Boeing 777-300ER Systems, Engines 'Flawless' in Flight-Test

The two Boeing [NYSE:BA] 777-300ER (Extended Range) airplanes are meeting, and often exceeding, expectations as they approach their sixth month of flight-testing.

As of June 16, crews had evaluated takeoff, landing, handling characteristics and fuel mileage tests through 187 flights and 536 hours of flying. The airplanes will undergo more than 1,600 hours of flight-testing.

One of the airplanes set a twin-engine airplane maximum takeoff weight record of 774,600 pounds (351,359 kilograms), while the other one is demonstrating engine thrust and fuel performance that's better than predicted.

Perhaps most importantly for the crews that will fly these newest 777s, flight-test pilots report the airplanes handle just like other 777 family members.

"All pilots, including the FAA, have come to the same conclusion ? that the 777-300ER is a very familiar airplane," said Boeing 777 Chief Test Pilot Frank Santoni, who presented a flight-test briefing today at the Paris Air Show.

Similar handling characteristics help airlines reduce costs for pilot training. It also speaks well for the capabilities of new 777 take-off improvement features, which have allowed the airplane to perform better than predicted.

One of the features, Tail-Strike Protection, helps the longer 777-300ER avoid tail contact with the ground on takeoff. Operating through the fly-by-wire flight controls, the system allows the airplane to lift off at reduced speed, increasing allowable takeoff weight by 4,000 to 10,000 pounds (1,814 to 4,536 kilograms), depending on airport conditions and airplane structural limits.

"It's in the primary flight computer," Santoni said of the special feature. "It's a function that looks at rate of closure of the tail to the ground during rotation, measuring how fast and at what distance the tail is moving toward the pavement."

If it's too fast or too close, the system moves the elevator for slower nose rotation. During abuse takeoffs, where Santoni has deliberately rotated the airplane early and fast, the system has responded as designed.

"It's doing a superb job, which is testament to our engineering team," Santoni said. "On the 777-300 program six years ago we did the same takeoff performance tests and contacted the tail about 12 times, which is expected during flight-test. On this program, we haven't touched it."

The new semi-levered landing gear allows the 777-300ER airplane to lift its nose early during takeoff by shifting the center of rotation from the main axle to aft axle of the three-axle landing gear truck.

"These two features are independent of each other, but both give our customers the ability to take off on shorter runways or put more payload on the airplane for the same length of runway," Santoni said.

The General Electric [NYSE:GE] GE90-115B engine will power the 777-300ER.

Certification of that engine is under way. Each engine produces 115,000 pounds of thrust -- nearly a quarter of a million pounds of total thrust for the airplane. By comparison, the original 777 had 75,000 pounds of thrust per engine.

"It's just an amazing engine," said 777 Senior Test Pilot Suzanna Darcy-Hennemann of performance evaluations. "It's smooth and quiet. It also allows the airplane to take off and climb very quickly."

The additional thrust increases the 777-300ER's maximum take-off weight to 759,600 pounds ? almost 100,000 pounds more than the 777-300 ? with virtually no difference in handling characteristics during takeoff, flight and landing.

That power comes at very little expense. Fuel mileage testing shows a 1 percent improvement in fuel efficiency over original predictions. Such an improvement can reduce by 106,400 gallons (402,724 liters) annually the amount of fuel one airplane uses. That's enough to power 130 automobiles for one year.

It also increases the airplane's range by 75 nautical miles (139 kilometers) to 7,495 nautical miles (13,881 kilometers); or it increases payload by 2,400 pounds (1,089 kilograms) -- passenger or cargo ? on a 7,000 nautical mile (12,964 kilometer) flight.

Extended Twin-Engine Operations testing begins in the fall, which will consist of 220 hours of ETOPS flying divided between the two flight-test airplanes. Generally, ETOPS flying will involve engine shutdowns for up to 330 minutes, and various system checks and simulated malfunctions will be flown to ensure the systems are working in the long-range environment.

Overall, said Darcy-Hennemann, flawless is the word that best describes the 777-300ER's performance so far.

"From a test-pilot's perspective, that's something you always like to say about a new product."

###

For further information:
Susan Bradley
Paris
33 (0)1 41 57 55 07
Debbie Heathers
Seattle
425-342-2902