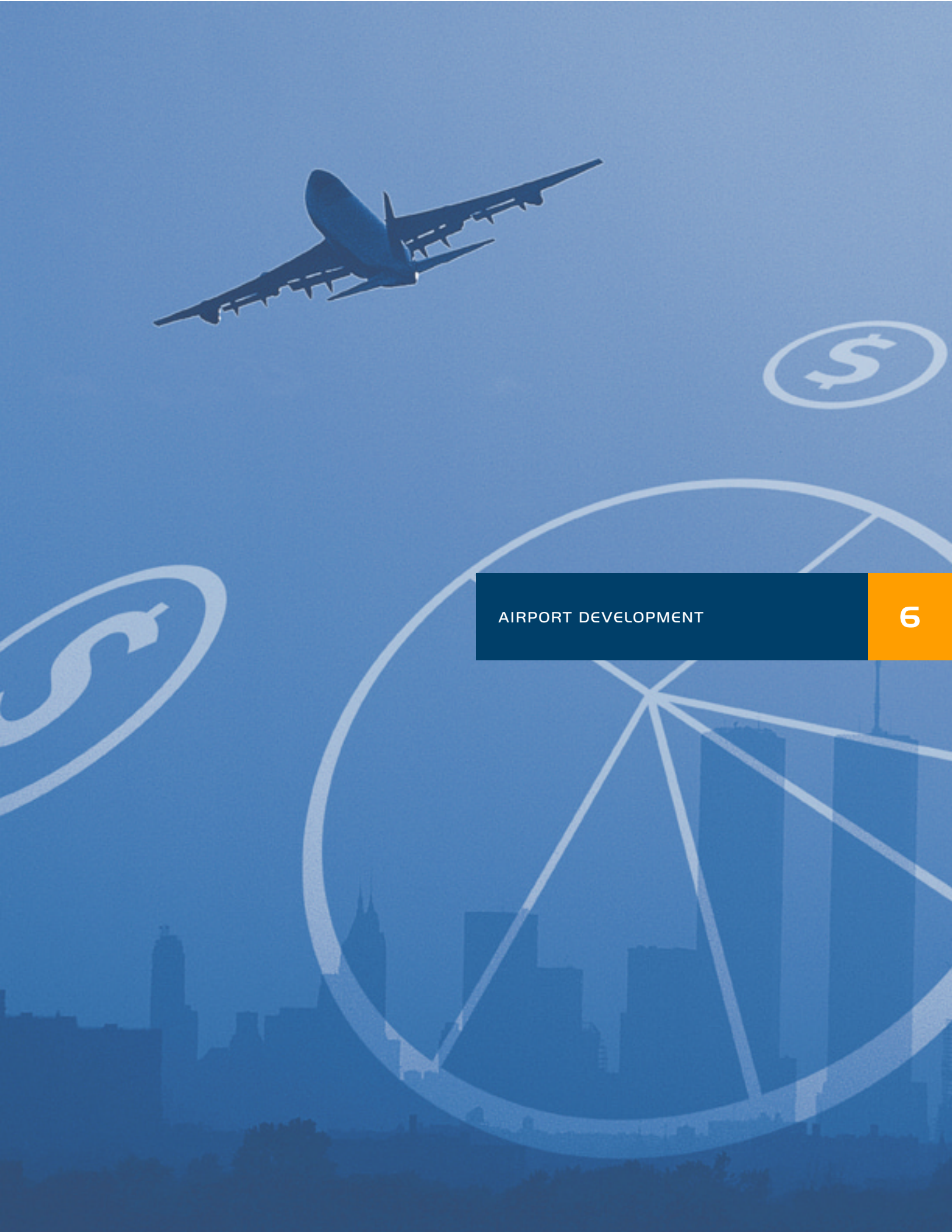


AIRPORT DEVELOPMENT

6

6 AIRPORT DEVELOPMENT

Expanding the nation's airport infrastructure is the most direct and effective means of ensuring adequate system capacity. Airport development projects, unfortunately, are very expensive. However, in recognition of the importance of new airport infrastructure in alleviating flight delays, recent legislative changes have increased the funding available to airports for capacity enhancement projects.

Local issues also affect airport development. Some of the busiest and most congested airports in the U.S. are located in densely populated areas where airport expansion is difficult because of noise and other environmental issues and limited land availability. In these cases, the FAA and airport operators pursue other measures to increase capacity, such as the development of reliever airports and the modification of operational procedures to use the existing infrastructure more efficiently. The Office of System Capacity (ASC) is instrumental in analyzing traffic patterns at congested airports and recommending modifications to increase capacity.

6.1 Airport Capacity Studies

The Office of System Capacity supports Airport Capacity Design Teams that evaluate alternatives for increasing capacity at airports that already are experiencing significant flight delays. ASC also acts as a team member in other airport capacity projects and participates in air traffic control simulations at the request of local and regional Air Traffic representatives and foreign airport operators.

6.1.1 Airport Capacity Design Team Studies

A typical Airport Capacity Design Team includes FAA representatives from ASC, Air Traffic, the Technical Center and the appropriate region, and representatives from the airport operator, airlines, and other aviation interests. Design Team members propose actions to improve airport capacity and the Technical Center's NAS Advanced Concepts Branch conducts computer simulations of the most promising alternatives. The output of the simulation is an analysis of the impact of each alternative on the operation of the airport.

Upon completion of its study, the Airport Capacity Design Team issues a Capacity Enhancement Plan (CEP) that presents a list of recommended actions and estimates of the impact of each alternative on delays at that airport. The recommendations require additional study before they can be implemented, but over the years, a large number of Design Team recommendations have been adopted by the airport operators, funded by the FAA and other sources, and implemented.

Forty-seven Airport Capacity Design Team studies have been completed and CEPs published. Appendix B lists completed CEPs, their recommendations, and the status of those recommendations (whether they were or were not implemented). The most recent studies of Newark International and Tampa International airports, which were completed in late 1999, the Anchorage Area Airspace Study, completed this year, and the ongoing Portland International Airport study update, to be completed in 2001, are summarized briefly below.

6.1.1.1 Newark International Airport

The Newark International Airport (EWR) Airport Capacity Design Team assessed ways to reduce delays and relieve current and forecast airport congestion. Among the capacity enhancements evaluated were the construction of a new runway and a number of new

approach procedures. The study determined the technical merits of each alternative and its impact on capacity. The analysis showed that at a point in the near future, the greatest savings in delays would be provided by building a new runway that could support independent arrivals in all weather conditions and by permitting immediate divergent turns for propeller-driven aircraft.

Additional studies will be required to assess airspace, environmental, socioeconomic, and political issues associated with these actions. Since all of the capacity enhancement alternatives produced delay savings, the Design Team recommended that each of the alternatives be further studied to determine whether it should be undertaken. The Design Team also concluded that planning for improving Newark's capacity should be undertaken immediately. All initiatives will move on to the next step in the planning process.

6.1.1.2 Tampa International Airport

The study was conducted in conjunction with the airport's master plan update to address the rapid growth in traffic at Tampa International Airport. Tampa is forecast to experience a 24.4 percent increase in operations by 2011. The team focused its analysis on aircraft activity inside the final approach fix and on the airfield. The analysis showed that the greatest savings in delays would be realized through construction of a new runway 17/35 for arrivals that will allow precision approaches to Runways 17, 18R, 35, and 36L.

6.1.1.3 Portland International Airport

Portland International Airport (PDX) ranked 30th in aircraft operations in 1999, but is forecast to experience a 37.9 percent increase in operations by 2011. Based on that forecast, the Portland International Airport Capacity Design Team is conducting an update of their 1996 study. The update will consider the feasibility of constructing a third parallel runway to the south, with associated taxiways, and constructing an additional terminal or expanding the existing terminal. Operational improvements are also being considered. The study update will be released in September 2001.

6.1.1.4 Anchorage Area Design Team Study

The Anchorage Area Design Team Study assessed ways to relieve congestion problems caused by the more than one million annual operations transiting over Point McKenzie. Recommendations included alternative approach procedures to the converging and the closely-spaced parallel runways at Anchorage International Airport. Their analysis of approach procedures determined that there was a need for two IFR streams. The study was completed this year, but additional local studies are still underway. The Anchorage Master Plan will address changes at the airport.

6.1.2 Additional Airport Capacity Activities

ASC is currently a participant on projects involving Dallas/Fort Worth International, Baltimore-Washington International and Washington Dulles International airports.

6.1.2.1 Dallas/Fort Worth International Airport

As of July 1999, regional jets represented just five percent of the commuter fleet at Dallas/Fort Worth International Airport (DFW). The FAA forecasts their numbers to increase significantly as turboprops are replaced, placing additional demand on current jet runways and route structures.

The DFW Airfield Capacity Design Team is currently conducting Phase III of its Airfield Capacity Enhancement Study, an RJ Impact Assessment, to estimate the effect of increased RJ operations under existing airport procedures. The assessment showed an increase in departures on runways 18L and 17R, leading to taxi-in delays for arriving aircraft and taxi-out and ground delays for departing aircraft. Phase IV of the study will review the impact of various capacity enhancement options on the delays and other impacts of the growth of RJ operations.

6.1.2.2 Baltimore-Washington International Airport

Baltimore-Washington International Airport (BWI) is one of the fastest growing airports in the NAS. The FAA forecasts operations at BWI to increase by 36 percent by 2011. Planned improvements include a new 7,800-foot runway 10R/28L, to be constructed by 2008. When the new runway is complete, runway 4/22 will be converted to a taxiway. Operations at BWI will be evaluated during Phase III of the Northeast Regional Capacity Design Study. The Design Team has been working with the Volpe National Transportation Center on this effort.

6.1.2.3 Washington Dulles International Airport

Washington Dulles International Airport (IAD) is also among the fastest growing airports in the NAS, with operations expected to grow by 37 percent by 2011. Several airport improvements are under consideration. A second parallel runway, 12R/30L, has been proposed for a location southwest of runway 12/30, with expected completion by 2002. A north-south parallel runway, 1W/19W, would be located west of the existing parallels and north of runway 12/30. Estimated opening date is 2008. When completed, these runways would provide triple independent parallel approaches.

6.1.3 Air Traffic Control Ground Simulations

ASC is participating in air traffic control ground simulations at Phoenix Sky Harbor International Airport. In addition, because of the FAA's recognized expertise in evaluating capacity enhancements, foreign airport operators have requested assistance. The FAA conducted a ground simulation at Frankfurt International Airport, Germany, in 1999 and at Ben Gurion International Airport in Tel Aviv, Israel in 2000. In both cases, the goal of these activities was to improve the operational efficiencies at these airports. These studies used the Technical Center's Airfield Delay Simulation Model (ADSIM) and the Airspace Delay Simulation Model (SIMMOD) to analyze various airfield configurations and to determine daily total aircraft travel times and ground delays.

6.1.3.1 Phoenix Sky Harbor International Airport

An ongoing initiative to assist Air Traffic with ground operations efficiency is being conducted at Phoenix Sky Harbor International Airport. The goal is to determine a more efficient use of runways for arrival and departure operations, based on both the present runway configuration and several alternate configurations during the construction of a third runway and the subsequent reconstruction of the existing runways. This initiative will be completed in early 2001.

6.1.3.2 Ben Gurion International Airport

The Israel Airports Authority asked the FAA to conduct an analysis of the airspace, airfield, and procedural operations at Ben Gurion International Airport; to assist in making improvement recommendations concerning all areas; and to analyze those recommendations through simulation modeling. The primary airspace recommendation was to create a more efficient northern arrival route to replace the present route from the west. Extension of runway 3/21 to accommodate northern arrivals, new parallel taxiways, high-speed exits, and a new terminal traffic flow were the primary airfield recommendations. Suggested procedural changes included a reduction in the separation standard from five to three miles and simultaneous arrival/departure procedures.

6.2 Funding of Airport Development

Airport development is funded by a combination of public and private sources. Major sources include the Airport Improvement Program (AIP), Passenger Facility Charges (PFCs), state and local funding programs, airport revenue bonds, and airport user charges. Public grants, PFCs, and airport revenue bonds provide most of the capital funding, while user charges generally cover an airport's operating expenses and the debt service for airport bonds.

6.2.1 Airport Improvement Program

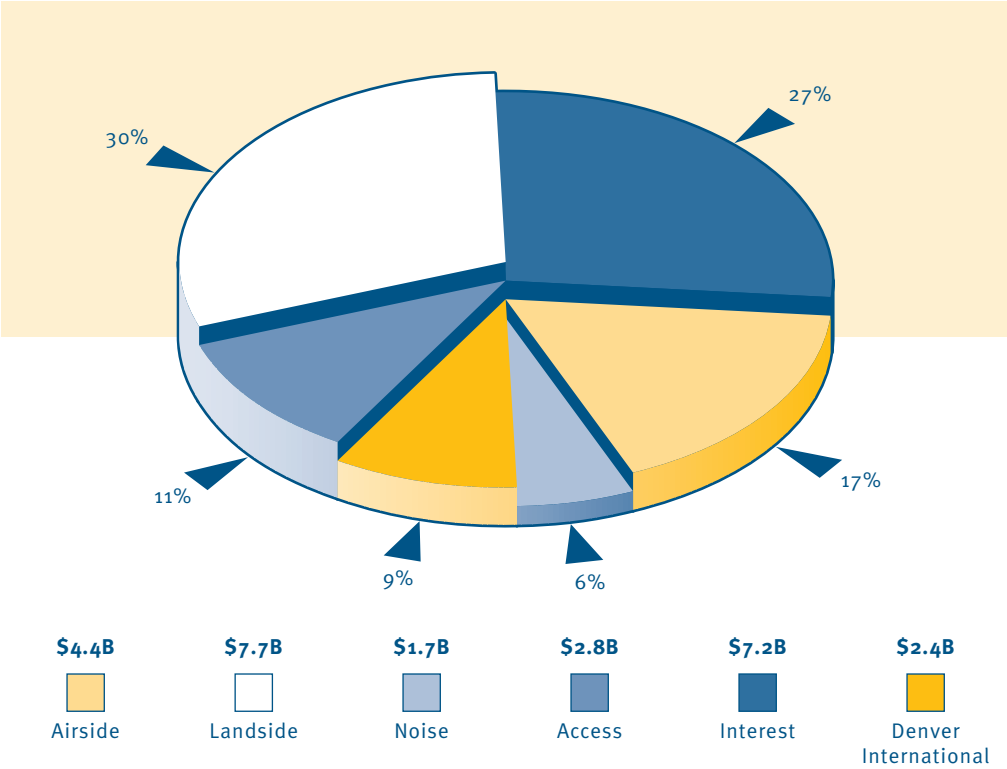
The Airport Improvement Program plays a critical role in maintaining and expanding the airport infrastructure. AIP provides federal grants for airport development and planning for capital projects that support airport operations, including runways, taxiways, aprons, and noise abatement. Airport sponsors and non-federal contributors must provide at least a ten percent share of any project funded by AIP grants. During the 1990s, AIP grants accounted for between 21 percent and 40 percent of total airport capital development expenditures. AIP funding for FY 1999 was $1.95 billion, with primary airports receiving 26 percent of the total. AIR-21 will provide a substantial increase in AIP funding over the next three years.

6.2.2 Passenger Facility Charges (PFCs)

The recently enacted AIR-21 increased the maximum passenger facility charge that airports can impose on each boarding passenger from $3.00 to $4.50. The increased funding stream from the higher PFCs will result in a significant acceleration of airport construction projects. Since the start of the PFC program, the FAA has approved 872 PFC applications at 316 airports, including 81 of the busiest 100 airports, and total collections of approximately $26.2 billion. Figure 6-1 shows the distribution of those funds by project type. Actual collections in CY 1999 were approximately $1.5 billion.

Figure 6-1

Approved Passenger Facility Charges



6.2.3 User Charges

Airport user charges include aircraft landing fees; apron, gate-use, or parking fees; fuel-flowage fees; and terminal charges for rent or use of passenger hold rooms, ticket counters, baggage claims, administrative support, hangar space, and cargo buildings. Non-airport user charges include revenue from sources such as terminal concessionaire rentals and fees, and automobile parking.

6.2.4 Bonds: Revenue, General Obligation and Special Facility

The issuance of bonds remains the primary means of financing airport development projects at commercial service airports. Bond debt service for interest, capital, and other costs is a major component of airport user charges. Most airport bond financing has used tax-exempt general airport revenue bonds (GARBs).

Terminal facilities have also been financed with special facility bonds. The introduction of PFCs as an additional source of funds has led to the evolution of a version of the GARB that relies partially or totally on PFC revenues for repayment. Because of the conservative nature of the tax-exempt bond market, these PFC-backed bonds often require special commitments from the FAA to reduce the likelihood of any bond default resulting from some federal actions that could affect future PFC collections.

6.2.5 Other Sources of Funding

State and local governments have contributed to the development and operation of community airports, offering matching grants to secure federal support, providing direct grants to fund airport maintenance projects, and financing the installation of navigation aids. To expand air service and to encourage competition, state and local governments have also supported airport marketing initiatives.

6.3 Airport Construction and Expansion

Airport development frequently entails the construction of new terminals, new and extended runways, and improved taxiway systems. In large metropolitan areas with frequent flight delays and limited airport expansion possibilities, other options must be explored. New airports, expanded use of existing commercial service airports, and civilian development of former military bases are options available for meeting expanding aviation needs.

6.3.1 Construction of New Airports

The construction of new airports provides the largest and most significant increase in aviation system capacity. However, given the high cost of construction, the large acquisition and use of land, and environmental impact of an airport, few new airports have been built in recent decades. Among primary airports, only two hub airports have been built: Denver International was completed in 1995 and Dallas/Fort Worth International in 1974. Two primary non-hub airports have recently been completed: Northwest Arkansas Regional Airport and Mid-America Airport. Mid-America is the St. Louis region's second major airport and serves as a reliever airport for Lambert-St. Louis International Airport and as a joint use facility with Scott Air Force Base. The airport opened in June 1998 with a construction cost of $210 million, with a 10,000-foot runway. Mid-America airport recently started scheduled commercial passenger air service.

6.3.2 Conversion of Military Airfields to Civilian Airports

The Military Airport Program (MAP) provides grants to current or former military airfields with the potential to improve the capacity of the NAS. These airfields include Base Realignment and Closure (BRAC) participants, and airfields that have entered joint-use agreements to accommodate civil and military users. Many of these airfields are located near congested metropolitan areas and have the potential to provide capacity gains with relatively small investments by state and local governments.

In 1999, two percent of AIP funds were set aside for the MAP program. Airports remain eligible to participate in the MAP for a maximum of five years. Since 1991, 14 participants have graduated from the program. Two-thirds of the 1999 participants will graduate in 2000. Figure 6-2 lists the 1999 MAP participants.

Figure 6-2

1999 Military Airport Program Participants

Civilian Name	Military Name	Location	Airport Type
Austin Bergstrom*	Bergstrom AFB	Austin, TX	Primary
Millington Municipal*	Memphis NAS	Memphis, TN	Reliever
Williams Gateway*	Williams AFB	Phoenix, AZ	Reliever
Alexandria International*	England AFB	Alexandria, LA	Primary
Rickenbacker International*	Rickenbacker AFB	Columbus, OH	Reliever
Sawyer*	K.I. Sawyer AFB	Gwinn, MI	Commercial Service
Southern California Intl	George AFB	Victorville, CA	Reliever
Chippewa County Intl	Kincheloe AFB	Sault Ste Marie, MI	Commercial Service
Pease International Tradeport	Pease AFB	Portsmouth, NH	Planned Commercial Service

* 1999 and 2000 graduates

The most significant MAP project to date has been the conversion of Bergstrom Air Force Base into a civilian airport, Austin-Bergstrom International. Austin-Bergstrom and two additional MAP projects are briefly described below.

6.3.2.1 Austin-Bergstrom International Airport

Austin-Bergstrom International Airport opened on May 23, 1999, and one year later, passenger traffic showed a 13.63 percent increase over Robert Mueller Municipal Airport's final year of operation. Year-to-date passenger enplanements continue to climb, making it one of the fastest growing major airports in the United States.

6.3.2.2 Alexandria International Airport

The England Authority became the operator of the England Air Force Base when the base closed in December 1992. England Air Force Base was converted and opened as Alexandria International Airport (AEX) in August 1996. Located in the central part of Louisiana, Alexandria International Airport offers convenient transportation for businesses and individuals within a 200-mile radius. With two runways, AEX presently serves commercial, general aviation, and military users, with approximately 55,000 operations and 250,000 passengers per year. AEX has spent over $18.5 million for capital improvements since 1993.

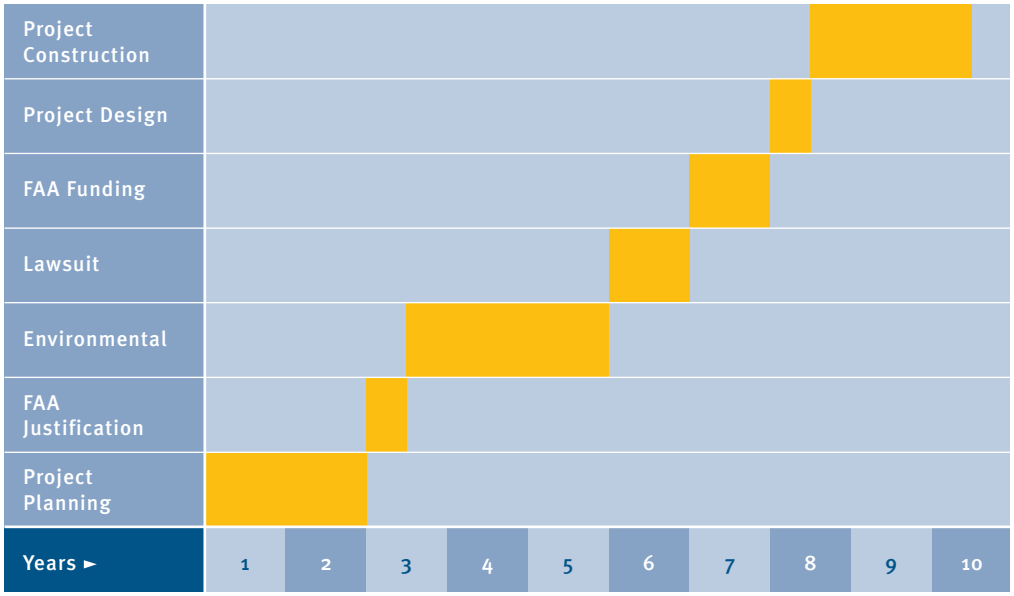
6.3.2.3 Sawyer International Airport

Sawyer International Airport (SAW) opened in 1998. SAW is located near the city of Marquette, Michigan, at the site of former K.I. Sawyer Air Force Base on the southern shore of Lake Superior. SAW presently provides regional air service through three service providers. A crosswind runway is planned to be operational in 2000.

6.3.3 Construction of New Runways, Extensions, Taxiways, and Aprons

Environmental, financial, and other constraints continue to limit the development of new airports. The redevelopment and expansion of existing airport facilities is an important option for airport development. The construction of new runways and the extension of existing runways are the most direct actions to improve capacity at existing airports, but can take a decade or more to complete. Figure 6-3 details the typical process, from planning through construction, for a new runway.

Figure 6-3
Life Cycle of a New Runway



A number of the busiest airports have completed new runways or other runway construction projects in the last six years. Figure 6-4 shows that eight new runways were opened from January 1995 to October 2000. Another 21 runway construction projects were completed, including 15 runway extensions, one renovation, three reconstructions, and two realignments.

Figure 6-4

Completed Runway Construction Projects January 1995 to October 2000

ID	Airport	New	Extension	Renovation	Reconstruction	Realignment	Year	Runway
ABQ	Albuquerque International				•		1995	8/26
CVG	Greater Cincinnati-Northern Kentucky Intl		•				1995	18R/36L
SLC	Salt Lake City International	•					1995	16R/34L
ANC	Anchorage International		•				1996	32
CMH	Port Columbus International		•				1996	28R
DFW	Dallas/Fort Worth International	•					1996	17L/35R
MKE	Milwaukee General Mitchell International					•	1996	7L/25R
MSP	Minneapolis-St. Paul International		•				1996	4/22
OMA	Omaha Eppley Airfield		•				1996	14R/32L
BOI	Boise Air Terminal		•				1997	10L/28R
CMH	Port Columbus International		•				1997	10L
GRR	Grand Rapids Kent County International		•				1997	18/36
IND	Indianapolis International	•					1997	5L/23R
LAS	Las Vegas McCarran International				•		1997	1L/19R
MDW	Chicago Midway				•		1997	4R/22L
SDF	Louisville International	•					1997	17R/35R
GRR	Grand Rapids Kent County International					•	1998	17/35
LIT	Little Rock Adams Field		•				1998	4L/22R
MEM	Memphis International	•					1998	18L/36R
MKE	Milwaukee General Mitchell International		•				1998	7L/25R
MSN	Madison/Dane County Regional	•					1998	3/21
PSP	Palm Springs Regional		•				1998	31L/13R
ABQ	Albuquerque International		•				1999	12/30
AUS	Austin-Bergstrom International			•			1999	17R/35L
GSP	Greer Greenville-Spartanburg		•				1999	3L/21R
PHL	Philadelphia International	•					1999	8/26
EWR	Newark International		•				2000	4L/22R
MEM	Memphis International		•				2000	18C/36C
PHX	Phoenix Sky Harbor International	•					2000	7/25

The busiest 100 airports also have a large number of runway construction projects in progress or in the planning stage. Figure 6-5 lists runway projects with planned operational dates between November 2000 and December 2005. Thirty of the 100 busiest airports have projects in the pipeline, including 14 new runways, 23 runway extensions, and one runway reconstruction. Appendix C shows additional runway construction projects proposed or planned for 2006 and beyond.

Figure 6-5

Runway Construction Projects November 2000 to December 2005

ID	Airport	New	Extension	Reconstruction	Runway Identifier	Estimated Cost ($M)	Planned Operational Year	In Progress
PBI	Palm Beach International		•		9L/27R	$ 9.0	2000	•
DSM	Des Moines International		•		5/23	$ 31.0	2001	•
DTW	Detroit Metropolitan Wayne County	•			4/22	$ 116.5	2001	•
ELP	El Paso International		•		4/22	$ 8.0	2001	•
MSP	Minneapolis-St Paul International		•		4/22	$ 7.0	2001	
OGG	Kahului		•		2/20	$ 47.0	2001	
ALB	Albany County		•		10/28	$ 5.8	2002	
BHM	Birmingham		•		5/23	$ 17.0	2002	
CLE	Cleveland Hopkins International	•			5W/23W	$ 467.0	2002	
CLT	Charlotte-Douglas International	•			18W/36W	$ 140.0	2002	
DAY	Dayton International		•		6R/24L	TBD	2002	
DFW	Dallas/Fort Worth International		•		18R/36L	$ 19.0	2002	
IAH	George Bush Intercontinental		•		15R/33L	$ 85.0	2002	
MCO	Orlando International	•			17L/35R	$ 115.0	2002	
PHX	Phoenix Sky Harbor International		•		8L/26R	$ 7.0	2002	•
PNS	Pensacola Regional		•		8/26	$ 12.3	2002	
SRQ	Sarasota Bradenton		•		14/32	$ 5.1	2002	
CVG	Greater Cincinnati-Northern Kentucky Intl		•		9/27	$ 12.0	2003	
DFW	Dallas/Fort Worth International		•		17C/35C	$ 25.0	2003	
IAH	George Bush Intercontinental	•			8L/26R	$ 130.0	2003	
MIA	Miami International	•			8/26	$ 206.0	2003	
MSP	Minneapolis-St. Paul International	•			17/35	$ 490.0	2003	•
DEN	Denver International	•			16R/34L	$ 160.0	2004	
DFW	Dallas/Fort Worth International		•		18L/36R	$ 48.0	2004	
GSO	Greensboro Piedmont Triad International	•			5L/23R	$ 96.0	2004	
IAD	Washington Dulles International	•			12R/30L	$ 217.0	2004	
ORF	Norfolk International	•			5R/23L	$ 100.0	2004	
SAT	San Antonio International		•	•	12L/30R	$ 43.0	2004	
TYS	Knoxville McGhee-Tyson		•		5L/23R	$ 7.0	2004	
ALB	Albany County		•		1/19	$ 7.5	2005	
ATL	Hartsfield Atlanta International	•			9S/27S	$ 450.0	2005	
BOS	Boston Logan International	•			14/32	$ 50.0	2005	
BUF	Greater Buffalo International		•		14/32	$ 4.9	2005	
CLE	Cleveland Hopkins International		•		5R/23L	$ 40.0	2005	
DFW	Dallas/Fort Worth International	•			18R/36L	$ 367.3	2005	
FLL	Fort Lauderdale-Hollywood International		•		9R/27L	$ 300.0	2005	
LBB	Lubbock International		•		8/26	$ 15.0	2005	