Boeing Completes Final JSF X-32B Flight-Certification Tests

Boeing this week successfully cleared the last ground-test hurdle for flight certification of its Joint Strike Fighter X-32B concept demonstrator.

Final engine runs, in the short-takeoff-and-vertical-landing (STOVL) mode, were completed with Pratt & Whitney and Rolls-Royce flight-certified propulsion system hardware and the final validated integrated flight and propulsion control software.

"This is the culmination of a series of tests in which we demonstrated the ease and operational flexibility of direct lift," said Frank Statkus, Boeing vice president and JSF general manager. "Boeing is ready to go fly STOVL.

"Hovering is the easy part -- it's the transition between conventional and vertical thrust that is key to STOVL. The tests confirmed our system's ability to do just that and demonstrated the low-risk aspect of our third-generation direct-lift solution."

During the final engine runs, the test team, which includes Pratt & Whitney and Rolls-Royce, conducted flow-switches, redirecting engine thrust from the aircraft's cruise nozzle to the lift nozzles and back again.

"We're using 21st century technologies such as simulation and modeling to design, build and test our 'X' aircraft," Statkus added. "Our approach was validated during X-32A flight-testing."

The X-32B will demonstrate the company's direct-lift solution to the STOVL requirements for the U.S. Marine Corps and the United Kingdom's Royal Navy and Royal Air Force.

Boeing has 30 years of experience with direct lift -- the only combat-proven approach to STOVL flight. The company is leveraging that experience into a new design that incorporates significant improvements to ensure the services receive a true third-generation, low-risk STOVL solution that is more capable, reliable, affordable and easier to fly than STOVL aircraft operating today.

To perform STOVL flight, the system closes the rear exhaust nozzle and redirects engine thrust downward through lift nozzles. For conventional flight the lift nozzles are closed, and thrust flows rearward through the two-dimensional thrust-vectoring cruise nozzle -- the same as in the X-32A -- to propel the aircraft forward and to supersonic speeds. The afterburner is not used during STOVL operations.

In more than 1,300 trials on the STOVL engine test stand, transition times between conventional and vertical thrust and back again have been accomplished consistently in one to three seconds. This rapid and direct transition capability is critically important for unrestricted STOVL operations and aircraft safety.

Underscoring the commonality of its JSF design, Boeing is using just two aircraft to demonstrate all government requirements for the U.S. Air Force, Navy, Marine Corps, U.K. Royal Navy and Royal Air Force in the concept demonstration phase of the program. Boeing used its X-32A aircraft to demonstrate both aircraft-carrier and conventional-takeoff-and-landing objectives. The X-32A completed its flight-test program Feb. 3 after 66 flights and 50.4 flight hours with six different pilots in the cockpit.

The next major milestone for the X-32B will be high-speed taxi tests later this month, followed shortly thereafter by first flight.

Completed X-32B SMI testing

Completed X-32B low- and medium-speed taxi tests

Completed X-32B engine accelerated mission tests

Completed X-32B maximum thrust STOVL engine runs

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