Boeing Demonstrates JSF Avionics Multi-Sensor Fusion

Boeing has successfully demonstrated multi-sensor fusion of its Joint Strike Fighter avionics aboard the company's 737 Avionics Flying Laboratory.

The ability to fuse inputs from multiple sensors and display the information in an easy-to-use format for the pilot is a key element of the Boeing JSF integrated avionics. During a series of recent flights, the AFL's synthetic aperture radar and targeting forward-looking infrared sensors collected target-area information, which was processed by automated target-cueing software to locate and identify the targets. The resulting data then was fused to present the pilot with a composite situational display.

Additional target information, detected by the electronic warfare sensor, also was fused allowing the pilot to locate and identify the threats without emitting signals. Each function was accomplished in a real-time environment using low-cost, commercial-off-the-shelf processors.

Combining the data from multiple sensors reduces the number of false alarms a pilot sees during a mission and helps determine where the target or threats are sooner, allowing the pilot to take the necessary "attack" or "evade" steps faster. This rapid decision making process allows the pilot to spend less time over threat areas.

"Our multi-sensor fusion solution will free the pilot from having to actively manage data flow in the cockpit," said Karl Timm, JSF AFL manager. "That allows the pilot to be a tactician rather than a sensor manager."

Boeing began testing the JSF's integrated avionics on the AFL in December 1999. Since then the aircraft has flown 24 missions, with approximately 25 more planned during the seven-month risk-reduction avionics flight-test program.

The AFL, a modified 737-200, is reducing risk in JSF avionics development by allowing engineers to evaluate and troubleshoot the avionics systems before installation on the JSF. Reduced technical risk translates into significantly reduced avionics costs later in the program.

The industry leader in avionics integration, Boeing also is using a test bed on the F-22 program to test and integrate the Raptor's avionics. The company has successfully demonstrated how a test bed can help reduce avionics development costs and future flight-test hours.

"Avionics integration is a Boeing area of expertise, and using our AFL to integrate and fuse the unique functions required for JSF missions will definitely help reduce both program risk and costs," Timm added.

Key JSF avionics components that have already been tested include radio-frequency and electro-optical sensors, and a prototype core processor. The processor, which runs the mission-system software, uses an open architecture that enables future technology enhancement and functional growth.

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

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