Boeing Refines Joint Strike Fighter Design

Boeing has taken the next step in maturing the design for its Joint Strike Fighter (JSF) , improving its affordability, supportability and performance capabilities while maintaining the fundamentals of its original weapon-system concept.

Boeing is designing a conventional takeoff and landing variant for the U.S. Air Force, a carrier-landing variant for the U.S. Navy and a short takeoff/vertical landing variant for the U.S. Marine Corps and U.K. Royal Navy.

A series of enhancements improves the overall performance of the three aircraft variants in the areas including maneuver capability, short takeoff/vertical landing, carrier approach handling qualities and weapons payload flexibility. The enhancements are incorporated in the Boeing Preferred Weapon System Concept (PWSC) -- its design for the operational JSF.

Boeing is maturing its PWSC design early to minimize costs in the JSF program's next phase -- Engineering and Manufacturing Development. In parallel with developing the PWSC, Boeing is building two X-32 concept demonstrators to prove its design and manufacturing processes and the basic flight qualities of its PWSC. Those efforts are collocated to facilitate the sharing of lessons learned.

"This is part of our long-term weapon-system maturation plan," said Frank Statkus, Boeing vice president and JSF general manager. "We're reducing risk by refining our configuration now rather than later. This update brings us closer to our final design for a truly affordable operational JSF."

The design updates include a refined empennage with horizontal tails for additional control power; a modification to the wing's trailing edge -- while retaining the same high leading-edge sweep of the original delta wing and the related approach speed and stealth advantages; and an aft-swept chin inlet that is lighter and stealthier and that enables better aerodynamic performance at all angles-of-attack.

Boeing continues its maturation of the avionics and cockpit suite based on major risk reduction demonstrations, including full mission simulations in a virtual strike-warfare environment.

These updates improve reliability, maintainability and affordability - both in initial and life-cycle costs.

The aircraft wing remains a single-piece, over-the-fuselage structure, thereby retaining the highly modular approach and high fuel capacity of the Boeing design. Other key features of the Boeing concept that were retained include the same wing sweep; wing span; vertical tail; forebody; propulsion systems, including the low-weight and simple direct-lift design for short takeoff/vertical landing; chin inlet; mission systems architecture; integrated support system; side weapons bay; and the same location and retraction for the landing gear.

"We've taken a very good design and made it better," said Dennis Muilenburg, director of the JSF weapon system. "The bottom line is that we continue to focus on providing our customer with the best-value solution. This design update improves life-cycle affordability, has more growth capability and is a better warfighting system."

The design continues to reflect a strong commitment to high commonality among the three service variants. Boeing embraces optimum commonality as key to achieving affordability and supportability.

Meanwhile, X-32 assembly in Palmdale, Calif.; Seattle; St. Louis; and Tulsa, Okla.; is ahead of schedule in many areas. Advanced design and manufacturing techniques such as 3-D solid modeling, virtual reality and digital simulation of assembly processes are reaping cost and schedule benefits beyond expectations.

The X-32A will demonstrate the characteristics of the U.S. Air Force's conventional takeoff and landing variant and the U.S. Navy's carrier variant while the X-32B will demonstrate the short takeoff/vertical landing variant for the U.S. Marine Corps, U.K. Royal Navy and Royal Air Force.

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

Note to Editors: An illustration of the Boeing Joint Strike Fighter is available at Boeing Media.

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