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# ascend

Taking your airline to new heights

## THE PILOT

A CONVERSATION WITH  
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# Bursting At The Seams

*With an airspace system that for decades has been overcrowded and inefficient, the U.S. Federal Aviation Administration is finally implementing new technology and processes to support the country's phenomenal airline industry growth rate as well as reduce flight delays and make the skies safer.*

■ By Michael Clarke | *Ascend* Contributor

The U.S. domestic airline industry has experienced phenomenal growth during the last 30 years since deregulation. In spite of major geopolitical events that have caused temporary reductions in passenger traffic, the number of passengers traveling within the domestic market and the number of aircraft movements have increased three fold. At the same time, there has been very little growth in the underlying airport and air traffic control system necessary to support this immense growth. As a result, there has been a consistent increase in the number of delayed and cancelled flights as measured by the U.S. Department of Transportation.

During the first half of 2007, nearly 28 percent of flights were delayed, cancelled or diverted. Of the late arrivals, passengers experienced an average delay of 57 minutes. An alarming and disturbing trend observed in delayed flights is a significant increase in duration of taxi-in and taxi-out times, in some cases exceeding five hours. With limited gate availability at major hub airports, airlines are often forced to board flights and reposition aircraft to holding areas until they receive departure clearance. On arrival, inbound flights often end up waiting until gates open, where, in some cases, the outbound flights at the occupied gates are waiting for delayed crew members on inbound flights.

Even during blue-sky days (something that rarely happens), existing U.S. airports and air traffic control systems are barely able to cope with the number of scheduled flights, especially in major metropolitan areas such as New York City. In fact, the three most chronically disrupted U.S. airports — John F. Kennedy International Airport, LaGuardia Airport and Newark Liberty International Airport — all serve the New York tri-state area. This bottleneck impacts the entire national airspace, and the U.S. Federal Aviation Administration has placed great emphasis on dealing with problems in the New York City area and the surrounding northeast region to minimize disruptions.

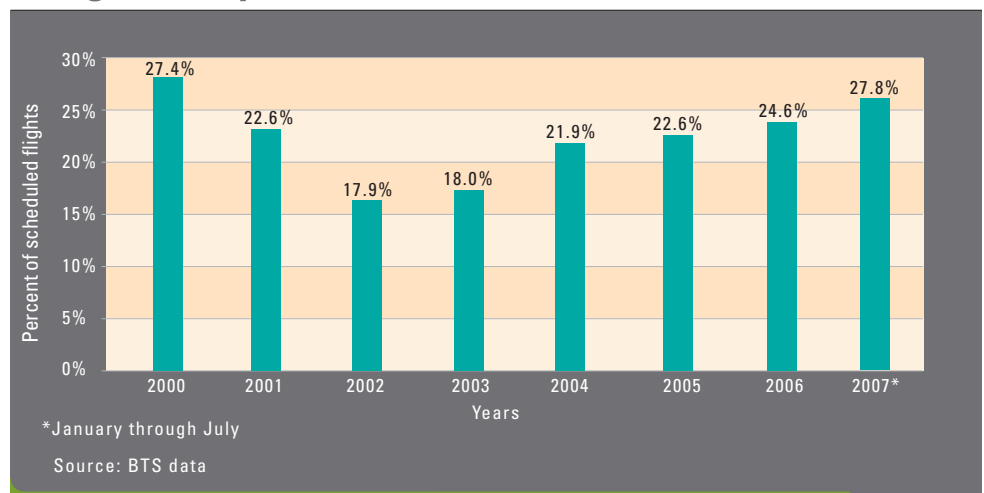
In March, the U.S. Department of Transportation announced the allowance of 30 additional daily flights at Newark Liberty Airport, but to achieve this and avoid the significant delays experienced last year, airlines must spread more services into off-peak times. The new cap went into effect in early May and applies to both domestic and international flights, enabling an average of 83 services per hour during peak periods. The same cap began in March on rotations at JFK Airport, and it already exists at LaGuardia Airport. America's domestic airline delays were the second worst on record in 2007 according to the DOT, and these three airports had the worst on-time arrival rates.

Several programs have recently been instituted by the FAA, including the redesign of the airspace in the northeast and the introduction of the airspace flow program. Based on past

experiences, it has been observed that airspace changes are essential for realizing the benefits of new runway projects, and they can enhance the flow of air traffic even without new airport infrastructure. For example, a recent airspace design above the Philadelphia International Airport has shown marginal improvements in northeast operations as Philadelphia traffic often impacted traffic bound for the tri-state area.

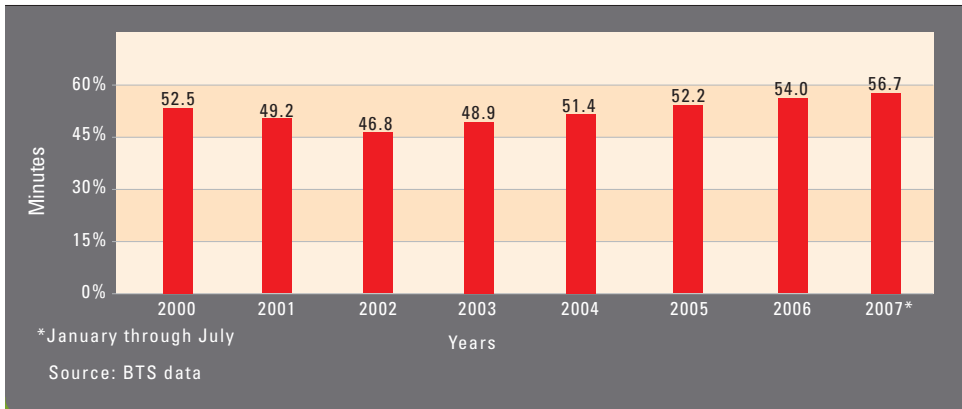
During an airspace flow program, air traffic controllers are allowed to delay only those flights that are expected to encounter extremely bad weather. As a result, the new program is expected to minimize the crippling effects of the sudden thunderstorms that frequently affect the nation's airspace system during the summer when travel is at its highest. On a single severe weather day, thousands of flights can be delayed, diverted or canceled, affecting hundreds of thousands of pas-

## Flight Delays, Cancellations And Diversions



The percentage of on-time arrivals at the nation's busiest airports has steadily declined each year since 2002, when only 82 percent of flights arrived on time at the 35 busiest airports. In 2006, the on-time arrival rate at those airports fell to 75 percent.

## Average Length Of Arrival Delays



**For flights that arrived late, passengers experienced an average flight delay of nearly 57 minutes, up nearly three minutes from 2006. These rising flight delays are leading to more on-board tarmac delays.**

sengers and resulting in millions of dollars in operating losses for carriers. Typically, there are more than 40 severe weather days annually in the U.S. domestic system. Under the AFP, controllers issue expected departure times to aircraft that are expected to pass through airspace affected by bad weather and safely meter them through the constrained area. Airlines are given the option of either accepting delays for flights scheduled to fly through storms or flying longer routes to safely maneuver around the weather system. It improves the FAA's ability to respond to severe weather and reduces the amount of unnecessary delays and disruptions. While this initiative does not create additional capacity, it limits the negative effects of severe weather patterns. It is estimated that in the first year of operations (summer of 2006), AFP programs saved U.S. airlines US\$20 million in reduced operating costs.

In another initiative, the FAA has implemented the adaptive compression program in which arrival slots that become available as a result of flight cancellations, delays and diversions are automatically filled with available flights. The underlying goal of this program is to ensure that airports impacted by bad weather receive the maximum number of flights that can safely arrive, thereby reducing the overall number of delay minutes experienced by the traveling public. While a lot of attention is often placed on extremely bad weather days, the FAA is advocating the use of new and emerging technologies such as data communication and satellite-based navigation to increase the capacity of the national airspace system.

Data communication provides an additional means for two-way exchange between controllers and flight crews for air traffic control clearances, instructions, advisories, flight crew requests and reports. The recent introduction of Reduced Vertical Separation Minimum, or RVSM, in the U.S. domestic system has helped increase the capacity of the national airspace system. RVSM was designed to reduce the vertical separation above flight level 290 from the previous 2,000-foot minimum to 1,000-foot minimum. This has enabled aircraft to safely fly more

optimum profiles, gain fuel savings and increase airspace capacity.

The FAA is developing the next-generation air transportation system, called NextGen, to modernize the national airspace system through 2025. As part of the NextGen initiative, the FAA will address the impact of air traffic growth by increasing national airspace system capacity and efficiency while simultaneously improving safety, environment impacts and accessibility to the ATC system.

Currently, the U.S. air transportation system handles 750 million passengers each year. It is anticipated that the NextGen system will accommodate two to three times the current traffic levels by shifting away from outdated ground-based, voice-driven technology. To achieve these goals, the FAA is leveraging emerging aircraft navigation capabilities, including performance-based navigation that uses satellite-based technology.

Performance-based navigation incorporates navigation performance requirements that can be applied to an air traffic route, instrument procedure or defined airspace. This includes both area navigation and required navigation performance specifications. Performance-based navigation provides a foundation for the design and implementation of automated flight paths as well as airspace design and obstacle clearance.

Area navigation enables aircraft to fly on any desired flight path within the coverage of ground- or space-based navigation aids within the limits of the capability of the self-contained systems, or a combination of both capabilities. As such, RNAV aircraft have better access and flexibility for point-to-point operations. RNAV arrival and departure procedures should drastically reduce noise, emissions and fuel usage. RNAV procedures at Hartsfield-Jackson Atlanta International Airport have already saved airlines US\$34 million in fuel costs. Required navigation performance is RNAV with the addition of an onboard performance monitoring and alerting capability. A defining characteristic of RNP is the ability of the aircraft navigation system to monitor the navigation performance and

inform the crew if the requirement is not met during an operation. This onboard monitoring and alerting capability enhances the pilot's situation awareness and can enable reduced obstacle clearance or closer route spacing without intervention by air traffic control. Once the required performance level is established, the aircraft's own capability determines whether it can safely achieve the desired performance and qualify for the operations.

The backbone of the NextGen system is Automatic Dependent Surveillance Broadcast, or ADS-B. It uses global positioning satellite signals to provide air traffic controllers and pilots with much more accurate information that will help keep aircraft safely separated in the sky and on runways, allowing flights to go from point to point. As a result, airlines will be able to file shorter flight plans, which lead to reduced travel times for passengers. Aircraft transponders receive GPS signals and use them to determine the aircraft's precise position in the sky, which is combined with other data and broadcast out to other aircraft and air traffic control facilities. When properly equipped with ADS-B, both pilots and controllers will, for the first time, see the same real-time displays of air traffic, substantially improving safety.

However, the benefits of these new concepts will be limited due to the slow acceptance by commercial airlines. As part of these solutions, airlines are required to equip their aircraft with the necessary onboard tools that are considered by some carriers expensive and not cost effective.

On the ground, the FAA is currently approving construction for new runways, installing new technology and instituting new procedures to facilitate capacity and efficiency enhancements. Since 2001, it has approved 10 miles of new runways at 10 of the United States' busiest airports including Hartsfield-Jackson Atlanta International Airport. At other major hub airports such as Dallas/Fort Worth International Airport, the FAA has introduced perimeter taxiways and high-speed exits that reduce the number of active runway interceptions necessary to get from the runway threshold to terminal gates. Together, these accommodate more than 1.6 million additional operations per year and decrease average delay per operation at these airports by approximately five minutes.

No one can question the dynamic role of the U.S. airline industry in the country's economy, and it is therefore essential that the FAA maintains a focused strategy in improving system capacity and efficiency. Without any substantial changes to the national airspace system, the level of congestion will only worsen, resulting in increased flight delays, cancellations and diversions. The increased levels of flight disruptions will lead to more disrupted passengers, increased airline operating costs and a continued negative impact on the environment. ■

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