X-48B Blended Wing Body Research Aircraft Takes First Flight

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Boeing's X-48B Blended Wing Body technology demonstrator shows off its unique lines at sunset on Rogers Dry Lake adjacent to NASA Dryden Flight Research Center. Credit: NASA

NASA's Dryden Flight Research Center in Edwards, Calif., provided critical support for the first flight July 20 of the X-48B. The 21-foot wingspan, 500-pound remotely piloted test vehicle took off for the first time at 8:42 a.m. PDT and climbed to an altitude of 7,500 feet before landing 31 minutes later. The Boeing Co. of Seattle developed the blended wing body research aircraft.

"Friday's flight marked yet another aviation first achieved by a very hard-working Boeing, NASA and Cranfield team," said Gary Cosentino, Dryden's Blended Wing Body project manager. "The X-48B flew as well as we had predicted, and we look forward to many productive data

flights this summer and fall."

NASA's participation in the blended wing body effort is focused on fundamental, advanced flight dynamics and structural concepts of the design. It is a Subsonic Fixed Wing project managed by NASA's Aeronautics Research Mission Directorate, Washington.

In addition to hosting the X-48B flight test and research activities, NASA provided engineering and technical support -- expertise garnered from years of operating cutting-edge air vehicles. NASA assisted with the hardware and software validation and verification process, the integration and testing of the aircraft's systems and the pilot's ground control station. NASA's range group provided critical telemetry and command and control communications during the flight, while flight operations provided a T-34 chase aircraft and essential flight scheduling. Photo and video support completed the effort.

Boeing's Phantom Works designed the X-48B flight test vehicles in cooperation with NASA and the U.S. Air Force Research Laboratory at Wright Patterson Air Force Base, Ohio, to gather detailed information about the stability and flight-control characteristics of the blended wing body design, especially during takeoffs and landings.

The Boeing blended wing body design resembles a flying wing, but differs in that the wing blends smoothly into a wide, flat, tailless fuselage. This fuselage blending provides additional lift with less drag compared to a circular fuselage, translating to reduced fuel use at cruise conditions. Since the engines mount high on the back of the aircraft, there is less noise inside and on the ground when it is in flight.

Three turbojet engines enable the composite-skinned, 8.5 percent scale vehicle to fly up to 10,000 feet and 120 knots in its low-speed configuration. The aircraft is flown remotely from a ground control

station in which the pilot uses conventional aircraft controls and instrumentation while looking at a monitor fed by a forward-looking camera on the aircraft.

Up to 25 flights are planned to gather data in these low-speed flight regimes. Then the X-48B may be used to test the aircraft's low-noise and handling characteristics at transonic speeds.

NASA long has supported the development of the blended wing body shape and concept, participating in numerous collaborations with Boeing on vehicle design and analysis, as well as several wind tunnel entries of various sizes and design models.

NASA is interested in the potential benefits of the aircraft: increased volume for carrying capacity, efficient aerodynamics for reduced fuel burn and possibly significant reductions in noise due to propulsion integration options. In these initial flights, the principal focus is to validate the research on the aerodynamics and controllability of the shape, including comparisons of the flight data with the extensive wind-tunnel database.

Later studies will be conducted to provide a detailed understanding of this unique aircraft shape and a knowledge database to enable a future full-scale design.

Two X-48B research vehicles were built by Cranfield Aerospace Ltd., in Bedford, England, in accordance with Boeing requirements. The vehicle that flew on July 20 is Ship 2, which also was used for ground and taxi testing. Ship 1, a duplicate, completed extensive wind tunnel testing in 2006 at the Full-Scale Tunnel at NASA's Langley Research Center in Hampton, Va. Ship 1 will be available for use as a backup during the flight test program.

Source: NASA