Boeing Completes First Test Phase of JSF Vehicle Management System

SEATTLE, July 8, 1999 - Boeing has successfully completed the first test phase of the vehicle management system for its Joint Strike Fighter X-32 demonstrator aircraft. The VMS operates the flight controls, including the actuators and hydraulics, the environmental control system and other subsystems.

Boeing is using a full-scale actuator test rig that simulates the aircraft's hydraulic and actuation systems. Both engine-driven pumps and auxiliary power unit-driven pumps are used to power the hydraulic systems. Testing of actuation performance, onboard diagnostics, pilot displays, avionics and utility systems, and sensor monitoring are well under way.

"Initial testing has proved very successful," said Barbara Sando, integrated product team leader for JSF vehicle management and integrated flight and propulsion control. "Our VMS design is performing as we anticipated."

The actuator test rig enables engineers to verify the operation of the flight-control surface actuators with the integrated flight- and propulsion-control hardware and the operational flight software. The rig is an exact copy of the X-32 actuation system, ensuring a match between the system performance observed in the laboratory and what will be measured on the aircraft during ground and flight testing. Integration of the electrical and hydraulic subsystems, actuation and cockpit -- including displays and controls -- are all complete.

"Designing a laboratory test rig to this level of air-vehicle fidelity is not new for Boeing," said Alan Hickman, VMS test and analysis engineer who previously worked on the Boeing 777 program. "We've done this on other commercial and military programs. We've seen increased test efficiency and a reduction in the number of surprises encountered during ground and flight test. We expect to achieve similar benefits on the X-32."

Test results can be correlated directly to the X-32 without adjustments for scaling or missing elements, making the test process more efficient. Potential interactions between hydraulics, actuators and software are identified and resolved early.

To help keep JSF program costs down, Boeing is re-using laboratory components, including instrumentation, hydraulic drive motors and actuator load systems used in similar testing for the 777 and the F/A-18 Hornet.

"We've drawn on a wealth of experience from Boeing Commercial Airplane Group and our teammates in St. Louis on the F/A-18 program," Sando said. "Our commercial group has tremendous experience building these kinds of test rigs. In fact, they built this one to JSF specifications."

The actuator test rig is one piece of the complex and highly sophisticated Vehicle Integration Laboratory Boeing has installed in Seattle. JSF engineers are using the lab to integrate and refine the vehicle management system and to demonstrate the system's ability to meet all X-32 safety and functionality requirements.

Meanwhile, assembly of both X-32 aircraft in Palmdale, Ca., is ahead of schedule and on cost. The X-32s will be used to meet three primary objectives: 1) demonstrate commonality across the variants as well as commonality of design/build processes; 2) demonstrate the Boeing concept for short takeoff/vertical landing (STOVL) propulsion hover and transition modes; and 3) demonstrate low-speed carrier-approach flying qualities.

Testing of the integrated VMS continues over the next five months. In October, the JSF program will begin formal validation testing in support of first flight, scheduled for early 2000.

Boeing is competing to build the operational JSF under a four-year concept demonstration contract sponsored jointly by the U.S. Air Force, Navy, and Marine Corps and the U.K. Royal Navy and Royal Air Force. The government is scheduled to select a winner in 2001.

###

99-126

For further information:
Mike Tull
(206) 655-1198