis of alternatives to identify requirements.

In 2019, the Air Force completed the analysis and created a Program Executive Office for Advanced Aircraft to speed development of technology for digital engineering, modular open systems architecture, and agile software development. Will Roper, then the Air Force Assistant Secretary for Acquisition, Technology, and Logistics, envisioned a “digital century series” of producing small batches of easily upgradeable aircraft with shorter service lives than typical fighters. One year later, Roper said the service had flown an

NGAD demonstrator. The Air Force sought to mature a variety of NGAD-related technologies, including CCA, advanced materials, and sensors. The Air Force also has been researching advanced propulsion systems that could power an NGAD platform under a Next Generation Adaptive Propulsion (NGAP) effort. Under NGAP, General Electric is developing a variable-cycle XA102 engine prototype and Pratt & Whitney is designing an XA103 engine prototype to support NGAD.

By 2023, it appeared that Boeing, Lockheed Martin, and Northrop Grumman had all developed NGAD demonstrators, and the Air Force released a classified request for proposals for an F-22 Raptor replacement. Northrop Grumman opted out of the competition as a prime contractor but with plans to support other bids as a supplier.

NGAD Status

From FY2022 to FY2024, Congress appropriated a total of \$5.1 billion for NGAD fighter technologies. The Air Force's FY2025 budget request states that key NGAD attributes are enhanced survivability, lethality, persistence, interoperability across a range of military operations, and crewed/uncrewed teaming. In FY2025, the Biden Administration requested \$2.75 billion for an NGAD platform, an amount projected to rise in the outyear estimates to \$5.72 billion by FY2029. Air Force FY2025 budget documents state that the Air Force intended to award an engineering and manufacturing development contract in 2024. During the summer of 2024, senior Air Force officials said they wanted to "pause" the program, citing cost concerns. The officials cast doubt on whether the Air Force could afford to develop the NGAD alongside programs including the B-21 Raider bomber and the Minuteman III ICBM replacement, the LGM-35 Sentinel. The Congressional Budget Office estimated in 2018 that the NGAD airframe could cost up to \$300 million apiece.

In September 2024, the Air Force Vice Chief of Staff reportedly said publicly that NGAD requirements are shaped by the way the Air Force asks itself what it will need to counter adversaries. "You get two different answers if you frame the question as, 'How do we achieve air superiority in a contested environment?' [versus] 'How do we build a 6th-gen manned fighter platform?'" he said. "Those are not necessarily the same question." Rather than building a newer, more advanced fighter jet, the Air Force may consider a different concept and "disaggregating," major subsystems such as the radar or weapons, and moving those to other platforms such as CCAs. Secretary Kendall ordered a study of the NGAD approach that reportedly supports the need for a manned fighter. Secretary Kendall has opted to let the incoming Trump Administration decide the program's future.

Legislative Activity

The National Defense Authorization Act for Fiscal Year 2025 (NDAA)—H.R. 5009 (P.L. 118-159), H.R. 8070, S.Rept. 118-188—cut \$30.9 million from the President's budget request. The House Appropriations Committee trimmed \$3 million from the program, according to its report on the FY2025 Defense Appropriations Act, H.Rept.

118-557. The Senate Appropriations Committee, in its report on the FY2025 Defense Appropriations Act, S.Rept. 118-204, recommended cutting \$557.1 million and transferring that amount to the CCA program. Additionally, the committee said the cost and the Air Force's reevaluation of the program raise "questions about the Air Force's commitment to fielding advanced aircraft capable of maintaining air dominance in a contested 21st century environment."

The committee further expressed concerns that the Air Force has not provided enough money in its Future Years Defense Program for fighter aircraft. Additionally, the committee expressed concerns about NGAD and the CCA being requested on the same funding line, limiting visibility into the cost and performance of each program element. The report directs the Air Force to establish a separate CCA budget line in FY2026. S.Rept. 118-204 also notes that the NGAP program is critical to the success of NGAD and "notes the importance of maintaining no fewer than two viable competitors to ensure innovation and cost realism," providing an additional \$280 million above the requested \$562.3 million for the program to reduce risk.

Potential Considerations for Congress

- Since the Air Force has paused the contract award for NGAD, Members may assess whether or not the \$2.75 billion for the program in the President's FY2025 budget request aligns with the Air Force's needs. As noted above, the Senate Appropriations Committee recommended rerouting some NGAD funding to the CCA program.
- Some former Department of Defense officials have argued that the Air Force should return to the "century series" approach (envisioned by former Assistant Secretary of the Air Force for Acquisition, Technology, and Logistics Will Roper) of lower cost, shorter-lived, upgradable aircraft design to stay relevant to changing threats at a lower price point. Other analysts have noted that current and future threats could require a larger aircraft capable of operating at long ranges. Still others contend that the era of manned aircraft has ended. Congress, in its oversight role, may consider studying how to transition away from a reliance on manned aircraft, perhaps considering the cultural, operational, financial, or other impacts of such a change. Congress may evaluate the results of the Air Force's NGAD assessment, along with guidance from the incoming Trump Administration, and seek further information about any new direction in which the Air Force may be taking NGAD. Members could also seek information about the program's planned cost and schedule, how the platform will meet future operational needs, and how much support a different type of NGAD might require from other aerial platforms. Members could also seek information on how a revised NGAD would fit into the Air Force's overall budget, plans for a next-generation tanker aircraft, and plans to retire older-model aircraft.

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