# Boeing Completes Key Phase of JSF X-32B Engine Runs

Boeing this weekend moved its Joint Strike Fighter X-32B concept demonstrator closer to first flight with completion of a key phase of installed engine runs.

As part of the build-up to short-take-off and vertical-landing (STOVL) flight, the Boeing test team conducted flow-switch transitions, redirecting engine thrust from the aircraft's cruise nozzle to the lift nozzles and back again. The Pratt & Whitney F119-614 engine was tested at various power settings to verify system integrity. The range of power settings simulates the representative thrust spectrum experienced in normal flight.

"The high-power operation of the X32-B engine confirmed both conventional and STOVL lift nozzle thrust operations," said Frank Statkus, Boeing vice president and JSF general manager. "All propulsion-system components operated as designed and predicted -- we're reducing risk daily as we move toward the start of our X-32B flight-test program."

In addition to the engine runs, the Boeing One Team is putting a STOVL qualification engine through a series of durability tests at Pratt & Whitney facilities in West Palm Beach, Fla. The tests will lead to propulsion system certification for STOVL flight.

The X-32B will demonstrate the company's direct-lift approach to the STOVL requirements for the U.S. Marine Corps and the United Kingdom's Royal Navy and Royal Air Force. Initial low-speed taxi tests are expected to take place shortly, followed by a final series of engine runs before first flight.

Boeing has 30 years of experience with direct lift - the only combat-proven approach to STOVL flight. Boeing is leveraging that 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.

Summarizing the Boeing solution to STOVL, Statkus said, "we're improving, not inventing, and that is the key to our simple, proven direct-lift approach."

To perform STOVL maneuvers, the system redirects engine thrust downward through lift nozzles in the airframe. 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.

In more than 500 trials on the STOVL engine run stand, transition times from conventional to 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.

The company's X-32A aircraft, which demonstrates conventional and aircraft-carrier (CV) flight characteristics, has completed 100 percent of its government required CV low-speed handling tests at Edwards Air Force Base, Calif., as well as aerial refueling and supersonic flight. The X-32A, which first flew Sept. 18, and the X-32B designs are as high as 90 percent common.

Boeing, the world's largest producer of military 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 later this year.

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