Boeing Completes JSF X-32A Flight Testing

Boeing on Saturday completed one of the most successful flight-test programs in history when its X-32A concept demonstrator landed here after its 66th flight.

Since it first flew on Sept. 18, the X-32A completed 50.4 flight hours with six different Boeing and government pilots at the controls. Boeing not only met all of the government test objectives but also provided an impressive array of additional flight test accomplishments beyond those identified by the customer.

"I've been associated with a lot of 'X'-aircraft flight-test programs," said Fred Knox, Boeing lead test pilot and a former U.S. Navy pilot. "The fact that we accomplished so much in so little time is a real tribute to the plane and our design and test team. It's really amazing."

The Boeing X-32 flight-test program is structured to validate the company's unprecedented use of simulation and modeling.

"From the first flight, the airplane flew exactly like the simulator," Knox said. "That is exactly what we wanted because it means we got it right."

Underscoring the commonality of its JSF design, Boeing used the X-32A to demonstrate both the aircraft-carrier variant (CV) and conventional-takeoff-and-landing (CTOL) handling qualities, without any modifications to the aircraft.

"Our design is so highly common we needed only one plane to demonstrate our ability to meet the customer's CV requirements as well as all of our own CTOL objectives," said Frank Statkus, Boeing vice president and JSF program general manager.

Statkus added that commonality is one of the three flight-test objectives mandated by the customer, the other two being low speed/carrier approach handling qualities and short-takeoff-and-vertical-landing (STOVL) capabilities.

"The experience gained on our X-32A flight-test program can be directly applied to the X-32B due to the high level of commonality built into the Boeing concept demonstrator aircraft," Statkus said.

Boeing completed all government-required flight test elements in early December and then demonstrated its own strategic objectives involving key CTOL performance capabilities, including supersonic flight, before the end of the year. The X-32A flights were split approximately 50-50 between CV and CTOL tests.

Among the milestones of the X-32A flight-test program were:

X-32A FIRST FLIGHT

The X-32A concept demonstrator began its flight test Sept. 18 when the airplane flew from Palmdale, Calif., to Edwards Air Force Base, Calif.

COMPLETION OF LOW-SPEED AIRCRAFT CARRIER TESTS

Flying as many as five flights a day in November and December, the X-32A on Dec. 2 successfully completed low-speed approach CV tests. U.S. Navy Commander Philip Yates, the government Joint Test Force lead pilot, said, "I continue to be impressed with the X-32A's flying qualities in the carrier mode configuration."

FIRST JSF X-32A AERIAL REFUELING

Also in December, the X-32A demonstrated its aerial refueling capabilities. Flying at 20,000 feet and 235 knots, the X-32A maneuvered into the refueling drogue and effortlessly maintained its position below a U.S. Air Force KC-10 tanker, successfully validating the handling qualities required for the air-refueling task.

SUPERSONIC FLIGHT

On Dec. 21, the Boeing X-32A broke the sound barrier when Lt. Col. Edward Cabrera, U.S. Air Force test pilot assigned to the Boeing program, took the aircraft to 30,000 feet and exceeded Mach 1.0.

WEAPONS BAY TESTING

In January, Boeing successfully completed vibration and acoustics tests of its unique side-mounted weapons bay. These tests were conducted both with and without an instrumented weapons load.

The second of the two JSF concept demonstrators, the X-32B, will demonstrate the company's third-generation direct-lift approach to the STOVL requirements for the U.S. Marine Corps and the United Kingdom's Royal Air Force and Royal Navy. After successful propulsion system ground tests in which more than 1,000 transitions between STOVL and conventional flight modes were completed, the X-32B in January completed initial engine runs and low- and medium-speed taxi tests at Palmdale. This moved the aircraft closer to first flight.

Boeing X-32 flight test is another key piece of the company's aggressive risk-reduction program. Last June, groundbreaking avionics flying lab demonstrations culminated in delivery of a Joint Direct Attack Munition on a ground target. In addition, the Boeing One Team concluded four highly successful full-mission simulation demonstrations with government pilots, logistics support demonstrations, as well as full-scale signature and supportability pole model testing at both Boeing and U.S. government facilities.

The Boeing-led One Team is competing to build the JSF under a four-year U.S. Air Force, Navy and Marine Corps concept demonstration contract, while also defining the design for the operational JSF. A winner is scheduled to be selected later this year.

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