Boeing Super Hornet Demonstrates Reconfigurable Flight Controls

The Boeing F/A-18E/F Super Hornet has achieved an unprecedented capability with the addition of a reconfigurable flight control system which is now being flight tested. This system will greatly enhance aircraft safety and the pilot's ability to recover control in the event of loss of the actuator that directs movement of the horizontal tail control surface.

The reconfigurable flight control system is one of the Super Hornet's many survivability improvements that makes it eight times more survivable than the combat-proven F/A-18 Hornet.

Recent flight tests of the reconfigurable flight control system at Naval Air Station Patuxent River, Md., were successful in demonstrating superior flying qualities with only one operational horizontal tail actuator. The flights are part of "degraded modes" testing during which Integrated Test Team (ITT) pilots assess the flying qualities of the aircraft when it experiences a system failure.

"We flew two flights and the results were better than expected," said ITT test pilot Jim Sandberg. "The first time out was very exciting because the aircraft handled extremely well with great control. From a pilot's standpoint, the flying qualities were all Level One."

During both flights, Sandberg used the Super Hornet's Dial-A-Function (DAF) flight control computer to simulate the failure of the left horizontal tail actuator. Although the probability of an actuator failure is remote, according to Sandberg, such a failure would be similar to having the steering wheel of a car come off while you are driving.

"The Super Hornet responded very well," said Sandberg. "I look forward to other pilots having the opportunity to fly it and give us their feedback."

If for any reason the Super Hornet's horizontal tail actuator fails to respond properly, the reconfigurable flight control system will automatically direct the horizontal tail to a fixed, known position and lock it there. The flight control software compensates for the failed actuator with the remaining flight control surfaces - rudders, ailerons and flaps - significantly reducing the pilot's workload.

The Super Hornet's reconfigurable flight control system replaces the mechanical backup system in earlier Hornets. In addition to the safety improvement provided by flying qualities that are far superior to those of the mechanical backup system, this approach reduces aircraft weight and cost, and increases the reliability of the flight control devices.

"Reconfigurable flight control is a significant leap in technology, yet it proved to be nearly transparent to the pilot," said Cmdr. Robert Wirt, Government Flight Test Director. "This is a tremendous reduction in combat vulnerability. What's really impressive is that the aircraft still handled well enough that shipboard recovery will be a viable option for the combat-damaged aircraft."

For the initial flight tests of the system, F/A-18E1 - a single-seat version - was flown in a clean configuration. Additional planned tests for the reconfigurable flight control system include an aerial refueling and flights with the Super Hornet in a variety of weapons configurations.

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