U.S. Air Force Collaborative Combat Aircraft (CCA)

What Are Collaborative Combat Aircraft (CCA)?

The U.S. Air Force is developing a new type of uncrewed weapon system called Collaborative Combat Aircraft. The Air Force contends that CCA is being created as a so-called "loyal wingman," a large uncrewed aircraft (UAS) that could fly alongside new and existing crewed fighter jets. The Air Force describes CCAs, powered by jet engines, as potentially able to fly alone or in small groups, and potentially equipped for a variety of missions, including air-to-air combat; air-to-ground combat; electronic warfare; targeting; and intelligence, surveillance, and reconnaissance. The Air Force says CCAs' AI-driven software would enable collaboration with, and take direction from, human pilots and would serve to expand the fighter fleet and protect human pilots at a lower cost than current fighter jets. Then-Air Force Secretary Frank Kendall stated that there is a "planning assumption" of 1,000 CCAs, a number derived by projecting the use of two CCAs for each of 500 advanced fighters.

CCAs are part of the Air Force's Next-Generation Air Dominance (NGAD) family of systems program (see CRS In Focus IF12805, *U.S. Air Force Next-Generation Air Dominance (NGAD) Fighter*), which also may include a future crewed fighter platform, sensors, weapons, and more. The U.S. Air Force requested $557.1 million in its FY2025 research, development, test, and evaluation (RDT&E) budget request for CCAs. Congress may approve, reject, modify, or choose not to act on the request.

Changing Concept of Operations

Aircraft are expensive to develop, buy, and operate. Since the 1990s, the U.S. Air Force's fleet has decreased, in part because of those costs. Former Secretary Kendall has stated CCAs would cost roughly one-third the price of crewed fighters. Service officials also indicate that training on CCAs would occur virtually, so the airframes themselves would fly less, potentially leading to lower maintenance and sustainment costs. The Air Force could therefore potentially purchase them in quantities large enough to buttress its fleet. China's use of anti-access/area-denial (A2/AD) capabilities, such as long-range missiles and sophisticated air defense systems, has challenged the U.S. Air Force's ability to achieve air superiority (i.e., the ability to control a certain air space to conduct operations without interference from air and missile threats). A tactical fighter fleet that includes CCAs and crewed combat aircraft could potentially help the Air Force to gain air superiority.

The Air Force is also pursuing a concept of operations—similar to those being implemented by other military services—called agile combat employment (ACE). Under the ACE concept, operations shift from large, centralized physical infrastructures to a network of dispersed locations. CCAs in those dispersed locations could help the U.S. Air Force add sensors or long-range weapons to its combat aircraft fleet. According to Commander of Air Combat Command General Kenneth S. Wilsbach, the addition of CCAs to the fleet could cause confusion for enemy aircraft and assist the fight for air superiority. "You can create mass, and so many targets out in the battlespace that your adversary will have to worry about … is that something that I have to use some munitions on," Wilsbach said in 2023, when he was Commander of Pacific Air Forces.

Initial Research and Development

The Defense Advanced Research Projects Agency, the Air Force, and Air Force Research Laboratory (AFRL) conducted numerous efforts to develop and test autonomy, software, and modular upgradable platforms during the past decade. The Air Force has sought to develop a pipeline of technologies feeding into CCA, because the integration and employment of autonomous systems in flight is relatively new. Those efforts helped to refine underlying technologies such as digital engineering, agile software, and open mission systems. Another project put AI to the test in three converted F-16 aircraft. The project collected data and conducted artificial intelligence experiments to help teach pilots how autonomous software behaves and reduce risk for CCA. Yet another project sought to demonstrate rapid development of a low-cost aircraft with an open software architecture. General Atomics Aeronautical Systems (GA-ASI) participated by designing, building, testing, and flying the experimental XQ-67A aircraft, which formed the basis for the company's CCA bid.

CCA Acquisition Strategy

As noted, former Secretary Kendall stated that the Air Force is using a "planning assumption" of 1,000 CCAs when analyzing "basic organizational structures, training and range requirements, and sustainment concepts." In January 2024, the service awarded initial contracts to five companies to design and build CCAs: Anduril, Boeing, GA-ASI, Lockheed Martin, and Northrop Grumman. In April, the Air Force announced that two of those companies—Anduril and GA-ASI—won contracts to build production-representative test articles. Kendall told Members of Congress that the Air Force anticipates ordering more than 100 CCAs for Increment 1 in the next five years.

The service says vendors not selected would still be eligible to compete for Increment 1 production contracts and future increments. Air Force officials have reportedly said that once Congress approves FY2025 funding, concept development for a second increment can proceed.

Increment 1

Figure 1. Anduril Fury

Source: Anduril concept.

Anduril

In September 2023, Anduril purchased Blue Force Technologies (a small, North Carolina-based company), which had developed a large uncrewed aircraft called Fury. Anduril said it invested in Fury to make it "a high-performance, multi-mission" aircraft that could serve as CCA. Anduril in January 2025 announced that it plans to manufacture Fury at a new factory in Columbus, OH. Anduril also produces Lattice, an open systems software program that the company says can be used by multiple sensors and domains for command and control. The company has stated it intends to leverage Lattice software for Fury.

Figure 2. GA-ASI XQ-67

Source: GA-ASI concept.

GA-ASI

GA-ASI officials confirmed that the company based its CCA bid on the experimental XQ-67A platform, which emphasizes endurance rather than speed and maneuverability. The resulting XQ-67A flew for the first time on February 28, 2024. A GA-ASI official said in June 2024 that production of its first CCA has begun.

Increment 2

The Air Force has reportedly said that preliminary work has started on Increment 2. The service indicated it intends to work with more than 20 industry partners, including those not initially selected for Increment 1, and is additionally exploring international partnerships. The Increment 2 award could be a more complicated platform that incorporates stealth technologies.

Funding Information

In FY2025, Congress authorized the Air Force to spend $3.3 billion for research and development of the service's NGAD family of systems, which includes both the NGAD platform and the CCA. The Senate Appropriations Committee, in its report on the FY2025 Defense Appropriations Act, S.Rept. 118-204, recommended cutting $557.1 million from the NGAD platform and transferring that amount to the CCA, because the Air Force paused a planned NGAD platform contract award (**Table 1**).

Table 1. FY2025 NGAD Program Funding Request

(in $ millions)

	FY2025	FY2026	FY2027	FY2028	FY2029
NGAD Platform	2,749.2	3,189.3	3,741.9	4,201.4	5,723.1
CCA	557.2	494.9	1,654.6	3,046.3	3,106.3
Total	3,306.4	3,684.2	5,396.5	7,247.7	8,829.4

Source: Department of Defense FY2025 Budget Estimates, Air Force, Justification Book 2 of 4, Research, Development, Test & Evaluation, Air Force, p. 427.

Legislative Activity

The House Armed Services Committee, in its report on a FY2025 National Defense Authorization bill, H.Rept. 118-529, encouraged the Air Force to consider drawing upon existing propulsion systems for CCA development to maximize affordability and minimize risk. The same report seeks a briefing on Air Force and Navy plans to incorporate modular open systems architecture standards into requirements for CCA.

Issues for Congress

Congress will have a role to play in considering, with the Air Force, the number of CCAs to be acquired and how CCAs may interoperate with potential NGAD fighters and other combat aircraft in the larger U.S. Air Force fleet and with the other military departments. CCAs are intended to have some level of autonomy, with humans involved in their operation. As AI-enabled software technology progresses, future CCAs may be able to respond faster and more effectively to battlefield changes than human operators. Members may consider the risks and benefits of relying more heavily on autonomy.

Congress may also consider whether the Air Force has adequately planned for testing and employment of CCAs in large numbers, as well as the challenges of storing and transporting hundreds of large UAS. Congress could also consider seeking a report from the Air Force on CCA storage and sustainment plans.

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