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Will Boeing's new 777 usurp demand for the 747?

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When Boeing introduces its bigger version of the 777, the new plane will be the largest twin-engine aircraft in the sky, dominating its sector.

But the super-efficient new 777 could also destroy the business case for continuing to build Boeing's largest jet, the 747.

Boeing hasn't disclosed the exact size of the 777 upgrade, but many analysts expect the company board in Chicago at the end of this month to offer a version that carries just 60 fewer passengers than the mammoth 747, while burning far less fuel.

Boeing says it has no plans to stop building 747s. But the new stretched version of the 777 could be a better bargain for airlines, whose choices are increasingly driven by fuel costs.

The possibility that Boeing's new plane could set in motion the demise of the 747 — the "queen of the skies" for more than four decades — has received little notice beyond aviation insiders. Whether painted as Air Force One or dressed for the world's major carriers, the 747 long has been the most visible image of the prowess and might of Boeing. Excluding freight-only versions, the 747 boasts a lifetime order book of 1,219.

But in the last five years, Boeing has sold only 16 — and four of those were to VIPs, not airlines with paying customers.

"It's been a flagship of Boeing for 40 years or so, but quite frankly, technology has evolved so that airplane is no longer competitive," said Gordon Bethune, former CEO of Continental Airlines, which flew 747s in the 1980s.

Though Boeing has updated the 747 over the years, it still comes with four engines, which consume more fuel per passenger than the twin-engine planes that now dominate the skies. Twin engines, by Bethune's estimate, are 15 percent more efficient.

Just to fuel a 747 for a single flight from Chicago to Tokyo can cost an airline $129,000.
"You can just look at the math and say, 'Who would buy a 747? What for?' " said Bethune, who also is a former Boeing executive.

Pushing Boeing to upgrade and stretch the 777 — shoving it into the 747's size domain — is an emerging threat from rival Airbus. The European planemaker claims its planned A350-1000 will nearly match the current 777-300ER in size, with 25 percent better fuel economy.

The A350-1000 will be a stretched version of an Airbus model that hasn't flown yet. But even the promise of the larger version is luring customers away from Boeing. The A350-1000 has already landed 110 firm orders.

The good news for Boeing is if it successfully updates and enlarges the 777 — without the problems and delays that have plagued the 787 — Boeing will be able to offer airlines a larger

twin-engine wide-body plane than Airbus can, with a wider fuselage and possibly superior per-seat fuel economy.

That upgraded 777 — known as the 777X until Boeing reveals its exact form — is critical for Boeing. As the largest twin-engine jetliner available, the 777 already monopolizes its sector. The most expensive model commands a list price of $315 million (though airlines generally negotiate discounts). The monopoly is Boeing's to lose.

But one likely consequence of maintaining the 777's dominance could be to trigger the end of the 747's long run as a passenger jet.

407 seats

The new version of the 777 that most analysts expect, called the 777-9, would offer 407 seats in a typical configuration. That's only 60 fewer than the current passenger version of the 747, the 8i. "It kills the 8i, that's the simple answer, but that airplane already is sucking wind right now," said Scott Hamilton, president of aerospace consultancy Leeham & Co. LLC.

The upgraded 777, Hamilton added, "will be the nail in the coffin of the 8i."

First delivered in 1969 to Pan Am, a now-extinct airline once known for globe-straddling flights, the 747 was the first truly long-range aircraft, able to connect distant city pairs like London-to-Tokyo on routes that previously had required refueling stops.

It was the 747's range more than its size that made it popular with airlines. The distinctive humped planes are often seen lined up loading passengers at major airports.
But range no longer is the sole domain of the 747. Today that need is met by an array of smaller and more-efficient twin-engine aircraft, including the Airbus A330 and the pending A350, as well as Boeing's own 787 and 777.

This loss of niche is reflected in the 747 backlog, now down to just 64 aircraft, mostly freighters, with only 26 orders for passenger planes.

In 2012, Boeing raised production at Everett's massive 747 manufacturing line to two planes monthly, the result of a decision made two years earlier when the company expected the end of the recession would bring a surge of new 747 orders. But the order surge never materialized, and at the current production rate, the paltry backlog of orders could run out in just over two years. Boeing's 2012 annual financial filing warned of a sales shortfall and pointed out that some 747s scheduled for production in 2013 had no buyers.

Planes built with no owners are called "white tails" in the industry, and are generally considered the death knell of a program.

"It hasn't been selling that well. You have to wonder, once they start to work their way through that ... backlog, how many years are left for the 747 series," said Ray Jaworowski, senior aerospace analyst at Forecast International Inc. in Newtown, Conn. "If they do get to that point where they have to go below one per month, it's difficult to see Boeing willing to build less than one 747 a month. At that point, they may decide to stop operating it."

Carrying the freight

The sole arena where the 747 retains significant market traction is as a freighter, due to the aircraft's carrying capacity and its unique front-opening nose door.

But even here the model faces problems, including the protracted weakness of the air freight market, a swarm of used 747s in the market that can be converted to freighters, and competition from smaller planes. Those rivals include freighters based on Boeing's 777 and the Airbus A330. Global air freight volumes dropped during the recession, 12 percent in 2009 alone, after years of growing 6 percent yearly, said Bob Dahl, managing director of the ACMG air freight consultancy in Seattle.

Now he expects that rising fuel costs, and shippers' continued drive for greater efficiency, will slow the air freight rebound to the range of 3 percent to 5 percent yearly.

"High fuel prices drive up air freight rates, and that incentivizes people to look for cheaper alternatives," he said, adding that some of these shippers are moving cargo to ships or rail, instead.

Air freight is a rarefied market, carrying just 3 percent of global freight, with just half of that aboard dedicated air freighters like the 747-8F, and the rest in the bellies of passenger aircraft, Dahl said. About 600 large-capacity freighters operate around the world. A third of them are existing 747-400s, with the balance a mix of other models, including 747-8s as well as smaller Boeing and Airbus aircraft.

Because demand for new freighter capacity is weak, Boeing has an order backlog of only 38 new freight-carrying 747-8Fs. So a key question for Boeing may be if it can sell enough freighters — mixed with a few personal 747s for VIPs or heads of state — to keep the 747 line alive once the 777-9 enters the market.

"They have another few years where they could produce at a low level, and hope the market comes back," said aerospace analyst Richard Aboulafia of the Teal Group, near Washington, D.C. "They would have to see some seriously grim cargo numbers to kill this thing."

While Boeing declined to make an executive available for this story, 747 program spokeswoman Joanna Pickup said Boeing is working to boost the 747 engine's efficiency by 1.6 percent. Boeing, she added, will continue to build passenger, VIP and freighter versions of the airplane.

"Right now our plan is to have all three in our product mix," she said. "We definitely have no plans to end the program."

New queen?
If those plans change and Boeing lets the 747 fly into history, the result might be palatable if it's due to market incursion from its own new 777 model.

Already the current 777-300ER, which can carry 365 passengers nearly 8,000 miles, has become one of Boeing's most popular planes. It and other 777 models have attracted a three-year backlog of 352 aircraft, driving production to a record 8.3 a month.

The next step would be to introduce the longer 777-9, with a fuselage nearly a foot wider than the A350's and able to carry more than 400 passengers seated 10 across. The combination of the new engines and a more efficient composite wing — plus the possible use of lighter aluminum-lithium alloys in the fuselage — could lead to what Boeing Chief Financial Officer Greg Smith earlier this year called "eye-watering kinds of performance."

Airline industry publication Flight Global estimates the 777-9 will be 21 percent more fuel efficient, per seat, than the 777-300ER it replaces.

While Boeing hasn't announced a decision on the 777-9, the signals have been ample. On Jan. 30, during a conference call on fourth-quarter results, Smith said about the 777 that Boeing is "focused on a technical solution that offers significant performance advantages to an already market-leading airplane," adding that the company is "getting close to offerability on the 777X."

Then, in a February presentation before the Pacific Northwest Aerospace Alliance, Vice President of Marketing Randy Tinseth showed an artist's rendering of a 777 with a large 9 on its tail, and said the new model would offer the "lowest fuel burn per seat of any airplane."

In March, Boeing announced it had chosen GE to build engines for the 777X.

The new 777-9 could be a very strong seller with nothing larger to compete against it but the 747 and the Airbus A380 superjumbo, a far larger, four-engine, double-deck plane.

"(The 777-9) will be in a class by itself. It's going to fit nicely between the larger of the 350s and the 380," said Michel Merluzeau, partner for aerospace consultancy G2 Solutions LLC in Kirkland. "This looks like a very, very strong product."

And among twin-engine jets, the 777-9 will be king, because Airbus' largest twin-engine competitor will be the significantly smaller A350-1000. It's unlikely Airbus will attempt another stretch, because it would probably have to redesign the A-350's wing to carry the larger load. "If you're an airline that wants similar range to A350-1000 but needs extra capacity," analyst Jaworowski said, "certainly the fact that there would be no absolute direct competition puts Boeing in the catbird seat."

The 777's dominance as the largest twin jet in the market might be solace enough for Boeing — and even for some 747 aficionados — if the new model causes the 747 to fly into the sunset.