

February 2007

REAGAN NATIONAL AIRPORT

Update on Capacity to Handle Additional Flights and Impact on Other Area Airports



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Highlights

Highlights of [GAO-07-352](#), a report to congressional requesters

Why GAO Did This Study

In 1999, GAO reported that Reagan National Airport could accommodate at least 36 more slots, which are authorizations from DOT for a takeoff or landing. In 2000 and 2003, two federal statutes, known as AIR-21 and Vision 100, permitted DOT to award 44 new slots to airlines, 24 of which could be used for flights to cities more than 1,250 miles, which was the statutorily mandated limit for non stop flights from Reagan National. The DOT awards went to airlines serving six cities (Denver, Las Vegas, Los Angeles, Phoenix, Salt Lake City, and Seattle). For this year's reauthorization of the FAA, GAO was asked for an update on the capacity of Reagan National to accommodate additional slots and the effect of relaxing the perimeter rule. GAO updated its 1999 study to answer these key questions: (1) To what extent can Reagan National accommodate additional flights? (2) Since AIR-21 and Vision 100, what changes have occurred in market share and fares for flights operating between the six beyond-perimeter cities and the three Washington, D.C., area airports? In commenting on this report, DOT and the airports authority generally agree with our findings but with one exception, the airports authority disagrees with DOT's estimate of slots because it disputes their methodological assumptions. We believe the department's methodology for estimating airport capacity is appropriate.

www.gao.gov/cgi-bin/getrpt?GAO-07-352.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Gerald Dillingham at (202) 512-4803 or dillinghamg@gao.gov.

REAGAN NATIONAL AIRPORT

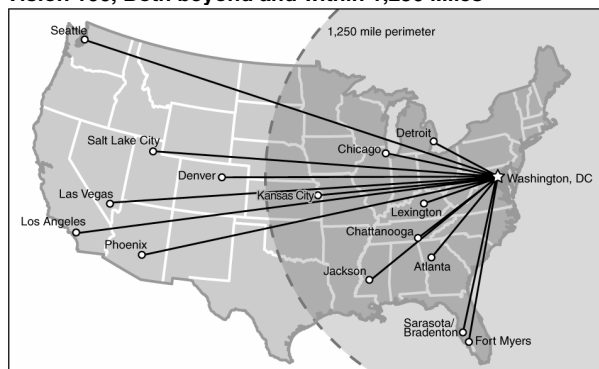
Update on Airport's Capacity to Handle Additional Flights and Impact on Other Area Airports

What GAO Found

Reagan National Airport can accommodate some additional in capacity, but airport infrastructure constrains how much can be added. FAA officials believe that some additional slots can be added, while airport officials have not made an estimate. FAA, using the results of a 1995 DOT capacity study, determined that the airport's airside infrastructure (e.g., runways) could accommodate four additional slots per hour. Airport officials said they were unsure how many additional slots, if any, the airport could accommodate but cited several factors that could limit the airport's capacity to absorb additional slots including the limited number of gates currently available for loading airplanes and other infrastructure constraints. GAO's work shows that even if the number of slots is not increased, there is some opportunity to expand current capacity by filling unused slots and increasing the size of aircraft on existing slots to increase the number of flights and the number of passengers served. Currently, nearly 80 slots are unused because they are at early morning or late evening times and airlines have not applied to use these time slots. In addition, many of the slots reserved for large passenger jets are currently being used by smaller regional jets.

Airlines awarded slots for direct flights between Reagan National and the six beyond-perimeter cities gained significant market share in those selected cities, but the effect of these slots on competing flights operating between these cities and the other Washington, D.C. area airports is not evident. For each of the six beyond-perimeter cities, the direct flights to and from Reagan National captured the majority of passengers flying between that city and Reagan National. In most cases, the airlines charged higher fares than competing connecting flights. GAO did not find evidence in passengers or fare data that would indicate that the new service between Reagan National and the six beyond perimeter cities had substantially affected service from Dulles or Baltimore-Washington International airports to these cities.

Cities Served with Additional Reagan National Airport Slots Permitted under AIR-21 and Vision 100, Both beyond and within 1,250 Miles



Source: GAO analysis of DOT documents.

Contents

Letter		1
	Results in Brief	3
	Background	5
	FAA Indicates Some Additional Capacity Could Be Added, but Airports Authority Cites Airport Infrastructure Constraints as an Obstacle	10
	Airlines with Nonstop Service between Beyond-Perimeter Airports and Reagan National Gained Significant Market Share of Traffic in Those Markets, While the Effect on Flights to Other Area Airports Is Not Evident	16
	Agency Comments	22
Appendix I	Scope and Methodology	25
Appendix II	Comments from the Metropolitan Washington Airports Authority	26
	GAO Comment	30
Appendix III	GAO Contact and Staff Acknowledgments	31
Tables		
	Table 1: Slots Per Hour by Carrier	7
	Table 2: Reagan National Slots Allocated and Used by Aircraft Type, August 2006	16
	Table 3: Share of Passenger Traffic by Airline	17
	Table 4: Average One-way Fares for Nonstop and Connecting Flights to Reagan National in Beyond-Perimeter Airports (2005)17	
Figures		
	Figure 1: Layout of Reagan National Airport	6
	Figure 2: Summary of Slot Exemptions Granted by DOT under AIR- 21 and Vision 100 as of September 2006	9
	Figure 3: Number of Flights at Reagan National By Aircraft, January 2001- August 2006	13

Figure 4: Annual Percentage Change in Passengers for All Dulles Flights and Flights between Dulles and Six Beyond-Perimeter Airports, 1999-2005	19
Figure 5: Annual Percentage Change in Average Fares for All Dulles Flights and Flights between Dulles and Six Beyond-Perimeter Airports, 1999-2005	20
Figure 6: Annual Percentage Change in Passengers for All BWI Flights and Flights between BWI and Six Beyond-Perimeter Airports, 1999-2005	21
Figure 7: Annual Percentage Change in Average Fares for All BWI Flights and Flights between BWI and Six Beyond-Perimeter Airports, 1999-2005	22

Abbreviation

AIR-21	Wendell H. Ford Aviation Investment and Reform Act for the 21 st Century
BWI	Baltimore-Washington Thurgood Marshall International Airport
DOT	Department of Transportation
DHS	Department of Homeland Security
FAA	Federal Aviation Administration
Vision 100	Vision 100 - Century of Aviation Reauthorization Act
IFR	Instrument Flight Rules
VFR	Visual Flight Rules
GAO	Government Accountability Office

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United States Government Accountability Office
Washington, DC 20548

February 28, 2007

The Honorable John Mica
Ranking Republican Member
Committee on Transportation and Infrastructure
House of Representatives

The Honorable Tom Petri
Ranking Republican Member
Subcommittee on Aviation
Committee on Transportation and Infrastructure
House of Representatives

Ronald Reagan Washington National Airport's (Reagan National) central location in the Baltimore-Washington D.C.-Northern Virginia region and proximity to the Nation's capital makes it very popular for airlines and passengers. However, since the 1960's, the federal government has restricted air traffic at Reagan National to reduce congestion and spur growth at other nearby airports. This has been achieved by controlling the number of takeoffs and landings that can occur at Reagan National each day within hourly time periods. To take off or land during any given hour at Reagan National, an airline must first obtain a slot that is an authorization from the Federal Aviation Administration (FAA) under what is called the slot rule. Each slot equates to one takeoff or landing. The airport's growth has also been constrained by limiting the distance that flights are allowed to travel. Under what is called the perimeter rule, the distance of nonstop flights that serve the airport is limited to 1,250 miles. Under this rule, passengers wishing to fly to Reagan National from airports more than 1,250 miles away must first fly to an airport within 1,250 miles and then take another flight continuing on to Reagan National. The slot rule also grants 12 slots per hour to general aviation or other aircraft that do not operate on a scheduled basis, such as corporate jets or military planes. Prior to the terrorist attacks of September 11, 2001, there were over 40,000 annual general aviation and unscheduled flights to and from Reagan National but since then, the Department of Homeland Security (DHS) restrictions on general aviation flights in the national capital region have drastically curtailed the use of these slots to about 200 over the past year.

In 1999, we analyzed legislative proposals to increase the number of slots at Reagan National and reported that the airport could accommodate at

least 36 more slots per day and that adding beyond-perimeter slots would have limited effects on nearby Dulles International (Dulles) and Baltimore-Washington Thurgood Marshall International Airport (BWI).¹ The rule that governs the number of slots at Reagan National limits the number of takeoffs or landings to 48 commercial slots per hour occurs during an 18-hour period (6:00 a.m. to midnight) over the airport's 24-hour operating day.²

In 2000 and 2003, two federal statutes —AIR-21³ and Vision 100⁴ increased the number of slots and for the first time allowed for exemptions to be granted to the perimeter rule. The statutes granted exemptions to the existing rules, adding 44 slots per day during a 15-hour period and allowing 24 of these slots for flights of more than 1,250 miles—flights longer than 1,250 miles are called beyond-perimeter flights.⁵ In effect, given the 15-hour period for these slot exemptions, this added on average three commercial slots per hour. The Department of Transportation (DOT) awarded these new slots exemptions to airlines and routes that best met specified criteria.⁶ The 24 beyond-perimeter slot exemptions were awarded to airlines operating flights from six airports—Denver International (Denver), Phoenix-Sky Harbor (Phoenix), McCarran International (Las Vegas), Los Angeles International (Los Angeles), Salt

¹GAO/RCED-99-234.

²14 C.F.R. § 93, Subpart K.

³The Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (AIR-21) Pub. L. No. 106-81 (Apr. 5, 2000).

⁴The Century of Aviation Reauthorization Act (Vision 100) Pub. L. No. 108-176 (Dec. 13, 2003).

⁵AIR-21 and Vision 100 permitted slots to operate during 7:00 a.m. through 9:59 p.m.

⁶Congress set forth slot exemption criteria, and DOT granted exemptions to airlines whose service would (for beyond-perimeter exemptions) (1) provide air transportation with domestic network benefits beyond the 1,250-mile perimeter, (2) increase competition by new entrant air carriers or in multiple markets, (3) not reduce travel options for communities served by small hub airports and medium hub airports within the 1,250-mile perimeter and, (4) not result in meaningfully increased travel delays. For within-perimeter slot exemptions, DOT distributed exemptions in a manner that promoted air transportation: (1) by new entrant air carriers and limited incumbent air carriers, (2) to communities without existing nonstop air transportation to Reagan National, (3) to small communities, (4) that will provide competitive nonstop air transportation on a nonstop route to Reagan National, or (5) that will produce the maximum competitive benefits, including low fares.

Lake City International (Salt Lake City), and Seattle-Tacoma International (Seattle).

In anticipation of this year's reauthorization of FAA, you asked for an update of GAO's 1999 report on Reagan National's ability to accommodate additional capacity and the effect of relaxing the perimeter rule. To provide this update, we addressed these key questions:

- To what extent can Reagan National accommodate additional flights?
- Since AIR-21 and Vision 100, for the six beyond-perimeter airports, what changes have occurred in market share and fares at Reagan National and what changes have occurred in the number of passengers and fares at Dulles and BWI airports?

To identify the number of additional slots Reagan National can accommodate and the factors affecting existing capacity, we reviewed FAA flight data and gate utilization data obtained from the Metropolitan Washington Airports Authority (airports authority) and we interviewed DOT, FAA and airport officials. To assess the changes in passenger levels and fares at Washington area airports and the six beyond-perimeter airports, we analyzed DOT origin and destination ticket data and interviewed officials at all three Washington, D.C., area airports. We reviewed the reliability of these data and concluded that they were sufficiently reliable for our purposes. We conducted our work from July 2006 to February 2007 in accordance with generally accepted government auditing standards. More details about the scope and the methodology of our work are presented in appendix I.

Results in Brief

Reagan National Airport can accommodate some additional capacity, but airport infrastructure constrains how much can be added. FAA officials believe that some new slots for flights can be added. Based on DOT's 1995 capacity study, FAA estimates that the airport's airside infrastructure—principally runways—could presently accommodate four additional slots per hour or 60 daily slots based on a 15-hour operating period. Airport officials disagree with FAA's method of measuring capacity and said they were unsure how many additional slots, if any, the airport could accommodate and cited several factors as contributing to their uncertainty. For example, officials said that the airport's ability to absorb the slot exemptions granted under AIR-21 and Vision 100 has been aided by the near absence of general aviation flights. Whether general aviation will return to the previous levels is currently unknown; but in its absence,

airport officials said that some runway capacity remains unutilized. Airport officials also said that if additional slots are added, the airport's ability to accommodate more aircraft will be limited by such factors as the lack of gates for loading airplanes and other infrastructure constraints. Our analysis shows that even if the number of slots is not increased, there is some opportunity for expanding capacity under current rules. Currently, 78 existing slots remain unused—mostly during the early morning and late evening hours—and airlines have not applied to use these slots. In addition, the capacity of the existing slots could also be increased by using larger planes to carry more passengers. Currently, smaller commuter aircraft, carrying a maximum of 76 passengers, are being widely used in slots designated for larger jets.

Airlines awarded slot exemptions for direct flights between Reagan National and the six beyond-perimeter airports gained a significant market share of traffic for those selected routes, but the effect of these flights on competing flights operating between these airports and the other Washington, D.C., area airports is not evident. For most of the six beyond-perimeter airports, the direct flights to and from Reagan National captured the majority of passengers flying between that airport and Reagan National. In most cases, the airlines charge higher average fares than on competing connecting flights. For example, in the Salt Lake City market, Delta Airlines (both nonstop and connecting flights) carries nearly 60 percent of the passenger traffic serving Reagan National and charges on average nearly \$50 more for a direct flight than competing airlines charge for connecting flights between Salt Lake City and Reagan National. We did not find evidence about passengers or fares at Dulles or BWI for the six beyond-perimeter airports that would indicate that the new beyond-perimeter service to Reagan National had substantially affected flights between these two airports and the six beyond-perimeter airports.

DOT and the airports authority provided comments on a draft of this report and generally agree with our findings with one exception. While the airports authority believes it can accommodate some additional capacity it disagrees with the department's estimate of how many additional slots it can accommodate because it disputes its methodological assumptions. DOT believes its methodology, which attempts to consider capacity under a variety of weather conditions, is more appropriate than the airport authority's preference to estimate capacity only under poor weather conditions. We believe the department's methodology for estimating airport capacity is more appropriate because the airport authority's approach would leave large amounts of airfield capacity unused because a significantly higher capacity could be achieved during better weather

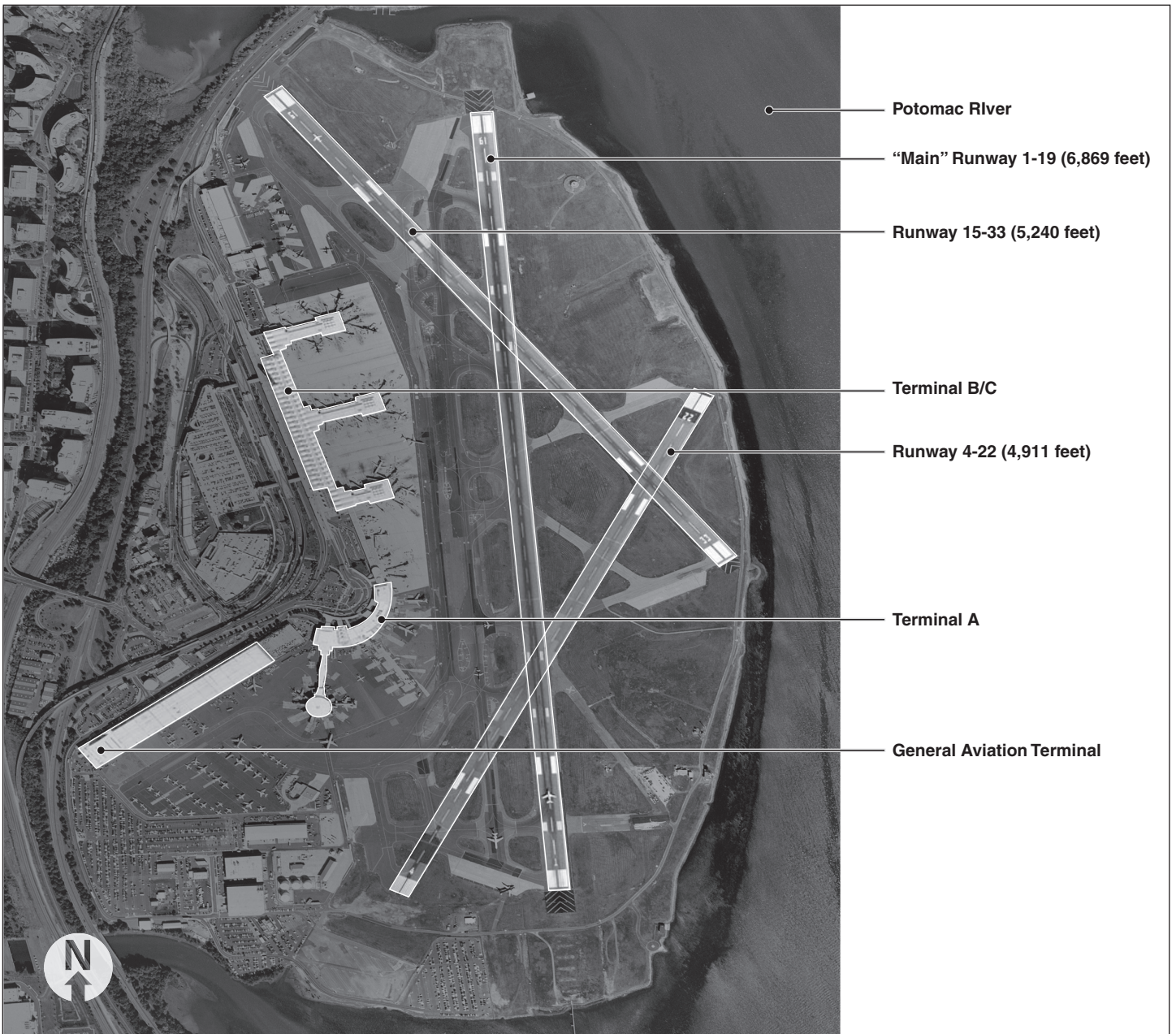
conditions. DOT and the airports authority provided overall comments and technical clarifications in some areas of this report. We have addressed these comments and clarifications where appropriate. The airport authority's comments and our responses are presented in appendix II.

Background

Reagan National Airport was built by the federal government and opened on June 16, 1941, on the western bank of the Potomac River, across from Washington, D.C.⁷ Reagan National currently has three runways and two terminals with a total of 44 gates or passenger loading ramps for use by air carriers. The airport currently handles 400 daily departures to 75 cities, offered by 20 different airlines (this includes commuter airlines, which operate solely for the major carriers). Terminal A, the original terminal, has 9 gates, and Terminal B/C, which opened in 1997, has 35 gates, 100 ticket counters, and 12 baggage claim areas. In 2005, 17.8 million passengers used Reagan National. The airline with the largest number of flights at Reagan National is US Airways, which controls 44 percent of the commercial slots. The next largest operators are Delta Airlines and American Airlines, which have 14 percent of the commercial slots each. During 2005, these three airlines together accounted for nearly 60 percent of total passenger enplanements at the airport.

⁷The airport's official name changed from Washington National to Ronald Reagan Washington National Airport under Pub. L. No. 105-154, 112 Stat 3 (1998).

Figure 1: Layout of Reagan National Airport



Source: FAA.

In 1969, FAA applied special air traffic rules to certain airports facing increasing delays and congestion that it designated as high-density airports: Chicago-O’Hare; New York’s LaGuardia and Kennedy; Newark, New Jersey; and Reagan National (DOT dropped Newark’s designation as a high-density airport in October 1970). Because of the restricted number of allowable flights, these airports are generally known as slot-controlled, and the special air traffic rules governing the allowable number of flights are referred to as slot rules, or high-density rules.

The number of hourly slots at Reagan National is controlled by the federal government. Since 1969, the federal government has restricted the number of commercial takeoffs and landings at Reagan National. Currently, the number allowed is 48 per hour: 37 for air carriers and 11 for commuter aircraft.⁸ Table 1 shows the number of slots per hour by type of aircraft permitted under the slot rule. FAA authorizes general aviation or unscheduled aircraft to make an additional 12 takeoffs or landings during each hour for a total of 60 slots per hour.

Table 1: Slots Per Hour by Carrier

Type	Slots per hour
Air carrier ^a	37 ^b
Commuter	11
General aviation/unscheduled	12
Total	60

Source: GAO analysis of DOT documents.

^aCan be used by commuter but not vice versa (14 C.F.R. § 93.123).

^bThe original limit on the number of air carrier slots was 40 per hour. FAA reduced it to 37 in 1981 and increased the number of commuter slots from 8 to 11.

A perimeter rule has been in place at Reagan National since May 1966 restricting airlines from operating nonstop flights between Reagan National and airports further than a specified distance. The FAA previously had concerns that allowing long-range jets to fly into Reagan National would create a noise problem and hamper growth of the newly

⁸Commuter aircraft are generally turboprop or small jet aircraft seating 76 or fewer passengers. Within the past few years, several commuter airlines have begun using small jet aircraft (regional jets) in their fleets. To avoid confusion throughout the remainder of this report, we will refer to all commuter aircraft, regardless of whether they are regional jets or turboprops, as commuter aircraft.

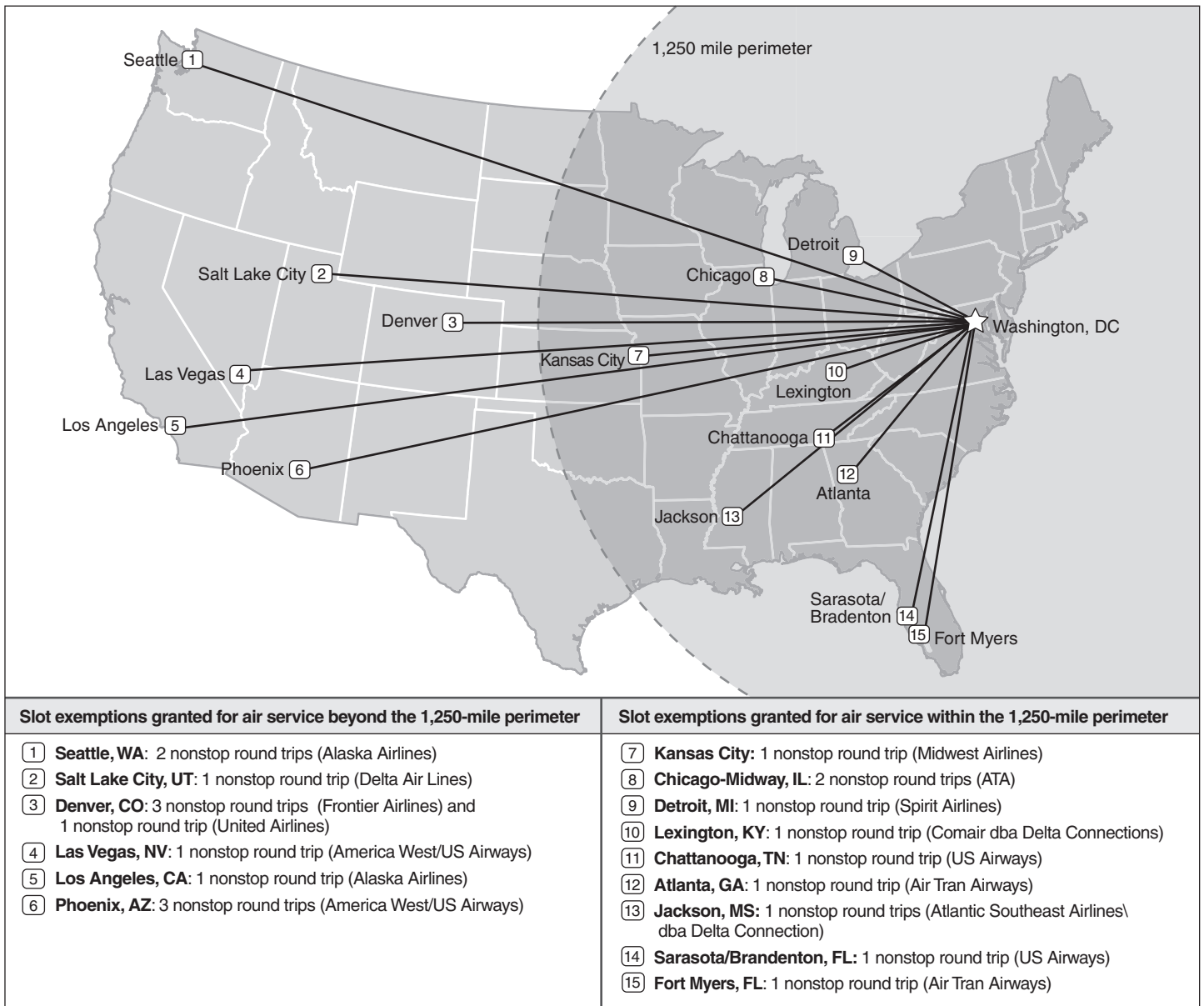
built Dulles International Airport. As a result, with the airlines agreeing, the Civil Aeronautics Board approved a 650-mile perimeter, with exceptions of seven cities between 650 and 1,000 miles away that enjoyed grandfather status as of December 1, 1965.

In 1986, the Congress codified the slot and perimeter rules into federal statute as part of the Metropolitan Washington Airports Act of 1986.⁹ The act led to the transfer of authority over Reagan National and Dulles from the federal government to the Metropolitan Washington Airports Authority and set the perimeter at 1,250 miles, which allowed nonstop flights as far as Houston and Dallas.

Two federal statutes enacted in 2000 and 2003 modified the slot and perimeter rules at Reagan National Airport. AIR-21 and Vision 100 effectively added up to three commercial slots per hour and for the first time designated some slots for flights beyond the 1,250 mile perimeter. AIR-21 and Vision 100, combined, allowed the Secretary of Transportation to award 22 roundtrips, 12 with service to airports beyond the perimeter and 10 with service to airports within the perimeter. Figure 2 shows each market by number of slots and airline.

⁹Pub. L. No. 99-500, 100 Stat. 1783-375, Pub. L. No. 99-591, 100 Stat. 3341-378.

Figure 2: Summary of Slot Exemptions Granted by DOT under AIR-21 and Vision 100 as of September 2006



Source: GAO analysis of DOT documents.

Two other commercial airports serve the Baltimore-Washington metropolitan area—Dulles International Airport and Baltimore-Washington International Thurgood Marshall Airport (BWI). Dulles opened on November 19, 1962. The federal government built Dulles, located approximately 30 miles west of Washington, D.C., in part to provide a facility for nonstop and connecting and international air carrier traffic into the Washington, D.C. area. In 2005, Dulles handled 27 million passengers. BWI, built by the city of Baltimore and originally named Friendship International Airport, was opened on June 24, 1950. BWI, which is owned and operated by the state of Maryland, is located 10 miles southwest of Baltimore and approximately 30 miles northeast of Washington, D.C. In 2005, BWI handled 19.7 million passengers.

FAA Indicates Some Additional Capacity Could Be Added, but Airports Authority Cites Airport Infrastructure Constraints as an Obstacle

According to FAA officials, whose estimate is based on airside capacity (principally runways) and not landside infrastructure (such as terminals and parking facilities), Reagan National can presently accommodate four additional slots per hour. Airport officials disagree on the basis for FAA's estimate and cite the unknown future course of general aviation at the airport and the limited capacity of airport infrastructure (such as gates, baggage handling areas, and parking) to handle more commercial flights. Airport officials were unsure of how many additional flights, if any, the airport could accommodate. Even without increasing the number of slots, there are opportunities to accommodate more flights and passengers. Some current slots remain unused during early morning or late evening hours, and some slots designated for air carriers are being used for smaller commuter aircraft.

FAA Estimates Airport Can Accommodate Additional Slots

According to FAA, Reagan National's overall runway capacity can presently accommodate about four additional hourly slots above the current slot allocation under the high-density rule.¹⁰ FAA continues to rely on the DOT's study of the high-density rule that it conducted in 1995.¹¹ The study estimated that the airport's balanced capacity is 67 flights per hour, or 4 more than what is currently in place, resulting in an additional 60

¹⁰The slot exemptions permitted by AIR-21 and Vision 100 used three of the seven additional slots DOT originally estimated in 1995.

¹¹U.S. DOT, Report to the Congress: A Study of the High Density Rule, May 1995.

flights per day based on an 15-hour operating period.¹² The study predated the exclusion of general aviation after September 11. The study concluded that FAA's traffic programs and procedures could safely accommodate the increase, but it also said the increase was likely to result in more delays. In 2004, the most current year for which this data are available, Reagan National experienced an average delay time of 5 minutes, one of the lowest in the nation for large hub commercial airports.¹³

Airports Authority Questions Reagan National's Capacity to Accommodate Additional Slots

Airport officials disagree with FAA's estimate because it assumes balanced capacity, whereas the airport prefers to measure capacity differently. Airport officials stated any measurement of capacity should be based on poor weather conditions and Instrument Flight Rules (IFR).¹⁴ FAA and GAO believe balanced capacity is a more appropriate method for determining an airport's capacity than the method suggested by the airports authority. The 1995 DOT study points out that estimating capacity under IFR conditions, when the airfield is at the lowest level of available capacity does not ensure steady airfield availability. In practice, this approach would leave large amounts of airfield capacity unused because a significantly higher capacity could be achieved during the better weather conditions under which Visual Flight Rules (VFR) apply.¹⁵ According to data from DOT, less than 1 percent of air traffic operations at Reagan National from November 2005 to November 2006 were delayed because of weather conditions.

Assuming capacity under IFR conditions, airport officials raised two issues that would limit growth at the airport. The first issue is the potential return of general aviation flights. Airport official said the absence of general aviation flights helped the airport to absorb the additional slots that were authorized under AIR-21 and Vision 100. After September 2001, DHS

¹²"Balanced capacity" refers to the average ability of an airport's runways to support a certain number of operations per hour under varying weather and wind conditions.

¹³A large hub enplanes (number of passengers boarded) at least 1 percent of all passengers.

¹⁴IFR governs procedures for conducting aircraft operations during weather conditions when the cloud ceiling is less than 1,000 feet and/or visibility is less than 3 miles, requiring certain aircraft separations and other operating standards.

¹⁵VFR governs procedures for conducting aircraft operations when the cloud ceiling is more than 1,000 feet and visibility is 3 miles or more. Airport capacity under these conditions is generally significantly higher than conditions under IFR.

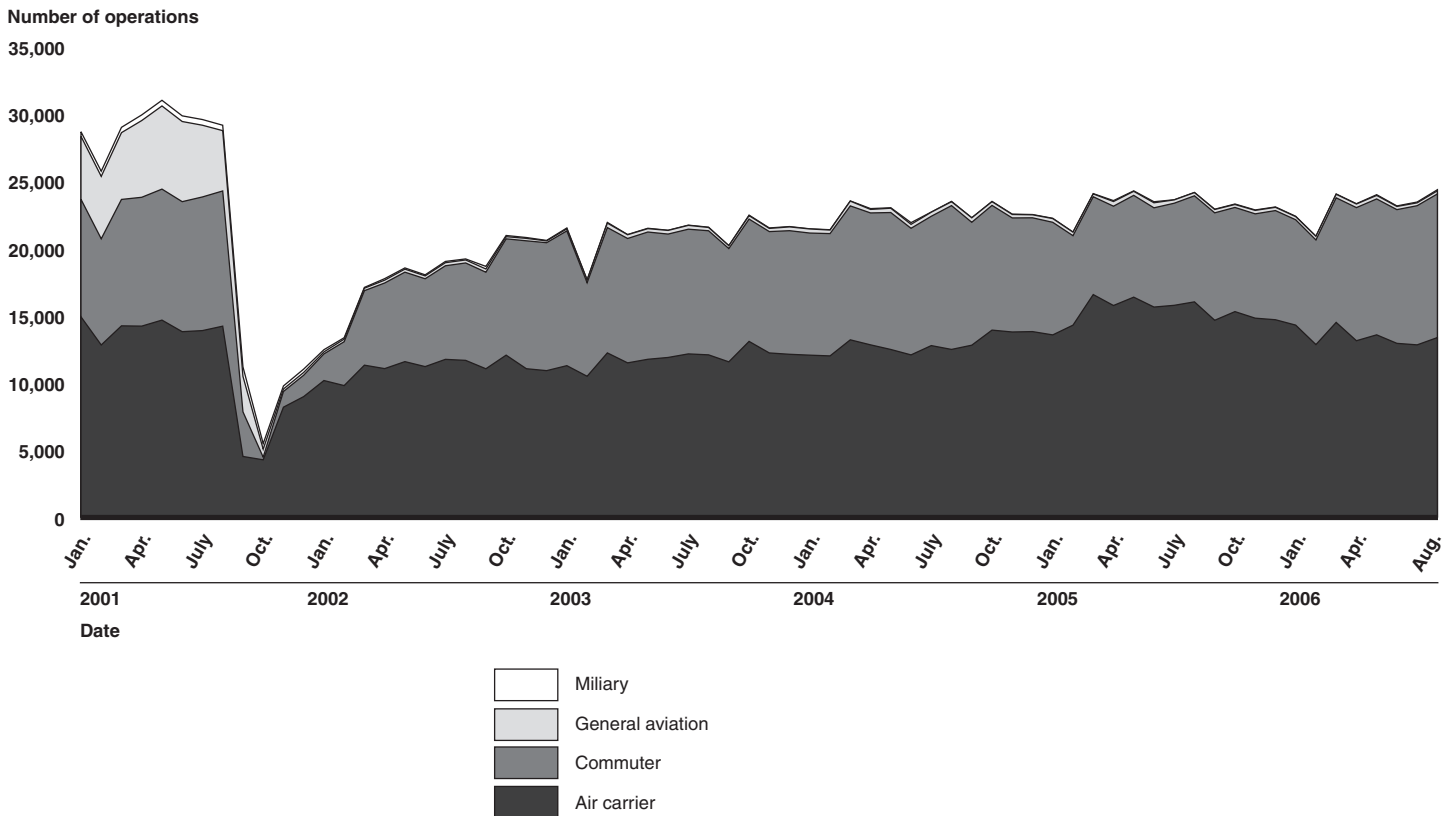
banned general aviation flights around the national capital region.¹⁶ Prior to the September 11 terrorist attacks, the airport handled 40,000 to 50,000 unscheduled aircraft flights including general aviation, annually.

Since October 2005, general aviation flights have been allowed to return, but only under very restrictive conditions, resulting in very little activity at Reagan National.¹⁷ According to airport officials, between October 2005 and August 2006, for example, the airport had fewer than 200 general aviation flights. Figure 3 shows the level of flights of all types of aircraft since January 2001. As the figure shows, traffic for all types dropped after September 11, 2001, but commercial traffic (commuter and air carrier) has basically returned to pre-September 11 levels. By contrast, general aviation has not done so.

¹⁶Special flight restrictions in the National Capital Region, where Reagan National is located, have been in place since September 2001, primarily affecting general aviation.

¹⁷According to FAA, airports authority, and the general aviation community, activity is low due to the DHS security requirements. National Business Aviation Association officials told us that the restrictions are onerous and force general aviation users to other area general aviation airports. As part of this reintroduction plan, DHS is required to conduct 1-year review of the first phase of the security program. To date, DHS has not conducted this review. We also asked if DHS had any time frame for further easing of the restrictions, but DHS did not have a date.

Figure 3: Number of Flights at Reagan National By Aircraft, January 2001- August 2006



Source: GAO analysis of FAA tower data.

According to airport officials, as a result of the significantly diminished presence of general aviation, some airside capacity remains, but commercial aviation might not be able to use it all. A key reason is that commercial aircraft require the longer main runway for takeoff and landings, while many general aviation aircraft can use the shorter runways for takeoff and landing.

The second issue airport officials raised as limiting capacity is infrastructure limitations. These limitations involve several aspects of the airport's infrastructure.

- *Passenger Loading Gates.* According to airport officials, the number of gates affects the ability to add more slots. Every gate at the airport is currently leased to airlines with flights at the airport, known as tenant airlines. Airlines wishing to begin flights at the airport, known as new

entrants, can make arrangements with tenant airlines to share a gate, but a tenant airline is not required to share its gate if its schedule does not allow it.¹⁸ A recent analysis by the airport shows that some gates are available during certain parts of the day. For example, during October 2006, some gates were unused during both peak and nonpeak times, primarily those in the older and less desirable terminal A. During the 18-hour operating period, gates in terminal A were unused 46 percent of the time, while gates in terminal B/C were unused 22 percent of the time. Most of the available time periods are during nonpeak hours.

- *Terminal Facilities.* Officials said Reagan National has limited capacity to expand terminal facilities such as ticket counters and baggage handling areas due to the lack of space on the airport property. If additional slots are permitted, existing tenant airlines might be able to use their existing facilities more fully, but new entrant airlines may have difficulty obtaining the necessary terminal facilities, especially at peak periods during the day. For the recent slots awarded under AIR-21 and Vision 100, the airports authority has been able to accommodate new entrants with gates and other facilities. However, airport officials said that such accommodation has become increasingly difficult. Officials from Alaska Airlines, one of the newer airlines at Reagan National, told us that its experience in getting the needed facilities has been positive.
- *Parking Facilities.* According to airport officials, limited parking at the airport could make it difficult to accommodate additional passengers, resulting from increased slots. Passengers have a variety of ways to access the airport terminal, including rail transit, taxis, shuttle services, and private car. For those who drive their own cars, the airport provides over 7,900 parking spaces. According to airport officials, the parking facility is running at or near capacity with the existing flight schedule. For example, over a 12-month period from November 2005 to October 2006, two of the four parking garages reached capacity 100 days or more. In order to help mitigate some of this pressure, the airport plans to add an additional deck to the current parking structure. This additional parking deck would provide 850 more spaces and is slated for completion in 2010.

¹⁸Under DOT grant requirements, airports unable to accommodate an airline's request for access to gates or other facilities shall submit a report to DOT outlining the nature of the request, why the request could not be accommodated, and a time frame when, if any, the airport will be able to accommodate the request.

Opportunities Exist to Expand Current Capacity at Reagan National

In two ways, Reagan National's current capacity under the existing slot limits could be expanded. First, the airport has available slots during certain parts of the day, though they are for less desirable times. Of the total 912 daily slots available for airlines, 834 are currently allocated and approximately 78 slots are unused.¹⁹ Each of these unused slots falls either in the early morning (between 6:00 and 7:00) or in the late evening (between 9:00 and midnight), which suggests that no existing airlines and most likely no new entrants wish to initiate new service with a schedule limited to these hours.²⁰ According to airport officials, these slots remain unallocated because there is less demand for passenger service during these hours and because noise restrictions after 10 p.m. require quieter aircraft.²¹

The second way in which current capacity could be expanded is to reduce the number of smaller commuter planes using slots that are allocated for larger jet planes that carry more passengers. For example, FAA data show that in August 2006, commuter flights used nearly double the slots that were designated for commuter flights (see table 2). For example, on one route, between Raleigh-Durham and Reagan National, DOT data show that in November 2006, two carriers operated an average of 26 daily flights using commuter jets, which have a maximum capacity of 76 seats, although larger jets were designated for the slots used for the commuter flights. FAA and airport officials acknowledged that commuter aircraft often use air carrier slots, but noted that this practice is permissible under federal regulation.

¹⁹Includes slot exemptions granted under AIR-21 and Vision 100.

²⁰FAA controls the allocation of available air carrier and commuter slots at Reagan National during an 18-hour period every day, from 6:00 am until midnight.

²¹Between 10 p.m. and 7 a.m. air carriers are required to meet the airports authority's noise regulation.

Airlines with Nonstop Service between Beyond-Perimeter Airports and Reagan National Gained Significant Market Share of Traffic in Those Markets, While the Effect on Flights to Other Area Airports Is Not Evident

Table 2: Reagan National Slots Allocated and Used by Aircraft Type, August 2006

Type	Total monthly number of slots	Actual flights	Percentage of slots utilized
Air carrier	22,320 ^a	13,333	60%
Commuter	6,138	10,681	174% ^b

Source: GAO analysis of FAA tower data.

^aIncludes slot exemptions added under AIR-21 and Vision 100.

^bCommuter reflects both commuter slots and air carrier slots used by commuters.

Airlines awarded slots for nonstop service between Reagan National and airports beyond the 1,250 mile perimeter have been able to gain a significant market share of traffic for routes. The price they charge for this direct service is generally higher than the price for flights requiring a connection. We did not find evidence that Dulles or BWI traffic or fares were affected by the beyond perimeter flights to Reagan National.

For each of the six beyond-perimeter airports, the airlines awarded slots for nonstop service between Reagan National and those airports gained significant market share of passenger traffic over a short period of time. For example, in the Denver market, Frontier Airlines, had no nonstop passenger traffic between Denver and Reagan National before it was awarded two slots (one daily roundtrip) in August 2000 and four additional slots (two more daily roundtrips) in 2004, and it now has garnered nearly 60 percent of the passenger traffic to Reagan National from Denver (see table 3). United Airlines, which was awarded two slots (one daily roundtrip) in the same market in 2004, now has 15 percent of the market. Between Frontier and United Airlines, the two carriers' nonstop routes have nearly three-fourths of the Denver-Reagan National traffic.

Table 3: Share of Passenger Traffic by Airline

Market	Airline	Year slot award service initiated	Before slot award average market share ^a	Current average market share (1 st qtr 2006)
Denver	Frontier	2000	0%	59%
	United	2004	0.5%	15%
Los Angeles	Alaska	2004	0%	43%
Las Vegas	America West	2000	0%	23%
Phoenix	America West	2000	12%	61%
Salt Lake City	Delta	2003	0%	59%
Seattle	Alaska	2001	0%	62%

Source: GAO analysis of DOT's origin and destination survey.

^aAverage market share data based on the year before award.

Airlines with beyond-perimeter slots generally charge higher fares than are charged for connecting flights to and from Reagan National (see table 4). In half of the cases the nonstop fare was on average \$25 to \$50 higher than the connecting flight fares to and from Reagan National. Los Angeles is the only market in which the average direct fare is less than the average fare for flights with connections.

Table 4: Average One-way Fares for Nonstop and Connecting Flights to Reagan National in Beyond-Perimeter Airports (2005)

Market	Airline	Nonstop flight	Connecting flight
Denver	Frontier	\$159	n/a
	United	\$237	\$151
Los Angeles	Alaska	\$178	\$190
Las Vegas	America West	\$180	\$176
Phoenix	America West	\$251	\$176
Salt Lake City	Delta	\$250	\$201
Seattle	Alaska	\$247	\$226

Source: GAO analysis of DOT's origin and destination survey.

The Effect of Beyond-Perimeter Slots on Area Airports Is Not Evident

We did not find evidence that beyond-perimeter flights to and from Reagan National affected flights from the same airports to or from Dulles or BWI. We analyzed fare and passenger data for flights between Dulles and BWI and those airports and for all traffic serving Dulles and BWI. In doing so, we observed that the data did not produce any distinguishable trends or

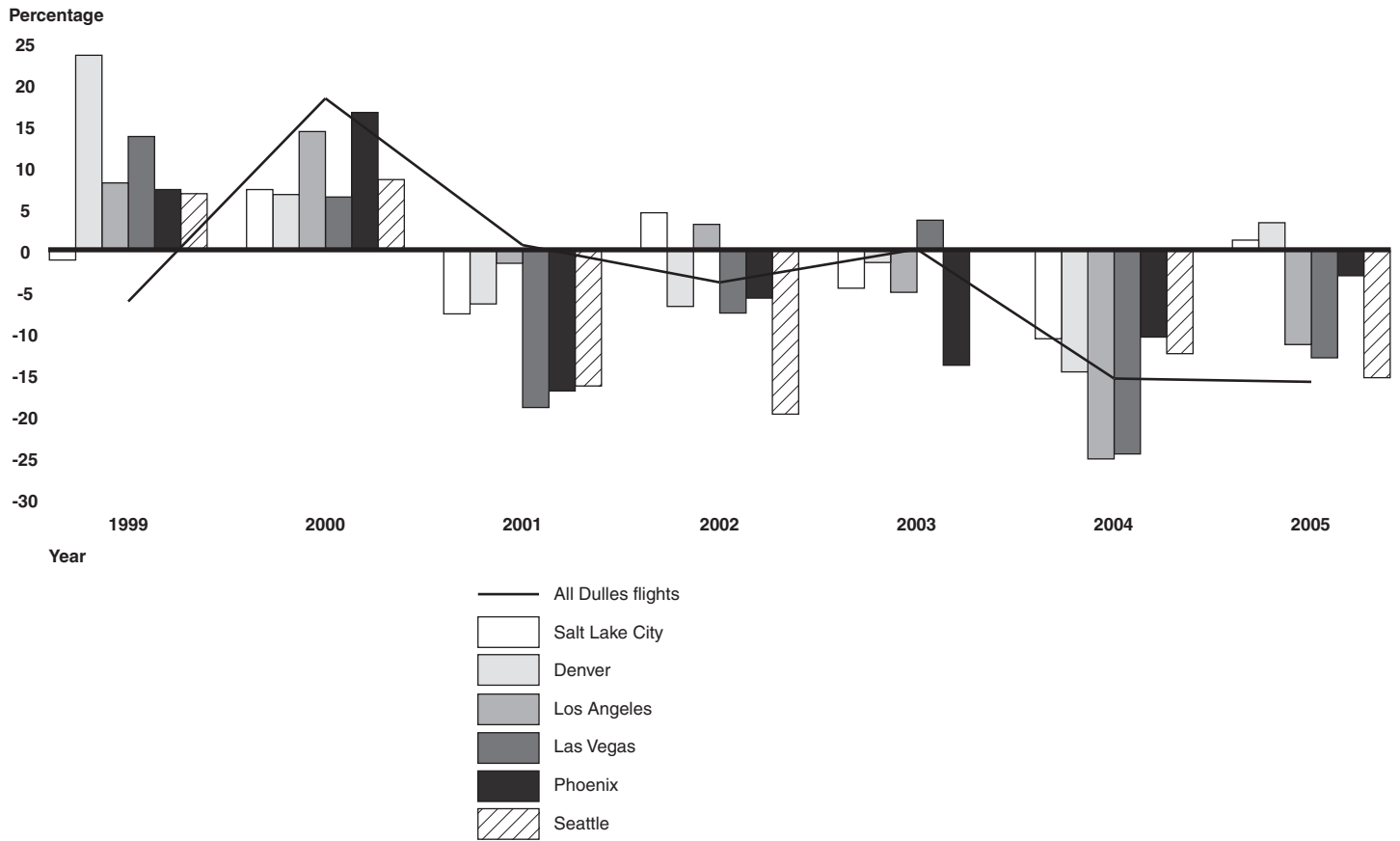
patterns that would indicate that beyond-perimeter slots at Reagan had any effect on fares or passenger levels at either Dulles or BWI.

Overall, Dulles has experienced growth in traffic and a decline in fares, while BWI has experienced little overall change in traffic or fares from 1999 to 2005. To assess whether the introduction of new nonstop beyond-perimeter routes into Reagan National affected service between the same six airports and Dulles or BWI, we compared the percentage change in average fares and total passengers, from 1999 through 2005 for travel between each of the six beyond-perimeter airports and Dulles and BWI against the overall percentage change in annual average fares and passengers for all traffic serving Dulles and BWI. As the figures below illustrate, some routes experienced greater or lesser changes relative to overall changes at the airport, but no consistent trends were apparent.

- Dulles annual airport passenger traffic grew from 1999 to 2005, from 19.7 million to 27 million, a 37 percent increase. We did not find any patterns or trends that would suggest that the changes to the perimeter rule at Reagan National had affected fares or service between Dulles and these six airports. (See figs. 4 and 5). Airports authority officials stated they had no reason to believe that these limited beyond-perimeter awards affected Dulles. Rather, the officials noted, the airport's fares and passenger traffic were significantly affected by its experience with low-fare carrier, Independence Air, which had a large growth of flights at Dulles but has now gone out of business.

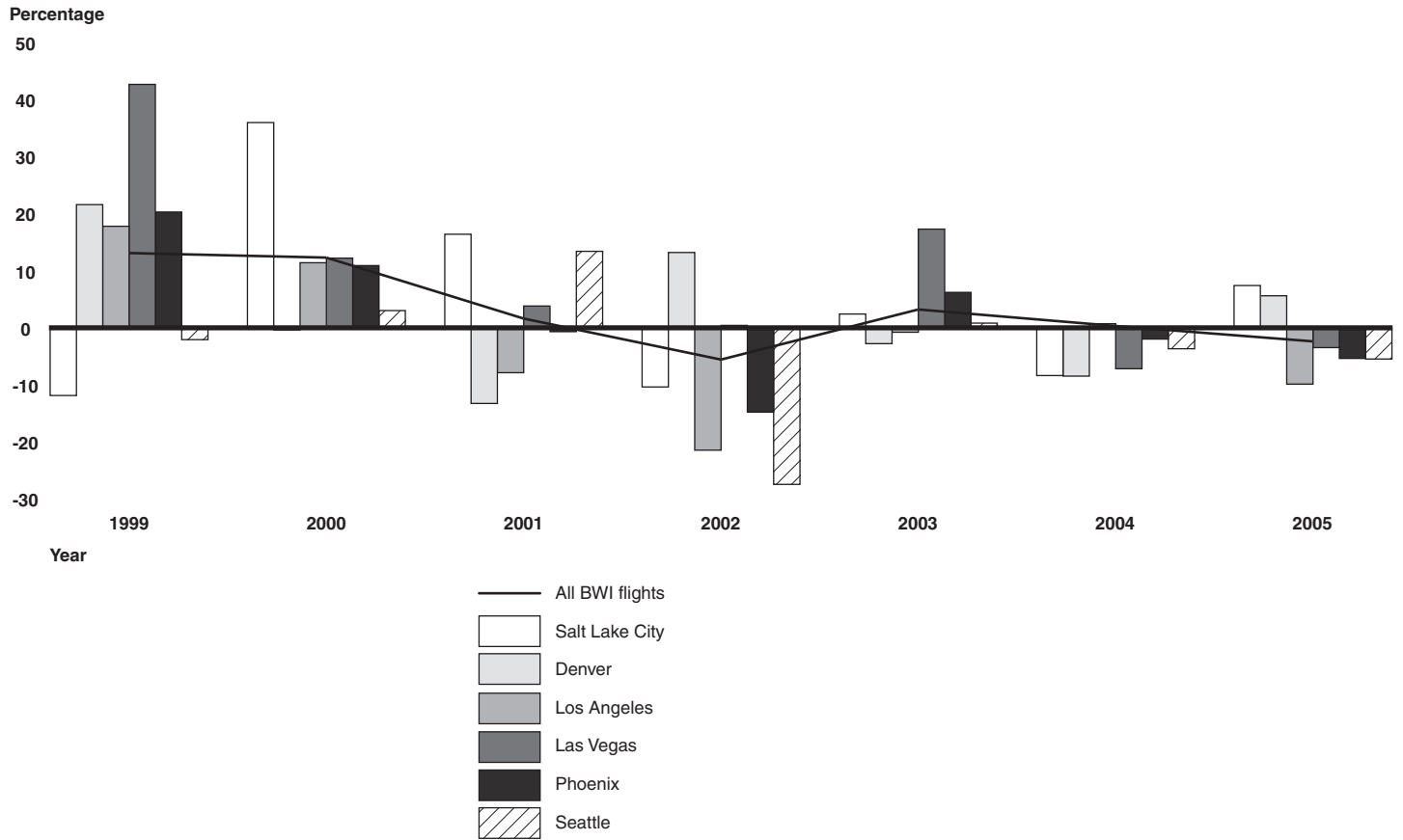
For overall passenger traffic between Dulles and the six airports, as figure 4 shows, we did not find evidence that the beyond-perimeter slots at Reagan National affected passenger levels. For example, passenger traffic between Dulles and some airports grew faster than overall airport traffic despite the introduction of nonstop flights to Reagan National.

Figure 4: Annual Percentage Change in Passengers for All Dulles Flights and Flights between Dulles and Six Beyond-Perimeter Airports, 1999-2005



Source: GAO analysis of DOT's origin and destination survey.

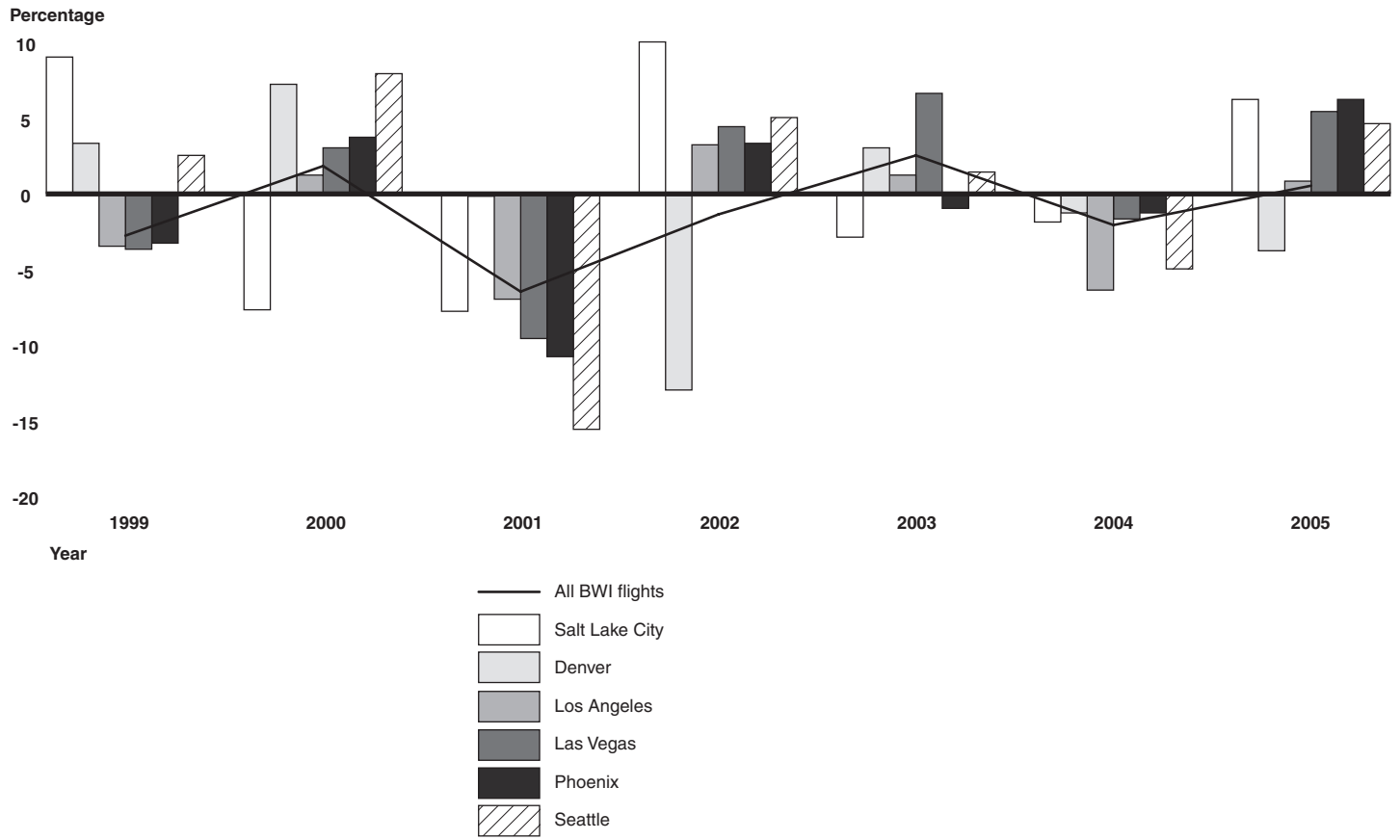
Figure 5: Annual Percentage Change in Average Fares for All Dulles Flights and Flights between Dulles and Six Beyond-Perimeter Airports, 1999-2005



Source: GAO analysis of DOT's origin and destination survey.

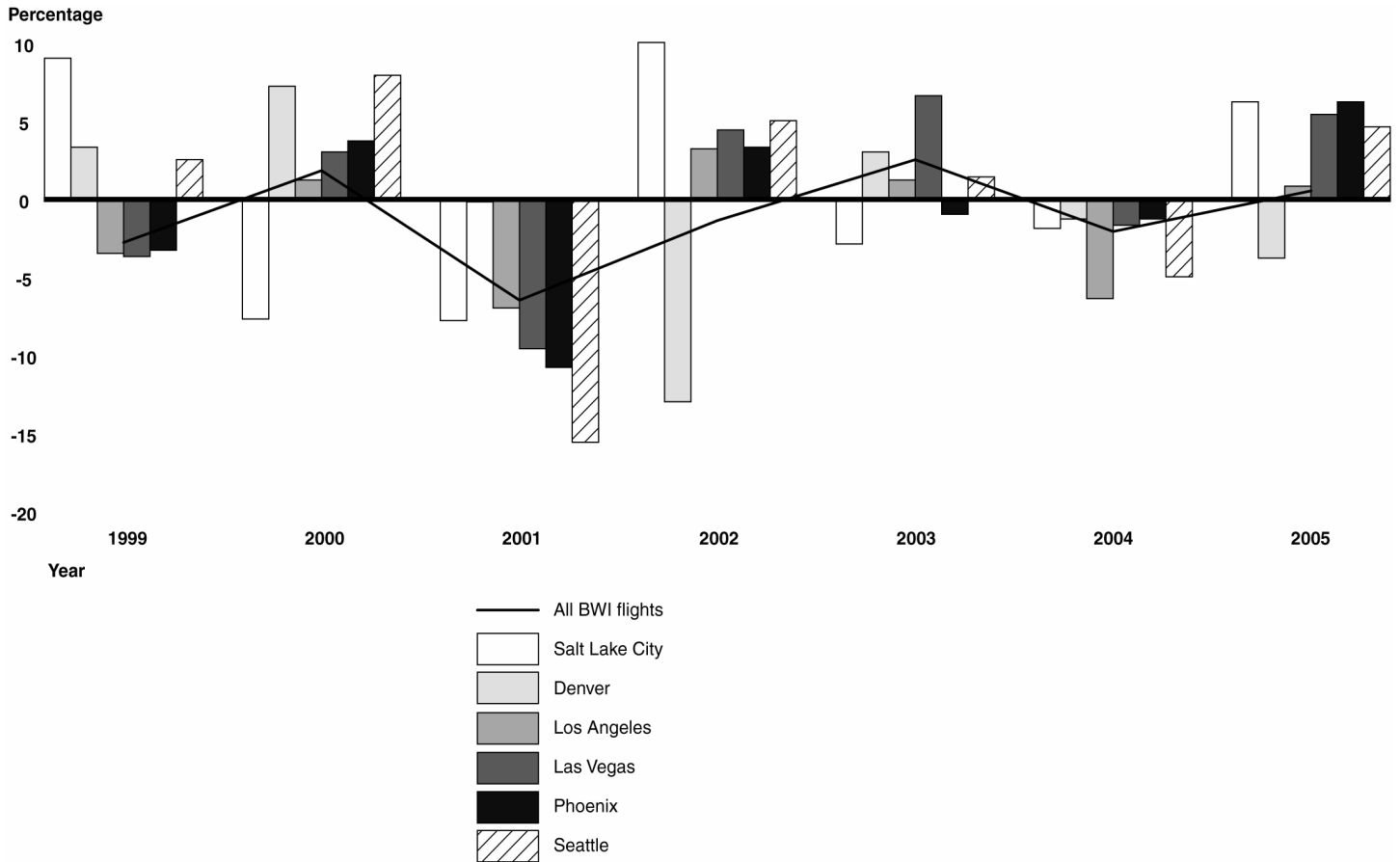
- BWI airport passenger traffic grew from 17.4 million in 1999 to 19.7 million in 2005. But, similar to Dulles, we found no patterns or trends in passengers or fares between BWI and the six airports that would suggest that changes to the beyond-perimeter rule at Reagan National had an impact on flights at BWI. (See figs. 6 and 7). Officials from BWI stated that changes to the slot and perimeter rule did not adversely affect BWI and noted other factors, notably US Airways reduction of its commuter service at BWI.

Figure 6: Annual Percentage Change in Passengers for All BWI Flights and Flights between BWI and Six Beyond-Perimeter Airports, 1999-2005



Source: GAO analysis of DOT's origin and destination survey.

Figure 7: Annual Percentage Change in Average Fares for All BWI Flights and Flights between BWI and Six Beyond-Perimeter Airports, 1999-2005



Source: GAO analysis of DOT's origin and destination survey.

Agency Comments

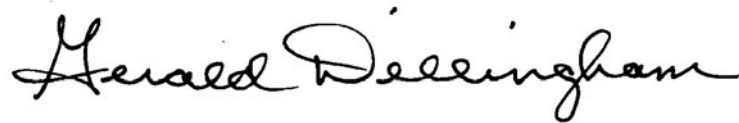
We provided copies of this report to DOT and the airports authority. We received comments from the Office of the Deputy Assistant Secretary for Aviation and International Affairs, Department of Transportation. DOT acknowledges that all available slots at Reagan National Airport are not used to maximum effect and agreed that there are a number of reasons for this, including curfew restrictions, the commercial viability of slots in the early morning or late evening under current regulations, and the concentration of the majority of slot holdings among a relatively small number of carriers. DOT also recognizes that the underutilization of slots is exacerbated by the fact that carriers can use commuter aircraft in slots designated for large aircraft but are legally prohibited from using large

aircraft in slots designated for commuter aircraft. In addition, other statutory restrictions, such as the perimeter rule, contribute to the underutilization of slots and prevent market forces from producing the maximum public benefit from these scarce assets. For example, the early departure and late arrival times at other airports are often used by airlines to operate overnight “red eye” or other long-haul flights. Regulations governing operations at Reagan National, such as the perimeter rule, prevent carriers from using such scheduling and fleet assignment techniques to maximize the value of slots and facilities at that airport. While we do not disagree with DOT’s observations, we also recognize that any changes in the commuter slot or perimeter rules at Reagan National would have competitive implications for airlines and the communities they serve. Assessing these effects was beyond the scope of our study. Finally, DOT offered technical comments, which we have incorporated as appropriate.

The airports authority commented that with one exception the report accurately reflects the situation at Reagan National. While the airports authority believes that the airport can accommodate some additional capacity, it is something less than the 4 slots per hour as suggested by DOT. The airports authority still disagrees with the basis for DOT’s 1995 estimate of 67 slots per hour under the High-Density Rule, just as it did in response to our 1999 report on this matter. The airports authority believes that maximum capacity should be based on IFR conditions, that is, capacity under adverse weather conditions. Instead, DOT bases its estimate of maximum capacity on a mix of IFR and VFR traffic, a methodology that we endorsed in 1999 and still do today. We believe, as does DOT, that balanced capacity is a superior method for determining the airport’s capacity because it accounts for the operation of aircraft during all weather conditions. The airports authority offered technical comments, which we have incorporated as appropriate. The airports authority’s comments, along with our responses to them appear in appendix II.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan on no further distribution until 3 days from the date of this letter. At that time, we will send copies of this report to the Secretary of Transportation and the Administrator of the FAA. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-4803 or dillingham@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Staff who make key contributions to this report are listed in appendix II.

A handwritten signature in black ink that reads "Gerald Dillingham". The signature is written in a cursive style with a large initial "G" and a long, sweeping underline.

Gerald L. Dillingham, Ph.D.
Director, Physical Infrastructure Issues

Appendix I: Scope and Methodology

To determine how many additional slots Reagan National Airport can accommodate, we analyzed Federal Aviation Administration (FAA) and Metropolitan Washington Airports Authority (airports authority) operational data, reviewed prior capacity studies, and interviewed airports authority, FAA, and Department of Transportation (DOT) officials. This analysis included reviewing data on the number and type of aircraft using the slots and how this usage was dispersed during the day and by which runway. We also reviewed the data contained in the 1995 study done by the DOT on the high-density rule and reviewed the basis for DOT's capacity estimates. In addition, we analyzed airports authority gate utilization data and airline leases to determine the extent to which gate space at the airport is unused. Finally, we interviewed officials from the DOT, FAA, airports authority and other stakeholders about Reagan National's current and future capacity.

To assess traffic between Washington, D.C., area airports and the six beyond-perimeter airports for which nonstop service to Reagan National was awarded since 1999, we analyzed DOT's Origin and Destination ticket data; we used these data to examine changes in fares and passenger levels between Reagan National, Dulles International (Dulles) and Baltimore-Washington Thurgood Marshall International Airport (BWI), and these airports. We also interviewed airports authority and BWI officials. For this analysis, we conducted a historical look at traffic between the six airports and the three Washington-Baltimore area airports. We obtained the ticket data from BACK Aviation Solutions, a private contractor that provides these data to interested parties. We used these data to examine trends in passenger and fares to identify any changes in traffic and fares between the six beyond-perimeter airports and Reagan National, Dulles and BWI airports. To assess the reliability of these data, we reviewed the quality control procedures applied to these data, and subsequently determined that the data were sufficiently reliable for our purposes. We conducted our review from July 2006 through February 2007 in accordance with generally accepted government auditing standards.

Appendix II: Comments from the Metropolitan Washington Airports Authority

Note: GAO comment supplementing those in the report text appear at the end of this appendix.

METROPOLITAN WASHINGTON AIRPORTS AUTHORITY



February 1, 2007

Dr. Gerald Dillingham
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Dr. Dillingham:

On behalf of the Metropolitan Washington Airports Authority (Authority), I thank you for the opportunity to review the draft of the report entitled "Reagan National Airport—Update On Capacity to Handle Additional Flights and Impact on Other Area Airports." I want to commend the staff of the Government Accountability Office (GAO) for taking the time to explore the complex issues of airport capacity and to discuss the unique Reagan National issues with the Authority staff. I am pleased that the report reflects an understanding of the evolution of the restrictions at Reagan National and the issues raised by the Authority staff, although I do believe that the report should place additional emphasis on several points.

As you know, the Authority is charged by law with operation of Reagan National and Washington Dulles International Airports. We have endeavored to improve and to operate these airports in the public interest since the Authority was formed in 1987. Reagan National came to us with restrictions on the number of flights, the length of nonstop flights, night time noise levels and flight paths. These restrictions were adopted by the United States Department of Transportation and ultimately by the United States Congress in the legislation that authorized the transfer of the airports to the Authority. The restrictions were intended to resolve longstanding issues over the roles of Reagan National and Dulles, community concerns about aircraft noise and particularly whether National should grow in activity. The limits on activity created a stable environment for Reagan National. They brought about community acceptance and enabled the Authority to proceed with the modernization of the airport. The limitations on Reagan National, specifically the flight limitations in the High Density Rule, have always been reflected in the Authority's planning and development of the gates and other facilities at the airport.

We are of course aware of the value of airport capacity and the need to efficiently use it. We are also very much aware of the need to control airport congestion that diminishes efficiency and undermines the reliability of air transportation and does not serve the traveling public. We

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**Appendix II: Comments from the
Metropolitan Washington Airports Authority**

Dr. Gerald Dillingham
U.S. Government Accountability Office
Page 2

are pleased that Reagan National is among the more efficient airports in the United States and, as the report notes (page 11), Reagan National enjoys one of the lowest average delay times of any large airport in the nation. Reliability of air service is a very valuable attribute of Reagan National and a great benefit to both the scheduled airlines and their passengers coming to and going from Washington.

The High Density Rule limits on scheduling, or slots, are a major factor in that reliability. National is essentially a single runway airport. More than 95 percent of its operations occur on one runway. The short cross wind runways are not frequently used by larger air carrier aircraft or even most of the commuter air carrier aircraft which today are regional jets. An analysis of capacity has to consider this. The GAO report cites the Federal Aviation Administration (FAA) report of 1995 which concluded that the airport could handle increased number of operations, from 60 (which had been the rule since 1969) to 67 an hour. Three slots an hour have effectively been added already by the legislation enacted in 2000 and 2003. As you know we were critical of that 1995 report and so advised GAO in our letter of August 1999. Our principal concerns about that FAA report remain today. The 1995 report does not reflect today's fleet mix. It assumed a greater availability of the cross wind runways than we believe is realistic for today's all jet fleet.

See comment.

The 1995 report also assessed capacity using a "balanced" or blended capacity analysis. This is a blend of Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) capacity. Clearly, that will yield a higher number than IFR alone. It will also lead to greater congestion, delays and unreliability when the airport is experiencing IFR conditions. The High Density Rule is an IFR rule. Its limits were set to assure efficient operations in IFR conditions. We believe that the limits on National need to remain close to that number in order to avoid the congestion and assure the reliability, particularly in poor weather, that we have come to value so much. One need only look to the airports where the High Density Rule was in place and then lifted, i.e., LaGuardia and O'Hare Airports, for examples of where demand will quickly outstrip capacity and diminish dependability to the point that the government has had to reassert controls. We recognize the concern about planning for reliability in poor weather leaves capacity unused in good weather. But we continue to believe that the creation of 67 slots an hour, i.e., the addition of another 4 per hour over today's activity, will lead to significant, and unwarranted, delays in IFR conditions, the very situation that the rule was enacted to prevent.

Our concern is well articulated in the GAO's own 2002 report *National Airspace System: Long-term Capacity Planning Needed Despite Recent Reduction in Flight Delays* (GAO-02-185). This report was prepared in response to the delays experienced in the summer of 2000 where 28 percent of all flights at 31 of the Nation's busiest airports were delayed, a truly unacceptable rate of delay. The report discussed methods of controlling delay and, with respect to the High Density Rule reported, "*These slots have been somewhat effective in controlling delays at these airports*" (Appendix III; Measure 2: Using Administrative or Regulatory Methods; Using Slot Restrictions; page 54).

Dr. Gerald Dillingham
U.S. Government Accountability Office
Page 3

GAO Report 02-185 referenced the FAA's *Airport Capacity Benchmark Report 2001* that studied capacity at the 31 airports, which included Reagan National. Key, and in contrast to their 1995 balanced capacity figure, in the *Benchmark* report the FAA indicated that adverse weather capacity was somewhere between 62 and 66 operations per hour under the *most favorable* IFR conditions, i.e., when operations are to the north using the instrument landing system and arrivals and departures are approximately equal. But FAA added disclaimers in the report including:

- "Half of the time during adverse weather, only the main runway can be used which reduces capacity to approximately 45 operations per hour."
- Any capacity gains through new technology (yet to be realized) may be "more than offset by reduced use of the shorter, crosswind runway as turboprop aircraft are replaced by regional jets.... Any change in the fleet mix that reduces the number of aircraft able to use these [crosswind] runways will reduce the overall capacity of the airport." FAA "Airport Capacity Benchmark Report 2001" Emphasis added.

To these disclaimers we add that Reagan National's capacity in adverse weather is reduced when arrivals exceed departures and when the winds dictate the use of the non-precision, curved, river approach from the north to Runway 19 rather than the straight-in precision approach to Runway 1 from the south.

As the draft report recognizes, but should emphasize more, the appearance of available capacity, i.e., the appearance that slots can be added without a negative impact, on the capacity of the airfield, is masked considerably by the absence of general aviation from the airport. Twelve slots per hour, nearly 20 per cent of today's total, are not being used due to Department of Homeland Security restrictions thereby creating the impression that slots can be added without contributing to congestion. However, if general aviation returns to Reagan National, some percentage of that activity will also be on the main runway. We can only reiterate our concern that the addition of up to 4 new air carrier slots per hour coupled with the return of the general aviation, totaling 67 operations an hour at Reagan National is likely to create the airfield congestion.

I am grateful that the report acknowledges the significant landside infrastructure issues that confront the airport. The creation of 4 new slots an hour could easily result in 400 more passengers, and perhaps 500 more passengers an hour. This would place stress upon the infrastructure. In terms of aircraft gates, the number at the airport is in balance with the number of slots, although there are a number of airlines that are sharing gates that would prefer to have their own. There is not enough gate capacity to absorb the addition of four slots an hour at all hours of the day. Also, gates are associated with back of the house operations such as ticket counter, baggage make up, office space and operational facilities. An airline needs to acquire the entire package to operate. The ticket counter situation at National is particularly acute since it is

Appendix II: Comments from the
Metropolitan Washington Airports Authority

Dr. Gerald Dillingham
U.S. Government Accountability Office
Page 4

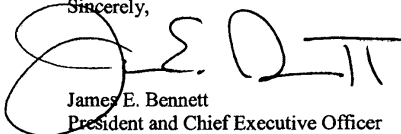
all leased and heavily used. Also, much of the once open space on the ticketing level at Reagan National has been taken up by TSA for its security equipment.

Finally, as the report notes the automobile parking facilities at National have become inadequate due in no small part to the demand generated by the added flights authorized by the recent legislation. The parking lots are regularly at capacity and travelers are turned away. The Authority is undertaking expensive and complicated parking garage expansions that should be available in 2010 and which are expected to add 1,380 spaces. Even with the additional garage parking, we anticipate that there will still be shortages of parking at Reagan National because passenger activity levels will grow *under the present slot rules* as larger aircraft are introduced.

In 2006, 18.5 million passengers used Reagan National Airport, a single year record for the airport, and up from 15.8 million in 2000, when slots were added by the "Air21" legislation. Working with the airlines and the TSA we have been able to accommodate that growth, maintain efficiency, and provide the level of service and the type of experience travelers to and from the Nation's Capital expect. The capacity to continue to do so in the face of significant added activity is not available, in our judgment. In sum, we agree with the statement in the report: "Reagan National Airport can accommodate some additional capacity but airport infrastructure constrains how much can be added." I am going further and saying that the Airports Authority, based on our experience and knowledge of our facilities and operational realities, believes strongly that an increase of four air carrier aircraft operations per hour as the report implies cannot be accommodated at Reagan National without serious negative impacts on the airport facilities and passenger service levels.

Thank you again for sharing the draft report and for your careful consideration of this important issue.

Sincerely,



James E. Bennett
President and Chief Executive Officer

JEB:mdw

The following is GAO's comment on the Metropolitan Washington Airports Authority's (airports authority) February 1, 2007, letter.

GAO Comment

We believe, as does DOT, that "balanced capacity" is a more appropriate method for determining an airport's capacity than the method suggested by the airports authority. While the airports authority contends that Instrument Flight Rules (IFR) should be used to measure capacity, DOT's Technical Supplement No. 3 to its 1995 report points out that IFR airfield capacity is indicative of the lowest level of available capacity, and thus virtually ensures constant availability of an airfield. In practice, this approach would leave large amounts of airfield capacity unused because a significantly higher capacity could be achieved during the better weather conditions under which Visual Flight Rules apply. According to data from FAA, less than 1 percent of all air traffic operations at Reagan National from November 2005 to November 2006 were delayed because of weather conditions. Because setting the number of slots on the basis of balanced capacity reflects both bad and good weather conditions, we did not revise our report.

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

Gerald Dillingham, Ph.D., (202) 512-4803, or dillinghamg@gao.gov

Staff Acknowledgments

In addition to the individual named above, Ed Laughlin, Assistant Director; Paul Aussendorf; Jay Cherlow; Dave Hooper; Nick Nadarski; Josh Ormond; and Stan Stenersen made key contributions to this report.

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