# Boeing Completes JSF X-32B Structural Mode Tests

Boeing yesterday completed structural mode interaction (SMI) testing of its X-32B concept demonstrator, moving a step closer to first flight.

The X-32B, which is expected to fly during the first quarter of 2001, will validate the Boeing direct-lift approach to short take-off vertical landing (STOVL) flight -- one of three customer requirements in the Concept Demonstration Phase of the program.

"Completion of the SMI tests is another positive step as we continue to validate our design," said Katy Fleming, Boeing JSF system test director. "We're making great progress; these tests reduce risk and help confirm that we are ready to begin a safe and productive X-32B flight-test program."

During SMI testing, the aircraft's flight control surfaces are moved at varying frequencies. This evaluation ensures special filters added to the flight control system are functioning properly to prevent vibration in other aircraft components. Fleming said the tests were successful and no anomalies were found.

Conventional takeoff and landing (CTOL) SMI test points were completed last month with similar positive results. In late September, Boeing completed the first phase of STOVL engine runs in the X-32B aircraft. High power conventional and STOVL engine runs are expected to begin later this month.

"To date, X-32B system performance is meeting all predictions and models, and we are demonstrating the high commonality between our X-32A CTOL-and-carrier- variant (CV) aircraft and the STOVL aircraft," said Frank Statkus, Boeing vice president and JSF general manager.

The company's X-32A demonstrator, which made its first flight Sept. 18, completed government-required CV tests at Edwards Air Force Base, Calif., Dec. 2.

Boeing has 30 years of experience with direct lift -- the only proven approach to STOVL flight. Boeing is leveraging that experience, and incorporating significant system improvements, to ensure the services receive a "third-generation" STOVL solution that is more reliable, affordable and easier to fly than any STOVL aircraft operating today.

"We're improving, not inventing," Statkus said. "Not only is direct lift the only combat-proven system, but our solution also is the simplest, safest and most efficient approach to STOVL flight."

To perform STOVL maneuvers, the system redirects engine thrust downward through lift nozzles in the airframe. For conventional flight the lift nozzles are closed so thrust flows rearward through a cruise nozzle to propel the aircraft forward and up to supersonic speeds.

In more than 500 trials on the STOVL run stand, transition times between conventional and vertical thrust have been accomplished repeatedly in one to three seconds, which is critically important for unrestricted STOVL operations and aircraft safety. Integration of the attitude-control system with the direct-lift system has been virtually flawless.

The U.S. Marine Corps and U.K. Royal Air Force and Navy are expected to be the primary STOVL Joint Strike Fighter users.

Boeing, the world's largest producer of fighter aircraft, is competing to build the JSF under a four-year concept demonstration phase contract with the U.S. Air Force, Navy and Marine Corps and the British Royal Air Force and Navy. A competition winner is scheduled to be selected in 2001.

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