

## A new ETOPS rule will make long-range flying more convenient

By JAY SPENSER

On Feb. 15, 2007, the U.S. Federal Aviation Administration enacted comprehensive new regulations governing extended operations (ETOPS)—flights on long routes over water or others that at some point take the airplane far from an airport. Known as the ETOPS rule of 2007, this regulatory updating will raise



# Connecting the

the industry to a higher level and make long-distance air travel more convenient and efficient.

This new rule is important to Boeing because it affects what airlines will require in terms of airplane size and performance, as well as the relative demand for these different jetliner size categories. It also includes updated type-design requirements that have an effect on how Boeing develops new products like the 787 Dreamliner and 747-8.

Performed with two-engine jetliners, or twinjets, since 1985, ETOPS sets the highest standard for safe, reliable, long-haul flying and is the state of the art in intercontinental air travel. Airlines have logged more than 5.5 million ETOPS twinjet flights over more than two decades, and some 143 operators worldwide fly about 1,700 more every day.

ETOPS uses a “preclude and protect” approach that makes these operations even safer and more reliable in two ways:

- ETOPS reliability enhancements preclude many mechanical- or system-related airplane diversions by reducing the need for flight crews to declare an emergency and divert to an airport other than the intended destination.

- ETOPS operational requirements further protect the airplane, its passengers and its crew on those rare occasions when diversions occur. (Diversions can't be eliminated





# dots

Boeing twinjets such as the 767 and the 777 have helped many airline customers perform ETOPS (extended operations) flights—and connect more city-pairs. Shown here (clockwise from top left) are a Continental Airlines 767, a Singapore Airlines 777, a Qantas Airways 767, an Emirates 777, a Pakistan International Airlines 777 and a Jet Airways 777.



QANTAS AND CONTINENTAL: BOEING PHOTOS; OTHERS: TIM STAKE PHOTOS

entirely because most are the result of passenger illness, weather or other factors unrelated to the airplane and its systems.)

## MAJOR REGULATORY CHANGES

The ETOPS rule of 2007 brings big changes to the ETOPS program. Building on the propulsion and systems reliability of today's long-range twinjets, this rule's updated requirements maintain existing safety standards while giving carriers the opportunity to fly properly configured and approved twinjets on optimal flight routings between virtually any two cities on earth.

For the first time, this rulemaking applies ETOPS requirements more broadly to cover the extended operation of three- and four-engine passenger jetliners. The FAA has taken this action because the dramatic growth in airplane range capabilities has resulted in flights increasingly traversing remote regions of the world.

Regardless of how many engines they have, all airplanes that fly these routes contend with the same operating challenges in terms of weather, terrain and limitations in navigation and communications infrastructure. Therefore, applying the proven protections of ETOPS to three- and four-engine passenger jets when they perform extended operations raises the industry to a higher and more uniform level of safety and reliability.

## TRANSFORMING AIR TRAVEL

In 1985, a Boeing 767 in transatlantic service performed the world's first ETOPS flight. That largely unheralded event allowed a profound transformation of global air-service patterns that continues today.

Before ETOPS, large airplanes such as the four-engine 747 or the three-engine DC-10 were the undisputed workhorses of air travel between Europe and North America. Today, intermediate-size twinjets like the 767 and 777 account for more than 70 percent of all transatlantic flights, and similar changes are occurring elsewhere (see map on Page 31).

How did this happen? The answer is technology, market liberalization and ETOPS. Starting with the 767 of 1982, fuel-efficient twinjets powered by enormously reliable high-bypass-ratio fanjet engines entered service that combined long range with smaller capacities. Moreover, overnight deregulation of the U.S. aviation industry in 1978 began a global easing of restrictive air-service policies. This liberalization gave airlines the freedom to pioneer new services.

## ■ COMMERCIAL AIRPLANES

Once ETOPS became available in the mid-1980s, airlines began linking a growing number of the world's cities. But ETOPS isn't entirely a widebody story; single-aisle twinjets such as the 737 also offer greater range than in the past and today are flying ETOPS services worldwide. The result has been a profound evolution of air-service patterns that makes flying more convenient and efficient.

A quarter-century ago, the 747 was the only airplane that could fly the world's longest routes. Some of these routes had just a few flights per week, because travel in those markets wouldn't sustain daily service. Once long-range, smaller-capacity ETOPS twinjets became available, airlines

used them to bring these markets up to daily service, benefiting their business and other time-sensitive travelers.

In addition, ETOPS lets airlines link

**The result of ETOPS has been a profound evolution of air-service patterns that makes flying more convenient and efficient.**

secondary markets that won't support profitable service with large jetliners. As a result, travelers today are increasingly likely to find nonstop flights to their destination

instead of having to transfer at major airports. Case in point: Twenty-five years ago, traveling from Atlanta to Milan, Italy, required flying to New York, taking a large jet from there to a European hub such as London or Paris, and then boarding yet a third flight to Milan. Today, just one flight is required, because ETOPS twinjets directly link these and countless other cities worldwide. In fact, this ETOPS trend of "bypass flying" has reduced pressure on the world's busiest airports.

ETOPS also makes flying more convenient between major hubs by letting airlines divide the total number of passengers among a greater number of smaller airplanes (two 767s carry about the same

The Boeing family of 777 jetliners recently marked its 1 millionth ETOPS (extended operations) flight.

BOEING GRAPHIC



### A million reasons to cheer

The Boeing 777 recently celebrated a major ETOPS (extended operations) milestone. Based on reported and projected 777 fleet data, Boeing estimates that this family of twinjets flew its 1 millionth ETOPS flight on May 11.

The 777's journey to reach 1 million ETOPS flights began with its introduction to service on June 7, 1995—which, fittingly, was a transatlantic ETOPS flight. To date, the 777 world fleet has accumulated more than 14 million flight hours, the majority in ETOPS service.

The 777 is the first airplane designed from the outset for ETOPS. In fact, it was the first airplane to receive its FAA and ETOPS certifications simultaneously—otherwise known in industry parlance as "ETOPS out of the box." Today, the 777 twinjet family includes five passenger models, including the 777-300ER (Extended Range) and 777-200LR (Longer Range), which let airlines serve very long nonstop routes. For cargo operators, Boeing is developing the 777 Freighter, scheduled to enter service in 2008.

—Jay Spenser

number of passenger as one 747). This practice benefits airlines through increased operational flexibility and passenger satisfaction. Passengers also come out ahead because they have more travel options, greater convenience in flight times and—since ETOPS gives airlines more ways to compete—lower ticket prices.

Furthermore, ETOPS offers environmental benefits. Because twinjets are inherently more efficient than jets with three or four engines, they use less fuel and create fewer emissions. In fact, the Boeing 787 Dreamliner, scheduled to enter service next year, will be the most fuel-efficient twinjet of all. Despite having fewer than half as many seats as the biggest four-engine jets, the 787 will use less fuel per passenger seat than any other jetliner.

**PRODUCT CHANGES**

Type-design requirements in the U.S. ETOPS rule of 2007 will guide the development of all future commercial jet transports except those dedicated to short-haul commuter operations. For existing three- or four-engine jetliner types, this rule requires no design changes unless these airplanes remain in production past Feb. 17, 2015, at which time ETOPS design changes that further enhance reliability must be incorporated into their manufacture.

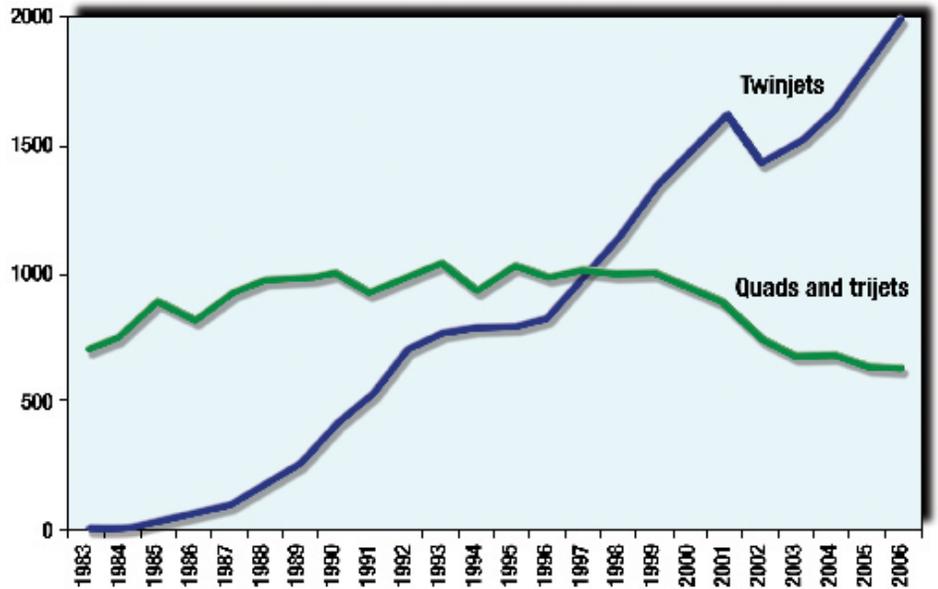
This new ETOPS rulemaking is guiding the design of the next two Boeing jetliners. The new 747-8—a major derivative of the 747, history’s most successful widebody—will be the first four-engine airplane designed from the outset for ETOPS.

The 747-8 will enter service as a freighter in 2009 and a passenger plane in 2010. Because all-cargo operations involving airplanes with more than two engines are exempted from the new ETOPS rule, just the 747-8 Intercontinental passenger version will be subject to ETOPS requirements when U.S. air carriers, and airlines based in other countries that adopt similar regulations, fly it on extended-division-time routes.

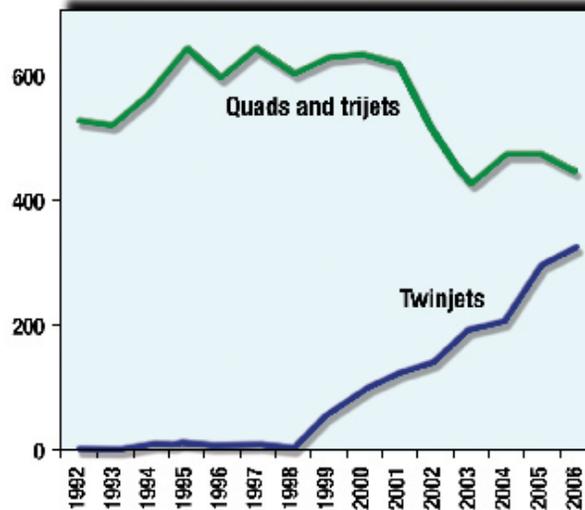
The all-new 787 Dreamliner, which enters service next year, also meets these latest ETOPS design requirements. Boeing plans to certify long-range versions of the 787 to allow operations up to its design capability, giving airlines the flexibility to fly optimal routings between any two cities on earth for which the airplane has sufficient range. Boeing also plans to extend the diversion capabilities of certain 777 models, based on customer needs. ■

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**North Atlantic**



**North Pacific**



**A (t)win-(t)win situation**

As these graphs show, the number of twinjets serving routes between the United States and destinations across both the North Atlantic and North Pacific oceans has increased steadily since the mid 1980s. In fact, twinjets now handle about three times as many flights across the North Atlantic as three- and four-engine airplanes do.

*Graphs reflect scheduled passenger flights per week from the United States across the North Atlantic and North Pacific as counted in the Official Airline Guide*

**ETOPS around the world**

Twinjets operating under ETOPS rules set the standard for safe, reliable long-range flying around the globe. Currently, Boeing twinjets alone perform about 40,000 ETOPS flights per month in service with more than 100 operators worldwide. Of the 5.5 million ETOPS flights logged since 1985, Boeing jets account for 4.5 million.

