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NATIONAL AIRSPACE SYSTEM

Initiatives to Reduce Flight Delays and Enhance Capacity are Ongoing but Challenges Remain

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May 26, 2005

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Highlights

Highlights of GAO-GAO-05-755T, a report to a report to Subcommittee on Aviation, Senate Committee on Commerce, Science, and Transportation

Why GAO Did This Study

Since the unprecedented flight delays in 2000, a year in which one in four flights were delayed, our aviation system has been adversely affected by many unanticipated events—such as the September 11th terrorist attacks, and Severe Acute Respiratory Syndrome (SARS)—that significantly reduced the demand for air travel. However, demand for air travel is rebounding. For example, the number of passengers traveling by air increased from 642 million in 2003 to 688 million in 2004.

Flight delays have been among the most vexing problems in the national transportation system and are defined by the Department of Transportation as instances when aircraft arrive at the gate 15 minutes or more after scheduled arrival time. In 2004, one in five flights were delayed primarily at New York La Guardia and Chicago O'Hare. Delays at these airports have consequences for the rest of the system. GAO's testimony addresses the following questions that pertain to flight delays and enhancing capacity: (1) What initiatives are ongoing by the federal government, airlines, and airports to address flight delays and enhance capacity? (2) What are some of the challenges in reducing flight delays and enhancing capacity? (3) What other options are available for reducing flight delays and enhancing capacity?

www.gao.gov/cgi-bin/getrpt?GAO-GAO-05-755T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Gerald Dillingham (202) 512-2834 or dillinghamg@gao.gov.

What GAO Found

Several initiatives to address flight delays and enhance capacity are ongoing. Many of these initiatives are reflected in FAA's February 2005 Operation Evolution Plan, which is a 10-year plan to increase capacity and efficiency of the national airspace system at 35 of the busiest airports in the United States. New runways opened in the last 6 years at the Phoenix, Detroit, and 5 other airports. Seven more runways are scheduled to open by the end of 2008. Congress and FAA also streamlined the process for building runways. In addition to building runways, several other initiatives were implemented. For example, in January 2005, FAA implemented the Domestic Reduced Vertical Separation Minimum which is designed to increase high altitude routes in the contiguous United States and Alaska. To reduce flight delays at some of the delay-prone airports, FAA is limiting the number of takeoffs and landings during peak periods at New York La Guardia and Chicago O'Hare and is considering auctioning off landing and take off rights at New York La Guardia.

A number of challenges in reducing flight delays and enhancing capacity remain. Chief among them is obtaining funding for the initiatives mentioned above; their successful implementation is predicated on the availability of funding from several sources, including FAA, airlines, and airports. Another challenge is reducing flight delays and enhancing capacity at delay-prone airports, such as New York La Guardia, which have little capacity to expand and would find it difficult to build even one more runway.

Other options to address delay problems include adding new capacity by building new airports. According to FAA, airport authorities in Chicago, Las Vegas, and San Diego are evaluating the need for new airports. Another option is to develop other modes of intercity travel, such as high-speed rail, where metropolitan areas are relatively close together. These options may conflict with the interests of one or more key stakeholder groups; and, in many cases, would be costly.

Flight delays totaled over one million in 2004

Source: FAA.

Mr. Chairman and Members of the Subcommittee:

We are pleased to be here today to discuss flight delays and capacity issues in the national airspace system. Since the unprecedented flight delays in 2000, a year in which flight delays totaled 1.4 million and one in four flights were delayed, our aviation system has been adversely affected by many unanticipated events—such as the September 11 terrorist attacks, the Iraq war and associated security concerns, and Severe Acute Respiratory Syndrome (SARS)— that significantly reduced the demand for air travel. However, that demand for air travel is rebounding. For example, the number of passengers traveling by air increased from 642 million in 2003 to 688 million in 2004. FAA estimates that by 2015 there will be as many as one billion travelers per year in the United States.

The current rebound in air travel has been a significant factor in a resurgence of flight delays today. Flight delays have many causes. Historically, the major cause of flight delays has been bad weather. For example, seventy percent of the flight delays from 2000 to 2004 were weather-related. Apart from weather, the next main cause is lack of capacity—that is, the inability of the national airspace system to handle the amount of traffic seeking to use it. Changes in the composition of the aircraft fleet—including the airlines' greater reliance on regional jets with an average of 49 seats— has also increased the number of aircraft in the national airspace system, which has placed greater demand on the system. Besides airlines, other parts of the aviation community are also likely to place more demands on the national airspace system. For example, corporations may make increasing use of their corporate jets, which often use the same airports and airspace as those used by airlines.

Flight delays have also been among the most vexing problems in the national airspace system and are defined by the Department of Transportation as instances when aircraft arrive at the gate 15 minutes or more after scheduled arrival time. In 2004, the number of flight delays totaled over 1.4 million and almost one in five flights were delayed primarily at New York La Guardia, Newark International, Chicago O'Hare, and Atlanta Hartsfield. Because these are some of the busiest airports in the country, their delays generally have significant ramifications for the rest of the national airspace system. Our nation's airspace system is a critical engine of economic growth that facilitates the safe and efficient movement of people and goods around the globe, consequently flight delays and capacity issues have significant ramifications. According to the

Commission on the Future of the United States Aerospace Industry, consumers stand to lose $30 billion dollars annually if people and products do not reach their destinations within expected time periods. The Air Transport Association also reports that flight delays in 2004 cost the airline industry an estimated $6.2 billion in direct operating costs (e.g. pilots, flight attendants, and fuel).

My statement today updates our 2001 report entitled: *National Airspace System: Long-Term Capacity Planning Needed Despite Recent Reduction in Flight Delays*[1] and addresses the following questions:

- What initiatives are ongoing by the federal government, airlines, and airports to address flight delays and enhance capacity?
- What are some of the challenges in reducing flight delays and enhancing capacity?
- What other options are available to address flight delays and enhance capacity?

To answer these questions, we obtained and analyzed information from FAA, Airports Council International, and Air Transport Association on the status and impact of initiatives to reduce flight delays that were identified in our December 2001 report. We performed our work in accordance with generally accepted government auditing standards.

In summary:

- Several initiatives to reduce flight delays, such as those shown in figure 1, and enhance capacity are ongoing.

[1]U.S. Government Accountability Office, *National Airspace System: Long-Term Capacity Planning Needed Despite Recent Reduction in Flight Delays*, GAO-02-185 (Washington, D.C.: December 14, 2001).

Figure 1: Illustration of Flight Delays

Source: FAA.

Many of these initiatives are reflected in FAA's February 2005 Operation Evolution Plan which is a 10-year plan to increase capacity and efficiency of the national airspace system and focuses on airport congestion, air traffic management flow efficiency, en route congestion, and terminal area congestion at 35 of the busiest airports in the United States.[2] FAA acknowledges, however, that the OEP is not intended as the ultimate solution to congestion and delay problems. Also, over the last the six years, new runways were opened at the Phoenix, Detroit, Denver, Miami, Cleveland, Houston, and Orlando airports, which provided those airports with the potential to accommodate about one million more annual operations (take-offs and landings). Seven more runways and one runway extension are scheduled to open by the end of 2008 with the potential to accommodate 889,000 more annual operations. In addition to building runways, several new systems or technologies were implemented. For example, in January 2005, FAA implemented the Domestic Reduced Vertical Separation Minimum which is designed to increase available high altitude routes which gives pilots and air traffic controllers more choices so that aircraft can fly more direct routes at the most fuel-efficient

[2]See appendix 1 for a list of the 35 airports that are in the OEP.

altitudes. FAA is also pursuing some additional solutions for flight delays that are not in the OEP. To reduce flight delays at some of the delay-prone airports such as New York La Guardia and Chicago O'Hare, FAA is also exploring administrative and market-based options. For example, FAA is considering auctioning off landing and take off rights and using congestion pricing at New York La Guardia and limiting the number of takeoffs and landings during peak periods at Chicago O'Hare.

- A number of challenges in reducing flight delays and enhancing capacity remain. Chief among them is obtaining funding for many of the initiatives mentioned above; their successful implementation is predicated on the availability of funding from several sources, including FAA, airlines, and airports. However, since 2000, the financial condition of the aviation industry has changed significantly. Many structural changes, such as the growth of the low cost carriers which led to lower average fares and external events (e.g. global recessions and a steep decline in business travel) have caused a dip in demand for air travel and resulted in sharp decreases in airline industry revenue and the amount of revenues flowing into the Airport and Airway Trust Fund.[3] FAA expects that over the next four years there may be an $8.2 billion dollar gap between its costs and revenues. In 2004, the airline industry losses totaled $14 billion and the industry is expecting similar losses in 2005, which will make it difficult for them to equip their aircraft with some of the new air traffic control technology, according to Air Transport Association officials.

- Other options are available to address delay problems. One option is to add new capacity—not by adding runways to existing capacity-constrained airports, but rather by building entirely new airports. According to FAA, airport authorities in Chicago, Las Vegas, and San Diego are evaluating the need for new airports. Another option is to develop other modes of intercity travel, such as, but not limited to, high-speed rail where metropolitan areas are relatively close together. These options may conflict with the interests of one or more key stakeholder groups, and, in many cases, would be costly.

Background

Although recent events may have moved airport congestion off center stage as a major national issue, delays remain a pervasive problem, in part because of the interdependence of the nation's airports. The effect of

[3]The Airport and Airway Trust Fund help funds the development of a nationwide airport and airway system and air traffic control facilities.

delays can quickly spread beyond those airports where delays tend to occur most often, such as New York La Guardia, Chicago O'Hare, Newark International, and Atlanta Hartsfield. Delays at these airports can quickly create a "ripple" effect of delays that affects many airports across the country. For example, flights scheduled to take off from these airports may find themselves being held at the departing airport due to weather or limited airspace. Similarly, an aircraft late in leaving the airport where delays are occurring may be late in arriving at its destination, thus delaying the departure time for the aircraft's next flight.

Delays have many causes, but weather is the most prevalent. Figures compiled by FAA indicate that weather causes about 70 percent of the delays each year. Apart from weather, the next main cause is lack of capacity—that is, the inability of the national airspace system to handle the amount of traffic seeking to use it. Capacity can be measured in a variety of ways. For example, at individual airports, one measure is the maximum number of takeoffs and landings that can be conducted in a given period, such as 15 minutes or 1 hour. In our 2001 report, we noted that FAA had established such a capacity benchmark at each of the 31 of the nation's busiest airports.[4] FAA's data on capacity and demand at these airports showed that even in optimum weather conditions, 16 airports had at least three 15-minute periods each day when demand exceeded capacity.[5]

Weather and capacity problems are often linked, because bad weather can further erode capacity. For example, some airports have parallel runways that are too close together for simultaneous operations in bad weather. When weather worsens, only one of the two runways can be used at any given time, thereby reducing the number of aircraft that can take off and land. FAA's data in 2001 showed that in bad weather, 22 of the 31 airports had at least three 15-minute periods when demand exceeded capacity. Another measure of capacity, apart from the capacity of individual airports, is the number of aircraft that can be in a given sector of the airspace. For safe operations, aircraft must maintain certain distances from each other and remain within authorized airspace. If too many aircraft are trying to use the same airspace, some must wait, either on the ground or en route.

[4]FAA updated its capacity benchmark report in 2004.

[5]The current OEP includes 35 of the busiest airports in the U.S.

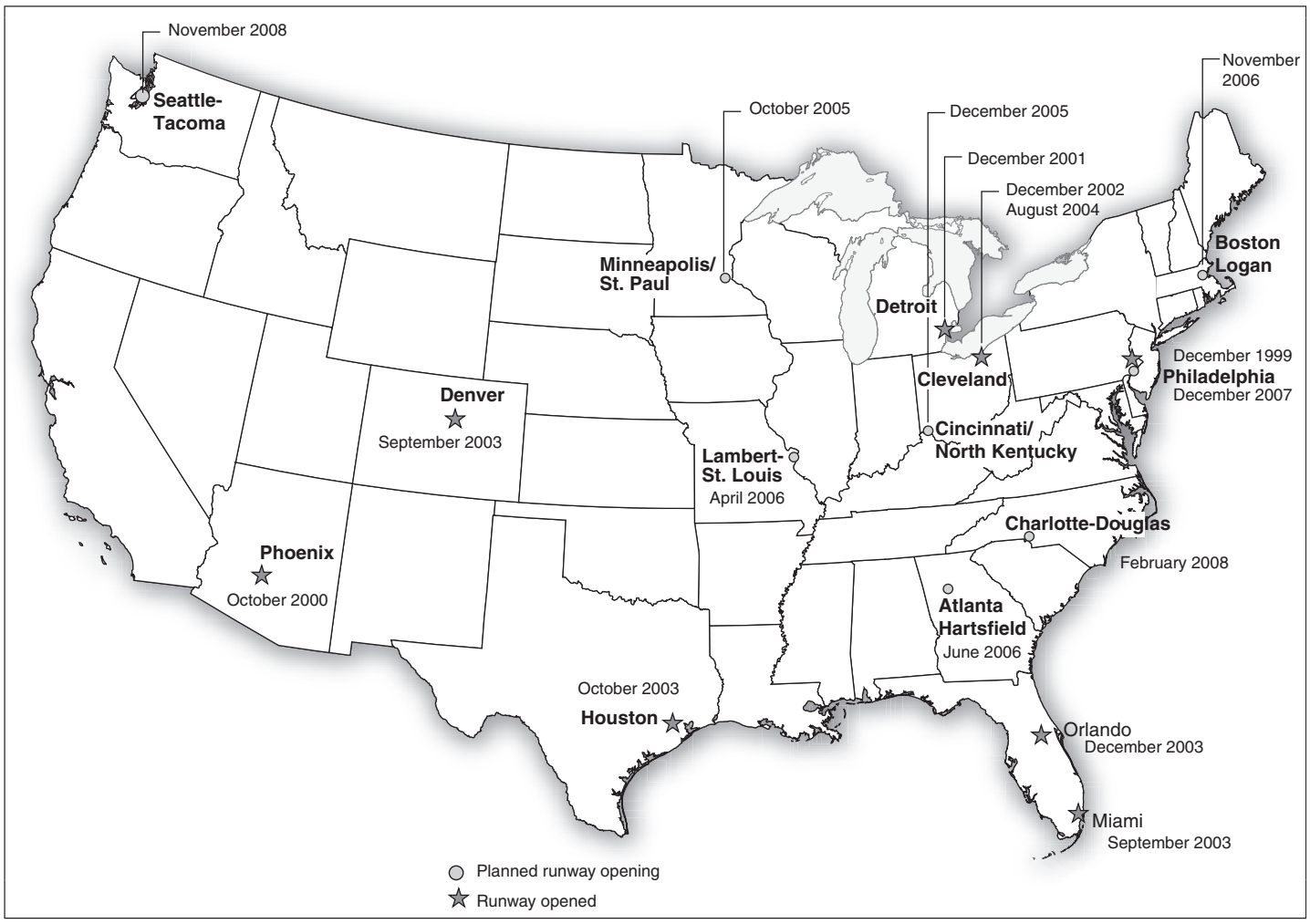
Addressing flight delay problems also requires action by multiple aviation stakeholders because no single entity has the authority or ability to solve delay-related problems. The federal government, especially through the Federal Aviation Administration (FAA) and its parent agency, the Department of Transportation (DOT), plays a major role by operating the national airspace system, distributing federal funding for airports, and setting operating standards for all aircraft and airports. Airports and airlines are also important decision makers and funding sources. The nation's airports are primarily owned and operated by local units of government, so that decisions about such steps as expanding airport capacity are primarily local in nature. Airlines' business decisions have a strong effect on the volume and routing of flights, the type and size of aircraft used, and the degree to which aircraft are upgraded to take advantage of new technology.

A Number of Initiatives to Reduce Flight Delays and Enhance Capacity Are Ongoing

Several initiatives to reduce flight delays and enhance capacity are ongoing. These initiatives which FAA, the airlines, and the airports are implementing are incorporated into FAA's major capacity-enhancing effort: the Operation Evolution Plan (OEP). The OEP is a rolling 10-year plan to increase capacity and efficiency of the national airspace system and focuses on airport surface infrastructure, and technological and procedural initiatives at 35 of the busiest airports in the United States. FAA acknowledges, however, that the OEP is not intended as the ultimate solution to congestion and delay problems. Responsibility for the various initiatives is still shared among the various segments of the aviation community. In February 2005, FAA published version 7 of the OEP and organized it into the following four quadrants:

Airport Congestion. The Airport Congestion quadrant focuses on capacity enhancements for the airport surface. One of the most effective ways to increase capacity is to build runways; however, it takes an average of 10 years from the time planning begins for a runway until it is commissioned. To help expedite the process for building runways, Congress and FAA streamlined the environmental review phase of the runway process. In addition, according to FAA, over the last six years, seven new runways were opened at Phoenix, Detroit, Denver, Miami, Cleveland, Houston, and Orlando airports which provided those airports with the potential to accommodate about one million more annual operations (take-offs and landings). Seven more runways and one runway extension are included in the OEP and are scheduled to open by the end of 2008. These runways are expected to provide those airports with the potential to accommodate 889,000 more annual operations in the system, as shown in figure 2.

Figure 2: Commissioned and Planned Runways, December 1999 to November 2008



Source: MapArt.

Note: Included in the planned runways is one runway extension project.

In addition to the runways listed in the OEP, nine more projects are in the planning or environmental stages, including one new runway, three airfield reconfigurations, one runway extension, and three new airports in major metropolitan areas. FAA also has additional flight reduction activities that are not included in the OEP. To reduce flight delays at some of the delay-prone airports, such as New York La Guardia and Chicago O'Hare, FAA is exploring administrative and market based options. For example, FAA is

considering auctioning off landing and take off rights at New York La Guardia and is currently limiting the number of scheduled arrivals during peak periods at New York La Guardia and Chicago O'Hare.

Air Traffic Management Flow Efficiency. This quadrant focuses on new technology and procedures to optimize the flow of traffic and maximize system throughput which may allow better control and utilization of current airspace. Included is the Collaborative Convective Forecast Product which is a graphical forecast of potential convective activity areas (i.e. thunderstorms) for use in the strategic planning and management of air traffic. It is intended to provide advance planning for long haul flights and allows for schedule predictability based on 2-, 4-, and 6-hour forecasts. This tool is most useful during the severe weather avoidance procedures season, which is from March to October. Another program is Collaborative Decision Making, which is a joint government/industry initiative. Collaborative decision making focuses on electronic data exchange; optimized airspace utilization; shared planning and decision-making; and post-analysis reporting. In addition, the Traffic Management Advisor, which is in operation at eight air route traffic control centers, is an automated decision support tool, is intended to provide controllers and traffic management coordinators more information on airport arrival demand and available capacity for making decisions on aircraft spacing.

En Route Congestion. Although the flying public is impacted by delays at the airports, many times this occurs in the en route areas as the airways become congested. The tools in this quadrant reduce delays and contribute to time and fuel savings for the vast majority of airspace users. One of the tools currently in use is reduced lateral (side-to-side) separation may provide space for additional routes between current city pairs or allow for new direct routes. Reduced longitudinal (nose-to-tail) separation may provide more opportunities to add flights without incurring delays. For domestic flights, Domestic Reduced Vertical Separation Minimum was implemented in fiscal year 2005 in the contiguous United States and Alaska and adds six additional flight levels between existing flight levels. The User Request Evaluation Tool which was installed at 17 air route traffic control centers and is operational at 13 air route traffic control centers, allows controllers to predict aircraft-to-aircraft and aircraft-to-airspace conflicts, which allows them to construct alternative flight paths. Airspace redesign projects also provide significant capacity improvements. For example, new routes added as part of the High Altitude Redesign increased en route throughput form the Pacific Northwest into the San Francisco Bay and the Los Angeles Basin areas.

Terminal Area Congestion. Terminal airspace is a critical component in the efficient use of airport capacity. In instances where volume has increased and the current airspace structure is the limiting factor, redesigning arrival and departure procedures, including the addition of Area Navigation and Required Navigation Performance procedures, will allow more efficient use of constrained terminal airspace. Also, by applying existing technology with new procedures may provide instrument approaches to nearly all runways greater than 5,000 feet and under a wider range of meteorological conditions that are insensitive to airport surface traffic. Area navigation procedures provide flight path guidance from the runway to the en route airspace with minimal instructions given by air traffic controllers. As a result, routine controller/pilot communications are reduced, which frees time to handle other safety-critical flight activities. Other key benefits include more efficient use of airspace, with improved flight profiles, resulting in significant fuel efficiencies to the airlines.

Additional solutions for increasing capacity in this arena are Time Based Metering which is used in conjunction with Traffic Management Advisor,[6] became operational at seven air route traffic control centers. By optimizing the flow of aircraft from the en route to the terminal area, Time Based Metering with Traffic Management Advisor may help an airport to efficiently use the full capacity of its runways which increases acceptance rates as well as peak throughput. An air traffic management tool called Integrated Terminal Weather System which provides full color graphic displays of essential weather information to promote the safety, capacity, and efficiency of air traffic control operations was also implemented at Boston Logan, Denver International, and Minneapolis-St. Paul airports in 2004. According to FAA, the plan is to install the production version of Integrated Terminal Weather System at the New York terminal radar control facility in 2006.

Challenges in Reducing Flight Delays and Enhancing Capacity Remain

A number of challenges in reducing flight delays and enhancing capacity remain. A daunting challenge that FAA and other aviation stakeholders will have to address is funding the various initiatives that are designed to address flight delays and enhance capacity. The successful implementation of many of these initiatives is predicated on the

[6]Traffic Management Advisor provides an aircraft arrival schedule in the en route and terminal units and produces meter lists for controllers that display that estimate optimal arrival times.

availability of funding However, since 2000, which is to date the worst year in history for delays, the financial condition of the aviation industry has changed significantly. A number of structural changes within the airline industry, such as the growth of the Internet as a means to sell and distribute tickets, the growth of the low cost airlines, and fare reductions by legacy carriers, all transformed the industry and led to lower average fares. These lower fares have resulted in lower ticket taxes and less revenue into the Airport and Airway Trust Fund. In addition, a series of largely unforeseen events, including the September 11 terrorist attacks, war in Iraq and associated security concerns, SARS, global recessions, and a steep decline in business travel seriously reduced the demand for air travel and resulted in sharp decreases in airline industry revenue.

Consequently, FAA expects that over the next four years there may be a multi-billion dollar gap between its costs and revenues. According to one aviation expert, this gap could have consequences that would increase air traffic delays. For example, FAA's Facilities and Equipment account, which provides funding for modernizing the air traffic control system and improving its reliability, capacity, and efficiency, was reduced by 15 percent in fiscal year 2005 and the President's 2006 budget proposes to reduce it by 20 percent in fiscal year 2006. These are the funds that are key to the national airspace system's future ability to handle demand and to minimize delays. For example, to provide the $4.4 billion needed for its major system acquisitions while remaining within its budget targets through fiscal year 2009, FAA has made significant cuts elsewhere in its capital funding plans. Specifically, FAA eliminated all of the $1.4 billion that it had set aside for what it calls the "architecture segment." These funds would have been used to perform about two years' worth of early research on new programs before they are mature enough to receive formal Joint Resources Council approval.[7] FAA also made significant reductions in planned investments for facilities—an action that runs counter to its reported need to refurbish or replace its physical infrastructure. Thus, even if all OEP initiatives are implemented the national airspace system is expected to fall behind demand, resulting in an increase in congestion and delays over the 10-year period of the OEP. FAA's Management Advisory Council estimates that passengers would experience 63 percent more total delay hours in 2012 than they did in 2000.

[7]The Joint Research Council is a FAA executive body consisting of associate and assistant administrators, acquisition executives, the chief financial officer, the chief information officer, and legal counsel. The council determines, among other things, whether an acquisition meets a mission need and should proceed.

In contrast, FAA states that if all of the OEP initiatives are implemented, delays will be maintained at or below the flight delay levels in 2000. However, FAA also stated that capacity at some airports will not keep pace with demand and in these cases delays will get worse over time because not all airports have improvements planned. In 2004, the airline industry losses totaled $9 billion and the industry is expecting similar losses in 2005, which will make it difficult for them to equip their aircraft with some of the new air traffic control technology, according to Air Transport Association officials.

Another important challenge is reducing flight delays and enhancing capacity at delay-prone airports, such as those shown in table 1, some of which have little capacity to physically expand and would find it difficult to build even one more runway, either because they lack the space or would face intense opposition from adjacent communities.

Table 1: Most Delay-Prone Airports in 2004

Airport	Delays per 1,000 operations
Chicago-O'Hare	97
Atlanta Hartsfield	72
Newark International	70
Philadelphia International	58
New York La Guardia	56
Houston International	36
Washington Dulles International	36
San Francisco International	32
New York John F. Kennedy	27

Source: FAA.

Although eight runways were opened during the last six years and seven new runways are scheduled to be opened by the end of 2008, only three (Atlanta Hartsfield, Philadelphia International, and Houston International) of the nine airports that experienced the highest rate of delays in 2004 will receive new runways. Because these delay-prone airports can cause delays that ripple throughout the system, other airports that have increased their own capacity could still experience delays. For example, in 2000, Phoenix Sky Harbor International put an additional runway into service, and the airport had sufficient capacity to allow flights to take off on time. However, the airport ranked among the top 15 in the United States for flight delays. According to airport officials, most of the delays in Phoenix were the result of delays and cancellations at other airports—

circumstances unrelated to the capacity at Phoenix. FAA also projects that the three New York-area airports—La Guardia, Newark, and Kennedy—will experience relatively small capacity gains during this decade—just 7 percent for Newark and 1 percent each for the other two airports.

In addition to addressing the capacity needs of the most delay-prone airports, FAA, airlines, and airports will also have to address the emerging capacity needs of new metropolitan areas in the South and Southwest. Among those metropolitan areas FAA believes will need additional capacity by 2013 are Tucson, AZ; Austin-San Antonio, TX; and South Florida.

Other Options Could Help Address Capacity Needs

Other options — not in the OEP — exist as potential measures to address capacity needs as shown in table 2. These options, which have been cited by various researchers and policy organizations over the last decade, basically fall into two categories. The first category involves measures for adding airport infrastructure besides adding runways to existing airports, such as building new airports or using nearby underdeveloped regional airports. The second category includes developing alternative modes of intercity travel other than air transportation, such as high-speed rail.

Table 2: List of Potential Options—Not in OEP— to Reduce Airport Capacity Gap

Options	Description
Category 1: Adding airport infrastructure	
Building new airports in metropolitan areas.	This measure involves new airports within metropolitan areas to provide additional capacity, especially where the existing airport has little expansion potential. This measure has recent limited use since only two major new airports—at Dallas-Fort Worth and Denver—have been built in large metropolitan areas since 1973.
Developing regional airports.	Existing regional airports located within 50 miles of metropolitan hubs would be developed to take advantage of unused system capacity. A regional approach is in place at several airports including Boston Logan and is being contemplated in other areas such as New York and Los Angeles.
Category 2: Using ground transportation alternatives	
Building high-speed, intercity ground transportation.	Building high-speed ground transportation (e.g., rail) between populous cities within 200 miles of each other may free up capacity at congested airports by reducing the air traffic demand at those locations. Such trains could travel at speeds of 200 mph or more. Technologically, high-speed rail has proven successful in Europe and Asia; efforts are under way in the United States to develop high-speed rail in several designated corridors.
Connecting nearby airports with high-speed ground transportation.	Using high-speed ground transportation to connect congested airports with underused airports nearby could accommodate passenger transfers within the current hub-and-spoke system. This measure has not been done in the United States.

Source: GAO analysis of previous studies

The applicability of any particular option is likely to vary by location, considering the circumstances at each major airport. There is no "one-size fits- all" solution; rather, substantially reducing delays will probably require a combination of options spread out over time. For example, the airspace surrounding the greater New York metropolitan area is perhaps the most congested airspace in the nation. The three major airports in the area (La Guardia, Newark, and Kennedy), which currently are among the nation's most delay-prone airports, are expected to continue to experience substantial air traffic growth. But these airports have very limited expansion potential, largely because they cannot realistically build new runways. Building new airports or developing regional airports to serve these airports are long-term solutions that will likely take many years to materialize. In the meantime, other short-term options would need to be considered as passenger demand increases, such as ways to use existing facilities more efficiently. This is the direction that FAA and the New York/New Jersey Port Authority, which operates the three area airports, were moving before the drop in passenger demand following the events of September 11.

As demand and delay are once again increasing, the FAA and Port Authority are reevaluating a regional approach to addressing these issues. As noted earlier, FAA and the Port Authority are also considering market-based and administrative approaches, such as auctioning off landing and take-off rights and congestion pricing for La Guardia. However, the airlines oppose auctions because of the uncertainty regarding number of slots and gates that they might receive. The airlines also, to a lesser degree, oppose market-based mechanism such as congestion pricing because of concerns over who would have responsibility for the revenue generated. Because major airports in other locations may face different circumstances than the New York airports face, they may need an entirely different set of solutions to address flight delays.

Options— such as building new airports, developing regional airports, or using ground transportation alternatives —are likely to be a more daunting challenge than implementing initiatives in the OEP. Implementing the OEP's initiatives will not be easy, but the opportunity for success is enhanced because FAA has the support of major aviation stakeholders on nearly all of the initiatives. By contrast, gaining consensus on any of these other options could be much more difficult because they change the nature of the system to the degree that each one could adversely affect the interests of one or more key aviation stakeholder groups—including passengers; air carriers; and aircraft operators, airports, and local communities. For example,

- Large infrastructure projects, such as building new airports that are located in metropolitan areas, could create major controversy. Such projects are often opposed by adjacent communities that are fearful of noise, displacement, or other environmental concerns. Also, finding suitable sites for such projects in crowded metropolitan areas—with enough land that is compatible with other potential land uses—may be difficult. Airlines may oppose some types of infrastructure projects if they fear that the projects would adversely affect them. For example, an airline with a dominant market position at a major hub airport may oppose building an additional airport nearby because the dominant carrier may view it as an opportunity for their competitors to enter the market in that area. In addition, some airlines are concerned about the need to divide their hub resources between the current airport and a new airport.

- Administrative, regulatory, and other measures for managing the demand for existing capacity could generate opposition from various sources as well. Airlines may oppose such measures if they perceive that these measures would restrict their choices in determining rates, schedules, and

aircraft sizes—all of which could affect their profits and competitive status relative to other airlines. Smaller communities may also oppose such measures, fearing that commercial air service to and from their airports may be reduced or curtailed because airlines would react by choosing more profitable routes for the limited number of airport slots available.

- Cost, a factor to be weighed in adding runways to existing airports, is also an important consideration when building a new airport. For example, the last major new airport—the Denver International Airport completed in 1995—cost almost $5 billion to build. This cost would have been greater had the airport been located closer to the city, but since it was located on open land away from established communities, the costs of noise mitigation and other land-use issues were minimized. Also, the construction of fast-rail service in populated metropolitan corridors is likely to be costly. For example, Amtrak estimates the cost to construct fast-rail service in federally designated, high-speed corridors and the Northeast Corridor of the United States will be about $50 billion to $70 billion.

In summary, the initiatives implemented by FAA, airlines, and the airports might help to reduce flight delays and increase capacity in the national airspace system in the short term. However, FAA and other aviation stakeholders continue to face a number of challenges in reducing delays at the most delay-prone airports and developing long term solutions for enhancing capacity. Addressing these challenges is perhaps more difficult today in comparison to in 2000 because a number of issues have exacerbated the situation. Chief among them is funding these initiatives during a time when the federal government and the aviation industry are experiencing significant fiscal problems. Consequently, keeping up with the economy's increasing demand for air transportation services will require a tremendous amount of planning; making some tough choices about which initiatives, both short-term and long-term, to pursue; and efforts to ensure that such initiatives are adequately funded.

For further information on this testimony please contact Dr. Gerald Dillingham by email at dillinghamg@gao.gov or Tammy Conquest at conquestt@gao.gov. Alternatively, we can be reached by phone at (202) 512-2834. Individuals making key contributions to this testimony include Colin Fallon, Simon Galed, David Hooper, Maureen Luna-Long, Richard Scott, Laura Shumway, and Nicolas Zitelli.

Appendix I: List of 35 Airports in the Federal Aviation Administration's Operation Evolution Plan, February 2005

1. Atlanta Hartsfield International
2. Baltimore-Washington International
3. Boston Logan International
4. Charlotte/Douglas International
5. Chicago Midway
6. Chicago O'Hare International
7. Cincinnati-Northern Kentucky
8. Cleveland-Hopkins International
9. Dallas-Fort Worth International
10. Denver International
11. Detroit Metro Wayne County
12. Fort Lauderdale-Hollywood International
13. George Bush Intercontinental
14. Greater Pittsburgh International
15. Honolulu International
16. Lambert St. Louis International
17. Las Vegas McCarran International
18. Los Angeles International
19. Memphis International
20. Miami International
21. Minneapolis-St Paul International
22. New York John F. Kennedy International

23. New York LaGuardia
24. Newark International
25. Orlando International
26. Philadelphia International
27. Phoenix Sky Harbor International
28. Portland International
29. Ronald Reagan National
30. Salt Lake City International
31. San Diego International Lindbergh
32. San Francisco International
33. Seattle -Tacoma International
34. Tampa International
35. Washington Dulles International

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