Boeing Completes Wing Mate of X-32A Demonstrator Aircraft

In a major assembly milestone, Boeing has completed mating the single-piece wing for the Joint Strike Fighter X-32 concept demonstrator to its fuselage. A small team of mechanics positioned and mated all of the attach points between the wing and the fuselage within six hours. The two sections practically snapped together, further validating Boeing "lean" concepts on the Joint Strike Fighter (JSF) program.

"This entire program is based on a lean approach to design and manufacturing, " said Frank Statkus, Boeing vice president and JSF general manager. "The X-32 is meeting its weight targets, meeting its schedule targets and meeting its cost targets. Overall fabrication and assembly costs, for example, remain at 30 to 40 percent below projections."

The wing, with it high leading-edge sweep, is a single-piece, over-the-fuselage structure that makes its design highly modular.

"The design reflects a strong commitment to high commonality among the three service variants," Statkus said. "Boeing embraces optimum commonality as key to achieving affordability and supportability."

Boeing 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 characteristics of the preferred weapon system concept - the operational JSF. Boeing is the world's largest producer of fighter aircraft.

The company is building two X-32 aircraft that will meet the JSF program's three concept-demonstration objectives: 1) demonstrate commonality across the variants, including design/build processes; 2) demonstrate the Boeing direct-lift propulsion concept for short takeoff/vertical landing hover and transition; and 3: demonstrate low-speed carrier approach flying qualities.

"We're on track with the assembly of both the X-32A and X-32B," Statkus said. "We're validating the lean concepts and management approach that we'll carry forward into the next phase of the program."

The wing design, which includes one-piece upper and lower composite skins, also reduces weight by eliminating heavy wing attachments at the sides of the fuselage. The Boeing design exploits the company's extensive experience in modern composites and manufacturing processes gained in the commercial 777 and 737 series aircraft, the B-2, the V-22 and the F-22.

Laser-tracker devices on the factory floor used 3-D design data to locate the parts for nearly tool-less wing assemble. Self-locating features designed in X-32 parts allow for quick and easy assembly in simple, inexpensive holding fixtures. As a testimony to the simplicity of the Boeing approach to manufacturing, manpower levels in final assembly continue to be lower than the initial plan.

"The use of advanced 3-D modeling and assemble simulation and low-cost assembly tooling has helped us meet our affordability initiatives and aggressive schedule in JSF development," said Tim Optiz, assembly team leader and program manufacturing manager. "Together, these innovative techniques are helping Boeing reduce tooling costs by 60 to 70 percent over requirements for other developmental products we have built, such as the YF-22. We have also cut tooling costs for the concept demonstrators by more than half."

With the wing mated to the fuselage, final assembly of the X-32A is nearly complete.

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