Lockheed Martin F-35B Succeeds In STOVL Propulsion Ground Test

PRNewswire-FirstCall
FORT WORTH, Texas

The shaft-driven lift fan propulsion system that will enable the Lockheed MartinF-35B Lightning II stealth fighter to perform short takeoffs and vertical landings (STOVL) operated for the first time in the aircraft during ground testing on Sunday, May 25. At full power, the F-35B's system generates more than 40,000 pounds of lifting force, or about 170 percent more than current-generation STOVL fighters.

Pilot Graham Tomlinson of BAE Systems performed two conversions from conventional (wing-borne) to STOVL (jet-borne) mode with the aircraft anchored to a specially instrumented hover pit at Lockheed Martin's STOVL Operations Test Facility. The F-35B is conducting a final series of ground tests before its first flight in the coming weeks.

"The F-35B's STOVL propulsion system operated exactly as expected, providing the power output that our models forecast and transitioning very smoothly from conventional to STOVL-mode and back," said Bobby Williams, Lockheed Martin vice president and F-35 deputy program manager. "We expect the same kind of seamless transition when the F-35B begins STOVL-mode flights in early 2009."

The F-35B combines the profound advantages of stealth and supersonic speed with the ability to operate from small ships and austere bases near front lines.

The F-35B STOVL propulsion system has logged more than 1,900 hours of operation on test stands. In 2001 the X-35B, a proof-of-concept STOVL aircraft using a prototype of the same propulsion system, completed 14 short takeoffs, 17 vertical takeoffs and 27 vertical landings. On July 20, 2001, the X-35B became the first aircraft in history to perform a short takeoff, accelerate to supersonic speed in level flight and descend for a vertical landing in a single mission.

The STOVL propulsion system comprises a Pratt & Whitney F135 turbofan engine, a drive shaft leading from the engine face to a gear box and clutch connecting to a counter-rotating Rolls-Royce lift fan located directly behind the cockpit, a 3-bearing swivel duct at the rear that vectors the engine thrust downward and provides yaw control, and a roll nozzle under each wing for lateral stability.

During the conversion from conventional flight to STOVL flight, all doors associated with the STOVL propulsion system begin to open including the lift fan inlet and exhaust doors, the roll-nozzle doors, the auxiliary-inlet doors atop the fuselage (providing increased efficiency to the main engine) and the aft fuselage 3-bearing swivel duct doors. The 3-bearing swivel duct begins vectoring engine thrust downward as well. Once all doors are open, the clutch engages and the lift fan begins turning. As the lift fan reaches full speed the clutch locks, providing a direct physical connection between engine and lift fan. The aircraft control laws then begin using the STOVL propulsion system to provide aircraft flight control. The system operates automatically at the touch of a button.

The F-35B will operate in conventional mode during its initial series of flights to evaluate overall flying qualities and airworthiness. In preparation for the F-35B's first flight, pilot Tomlinson flew the F-35A for the first time on May 28, assessing the aircraft's handling at various power settings. In early 2009, the F-35B will conduct initial STOVL flight operations before moving to Naval Air Station Patuxent River, Md., for further testing.

Sunday's test marked the first use of the newly constructed hover pit and its supporting facilities. "Our aim is to retire technical risk well before we deliver F-35s to the fleet," Williams said. "Our investment in facilities like the hover pit are helping us do just that while building confidence in the test program."

The F-35 Lightning II is a supersonic, multi-role, 5th generation stealth fighter. The three F-35 variants are derived from a common design and use the same sustainment infrastructure worldwide to replace at least 13 types of aircraft for 11 nations, making the Lightning II the most cost-effective fighter program in history.

Lockheed Martin is developing the F-35 with its principal industrial partners, Northrop Grumman and BAE Systems. Two separate, interchangeable F-35 engines are under development: the Pratt & Whitney F135 and the GE Rolls-Royce Fighter Engine Team F136.

Headquartered in Bethesda, Md., Lockheed Martin employs about 140,000 people worldwide and is principally

engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services. The Corporation reported 2007 sales of $41.9 billion.

For additional information, visit our Web site:
http://www.lockheedmartin.com/

F-35 photographs and information also available at:
http://www.teamjsf.com/

First Call Analyst:
FCMN Contact: karen.l.hagar@lmco.com

SOURCE: Lockheed Martin

Web site: http://www.lockheedmartin.com/

Company News On-Call: http://www.prnewswire.com/comp/117281.html

---

https://news.lockheedmartin.com/2008-05-29-Lockheed-Martin-F-35B-Succeeds-in-STOVL-Propulsion-Ground-Test