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The Boeing Company [NYSE: BA] this week began assembling the wings for the U.S. Air Force's 100th F-22 Raptor at the company's Developmental Center in Seattle.

"I'm proud of this team's perseverance in applying Lean Enterprise principles to the Raptor manufacturing process," said Paul Bay, Boeing vice president and F-22 program manager. "Since delivering the first set in November 1996, we've reduced the time it takes to build a set of wings by more than 45,000 man-hours and cut cycle time by 70 percent."

Boeing manufacturing engineers streamlined production in late 1999 when they developed new tooling that utilizes a built-in overhead handling system. The new tool also improved wing quality, allowing more rapid and even application of pressure as the upper and lower wing skins are matched to the substructure. This reduced variability and ensured a better overall fit.

During assembly, a caulk-like substance is applied to the skin and pressure is exerted to fill in any gaps between the skin and substructure. With the new tool, air bags inflate and apply uniform pressure, eliminating the need for 400 temporary fasteners.

Designed entirely with a computer-aided design application, the wings are made primarily of titanium and graphite composites. They are capable of withstanding supersonic speeds for extended periods of time and extremely "high-g" maneuvers. Each Raptor wing measures approximately 16 feet (side of fuselage) by 18 feet (leading edge) and weighs about 2,000 pounds.

The wing set is scheduled for delivery in December to teammate and prime contractor Lockheed Martin [NYSE: LMT], which recently delivered the 81st F-22 to the Air Force, with 26 additional Raptors currently on contract. The fighter is assigned to four U. S. bases: Testing is conducted at Edwards Air Force Base (AFB), Calif.; tactics development takes place at Nellis AFB, Nev.; pilots and maintenance teams receive training at Tyndall AFB, Fla.; and operational F-22s of the 1st Fighter Wing are assigned to Langley AFB, Va.

The F-22 Raptor is built by Lockheed Martin in partnership with Boeing and Pratt & Whitney. In addition to the wings, Boeing supplies the aft fuselage, integrates and tests the advanced avionics and has responsibility for the pilot and maintenance training systems. Parts and subsystems are provided by approximately 1,000 suppliers in 42 states. F-22 production takes place at Lockheed Martin Aeronautics facilities in Palmdale, Calif.; Meridian, Miss.; Marietta, Ga.; and Fort Worth, Texas, as well as Boeing's Seattle plant. Final assembly and initial flight-testing of the Raptor occur at the Marietta facilities.

Headquartered in Bethesda, Md., Lockheed Martin employs about 135,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services. The corporation reported 2005 sales of \$37.2 billion.

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