AVIATION

After Delays, Air Burst-Maneuvering X-65 to Fly in 2027

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By Jan Tegler

Aurora Flight Sciences rendering

A Defense Advanced Research Projects Agency X-plane employing bursts of air to initiate climbs, turns and descents rather than traditional flight control surfaces is scheduled to fly in 2027 after a long delay.

Two years have passed since DARPA announced in January 2024 that Boeing subsidiary Aurora Flight Sciences had been chosen to build the X-65, a subsonic, 7,000-plus pound unmanned aircraft with a 30-foot wingspan capable of maneuvering without traditional flight control surfaces like flaps, rudders or ailerons.

It was scheduled to roll out early in 2025 and fly employing active flow control this past summer as part of DARPA's Control of Revolutionary Aircraft with Novel Effectors, or CRANE, program.

The effort is moving forward, but the X-65 will not fly until late 2027 — a three-year delay from the 2024 first flight originally planned when DARPA launched the effort in 2020, according to CRANE Program Manager Chris Kent.

"The time needed to produce the flight test vehicle exceeded initial estimates from 2024," Kent told National Defense. "We were working through several engineering issues as well as honest-to-goodness supply chain issues," he added, explaining that his predecessor as program manager, Richard Wlezien, paused CRANE in 2025 to allow Aurora to address technical and supply chain problems as well as ballooning costs for the X-65.

"The pause was a real opportunity for the program to get investment from our performer and cap the cost for the government while still achieving the original program goals," said Kent.

An agreement with Aurora to co-invest in CRANE was reached in August, with the company's investment enabling DARPA "to get the program back on an executable path," Kent said.

Aurora was awarded a $42 million contract to begin detailed design of the X-plane in January 2023 in the second phase of CRANE. DARPA does not comment on its internal spending on programs or partners' internal spending on programs, but Kent acknowledged that "it's not cheap to build an X-plane."

After a successful critical design review later in 2023, a phase three contract for the build of a full-scale experimental prototype was awarded to Aurora. Defense Department fiscal year 2026 budget estimates indicate that DARPA spent $38.2 million on CRANE in fiscal year 2024 and $23.8 million in fiscal year 2025.

A Nov. 20 press release from Aurora stated that it is "progressing towards completion" of the X-65's fuselage in January 2026. Its fuselage, wing assemblies and engine diffuser are being manufactured in the company's West Virginia facility. Propulsion and active flow control system components are currently in-house and ready for integration.

The X-65 will use 14 effectors arrayed on the upper surfaces of its unique wing arrangement to achieve active flow control.

Kent described the effectors as "steady blowing jets" that emit bursts of air generated from the X-65's onboard auxiliary power unit to shape the flow of air over the aircraft's surface, controlling the plane's roll, pitch and yaw.

They are swappable, free-blowing jets at mid-chord of the wings that direct air over the top of the wing surface, he added.

Notably, the X-65 will also be equipped with conventional control surfaces to allow researchers to compare the differences between traditional control mechanisms and the blowing jets. Kent confirmed that active flow control would not be used to maneuver the X-65 across its full flight envelope initially.

"Right now, our prediction is to [experiment with] it up and away," he said, referring to flight control at altitude. "We are not necessarily going to be able on our first flight campaign to go to active flow control for takeoff."

The CRANE program's goals include removing complexity from future aircraft and potentially reducing their cost. The ability to maneuver aircraft without moving control surfaces could also significantly alter their outer mold lines in flight, potentially aiding stealth.

"We see a potential opportunity to even make planes that are 3D printed," Kent noted. "Then there's the hybrid version of that, which I guess the demonstrator really is, where it has some conventional moving surfaces, but we may be reducing the need for flaps."

The Air Force Research Laboratory, NASA, Naval Air Systems Command and the Office of Naval Research are closely monitoring CRANE and eagerly await the data this longer-than-typical DARPA program will produce, Kent said.

X-65 will fly under an experimental category Federal Aviation Administration certification, "which opens up the aperture of where this could potentially be flown," he said. That means it could fly from a military test facility or a civilian equivalent.

Ground testing will take place in late 2026 at Aurora's facility at Manassas Regional Airport in Virginia, Kent said. ND

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Re: After Delays, Air Burst-Maneuvering X-65 to Fly in 2027

A three year delay where the contractor will bill like crazy and reap money that would not be available if they delivered on time.

cbvand at 6:46 PM

Re: After Delays, Air Burst-Maneuvering X-65 to Fly in 2027

Interesting to see if the engineering scales well to practical applications in military types.
Although not the same thing, I have advocated for an exploration of a F-35D-XL airframe evolution to replace the A/B/C models which employs the cross-cycled F135 based variable or tri-stream bypass jet engines under development that ducts the outer airflow path to amplify the inboard wing sections as well as the tail control in a tailless or near tailless configuration. If the additional option of blowing engine air forward and down through a collapsible center line duct was an effective solution to generating more low speed landing lift, there would be no need for the B model STOVL variant and the compromises the big bulky lift fan has on the F-35B. The greater power of the engine and the extended fuselage would allow strike length internal weapon bays and fuel to reach or exceed 1000nm, the lower bypass air being used to improve stealth by subduing lateral radar reflections, improving sustained maneuverability by reducing the effect of big wing energy bleed off, and lowering landing and take off speeds and distances allowing use from constrained operating locations.
Although not directly related to the above, the X-65 would generate applicable data to the use of blown effects versus mechanical airfoils.

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