

## Design 90 Percent Complete on Long-Range Boeing 777-300ER

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Boeing engineers have released to manufacturing 90 percent of the design drawings necessary to build the 777-300ER (extended range) airplane. This means that design work on this first of two new longer-range 777s is nearly complete and signifies that the program is moving from the design to production phase.

"We've released more than 10,000 engineering events," said Roger Houck, Longer-Range 777 deputy chief project engineer. "Now, with most of the engineering drawings complete, program partners and suppliers around the world have begun manufacturing the first detailed parts."

A unique aspect of the program is that the design team consisted of designers from multiple continents. The 777-300ER represents one of the first large-scale commercial airplane efforts to design and build globally.

Much of the 777 airplane structure, which includes fuselage panels, the wing center section assembly, wing-to-body fairings, passenger entry doors and wing inspar ribs, is produced by a consortium of Japanese aerospace manufacturers including Mitsubishi Heavy Industries, Kawasaki Heavy Industries, Fuji Heavy Industries, Shinmaywa and Nippi.

Many of these components will change to accommodate 777-300ER requirements. When completed, they will be shipped to Boeing's assembly plant in Everett, Wash.

In addition to being the current flap track fairing and wing tip supplier for the 777 program, Korean Air Lines, Aerospace Division, will manufacture the airplane's new wingbox extension and raked wing tips.

Each 777-300ER wing is being extended by 6.5 feet (1.98 meters), and raked wingtips are being added to improve the overall aerodynamic efficiency. The raked wingtips help reduce takeoff field length, increase climb performance and reduce fuel burn.

Major European suppliers that continue to be involved in production of the newest 777 include:

- Spain -- Constructiones Aeronauticas SA continues to produce the 777s, ailerons, flaperons and radome;
- Italy -- Alenia Aerospazio continues to produce the 777s outboard flaps; and
- United Kingdom -- BAE SYSTEMS produces the fixed leading edges and Smiths Aerospace produces the electrical load management system and fuel quality indicating systems.

Major U.S. firms that continue to be involved in production of the newest 777 include:

- Goodrich, which produces the main and nose landing gear;
- Honeywell, which produces the Airplane Information Management System and various other systems;
- Hamilton Sundstrand, which produces multiple environmental control system and electrical systems and components; and
- Vought, which produces spoilers and flaps.

Boeing anticipates a market demand for more than 500 of these longer-range 777 models, with about 45 percent of those airplanes going to Asian operators.

The two new 777s, the 777-200LR and 777-300ER will extend the range of the 777 airplane family, while providing airlines with the ability to increase revenue. For example, an airline flying a 777-300 with 365 passengers and 2,000 pounds of cargo (900 kilograms) from Los Angeles to Tokyo could carry an additional

43,500 pounds (19,700 kilograms) of cargo on the new 777-300ER.

On longer routes currently served by the 777-200ER, such as from Paris to Los Angeles, the 777-300ER can fly that same route carrying an additional 78 passengers and 4,000 pounds (1,800 kilograms) of cargo. On even longer flights, such as from New York to Hong Kong, the 777-200LR can carry 22 more passengers and 35,000 pounds (15,900 kilograms) more cargo than the 777-200ER.

In addition, when the 777-300ER enters service in 2004, it will have a lower empty weight than originally forecast, increasing maximum payload carried on all routes by 1,000 pounds (450 kilograms) for both models.

The Boeing 777 longer-range airplanes will have seat-mile costs that are 15 to 18 percent lower than the A340-500 and A340-600 models. Fuel burn is considerably lower -- 21 to 22 percent lower for the longer-range 777s -- when compared to the A340-500 and A340-600. The 777 also takes advantage of new technology that makes maintenance more efficient and lowers costs.

In a typical three-class configuration, the 777-300ER will transport 365 passengers 7,250 nautical miles (13,427 kilometers). The 777-200LR will transport 301 passengers up to 8,865 nautical miles (16,417 kilometers).

The fuel-efficient, twin-engine Longer-Range 777 airplanes will be powered by a higher-thrust derivative of the General Electric GE90 engine that is offered on the existing 777s. The derivative engine will provide 115,000 pounds of thrust -- the most ever on a commercial jetliner.

The 777 family of airplanes has captured 68 percent of its market, with more than 30 customers worldwide having ordered 600 airplanes. This includes 49 Longer-Range 777s ordered by six customers including: Japan Airlines, Air France, All Nippon Airways, EVA Airways, GE Capital Aviation Services and International Lease Finance Corp.

Boeing also is developing two new Longer-Range 747-400s, one a passenger airplane and the other a freighter. The first of these airplanes rolls out of the factory later this month, and delivers to launch customer Qantas Airways in October. These longer-range 747-400s complement the 777 family, and together, the two airplane programs form the backbone of the Boeing long-range airplane strategy.

Major assembly of the first 777-300ER begins June 20.

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