TWIN 2030 CITIES

AVIATION SYSTEM TECHNICAL REPORT

METROPOLITAN COUNCIL

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Twin Cities Aviation System Technical Report

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Executive Summary

This document is a technical report containing new aviation forecasts and evaluations to be used to update the Twin Cities 2030 Aviation System Plan. The aviation section of the region's Transportation Policy Plan (TPP) will be amended as appropriate to reflect the new technical information. The Twin Cities Regional Aviation System consists of 11 airports that provide aviation services to the seven county metropolitan region.

This executive summary is organized into the following sections as described in more detail later:

- Inventory
- Aviation Industry Trends
- Forecasts
- Peer System Comparisons
- Airport Classification
- System Performance Evaluation
- Ground Travel and Airport Service Area Evaluation
- System Changes and Improvements
- System Financing

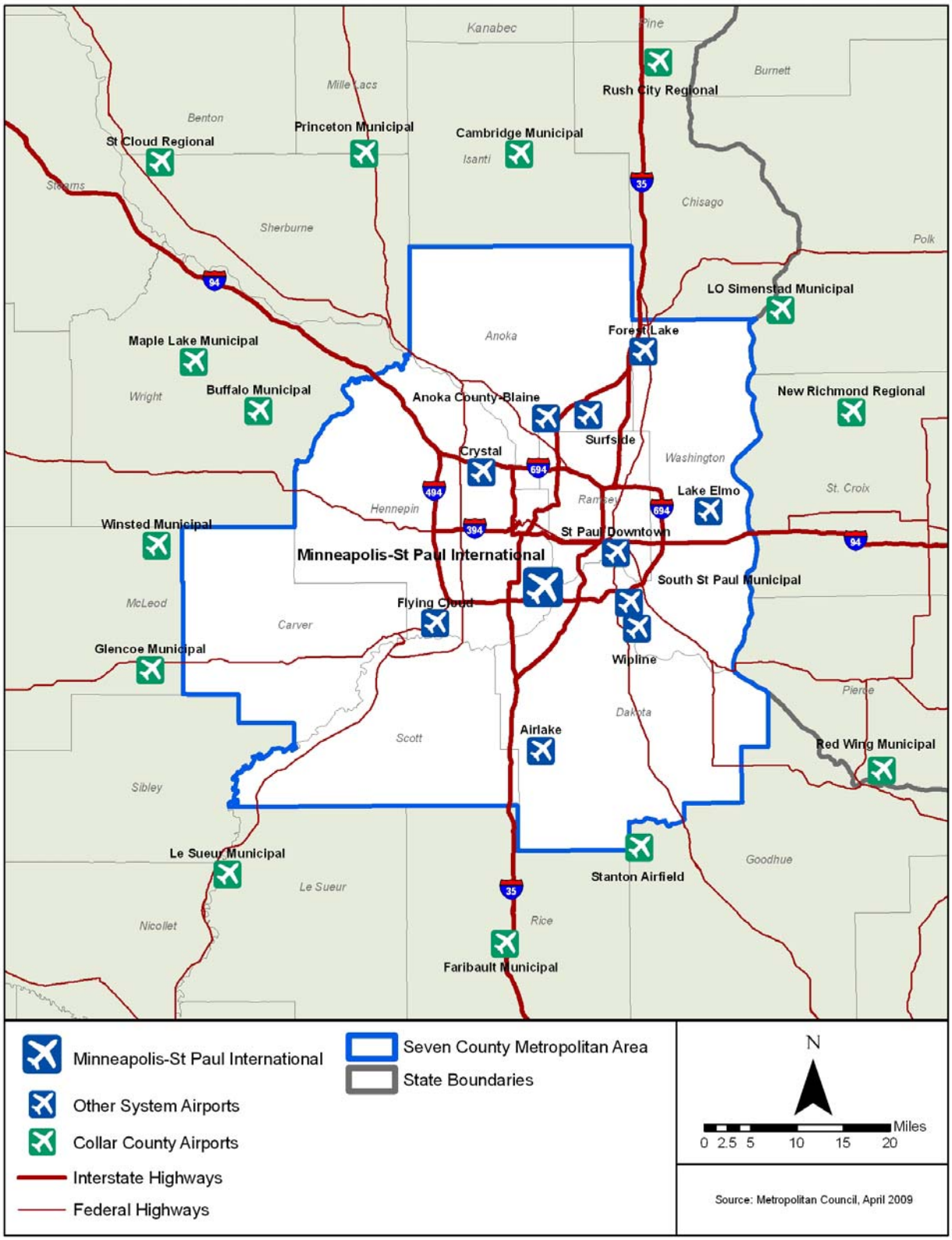
Inventory

The inventory of existing conditions is used to establish a baseline of facilities and services available at the study airports. Exhibit ES-1 shows the study airports along with the seven county metropolitan region. The eleven study airports are:

- Minneapolis-St. Paul International
- Airlake
- Anoka County-Blaine
- Crystal
- Flying Cloud
- Lake Elmo
- South St. Paul
- St. Paul Downtown
- Surfside Seaplane Base
- Wipline Seaplane Base

This inventory documented the facilities and services available at the 11 system airports. In addition to summarizing the infrastructure of each airport, basic background information on each airport was also summarized, including ownership and historic aviation activity in the form of based aircraft and operations. The airspace in the metropolitan region was also summarized, with an explanation of how the FAA controlled the airspace to enhance operations around Minneapolis-St. Paul International.

Exhibit ES-1: Study Airports



Demographic trends in the Twin Cities region were also examined with a look at expected levels of population, employment, and income projected through 2030.

Aviation Industry Trends

Recent trends in the aviation industry, both general aviation and commercial aviation, were examined. Starting from a national perspective, the challenges faced by the aviation industry, and commercial aviation in particular, were illustrated.

Since the deregulation of the airline industry in 1978, volatility in the industry has grown. Airlines as a whole have operated above their breakeven load factors as often as they have fallen below it in the past 20 years. Numerous recent trends have added to that volatility.

The fluctuations in fuel prices contributed significantly to airline difficulties, with crude oil peaking at $160 per barrel in July 2008 after rising from $90 per barrel in August 2007. By November 2008, it was down to $61 per barrel. This rise in crude oil prices more than offset the efforts by airlines to reduce costs through restructurings, downsizing, new labor agreements, and productivity gains.

Additionally, the recent economic recession resulted in increased unemployment, which helped to drive down air travel demand. Amidst this airline industry downturn, the commercial carriers responded by attempting to raise revenues in various ways. When increased fares met with only modest success, airlines resorted to surcharges and new fees to generate additional income. These fees included fuel charges, extra costs for checking baggage, charges for onboard food/snacks, and financial penalties for ticket changes.

Airlines also have reacted to the economic downturn by slashing seat capacity and eliminating service on unprofitable routes. By one estimate, approximately 500 airliners were grounded by the end of 2008.

The Twin Cities commercial airport – Minneapolis-St. Paul International (MSP) – has weathered these trends and faces additional challenges and uncertainties. The airport's main airline, Northwest Airlines, underwent a period of reorganization when it entered bankruptcy in September 2005 and emerged in May 2007. The ongoing merger with Delta Air Lines raises questions of what role the airport will play in the merged airlines network. Further complicating the situation at MSP is the entry of low-cost carrier Southwest Airlines in March 2009. These events make anticipating future commercial activity at MSP difficult.

General aviation has also experienced challenges over the years. As with commercial aviation, high fuel prices have contributed to the overall decline in general aviation activity. Even before the downturn in the economy, the general aviation airports of the Twin Cities region were experiencing a decline in general aviation activity. From 2000 to 2007, general aviation operations dropped by 46 percent at the six general aviation airports owned by the Metropolitan Airports Commission.

Forecasts

Starting with the aviation trends identified previously, forecasts of aviation activity were developed for the regional airport system and collar county airports. The forecasts were broken down into general aviation and commercial aviation sectors. General aviation in the metropolitan area is expected to continue its downward trend for the near term before reversing and recovering to current activity levels by the end of the 20-year forecast period. Aviation activity in the outlying collar county airports is expected to be more robust, but still modest. General aviation activity in the metropolitan region is anticipated to show average annual growth between 0.1 percent and 0.2 percent. **Exhibit ES-2** shows the forecast growth in based aircraft and operations at the 11 system airports.

Exhibit ES-2: Summary Table of Based Aircraft and Operations Forecasts at the 11 System Airports

	2007	2015	2020	2030	Average Annual Growth
Total Based Aircraft	1,913	2,046	2,007	1,993	0.2%
Total Operations	641,550	612,680	639,540	663,940	0.1%

Sources: Metropolitan Airport Commission and KRAMER aerotek, inc.

Because of the significant number of unknowns surrounding the future of MSP (e.g., fuel costs, merger between Delta and Northwest, and future expansion by Southwest), it was deemed prudent to develop a number of different scenarios that could address some of these factors. As a result, four scenarios were developed in addition to a base forecast for both passenger forecasts and aircraft operations at MSP. Based on these various scenarios, MSP is expected to experience anywhere from 1.7 percent to 3.3 percent growth in enplaned passengers, as shown in **Exhibit ES-3**.

Exhibit ES-3: Forecast of Enplaned Passengers at MSP by Scenario

Scenarios	2008	2015	2020	2030	Average Annual Growth 2008-2030
Base Case	25,936,600	31,229,600	35,988,600	47,896,300	2.8%
High Fuel Cost	25,936,600	27,860,500	30,814,000	37,955,800	1.7%
Low Fuel Cost	25,936,600	32,555,500	38,056,700	52,502,900	3.3%
High Economic Growth	25,936,600	33,335,700	38,570,400	51,877,000	3.2%
Declining Connections	25,936,600	29,946,800	33,634,500	42,755,100	2.3%

Source: Metropolitan Airport Commission, interpreted by KRAMER aerotek, inc.

Aircraft operations, under the same scenarios, are expected to undergo slightly less growth. **Exhibit ES-4** shows that aircraft operations at MSP are expected to grow between 0.6 percent and 2.0 percent annually, depending upon various factors beyond the control of the airport.

Exhibit ES-4: Forecast Aircraft Operations by Scenario

Scenarios	2008	2015	2020	2030	Average Annual Growth 2008-2030
Base Case	450,000	507,700	546,900	630,800	1.5%
High Fuel Cost	450,000	449,400	469,500	514,000	0.6%
Low Fuel Cost	450,000	534,000	583,900	697,800	2.0%
High Economic Growth	450,000	546,600	591,600	688,400	2.0%
Declining Connections	450,000	484,700	512,000	571,900	1.1%

Source: Metropolitan Airport Commission, interpreted by KRAMER aerotek, inc.

Peer System Comparisons

To put the Twin Cities Regional Aviation System in perspective, it was compared to a number of peer airport systems. These peer airport systems were selected on the basis of having similar populations, and a single major commercial airport serving as a hub for an airline. It was determined that airports systems in Atlanta, Charlotte, Denver, Detroit, Philadelphia, and Pittsburgh were suitable peers. In comparing to these airports systems, it was found that:

- The Minneapolis system has an above average number of reliever airports in its system and higher levels of aircraft operations.
- The Minneapolis system of airports also has a large number of based aircraft, and based general aviation jets by comparison.

Given the merger between Delta and Northwest, other airline hubs that have experienced consolidation were examined in an attempt to draw parallels. It was noted that since 2000, American downsized its hub at St. Louis; US Airways closed its Pittsburgh hub, Delta closed its Dallas hub and has cutback Cincinnati. Following the Delta-Northwest merger, the combined airline will have a network that includes seven domestic hubs and nine regional carrier subsidiaries or code-sharing partnerships. The likelihood of further consolidation and capacity cuts are high, with MSP likely to experience cutbacks to some degree. This is expected to result in declines of passenger service as that is what similar hub reductions have experienced. Between 2000 and 2008, St. Louis enplanements dropped 55 percent; Pittsburgh's fell 50 percent; and Cincinnati's declined 25 percent.

Offsetting these hub reduction risks at MSP is possibility of service expansion by Southwest Airlines. Looking at other airports where Southwest has initiated service shows that the airline typically enters

new markets aggressively and deliberately. Denver service started in 2006 with 20 daily departures to five cities and continued in 2009 with 111 daily departures to 32 cities. Likewise, Philadelphia service began in 2004 with 14 daily departures and immediately expanded to 28 departures to 13 cities. Service build-out occurred within four years and today Southwest offers 64 daily departures to 19 cities. Should the economy improve sufficiently, it is possible that Southwest could expand to as many as 40 daily departures at MSP.

Airport Classification

An integral part of system planning is the periodic review of the roles each airport serves in the system. By identifying the role an airport plays in a system, its performance in terms of the facility and services it provides can be benchmarked against a set of defined facility and service criteria. The airports in the Twin Cities Regional Aviation System have roles assigned by various classification systems, each tailored to the specific needs of the particular system, whether it is a national, state, or regional system.

In an effort to improve upon these classification systems, a system based upon the classification method used in the last system plan was proposed. Legislative restrictions effectively limit runway lengths on most airports in the Twin Cities region, thereby constraining the roles airports in the Twin Cities region can serve. The proposed classification method, which was ultimately discarded, took into account these legislative restrictions while attempting to provide some additional differentiation over the classification method used in the last system plan.

For each airport role, a set of facility and service objectives were developed, based upon the types of aviation users the airport predominately served. These recommended objectives covered the following airside facilities, landside facilities, and services:

- Airport Reference Code
- Primary Runway Length
- Taxiway Type
- Instrument Approach
- Runway Lighting
- Approach Lighting Systems
- Visual Glide Slope Indicators
- Other Visual Aids
- Air Traffic Control Tower
- Weather Reporting
- Paved Aircraft Parking
- FBO
- Auto Parking
- Fuel
- Ground Transportation
- Food Services
- Phone
- Snow Removal

System Performance Evaluation

Using the recommended objectives identified above, each airport was evaluated based on the proposed role assigned to it under the proposed classification system. Not surprisingly, the system airports met most of their objectives. The Twin Cities Regional Aviation System is a mature and well developed airport system, with little in the way of unmet facility and service needs. This is not to say that the system does not need improvements and maintenance. There are numerous projects identified by

individual airport planning documents, as well as maintenance of current infrastructure, needed by these airports. However, from a system perspective, this study identified very few objectives that the system airports were not currently meeting. Out of all objectives, the system airport met 98 percent.

In addition to evaluating facility and service objectives, this study also examined the geographic coverage provided by the system airports.

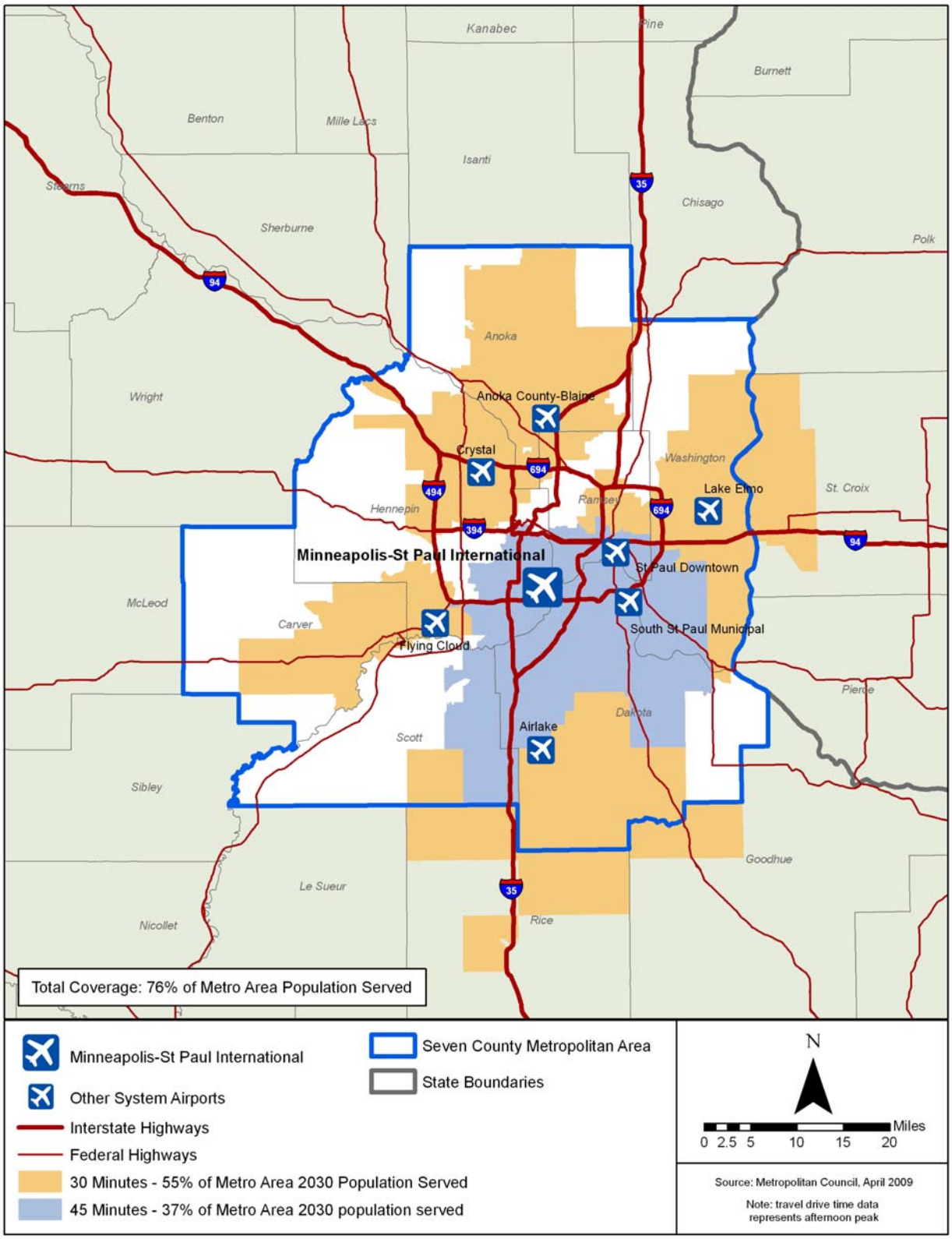
Ground Travel and Airport Service Area Evaluation

An airport system that serves the largest possible number of citizens and businesses is an important goal. The primary benchmark by which airport accessibility is measured is by their proximity to population centers. This is true not only of the Twin City's commercial service airport, which is important to businesses and individuals for airline travel worldwide, but also of its general aviation airports, which accommodate a far wider set of aviation activities. An analysis of drive times was used to evaluate the extent to which the airport system overall, as well as airports within their proposed roles, provided service to the region's population.

Overall, the system airports provide extensive coverage for the people of the Twin Cities region. Even with increasing traffic congestion, the system airports are expected to provide 30-minute access to 76 percent of the region's projected 3.7 million population in 2030, as shown in **Exhibit ES-5**.

The drive time analysis also examined whether there was still a need for a proposed new general aviation airport to the northwest of downtown Minneapolis, where a lack of service had been identified in previous planning studies. The drive time analysis showed that development of airports outside the Twin Cities Regional Aviation System provided some coverage of areas within the seven county metropolitan area. These outlying airports help to alleviate some of the demand on system airports. This additional capacity provided by collar county airports coupled with greatly reduced demand as compared with forecasts from earlier planning studies, leads to the conclusion that there is no longer a need for a new general aviation airport during the planning period.

Exhibit ES-5: All System Airports Drive Times



System Changes and Improvements

The Twin Cities Regional Aviation System is a well developed aviation system that amply serves the needs of the metropolitan region. The continued protection and maintenance of this system is an important aspect of the Twin Cities transportation infrastructure. This chapter identified a number of recommendations to further enhance the regional aviation system. Those recommendations are:

- Retain the existing regional airport classification system – the benefits of providing greater differentiation among system airports proved to be less advantageous than anticipated. Therefore, use of the existing airport classification system is recommended.
- Fulfill long term comprehensive plan objectives - the recommendations in this analysis are based on a system level examination of the Twin Cities Regional Aviation System. This type of planning is not intended to supplant planning efforts undertaken for individual airports, which take into account additional factors. However, the recommendations found in long term comprehensive plans need to be consistent with system policies and plans.
- Consider eliminating Search Area A from the Plan – when Search Area A was identified more than 20 years ago as a potential new general aviation airport site, forecast activity projected severe capacity shortfalls among the general aviation airports of the system. However, general aviation activity in the metropolitan area has not grown to the levels expected. That fact, coupled with continued urban development and capacity improvements at Buffalo Municipal Airport and other collar county airports, has reduced the need for an airport in the geographic area of Search Area A. Therefore, it is recommended that a new airport located in Search Area A be removed from further consideration for the regional airport system plan.
- Consider changing Forest Lake Airport's role – with no new airports proposed in the 2030 system update, it is important to protect and enhance existing facilities. Forest Lake represents an opportunity to accomplish this goal. The first step involves changing the role of the Forest Lake Airport from a Special Purpose Airport to a Minor Airport classification. As a Minor Airport, additional improvements would be needed to meet the recommended facility and service objectives.
- Install a lighting system at South St. Paul Municipal Airport – as the only Minor Airport in the system without any sort of approach lighting system or runway end identifier lights (REIL), it is recommended that REILs be installed on the runway.
- Examine the feasibility of intermodal connectivity options to system airports – Minneapolis has an extensive network of light rail and bus service. However, with the exception of Minneapolis-St. Paul International, none of these intermodal options serve the system airports. It is recommended that the economic feasibility of establishing intermodal service to the system airports be explored.

System Financing

In order for airports in Metropolitan Council's jurisdiction to meet their facility and service objectives outlined in this study and for the airport system to maintain its performance and function, continued investment in system airports will be needed over the 20-year planning period. Using information from various planning documents, it was estimated that the system airports will need $1.1 billion over the next 20 years to meet their maintenance needs, and local and system planning development objectives. **Exhibit ES-6** summarizes the costs for each airport category.

Exhibit ES-6: Estimated Cost of Recommended Regional System Improvements

Capital Improvement Projects	Major	Intermediate	Minor	Special Purpose	All Airports
Airfield Pavement & Lighting					
Runways	$2,800,000	$0	$13,800,000	$1,400,000	$18,000,000
Taxiways	$11,500,000	$0	$2,592,300	$1,200,000	$15,292,300
Airfield Lighting	$1,800,000	$0	$0	$180,000	$1,980,000
Pavement Maint & Rehab	$12,300,000	$4,800,000	$6,045,000	$0	$23,145,000
Visual/Navigational Aids					
Approach Lighting	$0	$0	$50,000	$50,000	$100,000
NAVAID/Radar	$5,000,000	$0	$0	$218,000	$5,218,000
Automated Weather Reporting	$0	$0	$0	$65,000	$65,000
Facilities					
Terminal Buildings	$725,185,000	$0	$0	$0	$725,185,000
Car Parking	$119,550,000	$0	$0	$0	$119,550,000
Aircraft Storage	$6,780,000	$0	$14,435,000	$250,000	$21,465,000
Aircraft Parking	$0	$0	$720,000	$0	$720,000
Other					
Fuel	$0	$0	$80,000	$0	$80,000
Noise Mitigation	$65,700,000	$0	$0	$0	$65,700,000
Utilities	$8,050,000	$1,300,000	$0	$12,000	$9,362,000
Snow Removal Equipment	$0	$0	$200,000	$0	$200,000
Other Improvements	$98,000,000	$1,800,000	$2,283,700	$1,614,800	$103,698,500
Total Airfield	$28,400,000	$4,800,000	$22,437,300	$2,780,000	$58,417,300
Total Navigational Aids	$5,000,000	$0	$50,000	$333,000	$5,383,000
Total Facilities	$851,515,000	$0	$15,155,000	$250,000	$866,920,000
Total Other	$171,750,000	$3,100,000	$2,563,700	$1,626,800	$179,040,500
Total Costs for Airport System	**$1,056,665,000**	**$7,900,000**	**$40,206,000**	**$4,989,800**	**$1,109,760,800**

Sources: MnDOT and MAC

The money for these projects will come from a variety of sources. Federal Airport Improvement Funds can be expected to provide the majority of funding for eligible projects. Other sources of funding likely include Minnesota state funds, airport revenues, and, in some cases, private funding.

Chapter One - Inventory

This chapter presents an inventory of existing conditions for the 11 airports that are currently part of the Twin Cities Regional Aviation System. Additionally, certain information on 14 public use airports in the Collar Counties is also presented.

The overall system planning process examines the adequacies and deficiencies of the existing airport system. As stated in the *Metropolitan Council 2030 Transportation Policy Plan* (TPP), planning updates are necessary in order to "…remain responsive to changing social and economic conditions, and user needs." This update to the regional aviation system plan was undertaken in two phases. The first phase, conducted in 2008, incorporated a revised air-transportation element into the 2030 TPP. The second phase, which this report documents, consists of a full technical evaluation of the aviation system plan, including updated aviation forecasts, resulting in potential amendments to the 2030 TPP as warranted. The process of inventorying the existing airport system is the first step of this second phase. The information gathered during the inventory process forms the basis for conducting the full technical evaluation of the airport system.

The process used to collect inventory data and present summary inventory data in succinct form will be explained in this chapter. The purpose of the inventory and data collection process is to develop an accurate database representative of a "snap-shot in time" view of the existing system that can be used throughout the study. The information in this chapter was collected in October 2008.

Summary of Existing Airport System

The Twin Cities Regional Aviation System has been defined by the Metropolitan Council in collaboration with aviation organizations in the area. The Metropolitan Council serves as the regional planning agency for the seven counties in the Twin Cities metropolitan region. Those seven counties are Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington. The Minnesota Legislature established the Metropolitan Council in 1967 to coordinate the orderly and economic planning and development within the Twin Cities metropolitan region. Since that time, the legislature has added additional responsibilities of managing and operating the region's largest transit system and its wastewater system.

The mission of the Metropolitan Council is to develop a comprehensive regional planning framework in cooperation with local communities. The Council primarily focuses on aviation systems, wastewater, parks, and transportation with an emphasis on guiding the growth of the metropolitan area in an efficient manner.

The Metropolitan Council consists of 17 members appointed by the governor of Minnesota, subject to confirmation by the State Senate. The chairman serves at large and the other 16 members represent individual districts in the Twin Cities region.

A staff of 3,700 supports the Metropolitan Council in its daily functions, including operating the region's transit and wastewater treatment systems. The Council operates with a $700 million budget, which is

funded primarily through state appropriations and user fees from transit users and wastewater treatment plants. Approximately 10 percent of the budget is supported by property taxes.

There are 11 public use airports within the Council's area of responsibility, listed in **Exhibit 1-1** as the 11 airports of the Twin Cities Regional Aviation System. Seven of those airports are under the direct control of the Metropolitan Airports Commission (MAC).

Exhibit 1-1: List of Study Airports

ID	Airport Name	Associated City	Ownership
Twin Cities Regional Aviation System Airports			
MSP	Minneapolis-St. Paul Intl.	Minneapolis	Public (MAC)
LVN	Airlake	Minneapolis	Public (MAC)
ANE	Anoka County-Blaine	Minneapolis	Public (MAC)
MIC	Crystal	Minneapolis	Public (MAC)
FCM	Flying Cloud	Minneapolis	Public (MAC)
25D	Forest Lake	Forest Lake	Public
21D	Lake Elmo	St. Paul	Public (MAC)
STP	St. Paul Downtown	St. Paul	Public (MAC)
SGS	South St. Paul Municipal	South St. Paul	Public
8Y4	Surfside SPB	Lino Lakes	Private
09Y	Wipline SPB	Inver Grove Heights	Private
Collar County Airports			
CFE	Buffalo Municipal	Buffalo	Public
CBG	Cambridge Municipal	Cambridge	Public
FBL	Faribault Municipal	Faribault	Public
GYL	Glencoe Municipal	Glencoe	Public
OEO	L O Simenstad Municipal	Osceola, WI	Public
12Y	Le Sueur Municipal	Le Sueur	Public
MGG	Maple Lake Municipal	Maple Lake	Public
RNH	New Richmond Regional	New Richmond, WI	Public
PNM	Princeton Municipal	Princeton	Public
RGK	Red Wing Regional	Red Wing	Public
ROS	Rush City Regional	Rush City	Public
STC	St. Cloud Regional	St. Cloud	Public
SYN	Stanton Airfield	Stanton	Private
10D	Winsted Municipal	Winsted	Public

Source: FAA Form 5010, October 2008

The Minnesota legislature created MAC as a public corporation in 1943 to promote and provide for and through aviation services in the Twin Cities region. The governor appoints a chairman and 12 commissioners for four-year terms to the MAC. The mayors of Minneapolis and St. Paul each appoint a commissioner for a four-year term, giving the MAC a total of 15 members. The MAC is funded entirely from the airport revenues and federal grants awarded to the seven airports it operates.

While the MAC is responsible for the operation of these seven airports, the Metropolitan Council is the designated Metropolitan Planning Organization (MPO) for regional planning in the Minneapolis-St. Paul metro area and is responsible for including these airports in its aviation system planning efforts.

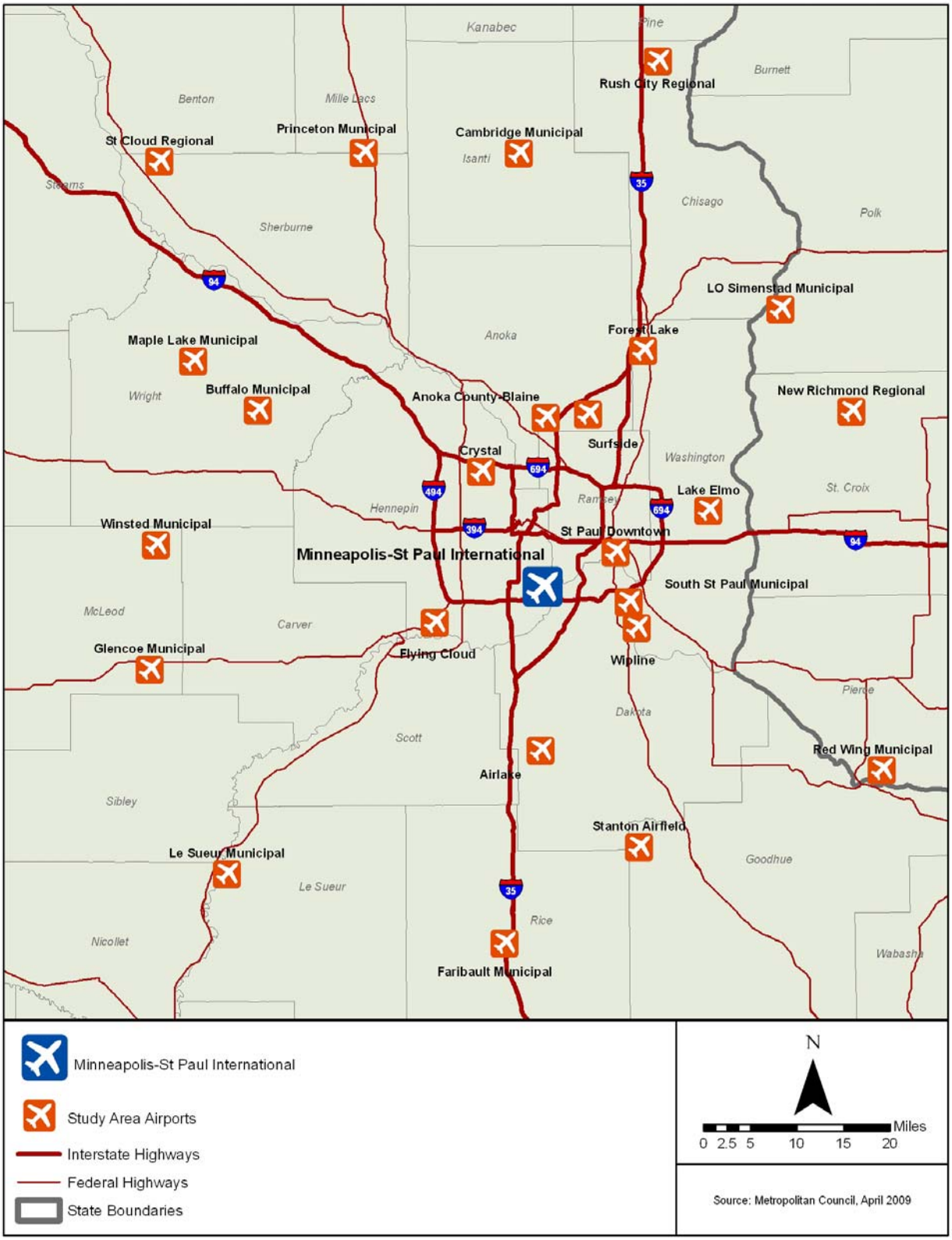
Exhibit 1-1 also lists the 14 airports in the Collar Counties. These airports have an impact on the system airports by offering competing services and facilities, as well as generating aviation activity that makes use of facilities at the regional system airports. A limited inventory and forecasting effort will be made in order to evaluate the effects that these airports have on regional system airports.

Airport Classification

The airports listed in Exhibit 1-1 are depicted geographically in **Exhibit 1-2**. The airports are classified in the categories explained below based on types of activity they accommodate. The specific classification for each airport is listed in **Exhibit 1-3**, found later in this chapter.

- Commercial: Airports that support scheduled commercial airline activity are categorized in Exhibit 1-2 as commercial airports. There are two commercial service airports included in this inventory effort, one in the Twin Cities Regional Aviation System (Minneapolis-St. Paul) and one in the Collar County Region (St. Cloud).
- Reliever: Reliever airports are described by the FAA as typically located in major metropolitan areas that divert general aviation activity from larger commercial service airports. By providing general aviation with an attractive alternative destination, reliever airports minimize delay and congestion at the larger scheduled commercial service airports, and provide safe and efficient general aviation access to larger metropolitan areas. There are seven reliever airports in the inventory.
- General Aviation: Public use airports that are part of the FAA's National Plan of Integrated Airport Systems (NPIAS) but do not support scheduled commercial service airline operations and are not identified as reliever airports are categorized as general aviation airports. There are 10 general aviation airports in the inventory.
- Non-NPIAS: Airports that are not part of the NPIAS and accommodate the needs of general aviation, but do not qualify for FAA funding. There are six Non-NPIAS airports in the inventory, including two seaplane bases and a turf airfield in the Twin Cities Regional Aviation System.

Exhibit 1-2: Airports in the Twin Cities Metropolitan Region



The NPIAS is a FAA plan that identifies airport facilities considered important to the national airport system. Airports included in the NPIAS are eligible for FAA funding for improvement and development of public use facilities. The airports included in the NPIAS are classified in the bulleted categories below, based on the types of activity occurring at the facility, the levels of activity occurring, and the airports role in national and regional aviation systems. NPIAS airports are classified into two major categories:

- Commercial
- General aviation

Within each major category, airports are further classified based on the types and levels of activity occurring at each facility. The NPIAS major categories and subcategories are described below:

- Commercial NPIAS Airport: NPIAS airports that receive scheduled passenger service and enplane more than 2,500 passengers annually. An enplaned passenger is one who boards an aircraft for departure.

    - Primary: Primary commercial service airports are NPIAS airports that receive scheduled commercial passenger service and enplane more than 10,000 passengers annually.
    - Other Commercial Service: Other commercial service airports are NPIAS airports that receive scheduled commercial passenger service and enplane between 2,500 and 10,000 passengers annually.

- General Aviation NPIAS Airport: NPIAS airports that do not receive scheduled passenger service are categorized as general aviation airports. Within the general aviation category, subcategories include reliever airports and general aviation airports.

    - Reliever: Reliever airports are either publicly or privately-owned, high capacity general aviation airports that relieve airport congestion in a metropolitan area. Reliever airports provide the general aviation user with an attractive alternative airport to divert their operations from a larger, more congested, scheduled service airport. Reliever airports must meet the following criteria to fulfill their designation1:

        - Current and forecast activity level of at least 100 based aircraft, or 25,000 annual itinerant operations (non-training flights that arrive/depart).

    In addition, the relieved airport must:

        - Be a commercial service airport that serves an area with a population of at least 250,000 persons or at least 250,000 annual enplaned passengers.

[1] FAA Order 5090.3C

- Either operate at 60 percent of its capacity, at such a level before being relieved by one or more reliever airports or is subject to restrictions that limit activity that would otherwise reach 60 percent of capacity.

o General Aviation: NPIAS airports that do not receive scheduled passenger traffic and do not meet the reliever criteria presented above are classified as general aviation NPIAS airports.

Out of the 11 system airports, eight are included in the NPIAS. All seven MAC-owned airports are in the NPIAS, and are classified as reliever airports, with the exception of Minneapolis International, which is a primary commercial service NPIAS airport. The other NPIAS airport, South St. Paul Municipal, is also classified as a reliever airport.

The three non-NPIAS airports in the system are Forest Lake Airport, and two seaplane bases – Surfside and Wipline.

Inventory Process

A large volume of information regarding the Twin Cities Regional Aviation System Airports exists in various locations. Due to this, an inventory process was developed to gather all of the available information regarding the airports. This process includes information accumulated by Met Council, MAC, the Federal Aviation Administration (FAA), as well as information available from the airports.

A partial list of the sources used includes:

- Metropolitan Council 2030 Transportation Policy Plan
- Metropolitan Council Aviation Advisory Task Force Report
- Airlake Long-Term Comprehensive Plan
- Crystal Long-Term Comprehensive Plan
- Lake Elmo Long-Term Comprehensive Plan
- FAA Terminal Area Forecasts
- FAA 5010 Airport Master Records
- FAA U.S. Terminal Procedures, North Central Volume 1 of 2

Information from these and other related materials were stored to create a database as part of the inventory process. Within the database, tables have been developed to present general categories of data on an airport-by-airport basis. These tables provide the necessary framework for storing, maintaining and analyzing inventory data. In addition, these tables will be used throughout this chapter to summarize airport facility and activity data for system airports.

Airport Inventory Data

Airport inventory data for this analysis has been collected, organized and presented for the following major categories:

- General Airport Information
- Airside Facilities
- Landside Facilities
- Airport Activity Statistics
- Minneapolis Airspace
- Demographic Characteristics of the Twin Cities Metropolitan Region
- Airport Jurisdictional Authority

The inventory data for each category is described below in more detail.

General Airport Information

Basic airport information from the survey is presented in **Exhibit 1-3**. Summary data for each airport is presented in the table for the following categories:

- Airport Name: The official name of each facility is presented.
- Status within the National Plan of Integrated Airport Systems (NPIAS): The classifications of those airports in the NPIAS are presented.
- Minnesota State Aviation System Plan (SASP) Classification: The Minnesota SASP established three airport categories, based upon the size and function of the airport. those three categories are:
    - Key Airports – These airports have paved and lighted primary runways 5,000 feet or longer in length. They are capable of accommodating all single engine aircraft along with larger multi-engine aircraft and most corporate jets.
    - Intermediate Airports – These airports have paved and lighted primary runways that are less than 5,000 feet long. Intermediate airports can accommodate all single engine aircraft, some multi-engine aircraft and most corporate jets.
    - Landing Strips – These airports have turf runways which can accommodate most single engine aircraft and some twin engine aircraft. They may be unusable during wet weather, winter months, and during the spring melt.

The airports owned by the MAC, as well as Forest Lake Airport and South St. Paul Municipal Airport, were not assigned roles in the Minnesota SASP and were instead designated as Metro Area Airports. The other two system airports (the seaplane bases) were not included in the Minnesota SASP. As a result, none of the system airports were assigned a Minnesota SASP classification. However, based on the criteria established in the Minnesota SASP, Minneapolis International, Anoka County-Blaine, and St. Paul

Downtown would all be classified as Key Airports. Forest Lake and the two seaplane bases would qualify as Landing Strips. The other airports would all be classified as Intermediate Airports.

Exhibit 1-3: General Airport Information

Airport Name	NPIAS Status	Minnesota SASP Classification
Twin Cities Regional Aviation System Airports		
Minneapolis-St. Paul Intl.	Commercial Service Primary	Metro Area Airport
Airlake	Reliever	Metro Area Airport
Anoka County-Blaine	Reliever	Metro Area Airport
Crystal	Reliever	Metro Area Airport
Flying Cloud	Reliever	Metro Area Airport
Forest Lake	Not in NPIAS	Metro Area Airport
Lake Elmo	Reliever	Metro Area Airport
St. Paul Downtown	Reliever	Metro Area Airport
South St. Paul Municipal	Reliever	Metro Area Airport
Surfside SPB	Not in NPIAS	Not Part of SASP
Wipline SPB	Not in NPIAS	Not Part of SASP
Collar County Airports		
Buffalo Municipal	General Aviation	Intermediate
Cambridge Municipal	General Aviation	Intermediate
Faribault Municipal	General Aviation	Intermediate
Glencoe Municipal	Not in NPIAS	Intermediate
L O Simenstad Municipal	General Aviation	Wisconsin SASP
Le Sueur Municipal	General Aviation	Intermediate
Maple Lake Municipal	Not in NPIAS	Intermediate
New Richmond Regional	General Aviation	Wisconsin SASP
Princeton Municipal	General Aviation	Intermediate
Red Wing Regional	General Aviation	Key
Rush City Regional	General Aviation	Intermediate
St. Cloud Regional	Commercial Service Primary	Key
Stanton Airfield	Not in NPIAS	Landing Strip
Winsted Municipal	General Aviation	Landing Strip

Source: Wilbur Smith Associates, October 2008

Airside Facilities

Airside facilities at an airport consist of runways, taxiways, their associated lighting facilities, navaids, and the navigation, communication and weather reporting infrastructure needed to facilitate aircraft operations at airports. The primary component of an airport and the most important airside facility is an airport's primary runway. Runways support the transition of aircraft from ground to air, and are often considered the lifeline of an airport's operation. Taxiways serve as a path for aircraft to move from one part of the airport to another. If a taxiway does not exist, the runway must fulfill the taxiway's purpose.

Exhibit 1-3 contains summary information regarding the runway and taxiway facilities at the system and collar county airports. The following data is provided in **Exhibit 1-4**:

- Primary Runway Designation: The identification of the airport's primary runway is presented.
- Primary Runway Surface: The material of which the airport's primary runway is constructed.
- Primary Runway Length: The length of the airport's primary runway is presented.
- Primary Runway Width: The width of the airport's primary runway is presented
- Primary Runway Lighting: According to intensity, the type of lighting that exists on the primary runway is presented. The types of runway lighting identified in the table include Low Intensity Runway Lighting (LIRL), Medium Intensity Runway Lighting (MIRL) and High Intensity Runway Lighting (HIRL).
- Taxiway System: The presence or absence of a taxiway for the primary runway is noted. A full-length taxiway spans the entire length of the primary runway. A partial-length taxiway spans less than the full length of the primary runway. Runways without a taxiway system may have areas at one or both ends of the runway called "turnarounds," where aircraft may reverse direction and perform other operations off the runway.

With the exception of the two seaplane bases, all of the system airports have some type of runway lighting system. Also, all of the airports, except the seaplane bases and Forest Lake, have full parallel taxiways. Forest Lake, the only turf runway in the system, doesn't have any type of taxiway.

Exhibit 1-4: Primary Runway Information

Airport Name	Primary Runway Designation	Surface	Length	Width	Lighting	Taxiway
Twin Cities Regional Aviation System Airports						
Minneapolis-St. Paul Intl.	4/22	Concrete	11,006	150	HIRL	Full
Airlake	12/30	Asphalt	4,098	75	HIRL	Full
Anoka County-Blaine	9/27	Asphalt	5,000	100	HIRL	Full
Crystal	14L/32R	Asphalt	3,263	75	MIRL	Full
Flying Cloud	10R/28L	Asphalt	3,909	75	HIRL	Full
Forest Lake	13/31	Turf	2,650	150	LIRL	None
Lake Elmo	04/22	Asphalt	2,850	75	MIRL	Full
St. Paul Downtown	14/32	Asphalt	6,491	150	HIRL	Full
South St. Paul Municipal	16/34	Asphalt	4,001	100	MIRL	Full
Surfside SPB	NE/SW	Water	6,500	1,000	N/A	N/A
Wipline SPB	17/35	Water	8,000	500	N/A	N/A
Collar County Airports						
Buffalo Municipal	17/35	Asphalt	2,600	60	LIRL	Partial
Cambridge Municipal	16/34	Asphalt	4,000	75	MIRL	Partial
Faribault Municipal	12/30	Asphalt	4,254	72	MIRL	Partial
Glencoe Municipal	13/31	Asphalt	3,300	75	MIRL	None
L O Simenstad Municipal	10/28	Asphalt	5,005	75	MIRL	None
Le Sueur Municipal	13/31	Asphalt	3,005	75	MIRL	Partial
Maple Lake Municipal	10/28	Asphalt	2,796	60	MIRL	Full
New Richmond Regional	14/32	Asphalt	5,503	75	MIRL	Full
Princeton Municipal	15/33	Asphalt	3,900	75	MIRL	Full
Red Wing Regional	09/27	Asphalt	5,010	100	HIRL	Full
Rush City Regional	16/34	Asphalt	4,400	75	MIRL	None
St. Cloud Regional	13/31	Concrete	7,000	150	HIRL	Full
Stanton Airfield	18/36	Turf	2,550	200	NONE	None
Winsted Municipal	09/27	Turf	3,248	200	LIRL	None

Source: FAA Form 5010, October 2008

In addition to the runways and taxiways, airports rely on navigational guidance to assist pilots in finding and flying their aircraft to a safe landing on the airport. Exhibit 1-4 lists the navigational guidance facilities each of the system and collar county airports has. The following data is provided in **Exhibit 1-5**:

- REIL: The presence or absence of runway end identifier lights (REIL) on the runway end with the best instrument approach is indicated here. REILs are a pair of synchronized, flashing lights positioned on each side of the runway threshold intended to provide rapid and positive identification of the approach end of a runway.
- Visual Glideslope: The presence of a visual glideslope on the runway with the best instrument approach is indicated. Visual glideslope equipment provides pilots with a visual indication of their vertical position along a predetermined approach path to the runway. This equipment can

take the form of a precision approach path indicator (PAPI) or visual approach slope indicator (VASI).

- Instrument Approach Type: The instrument approach procedure is listed here, if applicable. Airports without an instrument approach procedure are listed as visual. The types of instrument approaches are global positioning system (GPS), instrument landing system (ILS), localizer (LOC), non-directional beacon (NDB), area navigation (GPS) – lateral navigation (RNAV (GPS) – LNAV) and VHF omnidirectional range (VOR).
- Instrument Approach Ceiling: The minimum cloud ceiling for the best instrument approach at the airport is listed. This is the altitude (in feet) above the airport that a cloud ceiling can exist and aircraft flying the instrument approach can reasonably expect to land at the airport.
- Instrument Approach Visibility: The minimum flight visibility for the best instrument approach at the airport is listed. This is the flight visibility (in statute miles) that an aircraft flying an instrument approach needs in order to reasonably expect to land at the airport.
- Instrument Approach Lighting: The approach lighting system on the airport's best instrument approach is listed here. The types of approach lighting are approach light system with sequenced flashing lights (ALSF-2), and medium intensity approach light system with runway alignment indicator lights (MALSR).

All of the system airports except the seaplane bases and the turf strip airport (Forest Lake) have instrument approach procedures. Half of those airports have a precision ILS approach, the best instrument approach currently available. However, two of those airports – Airlake and St. Paul Downtown – have minimums that are above the typical 200 and ½ associated with an ILS. According to the Long-Term Comprehensive Plan for Airlake, in order to lower Airlake's minimums from 1 mile visibility to ½ mile visibility, the runway would need to be widened from 75 feet to 100 feet, and a taxiway relocated.

The other airports have some type of nonprecision approach. None of these nonprecision approach airports have any type of approach lighting system, which may hinder their approach minimums to some degree.

Exhibit 1-5: Navigational Guidance Information

			Instrument Approach			
Airport Name	REIL	Visual Glideslope	Type	Ceiling	Visibility	Lighting
Twin Cities Regional Aviation System Airports						
Minneapolis-St. Paul Intl.[1]	No	PAPI	ILS	200	1/2	ALSF-2
Airlake	No	PAPI	ILS	250	1	MALSR
Anoka County-Blaine	No	PAPI	ILS	200	1/2	MALSR
Crystal	Yes	VASI	GPS	432	1	None
Flying Cloud	No	VASI	ILS	200	1/2	MALSR
Forest Lake	No	None	Visual	N/A	N/A	None
Lake Elmo	Yes	PAPI	RNAV (GPS) - LNAV	554	1	None
St. Paul Downtown	No	PAPI	ILS	250	3/4	MALSR
South St. Paul Municipal	No	PAPI	LOC	481	1	None
Surfside SPB	No	None	Visual	N/A	N/A	None
Wipline SPB	No	None	Visual	N/A	N/A	None
Collar County Airports						
Buffalo Municipal	No	None	VOR or GPS-B	593	1	None
Cambridge Municipal	Yes	PAPI	NDB or GPS	535	1	None
Faribault Municipal	Yes	VASI	GPS	425	1	None
Glencoe Municipal	No	None	NDB	569	1	None
L O Simenstad Municipal	Yes	PAPI	RNAV(GPS) - LNAV	574	1	None
Le Sueur Municipal	No	VASI	Visual	N/A	N/A	None
Maple Lake Municipal	No	None	GPS	432	1	None
New Richmond Regional	Yes	PAPI	RNAV(GPS) - LNAV	424	1	None
Princeton Municipal	Yes	PAPI	RNAV(GPS) - LNAV	401	1	None
Red Wing Regional	No	PAPI	ILS	200	1/2	MALSR
Rush City Regional	Yes	PAPI	GPS	400	1	None
St. Cloud Regional	No	PAPI	ILS	200	1/2	MALSR
Stanton Airfield	No	None	Visual	N/A	N/A	None
Winsted Municipal	No	None	Visual	N/A	N/A	None

[1] Specially certified aircrew and aircraft are allowed to use minimums as low as zero ceiling and zero visibility.

Source: FAA U.S. Terminal Procedures, North Central Volume 1 of 2, October 2008

Landside Facilities

Landside facilities include terminal buildings, other airport buildings, fuel farms, hangars and T-hangars, aprons, and parking facilities. Data regarding the landside facilities at each system airport was collected and is summarized in Exhibit 1-6. Landside facility data provides information related to the types of facilities available to aviation users at each of the airports. An explanation of each of those facilities follows.

- Hangar Storage: This indicates whether the airport has aircraft storage facilities, either in the form of T-hangars, conventional hangars, or both.

- Terminal: This indicates whether the airport has a building that typically houses facilities catering to GA pilots and passengers such as pilot rest areas, restrooms, flight planning areas, conference rooms, food service, and telephone and internet facilities.
- Fuel - AvGas: This indicates the availability of AvGas, which is used by piston-powered aircraft. Piston powered aircraft are generally small single or twin-engine aircraft that usually have no more than six seats.
- Fuel – Jet A: This indicates the availability of Jet-A fuel, which is used in turbine-powered aircraft. Turbine powered aircraft include both jet aircraft and turboprop aircraft, both of which tend to be multi-engine business class aircraft, although some small single engine jet and turboprop aircraft are in service.
- Fuel – MoGas: This indicates the availability of MoGas, which is generally used in piston-powered aircraft. The engines in these aircraft are usually either automotive engines that have been converted to aviation use, or they are aviation engines that have been converted to use gasoline since it is typically cheaper than AvGas.

Exhibit 1-6: Landside Facilities Inventory

Airport Name			Fuel		
	Hangar Storage	Terminal	AvGas	Jet-A	MoGas
Twin Cities Regional Aviation System Airports					
Minneapolis-St. Paul Intl.	Yes	Yes	Yes	Yes	No
Airlake	Yes	Yes	Yes	Yes	No
Anoka County-Blaine	Yes	Yes	Yes	Yes	No
Crystal	Yes	Yes	Yes	Yes	No
Flying Cloud	Yes	Yes	Yes	Yes	No
Forest Lake	Yes	Yes	Yes	No	No
Lake Elmo	Yes	Yes	Yes	No	No
St. Paul Downtown	Yes	Yes	Yes	Yes	No
South St. Paul Municipal	Yes	Yes	Yes	Yes	Yes
Surfside SPB	No	Yes	Yes	No	No
Wipline SPB	No	Yes	Yes	Yes	No

Source: FAA Form 5010, Long-Term Comprehensive Plans, October 2008

It is not surprising that all of the system airports, with the exception of the two seaplane bases, provide aircraft hangar storage. All of them also have a terminal building.

Fuel availability is extensive at system airports. All 11 system airports provide AvGas. All but three of the system airports provide Jet-A. However, only one airport, South St. Paul Municipal offers MoGas. This is not surprising since demand among aviation fuel users for MoGas is typically the lowest of all the fuels.

Airport Activity Statistics

Airport activity can be critical in determining an airport's role within the system. Aviation activity can also highlight which airports may need expanded facilities to meet existing or increasing future demand. Also important is the type of aircraft that uses the airport. This helps to classify the airport's role in comparison to other airports in the system.

Based aircraft are a measure used to determine an airport's role and significance within the system. An aircraft is known to be based at an airport if it is stored at that airport for more than six months out of the year. This is essentially a count of all the aircraft known to be stored at an airport by local users.

The number of aircraft operations at an airport is another useful indicator of the role the airport plays in the system. An aircraft operation is either a take off or a landing of an aircraft, so an aircraft performing both a landing and a take off counts as two operations.

Operations at general aviation airports are extremely difficult to account for accurately. At most general aviation airports, there is no means of tabulating operations. Even at airports with air traffic control towers, operations counts are only maintained during the hours that the tower is operating. Outside of those hours, operations are estimated. Therefore, the best available operations data is often estimates provided by airport management or the airport FBOs.

Exhibit 1-7 provides information regarding the most recent general aviation activity levels estimated at each airport. These based aircraft and operation estimates came from a variety of sources, including recent MAC-approved data for the MAC owned airports, and FAA 5010 data.

The system reliever airports all have large numbers of based aircraft, which is not surprising since one of their purposes is to provide facilities for aircraft so they do not overwhelm the resources of the commercial airport, Minneapolis International. The large number of based aircraft at Minneapolis International is largely the result of its commercial airline operations, although there are also a number of military aircraft based on the airport.

General aviation operations at system airports ranged from a low of 130 annual operations (Wipline Seaplane Base) to a high of more than 117,000 (St. Paul Downtown). As expected, general aviation operations at reliever airports generally exceeded the general aviation operations taking place at Minneapolis International.

Exhibit 1-7: Based Aircraft Inventory

Airport Name	Based Aircraft	General Aviation Operations
Twin Cities Regional Aviation System Airports		
Minneapolis-St. Paul Intl.	134	46,000
Airlake	175	41,000
Anoka County-Blaine	459	81,000
Crystal	251	53,000
Flying Cloud	450	117,000
Forest Lake	26	8,000
Lake Elmo	227	39,000
St. Paul Downtown	124	118,000
South St. Paul Municipal	237	51,000
Surfside SPB	45	4,000
Wipline SPB	5	100
Collar County Airports		
Buffalo Municipal	51	22,000
Cambridge Municipal	42	17,000
Faribault Municipal	64	18,000
Glencoe Municipal	22	11,000
L O Simenstad Municipal	73	8,000
Le Sueur Municipal	43	2,000
Maple Lake Municipal	48	20,000
New Richmond Regional	163	44,000
Princeton Municipal	31	13,000
Red Wing Regional	52	13,000
Rush City Regional	51	8,000
St. Cloud Regional	105	66,000
Stanton Airfield	47	15,000
Winsted Municipal	44	14,000

Source: Metropolitan Airports Commission 2007 Annual Report to the Legislature and FAA 5010 Form, October 2008

Minneapolis Airspace

The airspace in the Twin cities region is dominated by the controlled airspace over Minneapolis-St. Paul International Airport. In order to explain how this airspace affects all airports in the region, it is first necessary to explain how and why airspace is given certain designations.

Airspace Overview

The primary purpose of airspace designations is to prevent mid-air collisions. This is accomplished by establishing rules for keeping aircraft separated that apply in each airspace designation. In general,

aircraft operate under one of two sets of rules – visual flight rules (VFR) or instrument flight rules (IFR) and each set of rules uses a different methodology to separate aircraft.

Under VFR, pilots rely on the "see-and-avoid" methodology to prevent mid-air collisions. Under this methodology, aviators are expected to maintain a visual lookout for other aircraft and alter course accordingly to avoid collisions and near misses. Obviously, this methodology requires adequate visibility and cloud clearance in order to function reliably since it is quite difficult to avoid something you are unable to see. Different classes of airspace require different visibility and cloud ceiling requirements in order to allow VFR flights. Generally, as airspace becomes more crowded, visibility and cloud ceiling requirements increase. Also, as aircraft speeds increase, the visibility and cloud ceiling requirements increase. In both cases, the idea is to give crews more time and opportunity to see and avoid other aircraft. Additionally, more complex airspace requires more equipment, more communication, and higher pilot qualifications.

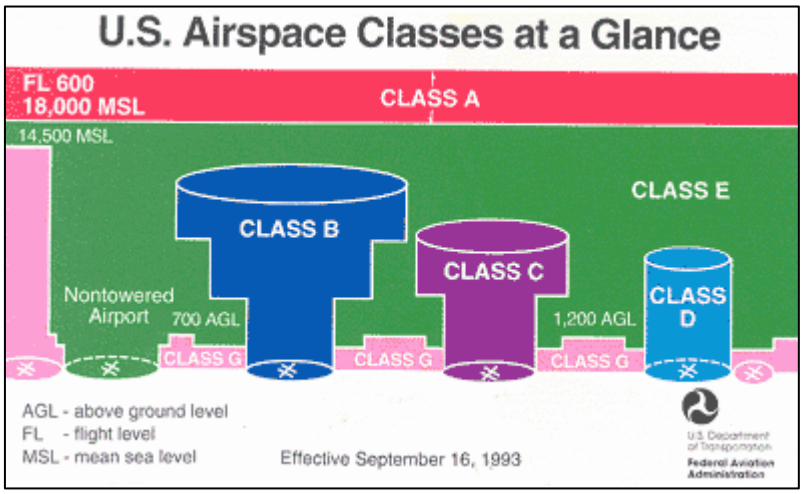
Under IFR, there are no visibility and cloud ceiling limits as there are under VFR. Mid-air collisions are prevented by air traffic control ensuring adequate separation between IFR flights.

When conditions allow IFR and VFR flights to mix, the "see-and-avoid" methodology is still required of both IFR and VFR flights to keep IFR and VFR aircraft separated in nearly all cases.

The FAA ensures that the see-and-avoid concept works by designating different classes of airspace, each of which has its own requirements. The airspace classes are designated A, B, C, D, E, and G. In general, air traffic controllers have the greatest degree of control over Class A airspace, and have progressively less control of each class of airspace down to Class G. Conversely, VFR flights have the least freedom in Class A airspace (where they aren't allowed to operate). VFR flight freedoms increase through each class of airspace down to class G, where they have the most freedom to operate from air traffic controllers, which is one of the advantages of VFR flight. However, with this freedom comes the responsibility for maintaining separation from all other aircraft and ensuring the necessary requirements are met prior to entering certain classes of airspace.

Exhibit 1-8 depicts a graphic representation of what each airspace class typically looks like and where it is used. Class A airspace consists of all airspace from 18,000 feet MSL to 60,000 feet MSL. All aircraft in Class A

Exhibit 1-8



Source: FAA

airspace must be on IFR flight plans, so all aircraft are separated by air traffic control. Class B airspace exists around the busiest airports in the country. Less busy airports have class C airspace around them. The least busy towered airports have class D airspace. Non-towered airports generally have Class E airspace, although their proximity to other airports may result in other airspace above them. In areas with low traffic, the least restrictive airspace, Class G, is used.

Exhibit 1-9 summarizes some of the requirements for each class of airspace. As stated earlier, air traffic control exercises tighter controls over higher airspace, as shown by the need to obtain a clearance, or permission, prior to entering Class A or B airspace.

Note that air traffic control provides separation for IFR traffic from VFR traffic in Class B and C airspace. In order to do this, all aircraft must be able to communicate with air traffic control. This communication requirement is also present in Class D airspace. It is important to note that it is possible for aircraft without radios to operate in Class B, C, and D airspace, if prior arrangements are made with the air traffic control facility.

In addition to communication requirements, aircraft are required to have a transponder under certain conditions. This device enhances the radar image of the aircraft and can provide ATC with the aircraft's altitude.

Exhibit 1-9: Airspace Requirements

Airspace Classes	Communications	Entry Requirements	Separation
A	Required	ATC clearance	All
B	Required	ATC clearance	All
C	Required	Two-way communications prior to entry	VFR/IFR
D	Required	Two-way communication prior to entry	Runway operations
E	Not required for VFR	None for VFR	None for VFR
G	Not required	None	None

Source: FAA

Metropolitan Area Airspace

Exhibit 1-10 depicts the current airspace around MSP and the surrounding region. MSP is dominated by the Class B airspace centered over the airport. Its purpose is to provide air traffic controllers with sufficient airspace to ensure proper separation for commercial airliners serving MSP, as well as other IFR traffic using the numerous airports in the area.

As with most Class B airspace, it is shaped like an inverted wedding cake over the primary airport. The ceiling of the Class B airspace extends up to 10,000 feet above mean sea level (MSL). Within 6 nautical miles of MSP, the Class B extends down to the surface. From 6 to 8.5 nautical miles, the base of the Class B is 2,300 feet MSL. From 8.5 to 12 nautical miles, the base is 3,000 feet MSL. And from 12 to 20 nautical miles, the base is 4,000 feet MSL. Beyond 20 nautical miles, additional chunks of airspace are carved out

for inclusion in the Class B airspace, including a corridor with a 4,000-foot floor that extends to the northwest and southeast an additional 10 nautical miles.

Class D airspace exists around the four towered airports – Flying Cloud (FCM), Crystal (MIC), Anoka Co.-Blaine (ANE), and St. Paul Downtown (STP). The boundaries of the Class D are depicted with a white circle. The Class D for STP extends from the surface to 3,200 feet MSL. For the other three, the Class D extends up to 3,400 feet MSL.

Exhibit 1-10: Current MSP Airspace

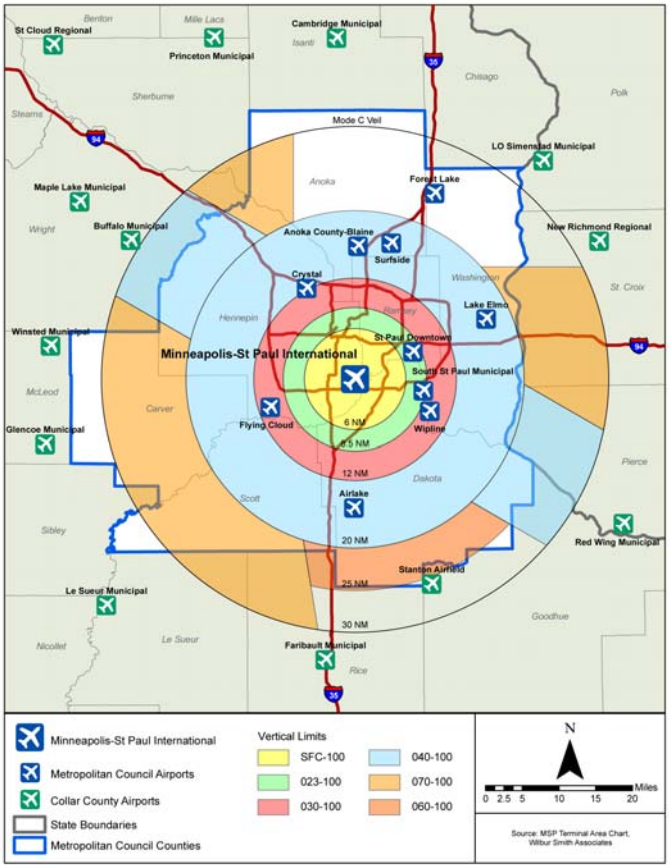


Exhibit 1-10 also depicts the 30-nautical mile mode C veil surrounding MSP, as shown by the thin black circle. Aircraft are generally required to have and operate a mode C transponder, which enhances the aircraft's radar signature and indicates its altitude, when operating within this ring.

Outside of the Class B and D airspace, most of the airspace around MSP is Class E. Within 20 nautical miles of MSP, Class E airspace extends from the bottom of the Class B airspace to 700 feet above ground level. Beyond 20 nautical miles, Class E airspace generally stops at 1,200 feet above ground level. Class G airspace exists under Class E airspace.

Demographic Characteristics of the Twin Cities Metropolitan Region

The area encompassing the system airports is comprised of seven counties. The Metropolitan Council develops forecasts for these seven counties for various demographic parameters. This section will discuss the growth the Metropolitan Council is expecting in the seven system counties.

Exhibit 1-11 shows the population of the seven counties for 2000 and the population projected by the Metropolitan Council for 2010.

Exhibit 1-11: Projected Population Trends in the Twin Cities Metropolitan Region

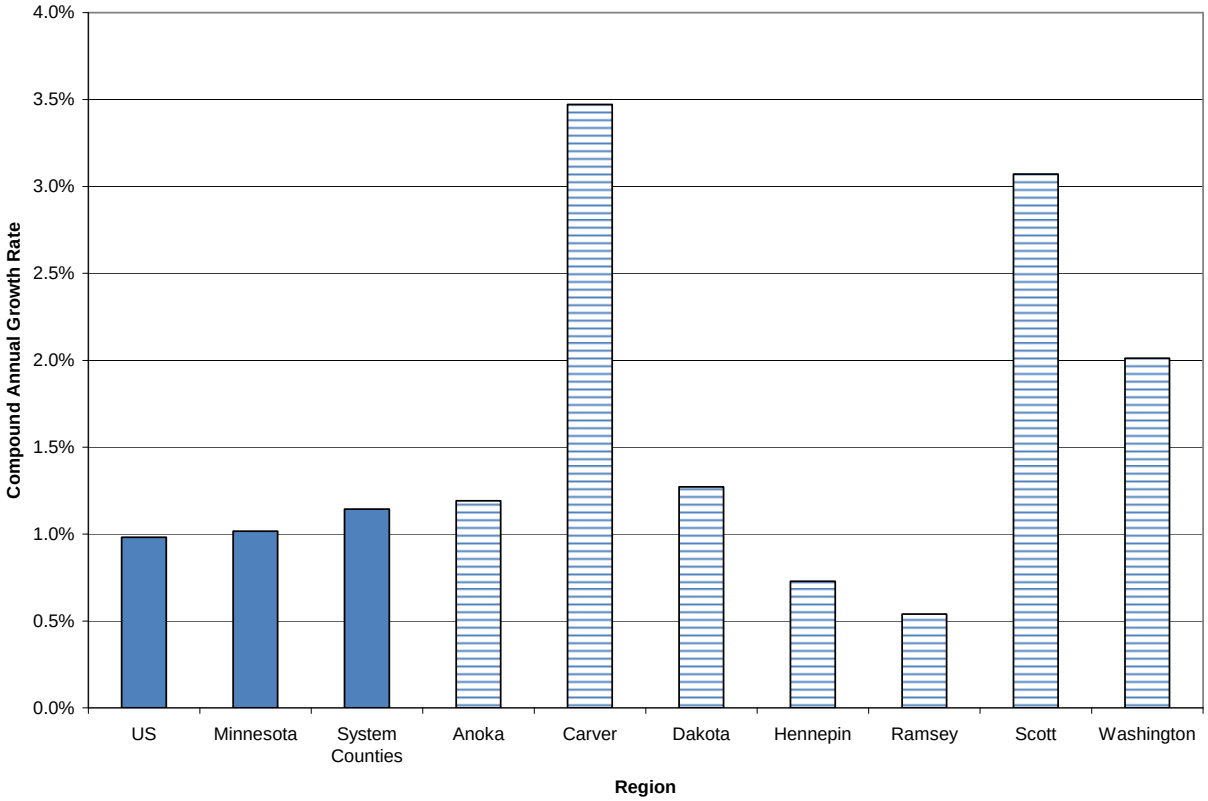
County	2000	2010	2020	2030	Change 2000 to 2030
Anoka	298,084	362,170	407,710	425,260	127,176
Carver	70,205	110,740	163,830	195,400	125,195
Dakota	355,904	429,160	488,750	520,010	164,106
Hennepin	1,116,206	1,217,330	1,312,430	1,387,900	271,694
Ramsey	511,035	547,700	571,260	600,500	89,465
Scott	89,498	146,340	186,800	221,770	132,272
Washington	201,130	258,542	316,083	365,590	164,460
Total Population	**2,642,062**	**3,071,982**	**3,446,863**	**3,716,430**	**1,074,368**

Source: Metropolitan Council, October 2008

The counties that are home to the Twin Cities bracket the range of population growth expected in the region. Hennepin County, which is where Minneapolis is located, is expected to have the largest increase in population, with an increase of more than 270,000 people by 2030. Ramsey County, which is where St. Paul is located, is expected to have the smallest increase in population, with an increase of approximately 89,000 people. The other five counties are projected to increase their populations by amounts in between those of Hennepin and Ramsey counties.

Exhibit 1-12 compares the average growth rates of the counties in the Twin Cities Metropolitan Region with the average growth rates of the populations of Minnesota and the United States. The average growth rate for all seven counties is also depicted. As can be seen, the population growth of the system counties exceeds the projected growth rates of both the U.S. and Minnesota. Among the individual counties, the lowest growth rates are found in the most populous counties – Hennepin and Ramsey. While these growth rates are lower than the national average, they are still positive. In a similar manner, the highest growth rates are found in the smallest counties – Carver and Scott. Both of these counties are located in the southwest portion of the study region.

Exhibit 1-12: Average Population Growth Rates, 2000 to 2030



According to forecasts by the Metropolitan Council, the region is expected to increase its employment from 2000 to 2030 by more than 542,000 workers, as shown in **Exhibit 1-13**. The largest increases are expected to occur in the most populous counties. Hennepin County is expected to have the largest increase, with nearly 228,000 new jobs added by 2030 and accounting for more than 42 percent of the expected increase in employment in the region. Ramsey County is forecast to experience the second largest increase, boosting the region's employment numbers by nearly 97,000 workers.

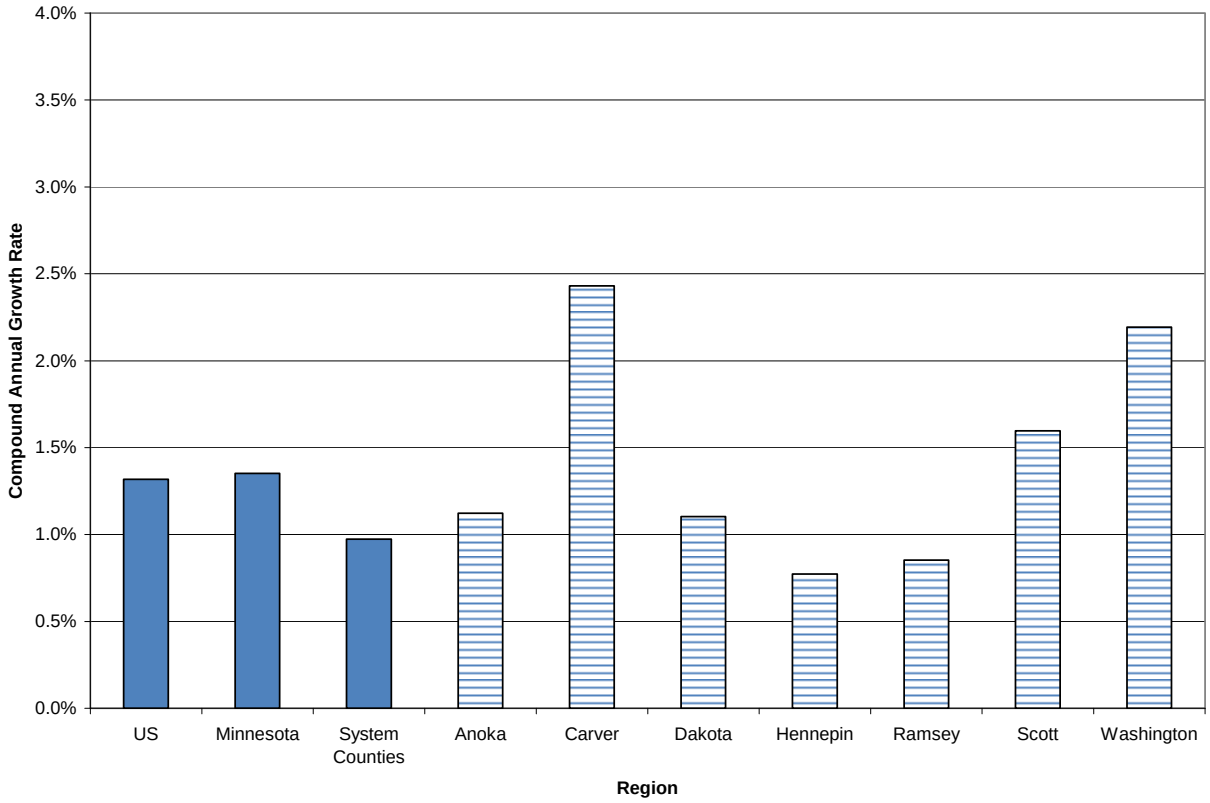
Exhibit 1-13: Projected Employment Trends in the Twin Cities Metropolitan Region

County	2000	2010	2020	2030	Change 2000 to 2030
Anoka	110,050	127,050	141,730	153,810	43,760
Carver	28,740	39,860	51,540	59,080	30,340
Dakota	154,242	179,710	199,540	214,350	60,108
Hennepin	877,346	970,090	1,045,610	1,105,230	227,884
Ramsey	333,305	372,630	405,030	430,090	96,785
Scott	34,931	42,310	49,730	56,190	21,259
Washington	67,649	88,060	110,740	129,700	62,051
Total Employment	**1,606,263**	**1,819,710**	**2,003,920**	**2,148,450**	**542,187**

Source: Metropolitan Council, October 2008

The region's growth in employment is expected to trail behind the growth projected at the state and national level. The low employment growth rates of Hennepin and Ramsey counties – both under 1 percent – result in the employment growth rate for the entire region falling below 1 percent, as shown in **Exhibit 1-14**. A number of the less populous counties are expected to exhibit employment growth rates well in excess of the national and state growth rates.

Exhibit 1-14: Average Employment Growth Rates, 2000 to 2030



The Metropolitan Council is also forecasting growth in the level of personal income for the region. From 2000 to 2030, the Metropolitan Council expects the total personal income in the region to increase by more than $101 billion, as shown in **Exhibit 1-15**. Like the population and employment forecasts, the largest increase in personal income is expected to take place in Hennepin County, with personal income increasing by more than $28 billion. The other counties in the region are expected to add anywhere from approximately $4 billion to more than $22 billion in personal income by 2030.

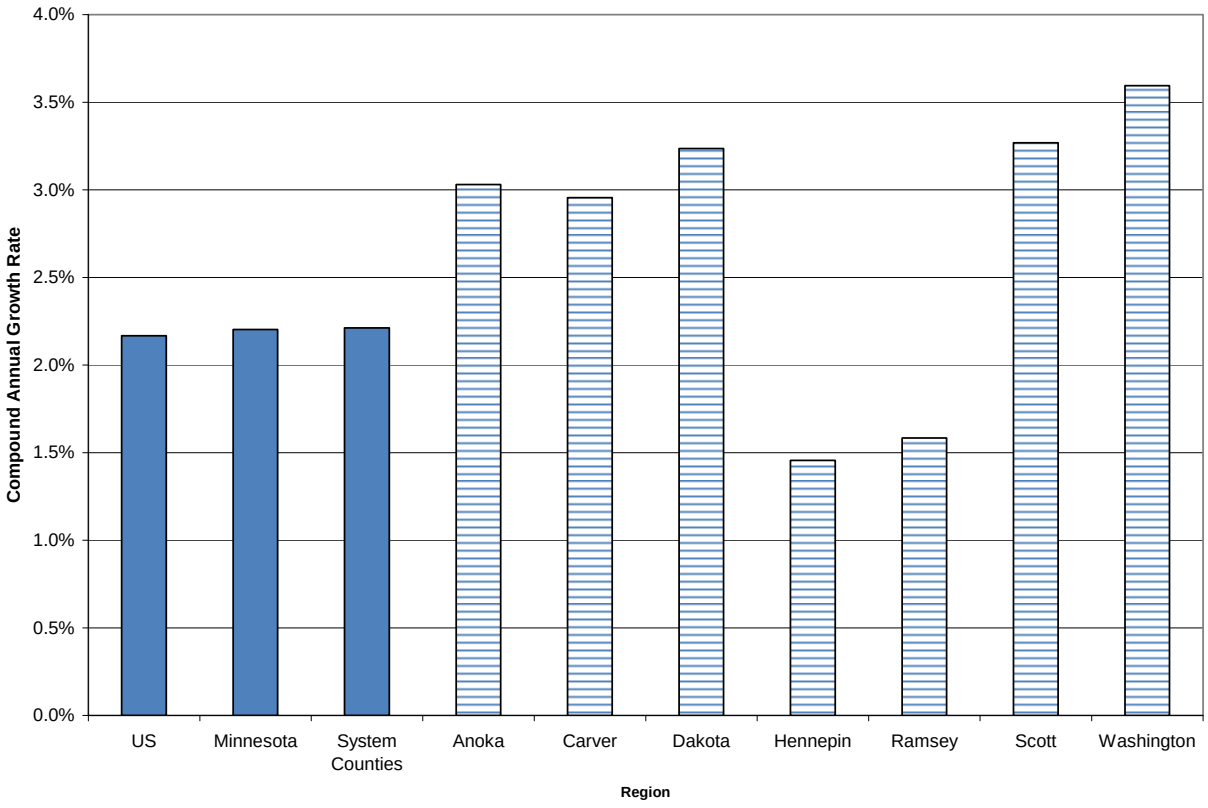
Exhibit 1-15: Projected Personal Income Trends in the Twin Cities Metropolitan Region (in millions of 2004 dollars)

County	2000	2010	2020	2030	Change 2000 to 2030
Anoka	$9,998	$13,307	$18,198	$24,483	$14,485
Carver	$2,989	$4,118	$5,459	$7,161	$4,172
Dakota	$14,186	$18,433	$26,508	$36,884	$22,698
Hennepin	$52,174	$55,726	$66,555	$80,481	$28,307
Ramsey	$18,506	$21,010	$24,793	$29,643	$11,137
Scott	$3,329	$4,621	$6,431	$8,737	$5,408
Washington	$8,001	$11,614	$16,647	$23,075	$15,074
Total Income	**$109,183**	**$128,830**	**$164,591**	**$210,465**	**$101,282**

Source: Woods & Poole Economics, Inc. October 2008

The growth rate of personal income from 2000 to 2030 for the region is expected to meet or exceed the growth rates for personal income in Minnesota and the U.S., as shown in **Exhibit 1-16**. This is largely because of the high growth rates in the less populous counties, such as Carver and Washington. Many counties are expected to experience personal income growth rates in excess of 4 percent through 2030.

Exhibit 1-16: Personal Income Growth Rates, 2000 to 2030



Airport Jurisdictional Authority

Local county, municipal, and township jurisdictions within the Twin Cities metropolitan region regulate land use within and around airports within their borders. Both the Metropolitan Council's Transportation Policy Plan and Aviation Policy Plan include policies and text on protection of the region's airspace resources. The airspace policy states that both FAA and Minnesota Department of Transportation aeronautics safety standards must be a major consideration in the planning, design, maintenance and operation of air transportation facilities and services. These federal and state policies outline the minimum requirements that local jurisdictions must follow in airport-related, land use planning activities.

Each jurisdiction within the metropolitan area is required to include airspace protection (through land use regulations) in its comprehensive plan. The protection is for potential hazards to air navigation including electronic interference. Airspace protection should also be included in local codes/ordinances to control height of structures, especially when conditional use permits would apply. Finally, each jurisdiction's comprehensive plan should include policy/text on "Notification to the FAA," as defined under Code of Federal Regulations CFR - Part 77, using the FAA Form 7460-1 "Notice of Proposed Construction or Alteration".

Exhibit 1-17 details the locations of each system airport. Exhibit 1-14 also identifies jurisdictions that are contiguous (immediately abut) the identified airports.

Exhibit 1-17: Locations of Twin Cities System Airports

Airport Name	Ownership	Location	Contiguous Jurisdictions
Minneapolis-St. Paul International	Public (MAC)	Hennepin County	Minneapolis, St. Paul, Eagan, Burnsville, Bloomington, Richfield, Mendota Heights, Fort Snelling State Park (State of Minnesota Department of Natural Resources), Minnesota Valley National Wildlife Refuge and Recreation Area (United States Fish and Wildlife Service)
Airlake	Public (MAC)	Lakeville, Eureka Township	Farmington
Anoka-County Blaine	Public (MAC)	Blaine	Mounds View, Lexington, Circle Pines, Spring Lake Park
Crystal	Public (MAC)	Crystal, Brooklyn Center, Brooklyn Park	None
Flying Cloud	Public (MAC)	Eden Prairie	Shakopee
Forest Lake	Public	Forest Lake Township (Owned by City of Forest Lake)	Columbus Township
Lake Elmo	Public (MAC)	Bayton Township, West Lakeland Township	City of Lake Elmo
St. Paul – Downtown (Holman Field)	Public (MAC)	St. Paul	South St. Paul, West St. Paul
South St. Paul Municipal	Public	South St. Paul	Inver Grove Heights
Surfside SPB	Private	Lino Lakes	None
Wipline SPB	Private	Inver Grove Heights	None

Source: Biko Associates, Inc., November 2008.

Summary

This chapter presented the results of the inventory and data gathering efforts of the project. This information provided a snapshot of the status of the Twin Cities Regional Aviation System and the surrounding airspace. Using this snapshot, current airport roles were defined and assigned to each airport in the system. This information was also used to determine what future roles these airports could fulfill.

Finally, several facts regarding the system are provided below:

- System airports: 11
- Collar counties airports: 14
- Airports in NPIAS: 8
- System airports designated as relievers: 7
- System airports with paved runways > 5,000 feet 2
- System airports with only turf: 1
- Seaplane bases: 2
- Airports with an Instrument Approach: 8
- Airports with Air Traffic Control Towers: 5

Chapter Two - Aviation Industry Trends

If we confined our view to what happened in 2007, the aviation industry outlook would be positive with strong indications of improved margins, profitability and traffic. Even the FAA forecasts released in March, 2008, describes the 12 months ending September, 2007 as one of vigorous competition. There is not a hint of the volatility experienced in 2008.

"…passenger demand growth on U.S. airlines rebounded from a weak year in 2006. System revenue passenger miles (RPMs) and enplanements grew 3.9 and 3.3 percent respectively…Competition is spurring carriers to continue to cut costs and prices in an increasing number of markets…" (FAA Aerospace Forecast Fiscal Years 2008-2025)

From the vantage point of 2007, the aviation industry is well into a turnaround, the first of significance in a decade. The network carriers showed operating profits of 9.2 percent in the second quarter of 2007 and 8.8 percent in the third quarter. The structural changes made by Northwest, Delta, US Airways and United airlines during Chapter 11 bankruptcy made it possible for these carriers to reduce capacity, jettison aging and less efficient aircraft, shrink operating costs, restructure debt, and reposition to more effectively compete with other carriers, particularly low cost carriers. These restructurings took place first by United who went into bankruptcy in 2002 and continued until mid-2007 when Northwest emerged from Chapter 11.

The airlines, probably more than any other industry in the U.S. came into the fourth quarter of 2007 in reasonably solid operational and financial shape. Then at the end of 2007, the price of fuel soared, nearly doubling by July, 2008. To put the price impact in perspective, fuel represented 12.8 percent of operating costs in 2003. By the first quarter, 2008, fuel represented 29.4 percent of total operating costs. While the network carriers had reduced many of their other costs, the price of fuel is an external cost and largely not controllable. (Southwest Airlines was one of the few carrier insulated from the spike in fuel prices as it had purchased long term contracts for fuel at a lower price.)

The airlines responded to the spike in fuel prices with unusual alacrity and determination. Capacity cuts announced for 2008 were the largest in 20 years. U.S. carriers grounded 500 aircraft and announced cancellation of more than 3,000 domestic departures. The battle to raise revenue resulted in fare increases and new fees for service imposed on passengers. On the cost side, jobs were eliminated, aircraft were flown to minimize fuel burn, and air service was cut to the barebones. Not all of the airlines made it. Aloha, Frontier, ATA, MAXjet, Skybus and most recently Minnesota's Sun Country declared bankruptcy or ceased operations.

Interestingly this most recent airline contraction occurred well in advance of the financial meltdown that manifested itself first in March, 2008 when the investment bank of Bear Stearns collapsed but took a good seven months to spread through financial markets around the world. As 2008 comes to a close, the outlook for aviation and the economy remains uncertain. The world economy has experienced an upheaval unprecedented in modern history. The surge and collapse of commodity prices, easy credit

coupled with a complex (and not well understood) web of global financial relationships caused the perfect storm. Its unwinding presents a contracted world economy for sure; but how much and for how long remains to be seen.

Minneapolis-St. Paul International Airport (MSP) performed reasonably well given that Northwest Airlines entered bankruptcy in September, 2005 , emerged in May, 2007, and announced its intention to merge with Delta Airlines in April, 2008. This merger was approved and consummated in November, 2008. Southwest's entry into the MSP market in March, 2009 is likely to result in intense service and fare competition first in the Chicago markets and in any other cities Southwest offers service from MSP. Both the merger and Southwest's entry are game changing events for MSP and all of the Greater Minnesota airports.

Highlights of changes already in the works at MSP include the following:

- Revenue Passengers
    - 2005 marked a peak in total passengers and operations at MSP.
    - In 2007, MSP handled 35.2 million passengers, down from 2005 by approximately 2.6 million passengers or 6.6 percent.
- Passenger Mix
    - The number of originating (local) passengers at MSP is increasing relative to connecting passengers. Since 2006, originating passengers exceed 50 percent of total traffic.
    - International passengers represent less than 8 percent of total passengers. This segment of the MSP market has remained stable with small increases. Because domestic passenger levels are declining, the share of international relative to total passengers is increasing.
- Operations
    - Total operations peaked in 2004 at 541,000.
    - In 2007, total operations declined to 453,000 or down by 16.3 percent.
    - Operations declined faster than the loss of passengers correlating strongly with statistics showing much higher load factors on aircraft.
    - Also, regional carriers are doing more of the flying. Revenue passengers travelling on regional carriers have increased from 11.7 percent in 2005 to 19.3 percent during the first nine months of 2008. However, this trend may not persist. Independent regional carriers are likely to see less flying for the combined Delta-Northwest operation.
- Capacity and Markets Served
    - Over the last ten years, total scheduled seats are down 12.7 percent. In 2008, cutbacks in scheduled seats have accelerated. Fourth quarter, 2007, total schedules seats (in and out) of MSP were 11 million. Fourth quarter, 2008, total scheduled seats at MSP are down to 9.9 million.

  - Despite cutbacks, the total number of domestic and international cities served has remained relatively stable with most of the growth in international markets. In 2007, MSP offers nonstop service to 123 domestic markets and 21 international markets.
- Northwest/Delta Hub Activity
  - With the merger now a reality, it is prudent to observe trends at Northwest and Delta hub airports.
  - Northwest's principal hubs are MSP, Detroit, and Memphis. Delta's hubs are: Atlanta, Salt Lake City, Cincinnati, and JFK.
  - Delta capacity (scheduled seats) at its hubs is much bigger than Northwest's. In the fourth quarter, 2008, Delta total scheduled seats at its four principal hubs were 31.3 million; Northwest's scheduled seats at its three hubs were 18.4 million.
  - In the past, MSP and Detroit were similar sized operations each supporting about 8 million total seats per quarter. However, this year, there were more cuts at MSP then Detroit. For the fourth quarter, 2008, Northwest cut 535,000 seats out of Detroit and 734,000 out of MSP.
  - Atlanta is Delta's largest hub supporting over 20 million scheduled seats per quarter. Atlanta has not been cut. However, Delta reduced Cincinnati seats by 23.5 percent in the fourth quarter of 2008 and Salt Lake City seats by 15.4 percent.

General and business aviation has been subject to similar downward pressures sustained by high fuel prices, limited credit and softening demand. The evidence of these impacts is coming in. The Aircraft Owners and Pilots Association (AOPA) reports in that between the first quarters of 2008 and 2007:

- Reductions by 18 percent in gallons of aviation gasoline (avgas) sold.
- General aviation activity reported at centers is down 5 percent and at towers; down 4 percent.

The General Aviation Manufacturers Association (GAMA) reported that shipments of aircraft were mixed for the first six months of 2007 and 2008.

- For the largest sector, piston aircraft, representing the bulk of personal flying, shipments were down 15.7 percent from 1,226 shipped in the first half of 2007 compared with 1,034 aircraft shipped during the same period in 2008.
- Turboprop sales increased by 19.4 percent with a growth from 186 to 222 aircraft shipped in the first half of 2008.
- Business jet sales also increased by a much larger margin of 39.3 percent to 663 aircraft shipped in 2008 versus 476 in the first half of 2007.

Since historically, the vast majority of general aviation flying has been personal flying, a large component of this flying is discretionary. Rising fuel costs and an aging fleet of piston aircraft that on average fly fewer hours are contributing to declining activity at airports around the country. Increases in general aviation fuel sales are almost certainly attributable to increased sale of jet fuel for business

aircraft. Minnesota has not escaped this trend. Most system plan airports and collar county airports have experienced declines in general aviation operations.

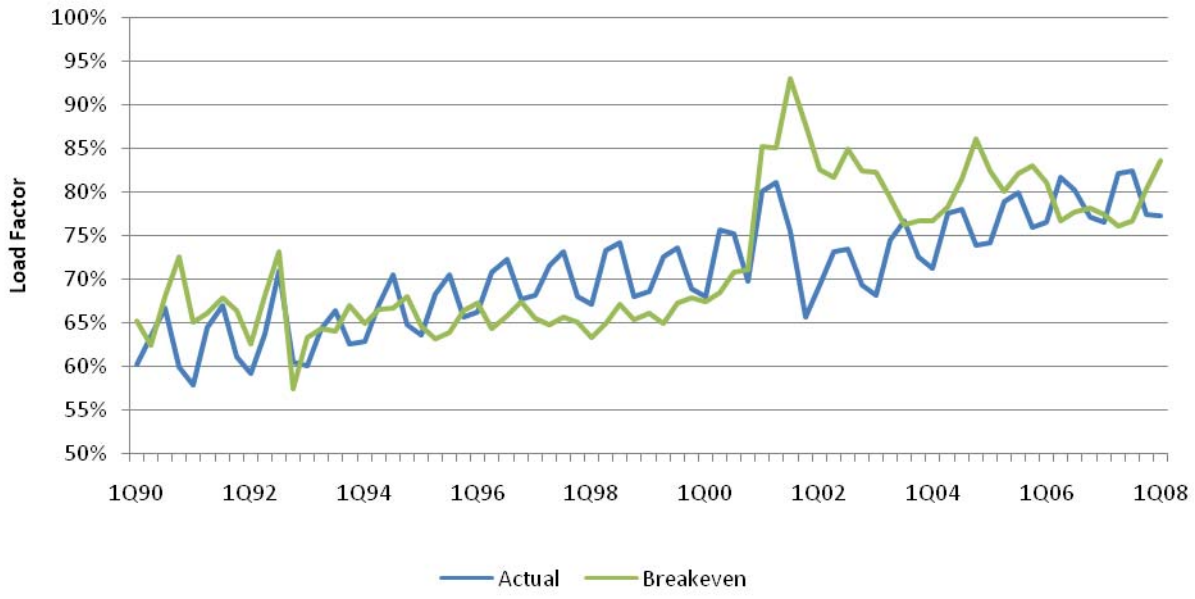
As late as last year there was continuing optimism about the prospects of very light jets (VLJs) entering the fleet for business flying? However, certifications for these new aircraft have taken longer than expected and capitalization of aircraft development programs has delayed or suspended a few promising ventures. DayJet, the first per seat, on-demand jet service, ceased operations in September, 2008. Original forecasts for VLJ activity were relatively conservative, but perhaps before their time.

Whether the extreme volatility of 2008 represents more than a transitory earthquake remains to be seen. For 2009, the Minneapolis general aviation and reliever airports are likely to experience reduced demand for flying. MSP faces the same economic uncertainties coupled with new competition from Southwest and the changes associated with the consolidated Northwest-Delta operation.

Current Conditions in the Airline Industry

The volatility of the airline industry since deregulation (Oct. 1978) has become legendary. Each crisis has given way to restructurings, mergers and acquisitions, and new attempts by the carriers to control markets, costs and revenue. As **Exhibit 2-1** suggests that during the last 20 years, the U.S. passenger airlines have performed with very mixed results, operating below breakeven points as often as above.

Exhibit 2-1: Actual and Breakeven Load Factors for U.S. Passenger Airlines, 1Q, 1990 to 1Q, 2008



Source: U.S. DOT, Form 41, via Air Transport Association

Early in 2007, the benefits of record high load factors and improved revenue for the airlines held promise for a profitable year in 2007. However, solid demand and increasing passenger yields were overshadowed by a spike in fuel costs. Positive operating profits for the network carriers turned negative in the fourth quarter of 2007 as **Exhibit 2-2** shows. For the first half of 2008, network carriers lost a total of 3.2 billion and are likely by year's end to erase the 5.1 billion in profits achieved in 2007.

Exhibit 2-2: Network Airline Quarterly Operating Profit/Loss Margin (in Percent)

Note: Alaska Airlines numbers not included in 2Q 2008.
Source: U.S. DOT, Form 41. Schedule P1.2

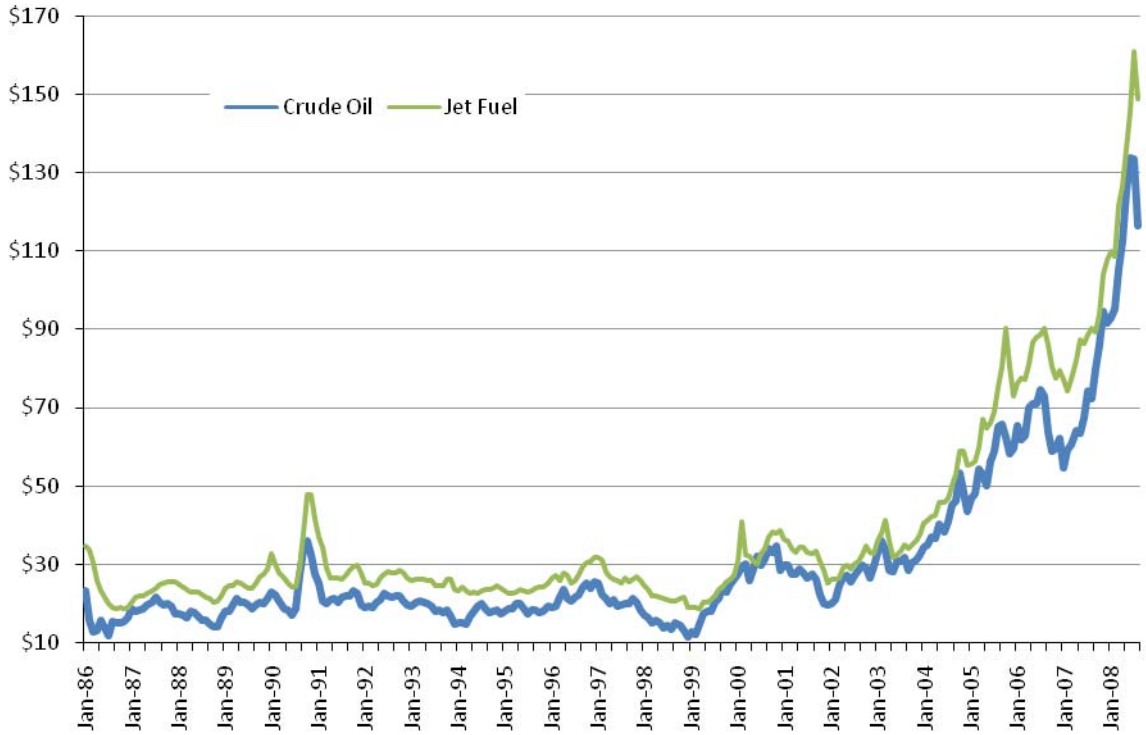
Impact of Fuel Increases

In August, 2007, crude oil was priced around $90 per barrel. In July, 2008, it priced at $160 per barrel. By November, 2008, a barrel of crude oil was back down to $61. The volatility of the price of oil is unprecedented. Many airlines planned for a contingency of $115 oil but not $160 oil. **Exhibit 2-3** shows how fuel prices began to ratchet up during the second half of 2007. **Exhibit 2-4** tracks the average price of jet fuel in 2007 and 2008. Until October, 2008, fuel remained at historic highs. To add insult to injury, several airlines fearing $200 oil locked in fuel contracts at high prices only to find themselves overpaying as the price of fuel made an equally steep descent.

It is evident that the near term prospects for the airlines are closely tied to the price of oil. At its peak, fuel costs represented almost 40 percent of total operating costs for the airlines. In 2003, fuel was 13 percent. **Exhibit 2-5** compares the various components of operating costs for airlines between 2000 and

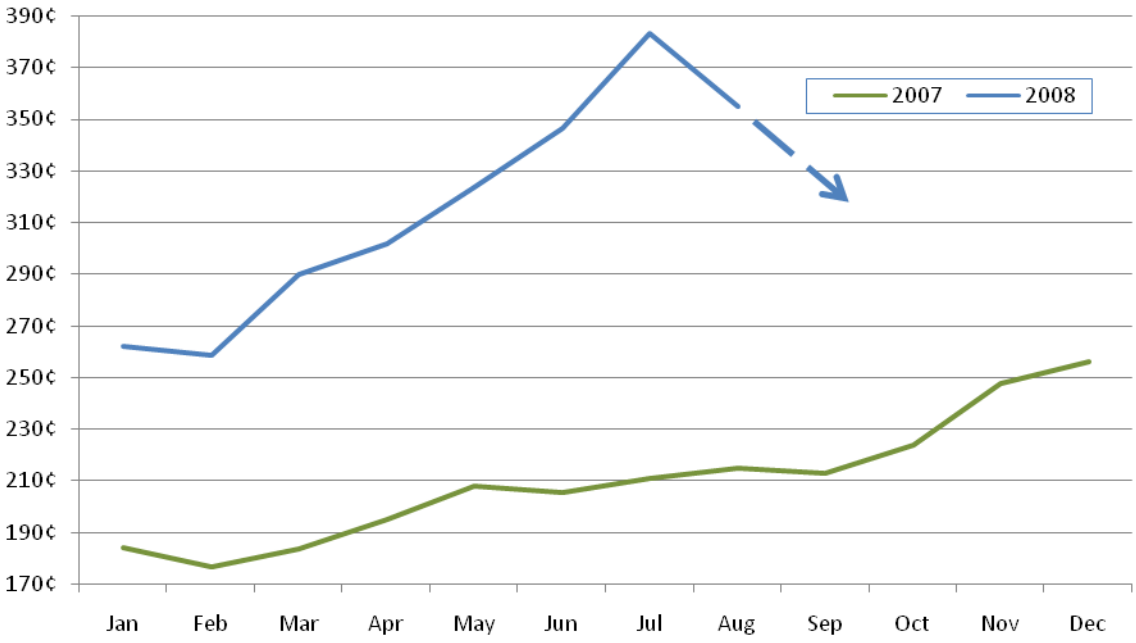
2007. Even before the spike in fuel prices in 2008, modest increases in the price of fuel effectively erased all of the cost-cutting gains made by the airlines through restructurings, downsizing, new labor agreements and productivity gains. Excluding fuel, airlines had reduced operating costs by 11.5 percent from 2000 to 2007. If fuel is added back in, operating costs were actually up by 9.6 percent, so the fuel impact has been huge.

Exhibit 2-3: Average Prices ($/Barrel): Crude Oil (Spot) and Jet Fuel (Paid)



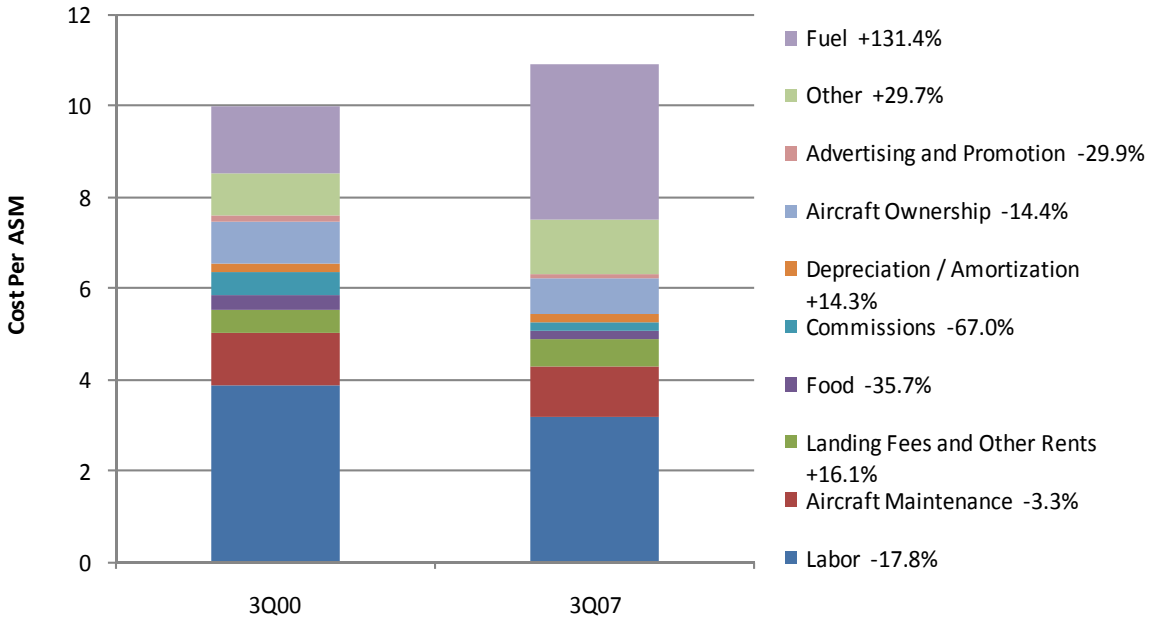
Source: Air Transport Association

Exhibit 2-4: Average Jet Fuel Price (Paid) per Gallon



Source: Air Transport Association

Exhibit 2-5: Comparison of Airline Operating Costs 3Q, 2000 with 3Q, 2007



Source: U.S. DOT, Form 41 via Oliver Wyman

Outlook for Travel Demand

The rise in commodity prices certainly spawned fears about inflation and discussions in certain metropolitan regions about the future viability of a long commute to work. Airline stock prices demonstrated a strong inverse relationship between the price of oil and the price of airline equity. **Exhibit 2-6** shows a ten year history of the AMEX airline index. The index is composed of 13 airline stocks, including the seven network carriers.[1] Stocks sunk to a ten year low in 2008 and in hindsight also provided strong indications about a weakening economy.

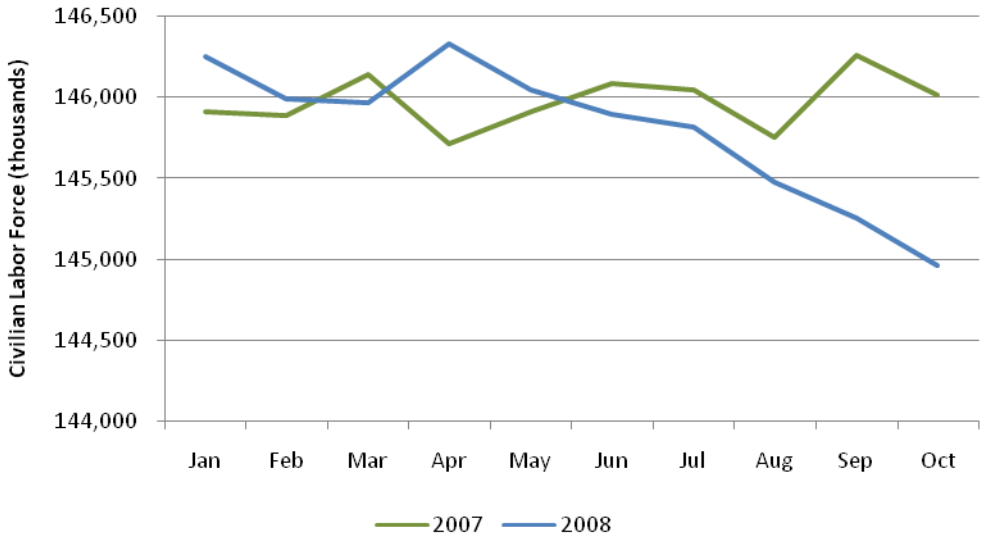
The dramatic unwinding of commodity and housing prices unleashed a financial tsunami unexpected in magnitude and velocity. Public perception went from the country experiencing a mild downturn to a world at the doorsteps of a global recession. Intervention at the federal level of this country, Japan, China, and in Europe underscored the gravity and risk in financial markets. Many industrial analysts have muted their optimism about the near term outlook. Evidence of a weakened economy is coming in quickly. In October, 2008 unemployment rose to 6.5 percent and a loss in the first 10 months of this year of 1.2 million jobs.[2] **Exhibit 2-7** compares civilian employment during the first 10 months of 2007 and 2008.

Exhibit 2-6: AMEX Airline Index

Source: American Stock Exchange

[1] Alaska Air Group, AMR Corporation, Continental Airlines, Delta Airlines, GOL Linhas Aereas, JetBlue Airways, US Airways Group, LAN Airlines, Southwest Airlines, Ryan Air Holdings, SkyWest Inc, TAM S.A. and UAL Corporation.
[2] Bureau of Labor Statistics

Exhibit 2-7: Civilian Labor Force



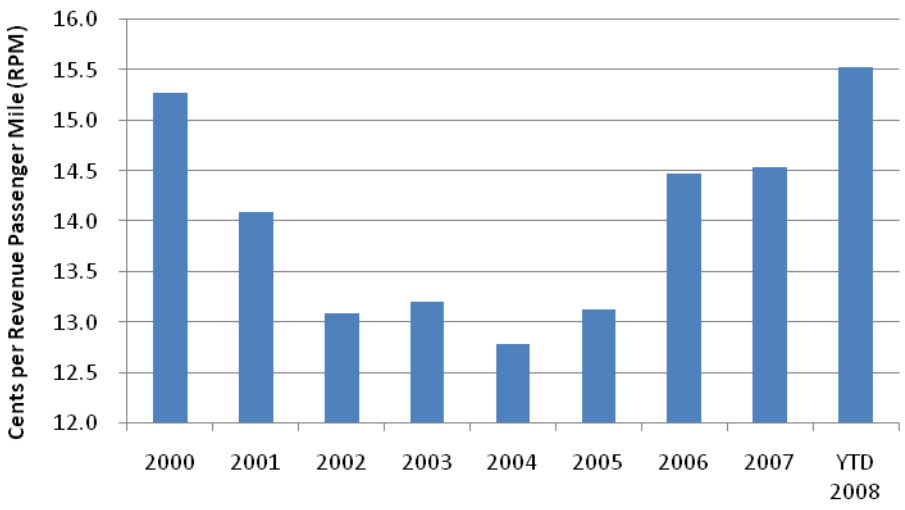
Source: Bureau of Labor Statistics

Airline Efforts to Increase Revenue

With the magnitude of fuel costs overwhelming other unit cost reductions, the U.S. passenger airlines embarked on a revenue enhancement effort that included raising fares 7.5 percent in the first 10 months of 2008. **Exhibit 2-8** shows yields (cents per revenue passenger mile) for seven of the mainline carriers[3] exclusive of the low cost carriers.

[3] Alaska, American, Continental, Delta, Northwest, United, US Airways and their regional affiliates

Exhibit 2-8: Domestic Yields for Mainline Carriers, 2000 - 3Q 2008



Source: Air Transport Association

In addition to raising fares, airlines introduced fuel surcharges and a host of new fees that will not appear in yield numbers, but do effectively raise the cost of flying for individual passengers. These fees include charges for checking bags, extra fees for curbside check-in, increases in ticket change penalties, fees for food, extra legroom and speaking to a live person to make a reservation. Exhibit 9 shows the scope and range of fees imposed. While too earlier to judge the impacts of these extra fees, Wall Street analysts estimate that such fees could add $3 billion annually to the industry.

Exhibit 2-9: U.S. Domestic Airline Fee Chart

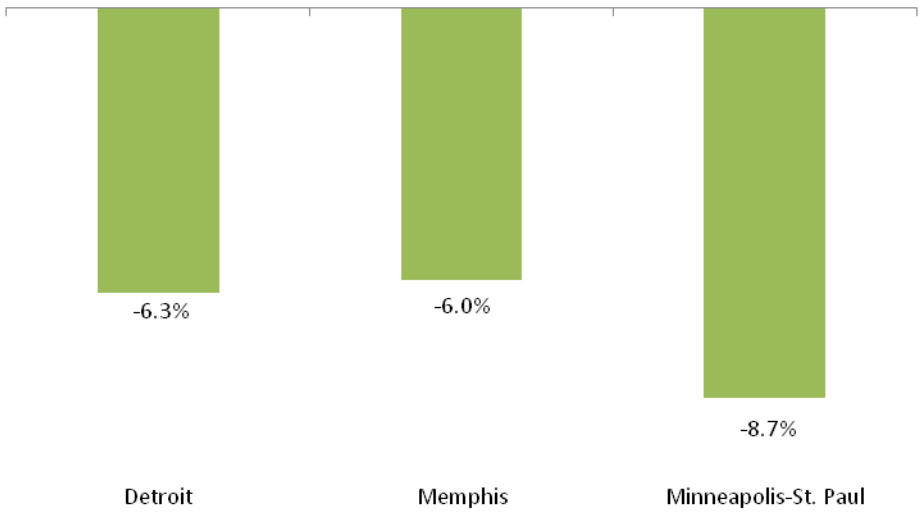
Extra Charge	Fee
Reservation by Phone	$10-$35
1st Checked Bag Fee	$10-$25
2nd Checked Bag Fee	$25-$50
Overweight Bag Fee	$29-$150
Extra Leg Room	$5-$109
Meal	$3-$11
Alcohol	$1-$7
Travel with Pets	$25-$359
Unaccompanied Minors	$75-$100
Non-Refundable Ticket Change Fee	$20-$150

Source: Data provided by farecompare.com, updated November 7, 2008

Capacity Reductions

The mainline carriers have pursued a two prong strategy, one of revenue enhancement and the other, capacity reduction. Almost every mainline carrier has announced significant capacity reductions including the grounding of 500 aircraft by the end of 2008. One analyst has estimated 11,000 fewer weekly domestic flights and nearly a million fewer seats by the beginning of 2009. **Exhibits 2-10 and 2-11** compare Northwest and Delta year-over-year changes at their respective hubs in total schedules seats from fourth quarter, 2007 to fourth quarter, 2008. These changes are significant in so far as the Delta-Northwest merger is going ahead.

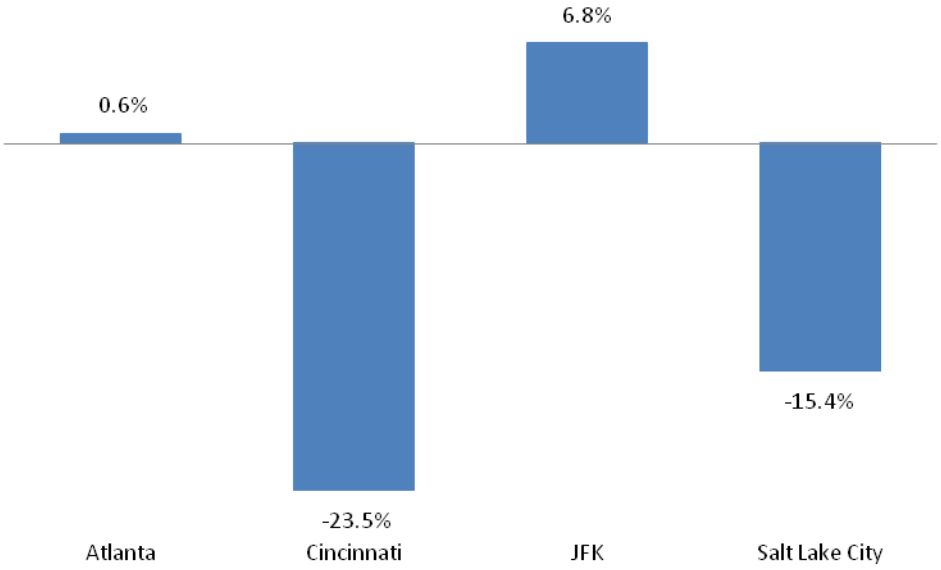
Exhibit 2-10: Year-over-Year Change in Northwest's Total Scheduled Seats, 4Q, 2007 and 4Q, 2008



	4Q 2007	4Q 2008	Change
Detroit	8,445,799	7,910,432	(535,367)
Memphis	2,985,212	2,804,672	(180,540)
Minneapolis-St. Paul	8,463,538	7,729,606	(733,932)
Total	**19,894,549**	**18,444,710**	**(1,449,839)**

Source: Official Airline Guide

Exhibit 2-11– Year-over-Year Change in Delta's Total Scheduled Seats, 4Q, 2007 and 4Q, 2008



	4Q 2007	4Q 2008	Change
Atlanta	20,204,463	20,335,680	131,217
Cincinnati	4,593,061	3,515,919	(1,077,142)
JFK	3,268,983	3,489,897	220,914
Salt Lake City	4,687,824	3,966,860	(720,964)
Total	**32,754,331**	**31,308,356**	**(1,445,975)**

Source: Official Airline Guide

Low Cost Carriers (LCCs)

Once considered renegades, Southwest, JetBlue and Air Tran are now among the ten largest airlines in the United States. Low cost carriers have had a huge impact on domestic travel. Within the U.S., LCCs transport more than 30 percent of all domestic passengers and operate in most of the largest cities. While LCCs serve the busiest and densest markets, their impact extends much further as they can draw passengers from a radius of as much as 120 miles.

LCCs continue to have a unit cost advantage over mainline carriers. However, LCCs are subject to the same pressures as the mainline carriers. **Exhibit 2-12** compares operating expenses and revenues per available seat mile for the largest mainline and LCC carriers. It is apparent that low cost carriers still have significant cost advantages, however high fuel prices have eroded profitability.

Exhibit 2-12: U.S. Carrier System Costs and Revenues per ASM, 2Q, 2008

Carrier	Cost/ASM (cents)	Revenue/ASM (cents)
US Airways	20.1	17.3
American	18.0	14.8
Delta	16.4	16.9
United	15.8	15.2
Continental	15.7	15.4
Northwest	15.6	16.7
Frontier	12.5	11.2
Air Tran	11.4	10.7
JetBlue	10.1	10.3
Southwest	10.1	10.9

Source: Bureau of Transportation Statistics, Form 41; Schedule P1.2. T100; T2 Data

As with the mainline carriers, low cost carriers also expect slower growth and have cut capacity and deferred delivery of aircraft orders. Frontier remains in Chapter 11 bankruptcy. JetBlue has curtailed some of its transcontinental flying and postponed delivery of 21 new A320 aircraft. Air Tran is also cutting capacity and postponing delivery of 18 new Boeing 737 aircraft. Southwest announced elimination of 200 daily flights, reducing its capacity by six percent. For the last two years, Southwest has focused attention on developing its service at Denver. In March, 2009, it is setting its sights on Minneapolis-St. Paul with initial service between the Twin Cities and Chicago Midway Airport.

Minneapolis-St. Paul Commercial Service Trends

Minneapolis-St. Paul International Airport as Northwest Airlines' principal hub has experienced a very high level of service given its metropolitan population of 3.5 million. According to the Metropolitan Airport Commission's 2007 Report to the Legislature, MSP ranks third highest in the number of nonstop markets per million population. As **Exhibit 2-13** shows, only Denver and Atlanta have a higher ratio of nonstop markets to population.

Exhibit 2-13: Ratio of Nonstop Markets to Population

Metropolitan Area	Population (millions)	Nonstop Markets	Ratio of Nonstop Markets to Population (million)
Denver	2.9	149	51.4
Atlanta	5.5	242	44.0
Minneapolis-St. Paul	**3.5**	**144**	**41.1**
Houston	5.6	179	32.0
Detroit	5.4	148	27.4
Phoenix	4.0	104	26.0
Cleveland	2.9	74	25.5
Dallas-Ft. Worth	6.4	162	25.3
Tampa-St. Petersburg	2.7	67	24.8
Miami-Ft. Lauderdale	5.5	118	21.5

Source: Metropolitan Airports Commission, 2007 Annual Report to the Legislature

Minneapolis-St. Paul International Airport (MSP) has performed reasonably well in view of the fact that Northwest Airlines (NWA) entered bankruptcy in September, 2005, came out in May, 2007, and announced its intention to merge with Delta Airlines in April, 2008. This merger was approved and consummated in November, 2008. Southwest's entry into the MSP market in March, 2009 is likely to result in intense service and fare competition first in the Chicago markets and any other cities Southwest initiates from MSP. Both the merger and Southwest's entry are game changing events for MSP and all of the Greater Minnesota airports that will undoubtedly unfold with more clarity in 2009-10.

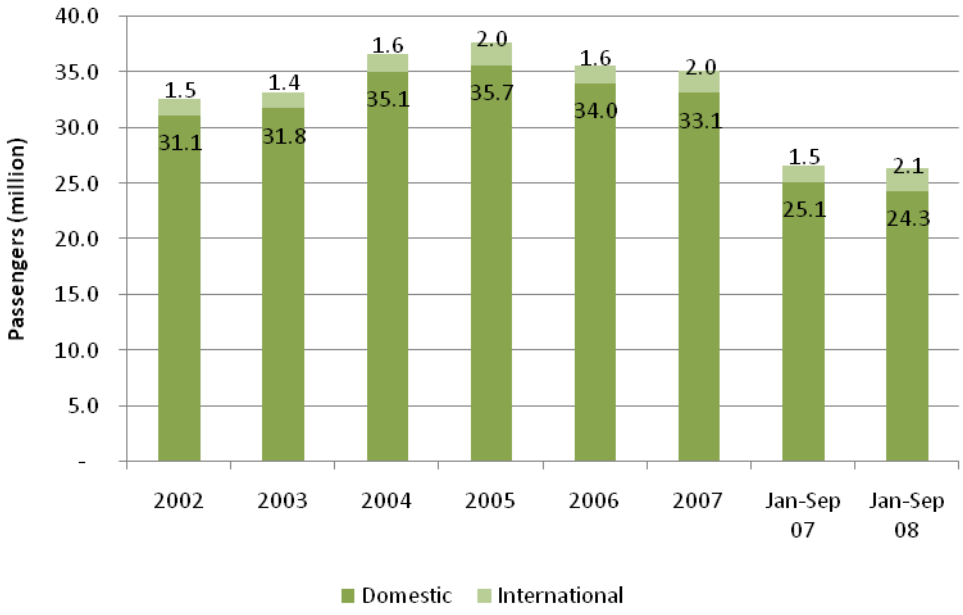
Passenger Trends

In 2007, NWA (not including regional affiliates) carried approximately 65 percent of all MSP passengers. Because of NWA's bankruptcy, the airline began capacity cuts in late 2005. Total passengers at MSP peaked in 2005 as **Exhibit 2-14** shows. In 2007, MSP handled 35.2 million passengers, down from 2005 by approximately 2.6 million passengers or 6.6 percent.

The mix of passengers is also changing along two dimensions: domestic versus international and connecting versus originating. Domestic passengers are declining whereas international passengers appear to be increasing in 2008. International passengers represent less than 8 percent of total passengers. This segment of the MSP market has remained stable with small increases. Because domestic passenger levels are declining, the share of international relative to total passengers is increasing.

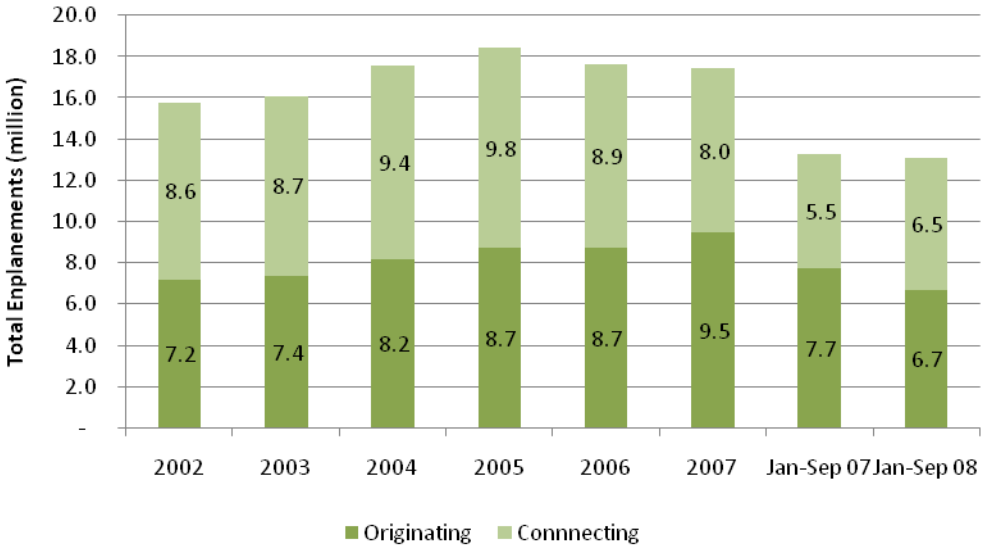
MSP is also experiencing an increasing share of originating passengers. The number of originating (local) passengers at MSP is increasing relative to connecting passengers. Since 2006, originating passengers have consistently exceeded 50 percent of total traffic. See **Exhibit 2-15**.

Exhibit 2-14: Total Minneapolis-St. Paul Passengers, 2002 - 3Q 2008



Source: Metropolitan Airport Commission

Exhibit 2-15: Originating and Connecting Passengers at MSP, 2002 - 2007



Year.	Originating	Connecting	Total Enplanements	Percent Originating
2002	7.2	8.6	15.8	**45.6%**
2003	7.4	8.7	16.1	**45.8%**
2004	8.2	9.4	17.6	**46.4%**
2005	8.7	9.8	18.4	**47.1%**
2006	8.7	8.9	17.7	**49.5%**
2007	9.5	8.0	17.4	**54.4%**
Jan-Sep 07	7.7	5.5	13.3	**58.4%**
Jan-Sep 08	6.7	6.5	13.1	**50.7%**

Source: Metropolitan Airport Commission

Operations

Total operations at MSP peaked in 2004 at 541,000. In 2007, total operations declined to 453,000 or down by 16.3 percent. Operations declined faster than the number of passengers flying which would support statistics showing much higher load factors on aircraft. In addition since 2002, regional carriers are doing more of the flying for mainline carriers. Revenue passengers traveling on regional carriers have increased from 11.7 percent in 2005 to 19.3 percent during the first nine months of 2008. To accommodate the additional passengers, operations have also increased by 37.7 percent in the first three quarters of 2008. (See **Exhibits 2-16** and **2-17.)** It is worth noting that the increase of regional

carriers appears to have out-distanced the increase in on-board passengers. This may be due to extensive downsizing by a number of carriers serving MSP, but also suggests that some readjustments in flights and passengers is likely to continue in this service segment.

Exhibit 2-16: Percent of MSP Revenue Passengers on Regional Carriers, 2002 - 3Q 2008

Year	Regional	Total	Percent Regional
2002	2,136,253	31,527,760	**6.8%**
2003	2,526,239	32,306,884	**7.8%**
2004	3,550,984	35,786,634	**9.9%**
2005	4,286,804	36,678,868	**11.7%**
2006	4,462,192	34,580,769	**12.9%**
2007	4,834,455	34,108,743	**14.2%**
Jan-Sep 07	3,478,572	25,899,330	**13.4%**
Jan-Sep 08	4,920,856	25,489,135	**19.3%**

Source: Metropolitan Airport Commission

Exhibit 2-17: Percent of MSP Operations on Regional Carriers, 2002 - 3Q 2008

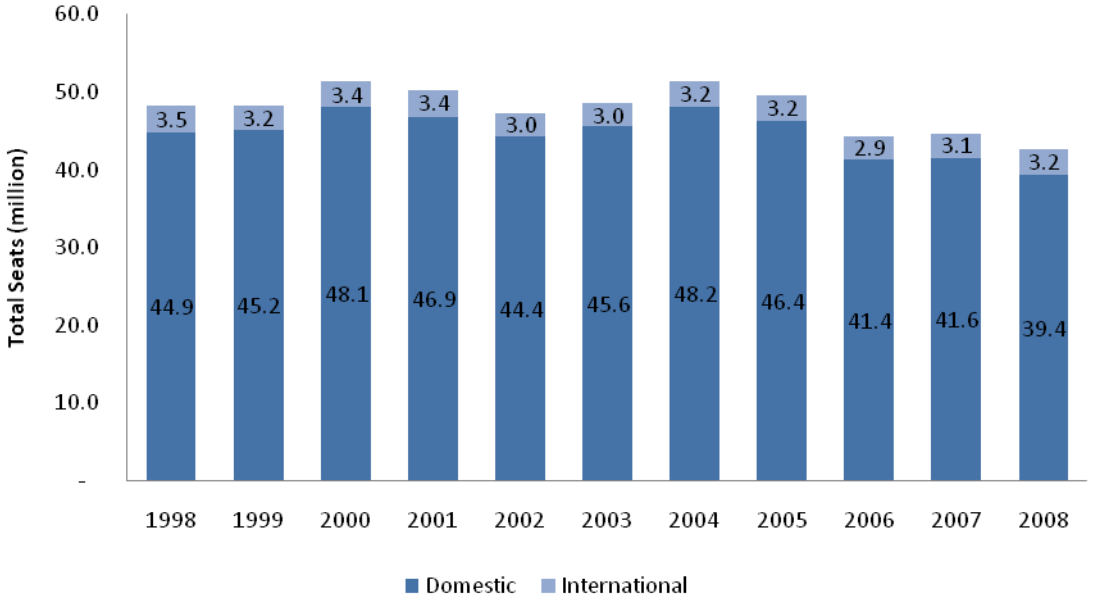
Year	Regional	Total	Percent Regional
2002	95,248	507,669	**18.8%**
2003	104,931	510,669	**20.5%**
2004	135,785	541,092	**25.1%**
2005	146,400	532,239	**27.5%**
2006	131,370	475,668	**27.6%**
2007	139,581	452,972	**30.8%**
Jan-Sep 07	102,049	340,487	**30.0%**
Jan-Sep 08	129,127	342,171	**37.7%**

Source: Metropolitan Airport Commission

Capacity

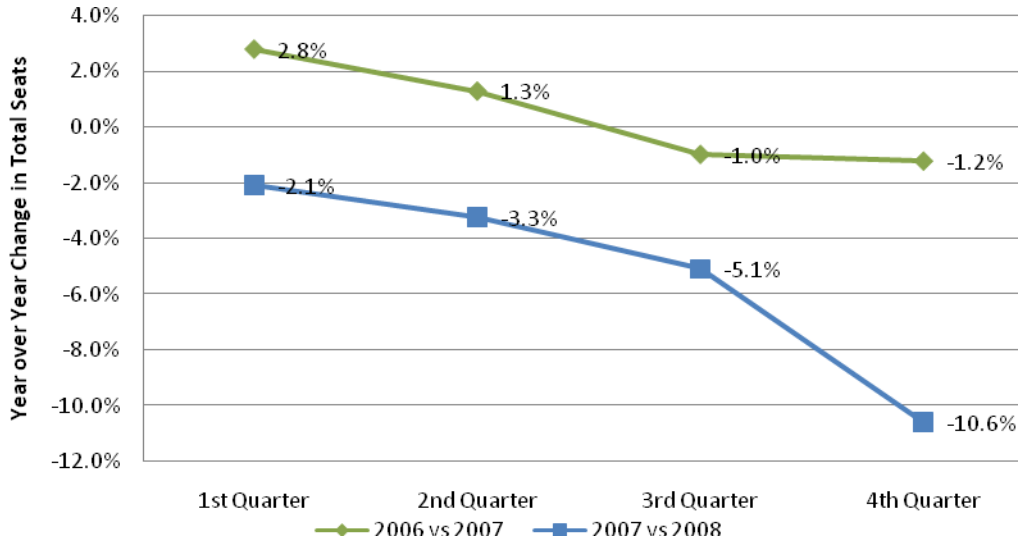
Over the last ten years, total scheduled seats are down 12.7 percent as shown in **Exhibit 2-18**. Domestic seats have declined from almost 45 million in 1998 to 39.4 million in 2008. Because of volatility, total scheduled seats for the fourth quarters of 2007 and 2008 were compared. It appears that cutbacks in scheduled seats is accelerating. **Exhibit 2-19** shows quarterly changes in total domestic scheduled seats comparing 2007 and 2008. **Exhibit 2-20** breaks out international seats. Fourth quarter, 2007, total schedules seats (in and out) of MSP were 11 million. Fourth quarter, 2008, total scheduled seats at MSP are down to 9.9 million.

Exhibit 2-18: Total Scheduled Seats at MSP, 1998 - 2008



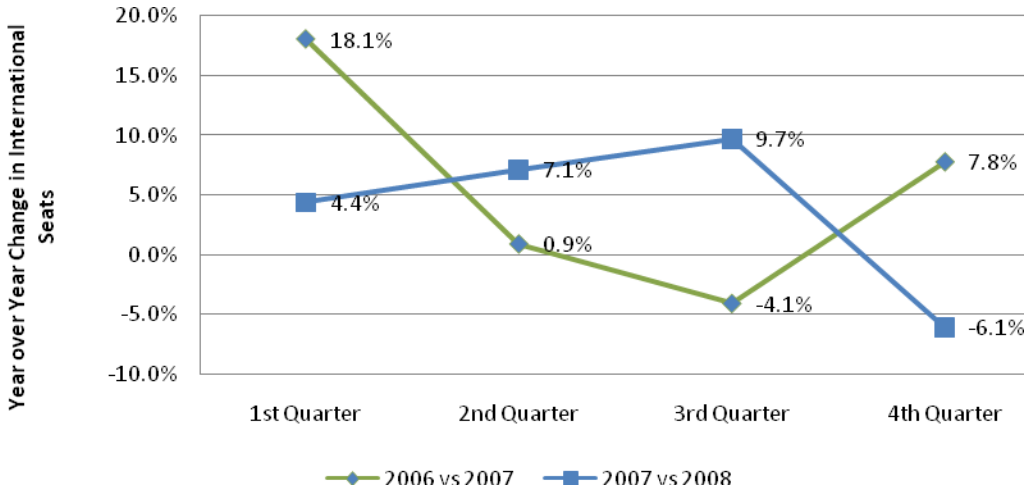
Source: Official Airline Guide

Exhibit 2-19: Total Domestic Scheduled Seats at MSP, Quarter over Quarter Change, 2006 - 2008



Source: Official Airline Guide

Exhibit 2-20: Total International Scheduled Seats at MSP, Quarter over Quarter Change, 2006 - 2008

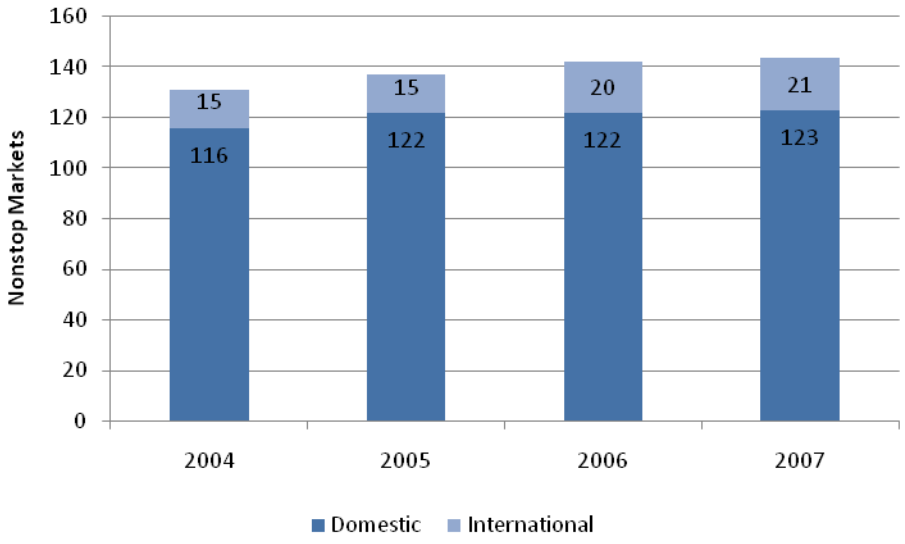


Source: Official Airline Guide

Markets Served

Despite cutbacks in capacity, the total number of domestic and international cities served as of 2007 from MSP has remained relatively stable with most of the growth in international markets. It would not be surprising to see somewhat fewer nonstop markets in 2008 and beyond. **Exhibit 2-21** shows the number of nonstop markets offered at MSP from 2004 to 2007.

Exhibit 2-21: Nonstop Domestic and International Markets Served from MSP



Source: Metropolitan Airports Commission, 2007 Annual Report to the Legislature

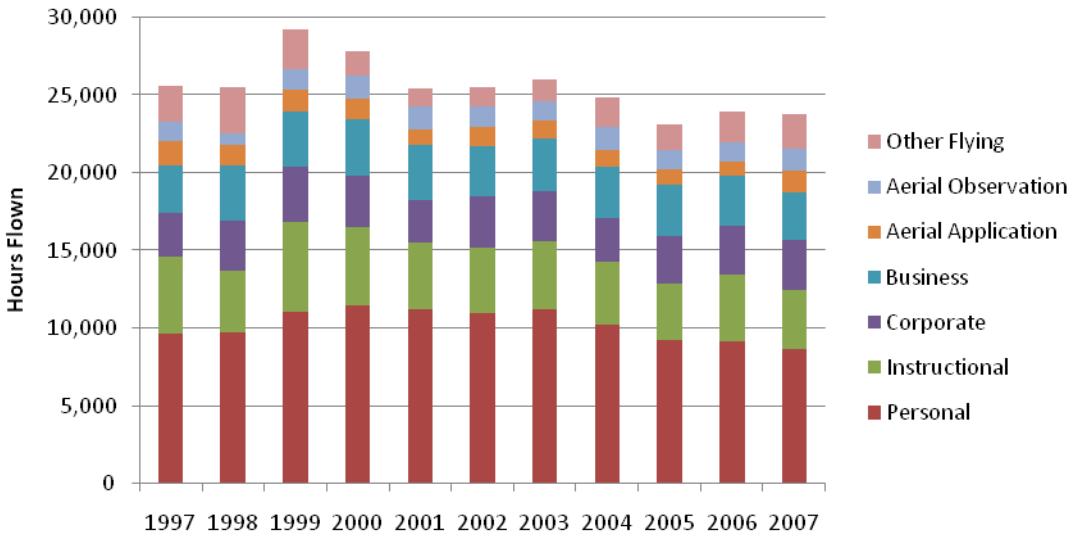
General Aviation Trends

The volatility that has buffeted commercial aviation and the rest of the economy is certainly also visible in the general and business aviation sectors. High fuel prices have curtailed discretionary personal flying. This is evident at almost every small general aviation airport where operations are down significantly as are Avgas fuel sales. The Aircraft Owners and Pilots Association (AOPA) reported that gallons of Avgas sold in the first quarter of 2008 are down 18 percent from the first quarter of 2007. Traffic at towered airports is down 4 percent during the same period. A weakened economy is likely to soften demand for business flying and certainly dampen the extent of personal flying. That said it is difficult to discern from the most recent information whether recent upheavals will convert to long term trends.

Long Cycle of Change for Personal Flying

General aviation does tend to run in an extended cycle. In the personal flying sector, aircraft are kept in service a long time. Pilots often take their training at an early age and embark on a lifetime of flying, provided of course that they can afford the cost of keeping certifications current, maintaining or renting an aircraft, and paying for fuel. Personal flying patterns can span an entire generation so there is a lot of drag on change. In its 2007 General Aviation and Air Taxi Survey (GAATA), the FAA reports that 36.4 percent of all hours flown in 2007 were personal. This is substantially down from a peak of 44.3 percent personal flying on more hours flown. So both the number of total general aviation hours flown has declined and the relative share of these hours flown for personal use has also declined.

Exhibit 2-22: Hours Flown by Use, 1997 - 2007

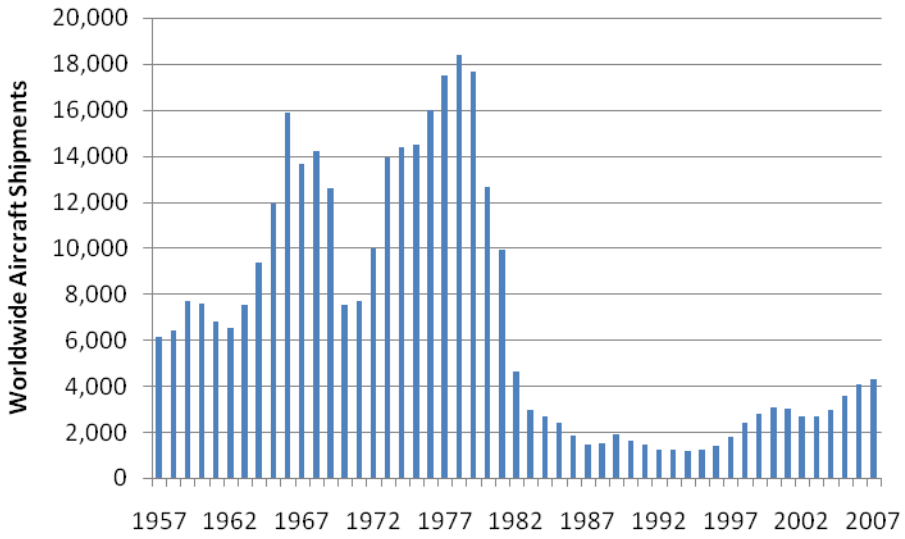


Source: FAA, 2007 General Aviation and Air Taxi Survey (GAATA)

Aside from obvious the deterrents to flying of high fuel costs and a weak economy data from the General Aviation Manufacturers Association (GAMA) and the FAA, suggests that one reason for fewer operations is the age of the general aviation fleet. **Exhibit 2-23** shows annual worldwide shipments of aircraft over the last 50 years. While this is a very long time horizon, general aviation aircraft stay in the fleet for quite a while. From 1965 until 1980, aircraft manufacturers delivered a huge a number of airplanes, 218,345 aircraft to be exact. Many of these are still active, but getting older. When the number of aircraft is correlated with the hours flown, it becomes clear that new aircraft fly significantly more hours than older aircraft. Aircraft under 25 years fly an average of 190 hours per year. Between 25 and 40 years, the average hours flown drops precipitously from 190 hours to 90 hours per year. Once an aircraft is over 40 years old, it may fly somewhere between 90 and 60 hours per year. A very large

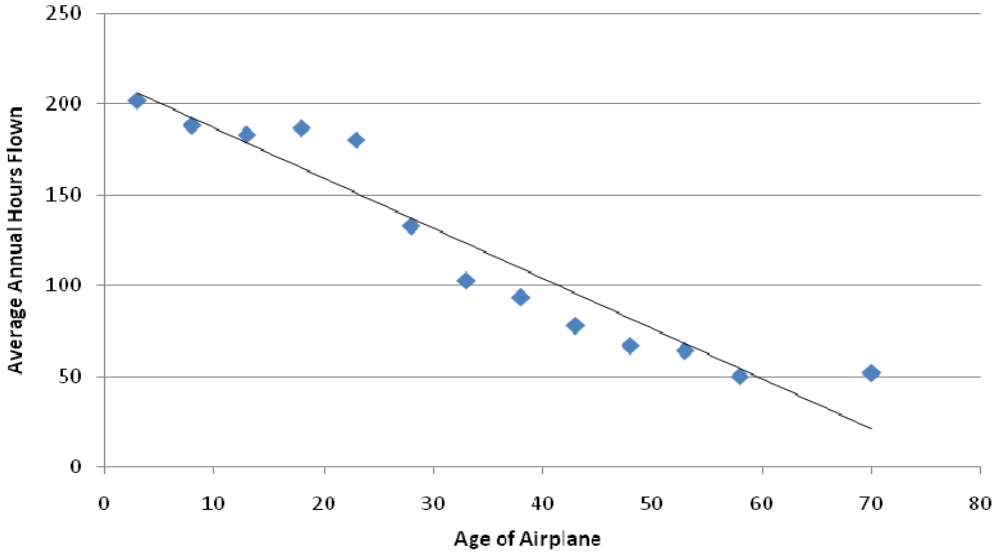
portion of the aircraft in the fleet is middle aged approaching over 40 years. This factor by itself could explain why there are few hours flown by the general aviation fleet.

Exhibit 2-23: Worldwide Aircraft Shipments, 1957 - 2007



Source: General Aviation Manufacturers Association

Exhibit 2-24: Relationship - Age of Airplane versus Average Annual Hours Flown

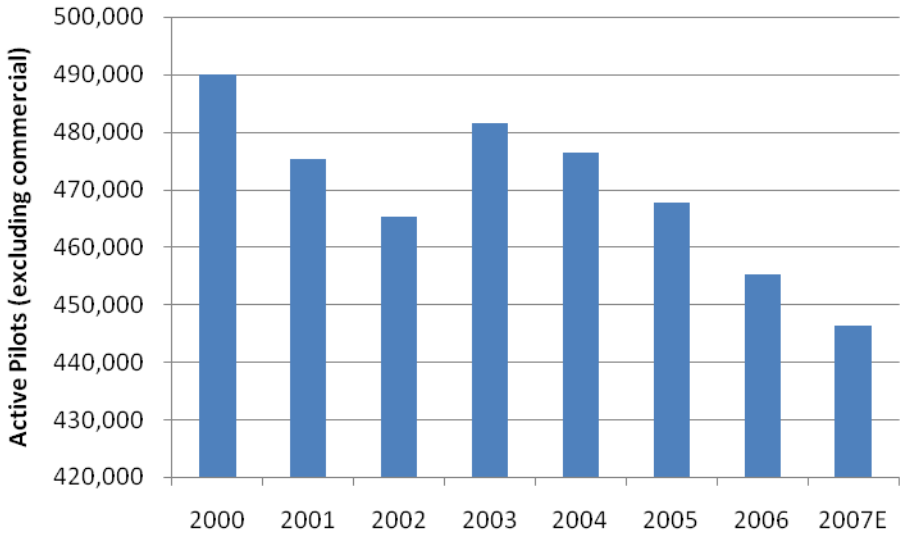


Source: General Aviation Manufacturers Association

Active Pilots

An important component of general aviation is the number of active pilots. **Exhibit 2-25** shows the number of active pilots certificated for general aviation. In every category except transport, rotorcraft and gliders, the number of active pilots is declining. The age of the pilot pool is not readily known, but the number of student pilots has declined 15 percent since 2000. So it is clear that new pilots are not replacing pilots that become inactive.

Exhibit 2-25: Active Pilots (Excluding Commercial Pilots)



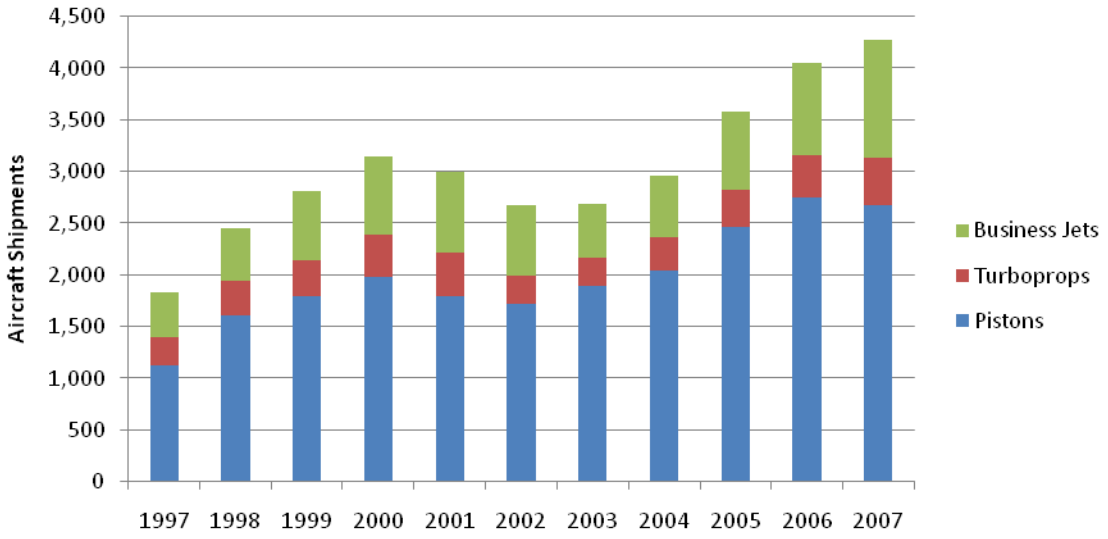
Source: FAA U.S. Civil Airmen Statistics

Increases in Business Jets and Turboprops

The data thus far suggests that while high fuel prices and economic weakness in the economy may be suppressing demand for general aviation and business flying. In addition, the general aviation fleet is getting older and a large number of these aircraft are flying fewer hours. The cost of newer aircraft is such that one-for-one replacement of aircraft does not appear to be taking place. In addition, shipments of business jets and turboprops are increasing at a faster rate than shipments of piston aircraft. (See **Exhibit 2-26.**) Comparing **Exhibit 2-26** with **Exhibit 2-23** that shows a fifty year history of aircraft shipments suggests that the replacement process for aging aircraft is just beginning and that the replacement aircraft that are coming on line, a larger percentage of them are business class aircraft. This may have important implications for gauging the levels of future activity at airports that are predominantly used for personal flying. The trend is further supported by **Exhibit 2-27** which shows

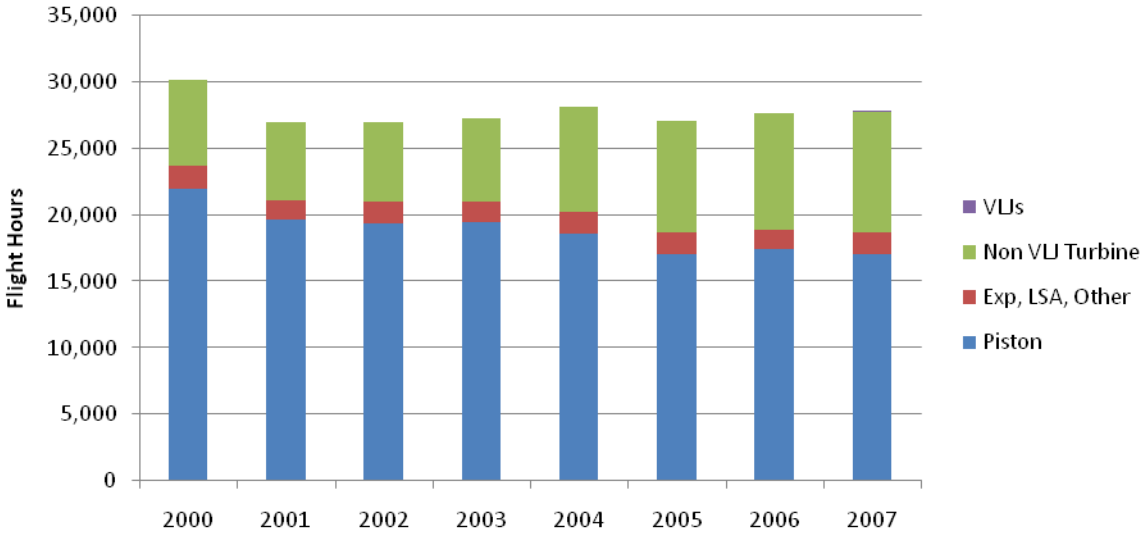
hours flown by types of aircraft. In this exhibit, total hours flown by piston aircraft are declining and hours flown by turbine aircraft are increasing.

Exhibit 2-26: Shipments by Type of Aircraft



Source: General Aviation Manufacturers Association

Exhibit 2-27: General Aviation Flight Hours by Type of Aircraft

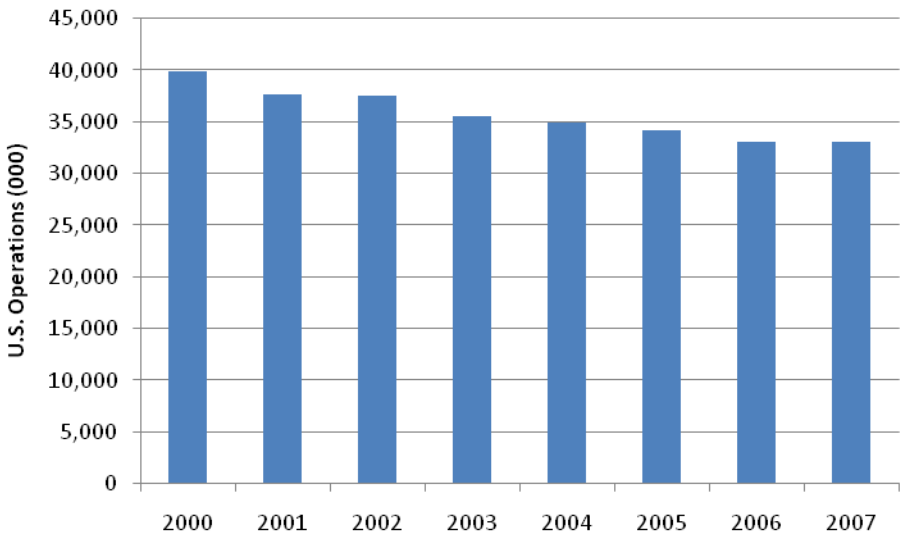


Source: FAA Aerospace Forecast Fiscal Years 2008-2025

General Aviation Operations

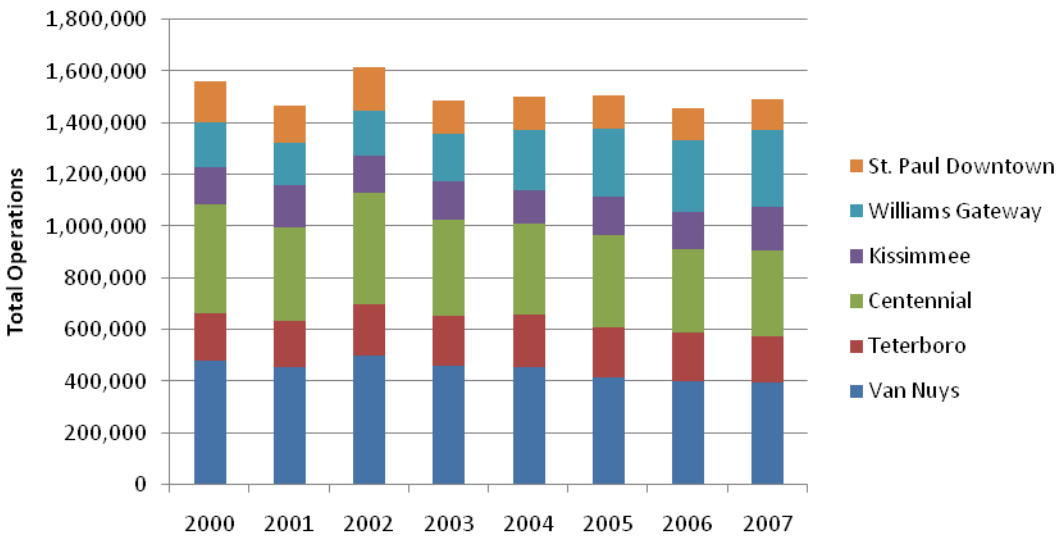
The composite trend is down for GA operations at airports throughout the country. (See **Exhibit 2-28**.), At the individual airport level, however, the experience is mixed. Airports that serve metropolitan areas primarily as business airports have seen less decline. This is true of St. Paul Downtown Airport and other larger general aviation airports such as Van Nuys, Teterboro, Centennial Airport, Williams Gateway and Kissimmee Gateway Airport.

Exhibit 2-28: U.S. General Aviation Operations, 2000 - 2007



Source: FAA Aerospace Forecast Fiscal Years 2008-2025

Exhibit 2-29: Total Operations at Larger General Aviation Airports

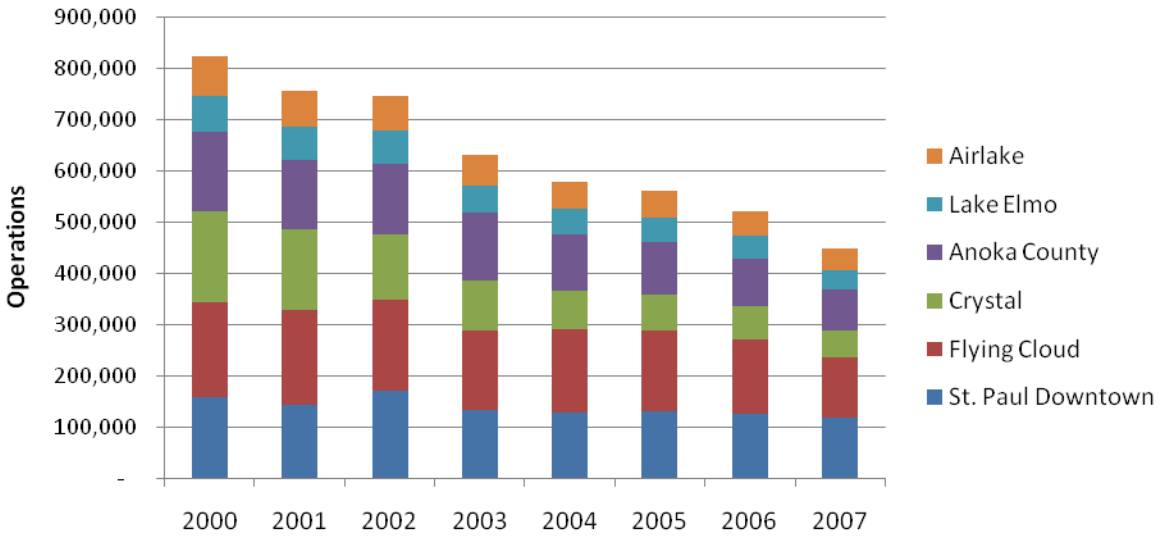


Source: FAA. Terminal Area Forecast data

Operations at MAC Reliever Airports

The Metropolitan Airport Commission owns and operates six reliever airports: Airlake, Lake Elmo, Anoka County, Crystal, Flying Cloud, Lake Elmo and St. Paul. In 2000, Total GA operations at these airports exceeded 824,000. In 2007, operations had shrunk to 448,500 or by 46 percent. The contraction did not occur evenly. St. Paul Downtown and Flying Cloud contracted the least; Crystal the most. **Exhibit 2-30** shows the history. The variation in experience at these airports underlies the importance of local conditions, service offered at an individual airport and community support.

Exhibit 2-30: Total Operations at Metropolitan Airport Commission Airports



Source: Metropolitan Airports Commission

Summary

This review of conditions in the aviation industry was written in November, 2008 in the midst of one of the most turbulent upheavals in the global economy. No sector was immune from its impact and at this writing a period of calm and stability has yet to materialize. The extreme condition of volatility in commodity prices and credit markets makes it difficult to discern whether the present situation is a disturbance or a structural change. Confidence in the markets leads to the view that our economy will readjust albeit at a smaller size. In this sense the airline industry has been working toward a smaller, leaner operation for some time in advance of many other sectors. It is a definite positive that the industry is now poised to react quickly and with determination to unexpected events.

There are a few implications of the analysis of trends. If we are looking at a mature and downsized industry in the United States, then airports and system of airports may need to fine tune priorities away from capacity increases to airport maintenance and investment in those segments of aviation (such as business flying) that have the potential to sustain activity and expand. The focus from a regional perspective should be on local demand at the GA airports, community support, and opportunities to serve identified segments of the GA market.

Southwest's entry into MSP has important implications for Greater Minnesota airports, especially St. Cloud, Rochester, and Brainerd. Duluth and Bemidji will also be impacted as there is a component of passengers to/from these areas that are willing to drive to MSP. Eau Claire, WI will definitely be

impacted. Northwest has already demonstrated that it will match Southwest prices at MSP, but it will also be important to stay vigilant on pricing at the out-state airports.

The full implications of the Delta-Northwest merger are unfolding. There is evidence from other mergers that consolidation may bring a smaller hub operation at MSP with more emphasis on origin and destination traffic. The flip side of less single carrier dominance is of course more competition and better average pricing.

Chapter Three - Forecasts

Forecasts of commercial and general aviation activity, presented in this chapter, estimate the level of activity expected at airports in the Twin Cities metropolitan region and the collar counties. These projections assist in verifying the roles of individual airports and bracket future levels of activity to determine whether there are any outstanding capacity issues that the regional system plan should address.

The chapter examines and projects the following components of activity:

- Annual passenger enplanements
- Based general aviation aircraft
- Aircraft operations

The forecast period is 2008-2030.

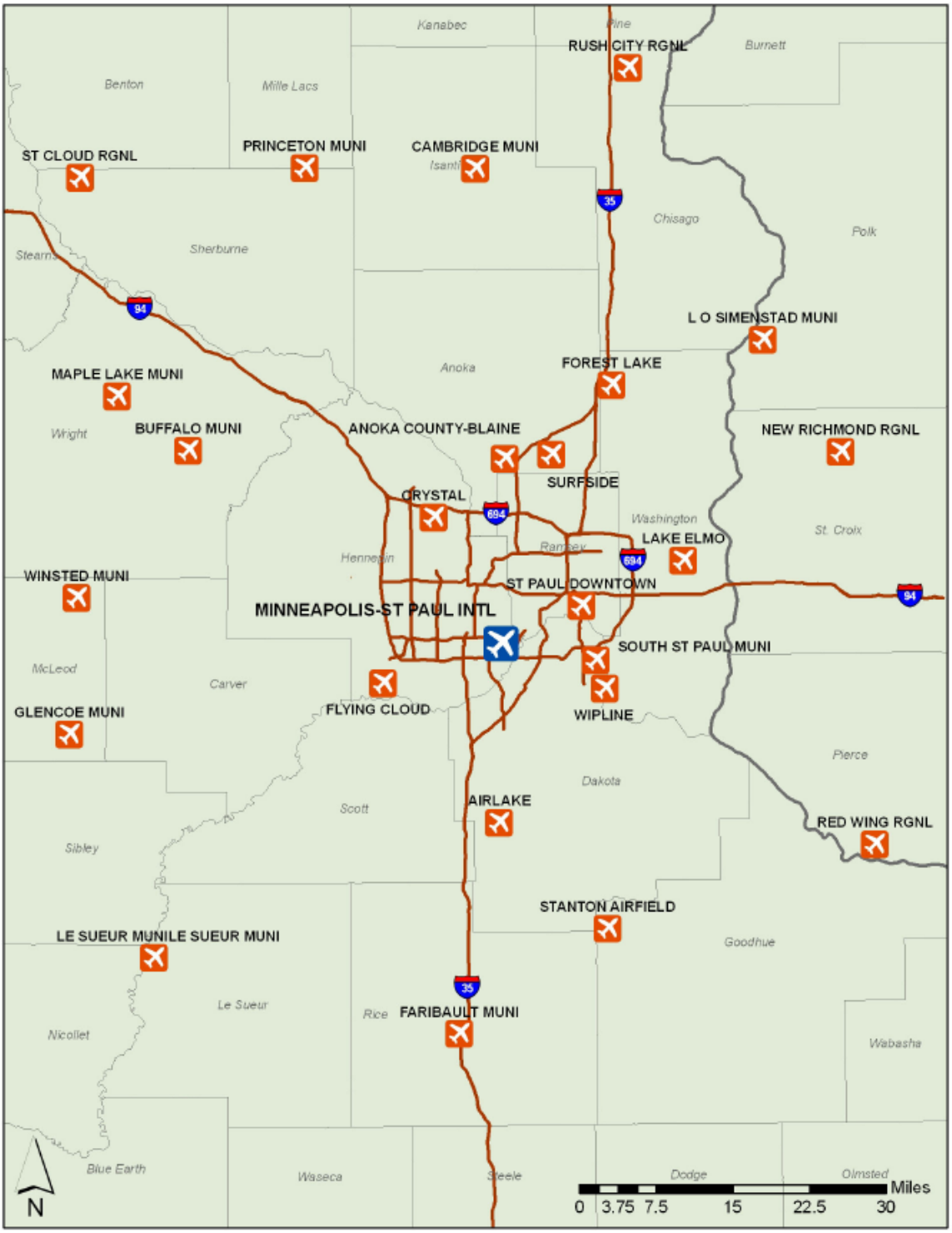
The airports considered take in a larger region than previously used for Metropolitan Council System Plan forecasts. **Exhibit 3-1** lists the Twin Cities' metropolitan region airports and the collar county airports. **Exhibit 3-2** shows the airports on a map. Altogether the region encompasses 11 airports in the metropolitan region and 14 collar county airports for a total of 25 airports. The Metropolitan Airports Commission (MAC) owns seven of the metropolitan region airports. St. Cloud Regional Airport is included as a collar county airport and is the only other commercial service airport in the group. Two of the collar county airports are in Wisconsin, L O Simenstad Municipal and New Richmond Regional.

Exhibit 3-1: Twin City Metropolitan Region and Collar County Airports

MAC Airports	Other Metropolitan Region Airports	Collar County Airports
Minneapolis-St. Paul Int'l	Forest Lake	Buffalo Municipal
Airlake	South St. Paul Municipal	Cambridge Municipal
Anoka County-Blaine	Surfside SPB	Faribault Municipal
Crystal	Wipline SPB	Glencoe Municipal
Flying Cloud		L O Simenstad Municipal, WI
St. Paul Downtown		Le Sueur Municipal
Lake Elmo		Maple Lake Municipal
		New Richmond Regional, WI
		Princeton Municipal
		Red Wing Regional
		Rush City Regional
		St. Cloud Regional
		Stanton Airfield
		Winsted Municipal

Source: Metropolitan Council

Exhibit 3-2: Map of Airports in the Metropolitan Region and Collar Counties



Source: Metropolitan Council

The larger catchment area for system planning purposes is indicative of two observed trends. First, the metropolitan area is spreading beyond the seven counties. To the northwest, the I-94 corridor is one of the fastest growing areas. With the Northstar Commuter Rail scheduled to begin operations in the fall of 2009, it will be possible to ride from Big Lake into the downtown, transfer to the Hiawatha Light Rail and go directly to Minneapolis-St. Paul International Airport (MSP). Anticipated connections either by bus or by rail between St. Cloud Regional Airport and Big Lake will enable passengers to get to St. Cloud Regional or MSP.

The second observed trend involves location patterns for based general aviation aircraft. There has been a flow of based aircraft out to the perimeter airports where the cost to hangar an aircraft is typically lower than the metropolitan region. Furthermore, the MAC does not permit the increasingly popular ultralight aircraft to operate at MAC airports. While ultralight aircraft need not be based at an airport at all, analysis of based aircraft shows growth of recreational aircraft at the perimeter and collar county airports. Consequently, for purposes of planning for general aviation at non-MAC airports, it is important to look at general aviation activity in a larger geographic region around the metropolitan region.

Economic volatility in the U.S. during 2008 and 2009 injected a high level of uncertainty into all public and private business planning. Forecasting remains a building block for system planning but it is clearly more art than science. Typically, forecasts include high and low ranges of possible futures. However, recent history confirms a high risk environment that might lead to outcomes beyond a traditional forecasting range.

For Minnesota, the most critical variables for forecasting are the following:

- The timing and pace of economic recovery from the current recession
- The price of jet and 100LL fuel
- The availability of credit and the degree to which general business and aviation in particular can maintain and/or expand activity
- Recovery in corporate aviation after recent disinvestment in the sector
- The build out of Southwest Airlines service at MSP
- The integration of Northwest's hub at MSP into the Delta system.

The level of uncertainty warrants a discussion of how these variables could influence the forecasts. The chapter is organized to first present forecasts for general aviation airports, then for MSP. As part of the discussion for MSP, 'high impact' variables are examined to see how they might affect the forecasts. To further gauge the future for MSP, Chapter 4 takes a closer look at how Southwest Airlines has recently built out service in other large cities and also compares aviation activity at MSP with activity levels at other hub airports.

Forecast Approach

As part of its Long Term Comprehensive Plans (LTCPs), MAC has recently prepared forecasts for MSP and the six reliever airports under its ownership. To integrate the MAC and Metropolitan Council planning efforts, the MAC forecasts have been adopted here and in the case of the reliever airports, interpolated so that planning years are consistent with this Regional Aviation System Plan. For other general aviation airports, a bottom up forecast for each individual airport was prepared after reviewing existing Master Plans, FAA Terminal Area Forecasts, and the Minnesota Statewide Aviation System Plan. FAA forecast assumptions incorporate a decline of activity in 2009, followed by an extended recovery that does not attain 2008 levels of activity until 2013. The outlook for sport aircraft and micro-jet growth is also dampened.

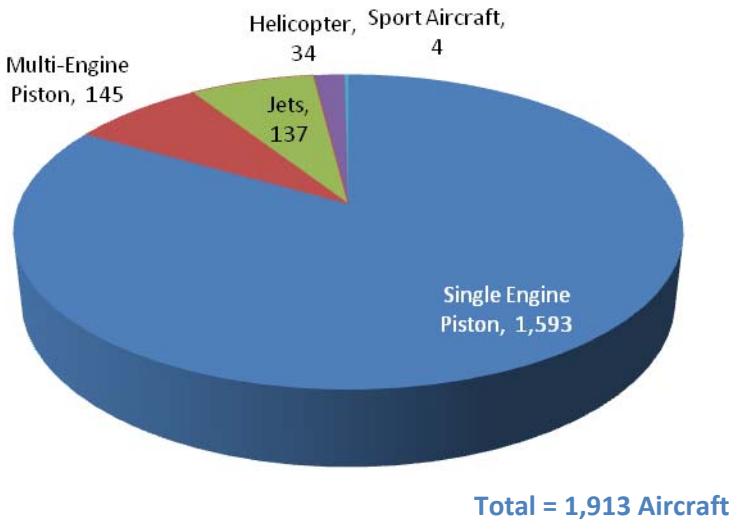
General Aviation Forecasts

Forecasts for general aviation activity estimate the number of based aircraft as well as the number of operations expected over the forecast period. Metropolitan region and collar counties are presented separately.

Current Based Aircraft

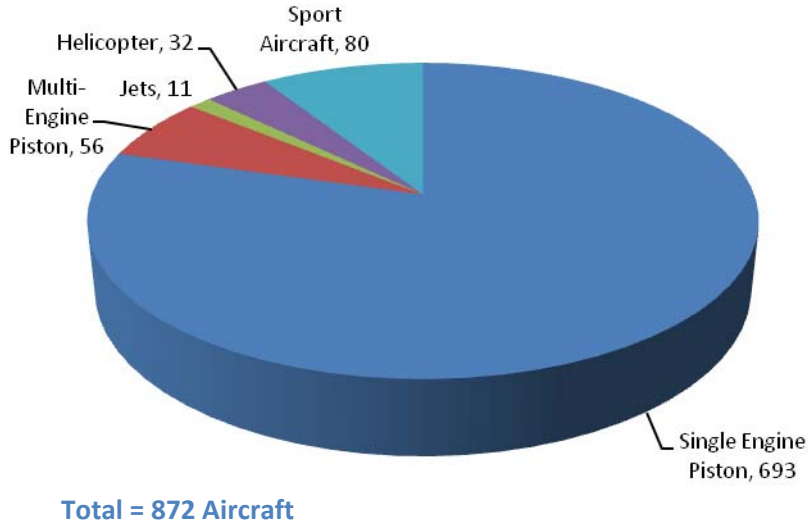
In 2007, there were an estimated 1,913 aircraft based metropolitan region airports and 870 in the collar counties for a total of 2,785 aircraft based in the region. **Exhibits 3-3, 3-4** and **3-5** show the distribution of aircraft by type of aircraft. In both areas, single engine piston aircraft make up the vast majority of aircraft. Of note, the percent share of single engine aircraft in the metropolitan region and collar counties is higher than the national share of this type of aircraft where single engine piston aircraft make up only 64 percent of the active fleet. In the collar counties, piston aircraft represent almost 80 percent of the fleet and in the metropolitan region it is 83 percent. Also there are few sport aircraft in the metropolitan region; approximately 80 are based in the collar counties.

Exhibit 3-3: Based Aircraft in the Metropolitan Region, 2007



Source: Metropolitan Airports Commission 2007 Annual Report to the Legislature and FAA 5010 Form, October 2008

Exhibit 3-4: Based Aircraft in Collar Counties, 2007



Source: Metropolitan Airports Commission 2007 Annual Report to the Legislature and FAA 5010 Form, October 2008

Exhibit 3-5: Based Aircraft Mix Detail, 2007

Region	Single Engine	Multi-Engine	Jet	Helicopter	Sport Aircraft	Total
Metropolitan Region	**1,593**	**145**	**137**	**34**	**4**	**1,913**
Metropolitan Region Distribution	83.3%	7.6%	7.2%	1.8%	0.2%	100.0%
Collar Counties	**693**	**56**	**11**	**32**	**80**	**872**
Collar County Distribution	79.5%	6.4%	1.3%	3.7%	9.2%	100.0%
Total Region	**2,286**	**201**	**148**	**66**	**84**	**2,785**
Regional Distribution	82.1%	7.2%	5.3%	2.4%	3.0%	100.0%
National Distribution	64.3%	8.2%	8.5%	4.3%	5.1%	100.0%

Source: Metropolitan Airports Commission 2007 Annual Report to the Legislature and FAA 5010 Form, October 2008

Based Aircraft Forecasts

MAC Airports

Various methodologies are typically employed to make based aircraft forecasts, using socio-economic correlations, trend analysis, and the application of national growth rates. The MAC uses a sophisticated approach to prepare its based aircraft forecasts. Presented below is an overview of the methodology:

- Three data sets serve as input into the forecast:
  - Projected income in the seven county region is used as a proxy for future economic conditions. (Income typically correlates strongly with general aviation activity.)
  - Current based aircraft at MAC airports serves as the starting point for the forecasts. Historical changes in the number of based aircraft at each airport are used to establish recent trends.
  - Planned capital improvement projects at MAC airports are also identified in case they might impact airport capacity or general aviation activity over the forecast period.
- The MAC forecasts are constructed through a multi-step process. They begin with a top down analysis that compares the number of based aircraft at MAC airports with the total number of active aircraft in the U.S. The MAC has been tracking its share of based aircraft historically. The share analysis identifies whether based aircraft are tracking or deviating from national trends.
- A region-wide forecast of based aircraft was prepared using (1) aircraft registration data from the MNDOT Office of Aeronautics; (2) historical fleet mix at MAC airports; (3) income projections; and, (4) FAA growth rates for each category of aircraft.
- The regional projections of based aircraft were then distributed among MAC airports. Some registered aircraft were assigned to non-MAC airports, such as South St. Paul Municipal Airport.

- Three additional adjustments were made to the unconstrained based aircraft forecast.

- Hangar waiting lists were examined to determine whether there was unmet demand that could be accommodated during the forecast period.
- Where capacity for based aircraft was limited (such as MSP), some forecast aircraft were redistributed to other metropolitan region airports that are not constrained for based aircraft.
- Lastly, ultralight aircraft were not assigned to MAC airports as these aircraft are not permitted to operate at MSP or relievers.

Other Airports

For based aircraft not at MAC airports, adjusted FAA national growth rates were applied to the actual fleet mix at every airport. FAA growth rates were adjusted downward for 2008 to 2010 to account for the current recession. These adjusted growth rates were then applied to the 2007 fleet mix at each non-MAC airport to obtain a weighted average annual growth rate for the airport. The resulting forecasts for based aircraft are shown in **Exhibit 3-6** and **Exhibit 3-7.** MAC reliever airport forecasts were interpolated to conform to the system plan forecast years.

Results

The FAA projects that the single engine and multi-engine fleet of piston aircraft is either declining or growing very slowly. Since the general aviation fleet in the metropolitan region and collar counties is predominantly aircraft in this category, the forecasts of based aircraft indicate low growth or declining based aircraft. There is some initial growth in based aircraft at Anoka, Crystal, and Airlake from aircraft on the waiting list as well as additions to the fleet. But predominantly, piston aircraft will decline over the entire forecast period at most metropolitan region airports as the number of active pilots decline and aircraft are retired at a faster rate than they are replaced. Business aircraft and light sport aircraft are the two types of general aviation aircraft showing some growth. The growth in business aircraft is reflected in additional based aircraft at St. Paul Downtown Airport, where, although there are limits to the area available for expansion, MAC determined that the airport could accommodate modest increases in based aircraft. The slightly higher rate of growth in collar county airports is attributable to a fleet mix that contains more sport and ultralight aircraft, which are categories of aircraft expected to grow in the future.

Exhibit 3-6: Forecast of Based Aircraft in the Metropolitan Region

Metro Airports	2007	2015	2020	2030	Average Annual Growth
Minneapolis-St. Paul Intl.	24	27	30	30	1.0%
Airlake	162	211	203	204	1.0%
Anoka County-Blaine	437	452	433	409	-0.3%
Crystal	244	269	254	246	0.0%
Flying Cloud	421	411	406	396	-0.3%
Forest Lake	26	26	27	30	0.7%
Lake Elmo	229	261	247	248	0.3%
St. Paul Downtown	83	107	118	127	1.9%
South St. Paul Municipal	237	235	242	255	0.3%
Surfside SPB	45	42	42	43	-0.2%
Wipline SPB	5	5	5	5	0.0%
Total	**1,913**	**2,046**	**2,007**	**1,993**	**0.2%**

Sources: Metropolitan Airport Commission and KRAMER aerotek, inc.

Exhibit 3-7: Forecast of Based Aircraft in the Collar Counties

Collar County Airports	2007	2015	2020	2030	Average Annual Growth
Buffalo Municipal	51	50	52	55	0.3%
Cambridge Municipal	42	42	43	45	0.3%
Faribault Municipal	64	64	65	69	0.3%
Glencoe Municipal	34	31	32	35	0.1%
L o Simenstad Municipal	73	72	74	78	0.3%
Le Sueur Municipal	43	43	45	47	0.4%
Maple Lake Municipal	54	53	55	58	0.3%
New Richmond Regional	168	158	163	178	0.2%
Princeton Municipal	33	34	35	38	0.6%
Red Wing Regional	55	56	58	66	0.8%
Rush City Regional	52	52	53	59	0.5%
St. Cloud Regional	105	106	110	122	0.7%
Stanton Airfield	47	48	50	55	0.7%
Winsted Municipal	51	51	53	57	0.5%
Total	**872**	**861**	**889**	**962**	**0.4%**

Source: KRAMER aerotek, inc.

General Aviation Operations

General aviation operations have declined across the country for a variety of reasons. The most important reasons are:

- The general aviation fleet is aging. Some aircraft remain active for 40 years but tend to fly fewer hours as the aircraft ages.
- The pilot population is also aging. Pilots are retiring at a faster rate than new pilots are obtaining certification.
- The volatility and rise of fuel prices has dampened recreational flying activity.
- Bad publicity about corporate aircraft and tight credit has resulted in a decline in business aviation.

The forecasts for general aviation operations for the metropolitan region and collar counties are derived from based aircraft forecasts. Consequently based aircraft trends will drive forecasts of operations. That said, general aviation activity is difficult to forecast for four reasons: (1) the relationship between economic growth and pricing is harder to determine statistically than demand for commercial air service; (2) many airports in the region do not have air traffic control towers so base year operations are at best an estimate; (3) the volatility of fuel prices and its influence on general aviation activity injects a level of uncertainty; and lastly (4) the emergence of micro jets as the next generation aircraft has been slower than first anticipated.

Two different methodologies were used to estimate general aviation operations. For MAC airports, base year operations were determined by either tower records or Airport Noise and Operations Monitoring System data. For the other airports, base operations were taken from the 5010 Airport Master Records and Reports.

Forecasts of general aviation operations are derived from based aircraft forecasts, so additions or deletions from the fleet of based aircraft will carry across to the forecasts of operations.

The MAC forecasts incorporated FAA forecast assumptions about average aircraft utilization and flight hours flown per based aircraft. The forecasts assume that operations per hours flown remain constant, touch and go operations in each aircraft category also remain constant as do military operations.[1] The MAC airport operations forecasts also test sensitivity to the price of oil. The MAC forecasts address three scenarios: a high, base and low forecast. The base (moderate) forecast is presented here in this chapter.

Forecasts of general aviation operations at the other metropolitan region and collar county airports were derived using the ratio of operations to based aircraft (OPBA). Since local operations prevail at many of the collar county airports, the number of operations per based aircraft is a valid relationship

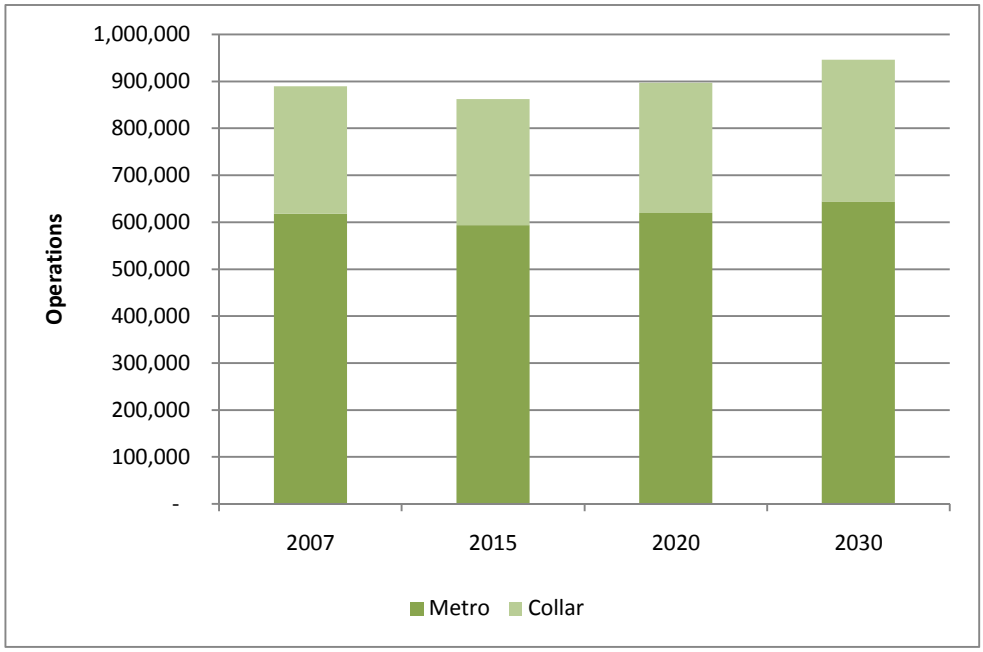
[1] HNTB Technical Report, April, 2009

and the one used to estimate future general aviation operations. The methodology involves first establishing the current level of operations per based aircraft and using the forecast of based aircraft as the driving variable for increasing or decreasing operations. In this instance where operations nationally are mostly flat or declining this conservative methodology is appropriate. **Exhibit 3-8, 3-9, and 3-10** shows the forecast for general aviation operations. **Exhibit 3-11** is a summary table of total based aircraft and operations for the region over the forecast period.

The metropolitan region generates twice the number of operations that take place in the collar counties. This makes sense as the relationship of based aircraft is similar. The collar counties are growing faster in terms of general aviation operations at an annual rate of about .5 percent per year although no single airport in the collar counties, with the exceptions of St. Cloud and New Richmond, WI have as many operations as the MAC reliever airports.

In summary, based aircraft in the region are expected to grow from 2,785 to 2,955 over the forecast period and operations are projected to grow from 913,000 to 965,000.

Exhibit 3-8: Forecast of Metropolitan Region and Collar County General Aviation Operations



Sources: Metropolitan Airport Commission and KRAMER aerotek, inc.

Exhibit 3-9: Forecast of General Aviation Operations at Metropolitan Region Airports

Metro Airports	2007	2015	2020	2030	Average Annual Growth
Minneapolis-St. Paul Intl.	45,850	51,590	57,320	57,320	1.0%
Airlake	65,000	84,660	81,450	81,850	1.0%
Anoka County-Blaine	86,840	73,330	75,970	77,650	-0.5%
Crystal	53,580	59,070	55,780	54,010	0.0%
Flying Cloud	124,570	97,150	106,030	111,070	-0.5%
Forest Lake	8,000	8,030	8,350	9,230	0.6%
Lake Elmo	74,230	66,810	68,560	73,940	0.0%
St. Paul Downtown	128,250	117,400	130,060	139,940	0.4%
South St. Paul Municipal	51,000	50,670	52,040	54,910	0.3%
Surfside SPB	4,100	3,850	3,860	3,900	-0.2%
Wipline SPB	130	120	120	120	-0.3%
Total	**641,550**	**612,680**	**639,540**	**663,940**	**0.1%**

Sources: Metropolitan Airport Commission and KRAMER aerotek, inc.

Exhibit 3-10: Forecast of General Aviation Operations at Collar County Airports

Collar County Airports	2007	2015	2020	2030	Average Annual Growth
Buffalo Municipal	22,130	21,870	22,500	23,830	0.3%
Cambridge Municipal	16,750	16,630	17,110	18,110	0.3%
Faribault Municipal	18,500	18,380	18,900	20,000	0.3%
Glencoe Municipal	10,620	9,800	10,130	10,840	0.1%
L O Simenstad Municipal	7,650	7,550	7,760	8,200	0.3%
Le Sueur Municipal	2,500	2,530	2,590	2,740	0.4%
Maple Lake Municipal	20,000	19,760	20,350	21,650	0.3%
New Richmond Regional	44,000	41,370	42,610	46,560	0.2%
Princeton Municipal	13,000	13,320	13,780	14,790	0.6%
Red Wing Regional	13,350	13,530	14,150	15,950	0.8%
Rush City Regional	7,800	7,730	7,970	8,820	0.5%
St. Cloud Regional	66,360	67,080	69,650	77,110	0.7%
Stanton Airfield	15,000	15,330	16,000	17,680	0.7%
Winsted Municipal	13,550	13,680	14,130	15,090	0.5%
Total	**271,210**	**268,560**	**277,630**	**301,370**	**0.5%**

Source: KRAMER aerotek, inc.

Exhibit 3-11: Summary Table of Based Aircraft and General Aviation Forecasts

	2007	2015	2020	2030	Average Annual Growth
Total Based Aircraft	2,785	2,907	2,896	2,955	0.3%
Total Operations	912,760	881,240	917,170	965,310	0.2%

Sources: Metropolitan Airport Commission and KRAMER aerotek, inc.

Minneapolis-St. Paul International Commercial Service Forecasts

The Regional Aviation System Plan incorporates the MAC forecasts for Minneapolis-St. Paul International Airport (MSP) into this document.

Background

The Metropolitan Airports Commission is updating the Long-Term Comprehensive Plan for MSP. An important element of the plan is revised forecasts of aviation activity. These drive the assessment of whether there is a good match between landside and airfield capacity and anticipated demand. The components of the forecasts include: scheduled domestic and international passengers, non-scheduled passengers, air cargo, general aviation and military activity. Passenger and operations forecasts are summarized in this chapter. The complete forecasts and methodology are presented in a technical report prepared by HNTB, "Minneapolis-St. Paul International Airport Long-Term Comprehensive Plan Forecast."

The passenger forecasts for MSP are developed by separately forecasting originating, connecting, international and domestic passengers. Once the passenger forecast is made, operations are estimated built upon projections about future air service, load factors, and fleet mix. The forecasts include a base case and four scenarios. The scenarios change assumptions about (1) the cost of fuel (2) the rate of economic growth; and (3) the amount of connecting activity at MSP. Each scenario examines what happens when assumptions about a particular variable are changed. For example, what happens if fuel prices stay persistently high or what if connecting activity at MSP becomes a much smaller component of airport activity?

Trends Analysis

To prepare the forecasts, historical trends are evaluated. Economic trends include population, employment, income and per capita income in the seven counties that comprise the Metropolitan Council. The counties are: Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington counties. Trend analyses of passenger activity and aircraft operations at MSP were also evaluated. These are summarized in the next sections.

Passenger Trends

From an airport planning perspective, the following types of passenger activity are important:

- How many passengers are boarding aircraft (passenger enplanements)?
- How many passengers are originating from the region?
- How many are connecting passengers?
- How many passengers are destined for international versus domestic cities?

These trends are summarized below.

Domestic Trends

Enplanements. In 2008, MSP enplaned 15.1 million domestic passengers. This was down 5.1 percent from 2007. Many other large U.S. airports also experienced service and capacity reductions in 2008 following a spike in fuel prices that peaked in July 2008 and pushed crude oil to over $140 a barrel. In October 2008, upheaval in the financial industry impacted every sector of the economy. The airlines reacted quickly to reduce capacity further. Demand for air service also contracted in the last quarter of 2008 and into 2009.

Connecting Traffic. Over the last 15 years, connecting traffic at MSP has represented as much as 58 percent of enplanements. However from 2004 to 2008, the share connecting passengers has fallen from 58 percent to 52 percent. **Exhibit 3-12** shows a time series of originating and connecting traffic starting in 1990 and **Exhibit 3-13** graphs the trend.

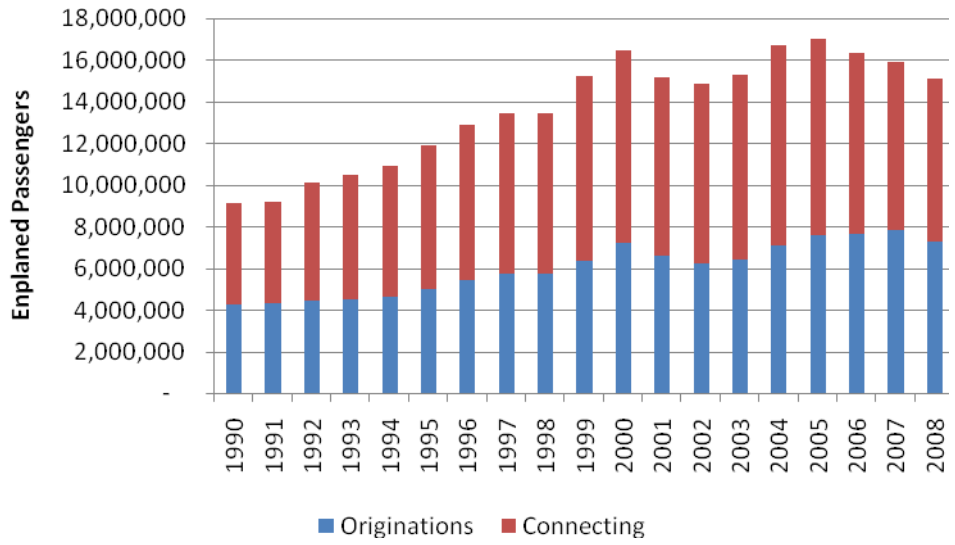
Exhibit 3-12: Domestic Originating and Connecting Enplanements at MSP, 1990 - 2008

Year	Originations	Connecting	Total Enplanements	Percent Connecting
1990	4,284,240	4,820,837	9,105,077	53%
1991	4,288,090	4,887,217	9,175,307	53%
1992	4,414,590	5,702,582	10,117,172	56%
1993	4,511,050	5,989,964	10,501,014	57%
1994	4,598,270	6,309,846	10,908,116	58%
1995	5,021,830	6,883,964	11,905,794	58%
1996	5,411,820	7,451,712	12,863,532	58%
1997	5,750,780	7,700,184	13,450,964	57%
1998	5,736,650	7,729,307	13,465,957	57%
1999	6,365,610	8,866,000	15,231,610	58%
2000	7,225,020	9,258,588	16,483,608	56%
2001	6,603,320	8,585,287	15,188,607	57%
2002	6,207,930	8,640,616	14,848,546	58%
2003	6,390,140	8,905,671	15,295,811	58%

Year	Originations	Connecting	Total Enplanements	Percent Connecting
2004	7,074,980	9,605,091	16,680,071	58%
2005	7,609,360	9,378,170	16,987,530	55%
2006	7,643,820	8,690,318	16,334,138	53%
2007	7,857,050	8,046,059	15,903,109	51%
2008	7,291,815	7,795,574	15,087,389	52%

Source: Metropolitan Airport Commission

Exhibit 3-13: Domestic Origination and Connecting Enplanement Trends

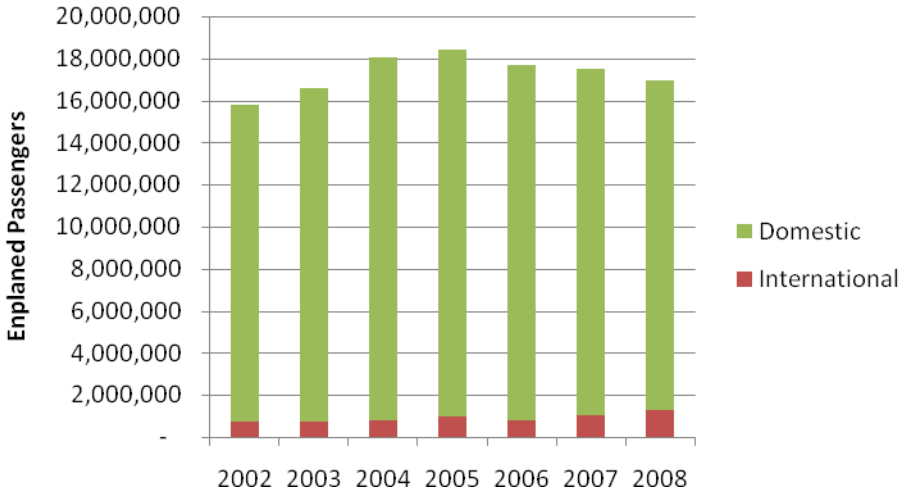


Source: Metropolitan Airport Commission

International Traffic

International passenger enplanements have grown steadily but still represent a relatively small portion of total enplanements. In 2002, international passengers represented less than 5 percent of total MSP enplanements; in 2008 international enplanements had grown from 741,000 enplaned passengers to almost 1.3 million and now represents 8 percent of MSP enplanements. **Exhibit 3-14** shows the trend**.**

Exhibit 3-14: International and Domestic Enplanement Trends

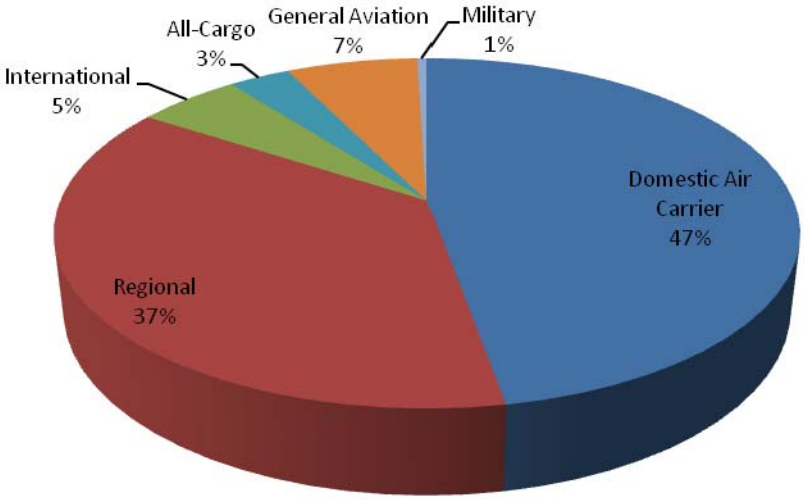


Source: Metropolitan Airport Commission

Trends in Aircraft Operations

Aircraft operations at MSP include: air carrier, regional, charter, all cargo, general aviation and military operations. In 2004, total operations peaked at 541,093. In 2008, total operations stood at 450,044. Eighty-nine percent of these operations involve commercial air service as **Exhibit 3-15** shows.

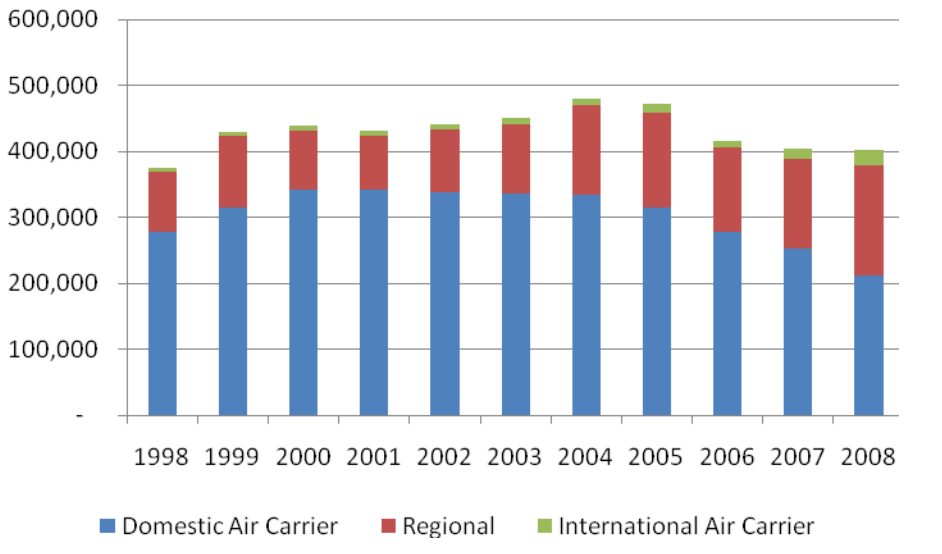
Exhibit 3-15: Aircraft Operations, 2008



Source: Metropolitan Airport Commission

While the trend in aircraft operations is down, not every segment is declining. The largest growing segments are regional and international operations. Domestic operations have declined the most. **Exhibit 3-16** shows a ten year history of commercial service operations by major segment

Exhibit 3-16: Commercial Service Aircraft Operations, 1998 - 2008



Source: Metropolitan Airport Commission

Passenger Forecasts

Forecasting passengers and operations at MSP is complicated by the Delta-Northwest's merger in October, 2008 and the entry of Southwest Airlines into the market in March, 2009. Against this backdrop of airline changes are the deep recession that began in the fall of 2008, high volatility in fuel prices, and a global credit crisis. In other words, there are many variables that can and will impact airport activity.

To address the uncertainty, the MAC examined the outlook for passengers in three component groups:

1. Domestic enplaned passenger (originating and connecting)
2. International enplaned passenger (originating and connecting)
3. Domestic passenger originations (local passengers beginning their trip at MSP)

For each group of passengers, the MAC prepared a base forecast and four scenarios:

- Scenario 1: High Fuel Cost
- Scenario 2: Low Fuel Cost
- Scenario 3: High Economic Growth
- Scenario 4: Declining Connections

To get a handle on the range of possible futures with respect to passengers, **Exhibit 3-17** presents the base case and scenario forecasts. Each of the forecasts is rounded to better observe the variations that result from the different scenarios and assumptions. Several observations are immediately apparent:

- Despite short term declines, total enplanements will grow over the forecast period at an average annual rate of between 1.2 and 3.0 percent. International passengers will grow at a faster rate, although the base is much smaller.
- High fuel prices results in the lowest number of forecast enplanements and significantly constrains international travel.
- Low fuel prices and high economic growth are the greatest stimulants of traffic.
- Declining connections is the second most important contributor to lower enplaned passengers.
- *The degree of uncertainty is very high and forecasts project a wide band of possible futures*. For total enplanements, by 2030, the difference between a prolonged period of high cost fuel or low cost fuel is almost 10 million passengers or a 45 percent difference.
- There is a 75 percent difference or 1.3 million passengers between the highest and lowest international passenger forecast.
- The originating passenger forecast exhibits the smallest range of possible outcomes. This scenario effectively sizes the MSP market as a local origin and destination market (no hubbing). In 2030, the local MSP market is forecast to be between 14.2 and 18 million originating enplanements.

Exhibit 3-17: Forecast of Passengers at MSP

Originations	2008	2015	2020	2030	Average Annual Growth 2008-2030	Difference in Scenarios By 2030	
Base Case	8,287,800	10,654,300	12,333,800	16,624,900	3.2%		
High Fuel Cost	8,287,800	9,904,000	11,280,800	14,707,500	2.6%		
Low Fuel Cost	8,287,800	11,114,200	13,054,900	18,256,800	3.7%		
High Economic Growth	8,287,800	11,378,000	13,217,200	17,979,100	3.6%		
Declining Connections	8,287,800	10,654,300	12,333,800	16,624,900	3.2%		
2030 High/Low Difference						3,549,300	24%
Total Enplanements	**2008**	**2015**	**2020**	**2030**			
Base Case	16,384,300	19,102,800	21,818,200	28,431,900	2.5%		
High Fuel Cost	16,384,300	16,651,500	18,068,000	21,401,100	1.2%		
Low Fuel Cost	16,384,300	19,921,300	23,063,000	31,111,200	3.0%		
High Economic Growth	16,384,300	20,421,200	23,378,500	30,656,300	2.9%		
Declining Connections	16,384,300	17,869,000	19,601,300	23,708,100	1.7%		
2030 High/Low Difference						9,710,100	45%
International (only)	**2008**	**2015**	**2020**	**2030**			
Base Case	1,264,500	1,472,500	1,836,600	2,839,500	3.7%		
High Fuel Cost	1,264,500	1,305,000	1,465,200	1,847,200	1.7%		
Low Fuel Cost	1,264,500	1,520,000	1,938,800	3,134,900	4.2%		
High Economic Growth	1,264,500	1,536,500	1,974,700	3,241,600	4.4%		
Declining Connections	1,264,500	1,423,500	1,699,400	2,422,100	3.0%		
2030 High/Low Difference						1,287,700	75%

Source: Metropolitan Airport Commission, interpreted by KRAMER aerotek, inc.

Built into the forecasts are expectations for Southwest Airlines traffic. The forecasts estimate that Southwest will attract approximately a quarter million enplaned passengers in 2010 and by 2030 will carry 1.9 million enplaned passengers. **Exhibit 3-18** shows annual and weekly passengers and extrapolates an estimate of weekly seats based on assumed load factors of 70 and 80 percent. Estimated seats allow comparison of implied MSP forecasts of Southwest capacity with levels of service offered at other Southwest cities.

Exhibit 3-18: Forecast Enplaned Passengers on Southwest Airlines at MSP

Year	Annual Enplanements	Weekly Enplanements	Weekly Seats @ 70% Load Factor	Weekly Seats @ 80% Load Factor
2010	224,044	4,309	6,155	5,386
2015	1,228,723	23,629	33,756	29,537
2020	1,407,229	27,062	38,660	33,828
2025	1,614,786	31,054	44,362	38,817
2030	1,850,451	35,586	50,837	44,482

Source: Metropolitan Airport Commission, interpreted by KRAMER aerotek, inc

Southwest Airlines has begun service at several large cities in the last few years, including Philadelphia in 2004, Pittsburgh in 2005, Denver in 2006 and Washington Dulles in 2006. Service at MSP began in March 2009 with three flights to Chicago Midway and has expanded service with three flights to Denver at the end of May 2009. To gauge possible expansion paths for Southwest, **Exhibit 3-19** summarizes weekly seats offered by Southwest at a sample of large cities in April 2009.

Exhibit 3-19: Southwest Airlines Scheduled Weekly Seats, April 2009

City	Weekly Seats
Minneapolis-St. Paul	7,398
Washington Dulles	10,275
Pittsburgh	20,186
Philadelphia	61,851
Denver	104,977
Baltimore	149,340
Chicago Midway	196,340

Source: Official Airline Guide

Chapter 4 analyzes in more depth the buildup of schedules and capacity at newer Southwest cities. The patterns at other cities suggest a more rapid initial development of service at MSP than is indicated by the current MAC forecasts. Whether the ultimate build out of Southwest service is typical of what has

happened at Philadelphia, Denver or Pittsburgh remains to be seen, however the MSP forecast may be conservative.

Operations Forecast

Forecasts of operations are built first from projections of future passenger enplanements. The enplanements are allocated to individual markets (destinations). Future non-stop service was estimated based on historical airline service patterns and a projection of revenue passengers in each destination market. Forecast load factors were used to make an estimate of seat departures in each non-stop market. These were converted to estimates of aircraft departures based on likely ways that airlines would accommodate demand in each market. **Exhibit 3-20** shows the base forecast of all aircraft operations by type of operation**. Exhibit 3-21** shows total operations under the base case and scenarios forecasts.

Exhibit 3-20: Summary of Forecast Aircraft Operations

Type of Operation	2008	2015	2020	2030	Average Annual Growth 2008-2030
Domestic Air Carriers	378,300	426,900	461,100	529,600	1.5%
International Air Carriers	24,100	28,800	32,500	47,100	3.1%
Charter	500	400	400	200	-4.1%
All Cargo Carriers	14,400	16,100	17,500	18,800	1.2%
General Aviation/Air Taxi	30,700	33,400	33,300	33,000	0.3%
Military	2,100	2,100	2,100	2,100	0.0%
Total	**450,000**	**507,700**	**546,900**	**630,800**	**1.5%**

Source: Metropolitan Airport Commission, interpreted by KRAMER aerotek, inc.

Exhibit 3-21: Forecast Aircraft Operations by Scenario

Scenarios	2008	2015	2020	2030	Average Annual Growth 2008-2030
Base Case	450,000	507,700	546,900	630,800	1.5%
High Fuel Cost	450,000	449,400	469,500	514,000	0.6%
Low Fuel Cost	450,000	534,000	583,900	697,800	2.0%
High Economic Growth	450,000	546,600	591,600	688,400	2.0%
Declining Connections	450,000	484,700	512,000	571,900	1.1%

Source: Metropolitan Airport Commission, interpreted by KRAMER aerotek, inc.

Summary

The forecasts presented in this chapter have been developed during a time of economic uncertainty. Rising fuel prices, a credit crisis of very large scope, the acquisition of Northwest Airlines by Delta Airlines all lead to higher levels of forecasting uncertainty. Within this environment, forecasts of aviation activity have been presented for the general aviation airports in the system, collar counties and MSP. Among the general aviation airports, growth is expected in the sport aircraft and business segments, while the more traditional (and largest) segment – single-engine pistons aircraft – is expected to decline slowly. At MSP, service by Southwest is expected to drive some growth, but two other factors – the merger between Delta and Northwest and the potential for persistent high costs for fuel – could dampen future activity levels at MSP over the forecast period.

Chapter Four – Peer System Comparisons

Introduction

The forecast chapter investigated past trends at Minneapolis-St. Paul International Airport (MSP) and at the region's general aviation airports. Future levels of activity were anticipated based on local conditions, FAA assumptions about the future direction of aviation, and other influential factors such as income growth and the price of fuel. For MSP, the forecasts also tested the implications of lower volumes of connecting passengers. This chapter examines some larger issues that may impact the future direction of MSP and the Metropolitan System general aviation airports. The following highlights key elements of this chapter.

- How does the regional system of airports compare with other metropolitan areas?
- How does MSP compare with its peers with respect to enplanements, operations, cargo?
- Are there any regional trends occurring within the U.S. that have resulted in changes in connecting patterns at network carrier hub airports?
- What can be learned from other large cities where Southwest Airlines has recently started service?

While no two regions or cities are exactly comparable, a review of changes taking place at other airports helps to identify national trends and separate them for specific local factors that are influencing MSP in particular. This chapter presents a high level overview of these trends.

Major Findings

The following summarizes the major findings of this chapter.

Comparisons of Regional Airport Systems

- Atlanta, Charlotte, Denver, Detroit, Minneapolis, Philadelphia and Pittsburgh were compared.
- The Minneapolis system has an above average number of reliever airports in its system and higher levels of aircraft operations.
- The Minneapolis system of airports also has a large number of based aircraft, and based general aviation jets by comparison.
- However, the Minneapolis system is below average for the number of airports with at least 5,000 feet of runway.

Top 20 Airport Comparison

- The top five largest airports have held the same enplanement rankings since 2000 as follows: (1) Atlanta; (2) Chicago O'Hare; (3) Los Angeles – LAX; (4) Dallas-Ft. Worth; and, (5) Denver. Newark and Orlando are rising in rank as is Charlotte.

- In 2007, MSP ranked 14th in the total number of enplanements; in 2000 it ranked 10th. Detroit has tracked closely with MSP in these rankings.
- Aircraft operations overall are declining at many of the top airports. However, where capacity permits, the most active airports appear to be attracting more traffic. Notable exceptions, include Dallas-Ft. Worth, Minneapolis-St. Paul, Detroit and Miami.

Changes in Airline Hubs

- Since 2000, American downsized its hub at St. Louis; US Airways closed its Pittsburgh hub, Delta closed its DFW hub and has cutback Cincinnati.
- The Delta/Northwest merger has resulted in a network that includes seven domestic hubs and nine regional carrier subsidiaries or code-sharing partnerships. The likelihood of further consolidation and capacity cuts are high, even if it is done on a system-wide basis.
- The fastest growing hub airports in the country are located either in the eastern or mountain regions. New York's JFK, Charlotte, Denver, Atlanta, Houston Intercontinental and Las Vegas have experienced the highest actual gains in enplanements.
- Except for Houston and Chicago Midway, central region hub airports are lagging behind the rest of the country.
- Surprisingly, three cities on the West Coast – Seattle, San Francisco, and Los Angeles – are also declining in terms of enplanements.
- In terms of population growth, the eastern region remains the largest with 70 million people, followed by the central region's population of 52 million, and the western region's population of 30 million.
- Average fares at airports appear to be converging. Airports that have lost status as fortress hubs have experienced a decline in average fares especially when low cost carriers have entered the market. Airports dominated by low cost carriers in 2000 have experienced increases in average fares.

Implications of Hub Closures and Reductions

- There is no doubt that every airport that has experienced a disruption or termination of its status as a connecting airport has seen reduced activity, lower utilization of airport facilities, and revenue losses.
- Since 2000, St. Louis enplanements are down 55 percent; Pittsburgh's are down 50 percent; and Cincinnati's are down 25 percent.
- Cincinnati departures are actually up by 24 percent as Delta has replaced larger jet aircraft with smaller gauge aircraft.
- Contingency planning for revenue diversification is a wise approach given the enormity of change when an airline closes or reduces hub activity at an airport.
- Through 2008, Minneapolis has maintained levels of connecting hub activity. Current agreements with Delta will keep MSP as a hub for the immediate future. However, MSP is

subject to capacity reductions that are consistent with those at other Delta domestic hub airports.

Southwest Entry Experience at Other Airports

- In better economic times, Southwest has entered new markets deliberately and aggressively.
- Denver service started in 2006 with 20 daily departures to five cities and continues in 2009 with 111 daily departures to 32 cities.
- Philadelphia service began in 2004 with 14 daily departures and immediately expanded to 28 departures to 13 cities. Service build-out occurred within four years and today Southwest offers 64 daily departures to 19 cities.
- Pittsburgh, which is half the size of MSP, has 22 daily flights to seven destinations.
- For an historical perspective, the Southwest startup at MSP included eight daily departures to Chicago Midway and then expanded with three departures to Denver. This was a conservative start, but these are also more difficult economic times.
- With an improved economy, Southwest could potentially expand to 35 to 40 daily departures at MSP.

Twin Cities Regional Aviation System Compared with other Regional Systems

A comparative analysis was conducted to provide insight into how other regional systems function when compared with MSP and its regional airport system. The analysis also evaluated the roles of these airports within the system and how the demographics of these similar metropolitan areas are tied to their airports. Six peer airport systems were identified for the comparative analysis with the Twin Cities Regional Airport System based on several factors, including:

- Only one major hub airport serves the metropolitan area,
- Low cost airline service was present at some time at the major hub airport, since Southwest recently began service at MSP, and;
- The airports rank in the top 20 in terms of activity.

The six similar metropolitan areas included in this analysis are Atlanta, Charlotte, Denver, Detroit, Philadelphia and Pittsburgh. A brief description of each associated airport is provided.

Atlanta is located in northern Georgia and served by the busiest airport in the world, Hartsfield-Jackson Atlanta International Airport (ATL) and opened it fifth parallel runway in 2006. The fifth runway provides ATL with simultaneous instrument flight rules (IFR) triple approach capability. The airport is served by Delta Air Lines and Air Tran, their low cost carrier. The Atlanta Metropolitan Statistical Area (MSA) consists of over 5 million people and includes 13 NPIAS airports within its regional system, as shown in Exhibit 4-1.

Charlotte is located in southwest North Carolina and is served by the ninth busiest airport in the U.S. US Airways utilizes Charlotte Douglas International Airport (CLT) as its mid Atlantic hub. The airport is currently constructing its third parallel runway, due to open in January 2010 and will provide

simultaneous IFR triple approach capability. Charlotte's MSA includes over 1.6 million residents and includes five NPIAS airports within its regional system, as shown in Exhibit 4-2.

Denver is located in the foothills of the Rocky Mountains in eastern Colorado and has the fifth busiest airport in the U.S. The Denver International Airport (DEN) is one of the newest airports, opening in 1995 and consists of six runways, four parallel north-south runways and two east-west runways. The newest runway opened in 2003 and the longest is 16,000 feet long. The airport is capable of simultaneous IFR triple approaches. DEN serves as a hub for United Airlines and Frontier Airlines, a low cost carrier. Southwest Airlines initiated service from DEN in 2008 with four gates. Denver's population includes almost 2.5 million people in 2007 and includes four NPIAS airports within its regional system, as shown in Exhibit 4-3.

Detroit is located in southeastern Michigan and is home to the eleventh busiest airport in the U.S. The Detroit Metropolitan Wayne County Airport (DTW) has six runways – four parallel northeast-southwest and two parallel in the east-west direction. The newest runway opened in late 2001 and provides simultaneous IFR triple approach capability. DTW served as one of Northwest Airlines major hubs, along with MSP and Memphis and is now a major hubbing operation for Delta Air Lines. Sprite Airlines is a low cost carrier and is based out of DTW, located in the recently opened North Terminal, separate from the Delta-Northwest McNamara Terminal. The Detroit MSA includes about 4.5 million people as of 2007 and includes 10 NPIAS airports within its regional system, as shown in Exhibit 4-4.

Philadelphia is located on the eastern edge of Pennsylvania on the Delaware River and is the tenth busiest airport in the U.S. Philadelphia International Airport (PHL) has four runways, three of which are parallel, but closely spaced and staggered and so it does not have simultaneous IFR approach capability. The airport is continuing to develop its Capacity Enhancement Plan which hopes to alter the airport to provide four parallel runways and at least simultaneous IFR dual approach capability. PHL serves as a major hub for US Airways and Southwest Airlines began service from PHL in 2004, operating out of nine gates. The Philadelphia MSA includes a population of almost 6 million over three states and includes 18 NPIAS airports within its regional system, known as the Delaware Valley Regional Planning Commission (DVRPC) and shown in Exhibit 4-5.

Pittsburgh is located in western Pennsylvania and is served by Pittsburgh International Airport (PIT), which was a major hub operation for US Airways until 2004 when America West took over US Airways and downsized operations at the airport. Southwest Airlines began service to PIT in 2005 and operates out of three gates today. PIT has three runways, two of which are parallel providing dual simultaneous IFR approach capability. The Pittsburgh MSA includes 2.3 million residents and includes 10 NPIAS airports within its regional system, as shown in Exhibit 4-6.

As part of the regional system comparison, several factors were used to help benchmark these airports:

- Population of the associated MSA,
- Number of NPIAS airports within the airport system,
- Number of reliever airports within the airport system,
- Number of general aviation (GA) based aircraft within the airport system,

- Number of corporate jet based aircraft within the airport system,
- Annual general aviation operations within the airport system, and;
- Number of system airports with runways at least 5,000 feet in length.

These factors provide the basis from which to make an effective comparison of the Twin Cities Regional Aviation System and offer a glimpse of the potential future in these ever changing economic times. **Exhibit 4-1** compares the six airport systems.

Exhibit 4-1: Airport System Factor Comparison

City Name	MSA Population (July 2007)	Number of NPIAS Airports in System	Number Reliever Airports in System	No. of GA Based Aircraft in System	Number of GA Based Jets in System	Annual GA Aircraft Ops in System	No. of Airports w/ 5,000' Runways
Atlanta	5,278,904	13	4	1,907	175	868,710	9
Charlotte	1,651,568	5	2	350	30	253,566	3
Denver	2,464,866	4	3	1,509	125	605,315	3
Detroit	4,467,592	10	7	1,474	208	593,555	3
Minneapolis	**3,208,212**	**8**	**7**	**1,913**	**137**	**641,550**	**2**
Philadelphia	5,827,962	18	10	1,656	78	772,550	3
Pittsburgh	2,355,712	10	5	693	93	345,569	3
Average	**3,607,831**	**10**	**5**	**1,357**	**121**	**582,974**	**4**

Sources: U.S. Census, MAC, and FAA, 2007

Philadelphia is the largest population-based airport system, and has the most airports and reliever airports within its system. Atlanta has the most general aviation aircraft based within its system as well as the most general aviation aircraft operations in 2007 and the most airports with at least one 5,000-foot or longer runway. Detroit has the most corporate jets based within its airport system.

Charlotte's airport system has the least number in most categories, except the number of NPIAS airports, in which Denver had only four NPIAS airports. All the airport systems have three airports with at least one runway of 5,000 feet or more in length, with the exception of Atlanta (with nine) and Minneapolis (with two).

Minneapolis' airport system is close to the average values for many of the categories. It is above the average for the number of reliever airports, general aviation operations, the number of based aircraft, and the number of based general aviation jets. However, it is below the average for the number of airports with 5,000-foot or longer runways.

As illustrated by **Exhibit 4-1**, the Twin Cities Regional Aviation System is robust and compares well with its peer airport cities.

A similar comparison was made to evaluate the number and type of aircraft operations that occurred at the system's hub airport. **Exhibit 4-2** summarizes the total number of aircraft operations for the years

2007 and 2000 since this was the last peak year in operations before the terrorist attacks on September 11th, 2001. The table then compares the percent of commercial service operations and the percent of general aviation operations to determine whether general aviation operations decline as commercial activity increases. The premise is that pilots of smaller and slower aircraft, such as single engine propeller aircraft, are less interested in flying into a hub airport due to wake turbulence issues and the intensely controlled environment compared to a nearby reliever airport.

As shown in Exhibit 4-2, Atlanta had the most aircraft operations and the most commercial service aircraft operations in the year 2000 and 2007, and hence received the title "world's busiest airport".

Exhibit 4-2: Peer Airport Operations Comparison

Airport Name	2007 Aircraft Operations	2007 Percent Commercial Service Operations	2007 Percent General Aviation Operations	2000 Aircraft Operations	2000 Percent Commercial Service Operations	2000 Percent General Aviation Operations
Atlanta (ATL)	994,346	98.7%	1.2%	915,454	97.4%	2.4%
Charlotte (CLT)	522,541	93.5%	6.1%	452,009	89.7%	9.6%
Denver (DEN)	614,065	95.8%	0.9%	520,073	91.9%	2.9%
Detroit (DTW)	467,230	97.6%	2.4%	555,375	87.9%	11.8%
Minneapolis (MSP)	452,972	89.4%	6.7%	523,146	84.9%	11.1%
Philadelphia (PHL)	499,653	94.9%	4.6%	484,308	87.3%	12.6%
Pittsburgh (PIT)	209,303	88.1%	7.5%	448,785	93.3%	5.5%
Average	**578,697**	**95%**	**4%**	**548,338**	**90%**	**8%**

Sources: FAA

Philadelphia had the highest percentage of general aviation operations in 2000. Pittsburgh earned this distinction in 2007. However, Pittsburgh experienced a major transition when US Airways discontinued use of the airport as a major hub in 2004, thus reducing the number of commercial service operations dramatically.

Many factors contribute to why a hub airport has a low percentage of general aviation operations. Atlanta has minimal space and facilities for general aviation operations, thus discouraging even small corporate jets from operating at ATL. However, the surrounding system of airports provides many choices for general aviation pilots that are conveniently located to conduct their business and avoid the hassles at ATL. Denver has the space for fixed base operators and corporate jet operations but the airport is located so far from the City of Denver and their businesses that both corporate and general aviation pilots use the more convenient airports located closer to where they are ultimately going.

As shown in Exhibit 4-2, MSP has a higher percentage of general aviation operations than its peer airports in 2007, except PIT, and was among a group of three airports with the highest percentage of general aviation operations in 2000. This helps support the need for reliever airports to accommodate additional general aviation operations within the Twin Cities Regional Aviation System. MSP has limited space for general aviation aircraft, including corporate jets; however it has more general aviation

facilities located on-airport than ATL. And similar to ATL, there are several airports near MSP that cater to corporate aviation, such as St. Paul Downtown. As MSP air carrier operations increase, so does airfield congestion, thus shifting general aviation operations to reliever airports, which helps reduce airfield congestion and associated delay costs.

Top 20 Airport Aviation Activity Comparisons

An analysis of the top 20 airports was conducted to review the aviation activity of these U.S. airports and to compare passenger enplanements,[1] aircraft operations, and cargo tonnage. These comparisons help to gauge how MSP ranks among its peers.

Passenger Enplanements

Exhibit 4-3 presents the top 20 airport's passenger enplanements for the years 2000, 2003 and 2007 as compared to the entire U.S. passenger totals. As shown, overall passenger numbers have grown from 709 million in 2000 to 762 million in 2007. However, the top 20 airports remained relatively constant, with ATL being the exception, accounting for most of the growth in passengers. Both MSP and DTW passenger levels remained constant and nearly identical, ranging between 16 and 18 million passengers over the past eight years.

[1] An enplanement is a passenger that boards an aircraft. This passenger may be just starting their trip or they may be part-way through their trip and changing aircraft at an airport. Two other terms relating to the number of passengers are used in this section – connecting passengers, and origin & destination (O&D) passengers. Connecting passengers are travelers at an airport that have just departed one plane and boarded another to continue their trip. O&D passengers are those that are either beginning or ending their trip at that airport. While there is some overlap in the use of these terms, they are used in specific areas of airport planning.

Exhibit 4-3: Hub Airport Enplanement Comparison (millions)

Rank	2007 Airports	2007 Enp.	2003 Airports	2003 Enp.	2000 Airports	2000 Enp.
1.	Atlanta (ATL)	44.8	ATL	39.7	ATL	40.2
2.	Chicago (ORD)	38.4	ORD	36.9	ORD	37.6
3.	Los Angeles (LAX)	31.0	LAX	27.5	LAX	33.8
4.	Dallas/Ft (DFW)	29.9	DFW	26.6	DFW	30.4
5.	Denver (DEN)	24.9	DEN	18.8	DEN	19.4
6.	New York (JFK)	23.8	PHX	18.6	SFO	20.2
7.	Las Vegas (LAS)	23.5	LAS	18.1	LAS	18.4
8.	Houston (IAH)	21.6	IAH	17.0	IAH	17.5
9.	Phoenix (PHX)	20.9	**MSP**	**16.6**	PHX	17.6
10.	Newark (EWR)	18.2	DTW	16.4	**MSP**	**18.2**
11.	Orlando (MCO)	18.2	JFK	15.8	DTW	17.7
12.	Detroit (DTW)	18.0	MIA	14.8	MIA	16.8
13.	San Francisco (SFO)	17.7	EWR	14.7	EWR	16.9
14.	**Minneapolis (MSP)**	**17.5**	SFO	14.4	JFK	16.3
15.	Miami (MIA)	16.9	MCO	13.6	MCO	15.3
16.	Charlotte (CLT)	16.6	SEA	13.4	SEA	14.5
17.	Philadelphia (PHL)	16.0	PHL	12.4	STL	14.2
18.	Seattle (SEA)	15.6	CLT	12.4	BOS	15.3
19.	Boston (BOS)	14.0	BOS	11.5	PHL	13.9
20.	New York (LGA)	12.5	LGA	11.4	CLT	12.4
	US Total	**762.4**		**650.8**		**709.8**

Source: FAA

As expected, the largest hub airports, Atlanta, Chicago-O'Hare, Los Angeles, and Dallas-Ft. Worth, remain ranked at the top year after year.

Aircraft Operations

Exhibit 4-4 presents the aircraft operations totals for the top 20 airports for the years 2000, 2003 and 2007 as compared to the entire U.S. total. As shown, U.S. aircraft operations have fallen from almost 68 million operations in 2000 to less than 61 million operations in 2007. Much of this can be attributed to the shedding of excess seating capacity, the retirement of older, fuel inefficient aircraft by the airlines following the 9/11 attacks, and the economic downturn.

Exhibit 4-4: Hub Airport Aircraft Operations Comparison (thousands)

Rank	2007 Airports	2007 Ops.	2003 Airports	2003 Ops.	2000 Airports	2000 Ops.
1.	Atlanta (ATL)	994	ORD	929	ATL	915
2.	Chicago (ORD)	927	ATL	912	ORD	909
3.	Dallas/Ft (DFW)	685	DFW	765	DFW	838
4.	Los Angeles (LAX)	681	LAX	622	LAX	783
5.	Denver (DEN)	614	PHX	542	PHX	580
6.	Las Vegas (LAS)	609	**MSP**	**510**	DTW	555
7.	Houston (IAH)	604	CVG	506	**MSP**	**523**
8.	Phoenix (PHX)	539	LAS	501	LAS	521
9.	Charlotte (CLT)	523	DEN	500	MIA	517
10.	Philadelphia (PHL)	500	DTW	491	DEN	511
11.	Detroit (DTW)	467	IAH	475	BOS	488
12.	**Minneapolis (MSP)**	**453**	VNY	461	PHL	484
13.	New York (JFK)	446	PHL	447	IAH	484
14.	Newark (EWR)	436	CLT	443	STL	481
15.	Salt Lake City (SLC)	422	MIA	417	CVG	478
16.	Boston (BOS)	400	EWR	406	IAD	456
17.	New York (LGA)	392	MEM	402	CLT	452
18.	Miami (MIA)	386	SLC	400	EWR	450
19.	Washington (IAD)	383	DTV	389	OAK	449
20.	San Francisco (SFO)	380	SFB	385	PIT	449
	US Total	**60,807**		**62,659**		**67,682**

Source: FAA

Atlanta and Chicago-O'Hare annually compete for the title of busiest airport in the U.S. and the world, as illustrated in **Exhibit 4-4**. However, ATL has increased the most in terms of operations over this time period, partly due to the capacity provided by the fifth parallel runway opening in 2006. MSP and DTW typically have had similar aircraft operation levels year after year and have ranked sixth or seventh in the country until recently. MSP peaked in 2004 with 541,000 operations and DTW peaked in 2000 with 555,000 operations. Although DTW's fourth parallel runway opened in 2003 and MSP's new runway opened in late 2005 providing additional airfield capacity, the economy and high fuel prices forced Northwest Airlines and Delta Air Lines to file for bankruptcy protection shortly thereafter. Aircraft operations at both of these airports have been down since 2005.

Air Cargo

Exhibit 4-5 presents the air cargo volumes for the top 26 airports for the years 2001, 2004 and 2007 as compared to the entire U.S. total. U.S. air cargo totals have remained relatively flat since 2000, ranging

between approximately 28 million metric tons and 31 million tons. Memphis has been the top air cargo shipping airport in the U.S. due to FedEx operating their major sort facility from this airport.

MSP's air cargo rank has ranged from 20th in 2001, down to 26th in 2004 and 22nd in 2007. MSP had many air cargo operators and freight forwarding companies operating at the airport in 2000, before the "Tech bubble" burst and 9/11 occurred. After the stock market declined, many cargo operators contracted, merged or left the market. FedEx and UPS are the major air cargo operators at MSP today and, with other cargo operators, shipped 257 million metric tons in 2007, a decline from the 340 million tons in 2001. MSP currently has the capacity to accommodate additional cargo operations; however, most cargo from Minneapolis is shipped by truck to Chicago-O'Hare due to convenient highway and rail infrastructure. ORD is consistently ranked seventh in the country for air cargo and shipped six times as much cargo as MSP in 2007. Detroit ranked as high as 26th for the first time in 2007.

Regional Shifts in Airline Hub Strategies

Airline Bankruptcies and Mergers

The recent merger agreement between the Metropolitan Airports Commission and Delta Air Lines calls for Delta to maintain a minimum of 400 daily flights of any sized aircraft and 250 flights of jet aircraft greater than 70 seats at MSP. For the immediate future, MSP remains secure as a hub airport in the Delta system. However, as Delta integrates its jet and regional systems with Northwest, some cost cutting and economies of scale will be achieved through consolidation of capacity at MSP and at other Delta hubs. To set a context for future levels of aviation activity at MSP, this section compares MSP with other domestic airports that serve as connecting hubs.

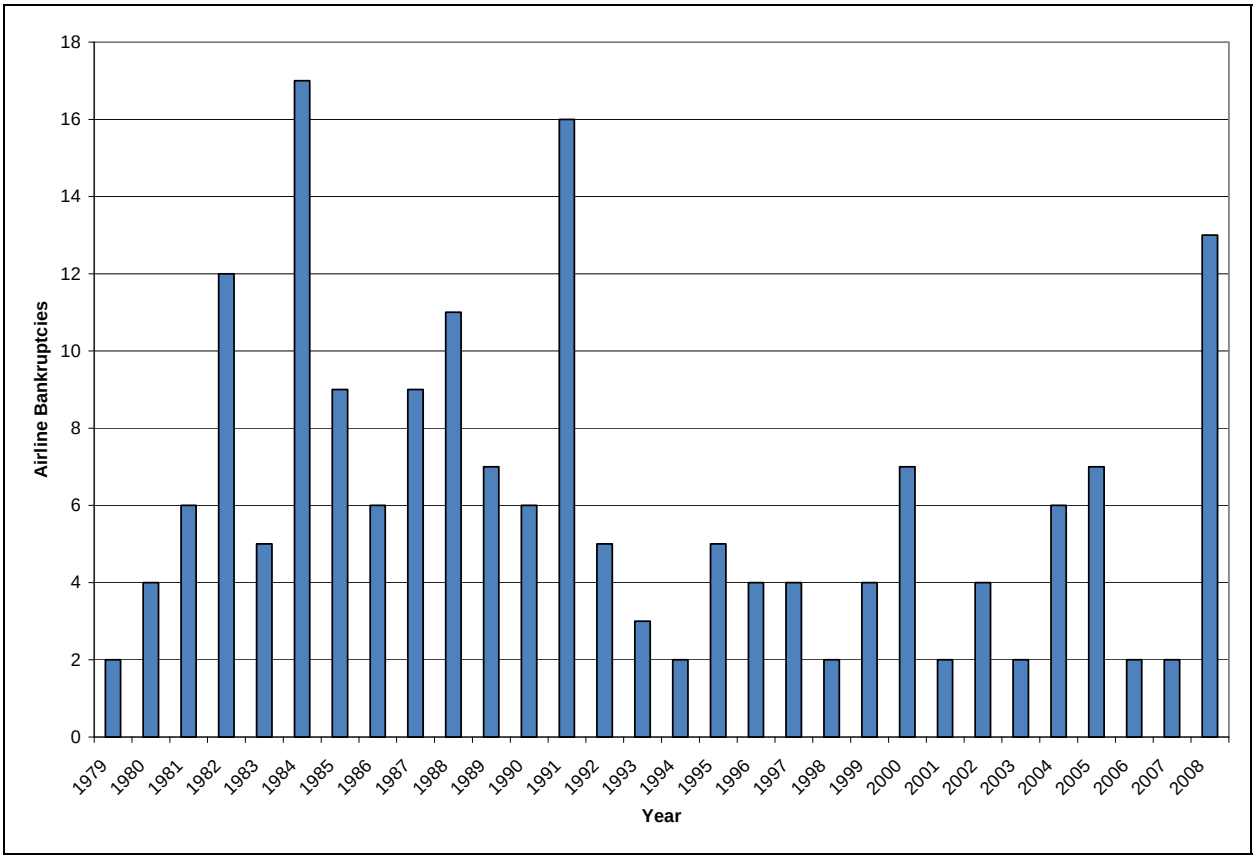
Exhibit 4-5: Hub Air Cargo Tonnage Comparison (millions of metric tons)

Rank	2007 Airports	2007 Cargo	2004 Airports	2004 Cargo	2001 Airports	2001 Cargo
1.	Memphis (MEM)	3,840	MEM	3,555	MEM	2,632
2.	Anchorage (ANC)	2,826	ANC	2,253	ANC	1,874
3.	Louisville (SDF)	2,079	LAX	1,914	LAX	1,774
4.	Miami (MIA)	1,923	MIA	1,779	MIA	1,640
5.	Los Angeles (LAX)	1,884	SDF	1,739	SDF	1,469
6.	New York (JFK)	1,607	JFK	1,706	JFK	1,431
7.	Chicago (ORD)	1,534	ORD	1,475	ORD	1,300
8.	Indianapolis (IND)	999	EWR	985	IND	1,115
9.	Newark (EWR)	964	IND	932	EWR	796
10.	Dallas/Ft (DFW)	724	ATL	862	DFW	784
11.	Atlanta (ATL)	720	DFW	742	ATL	740
12.	Oakland (OAK)	648	OAK	645	SFO	636
13.	San Francisco (SFO)	563	PHL	571	OAK	594
14.	Philadelphia (PHL)	543	SFO	563	PHL	536
15.	Ontario (ONT)	483	ONT	549	DAY	532
16.	Houston (IAH)	409	HNL	435	ONT	419
17.	Toledo (TOL)	362	CVG	413	SEA	400
18.	Washington (IAD)	359	IAH	401	BOS	395
19.	Seattle (SEA)	319	BOS	366	DEN	359
20.	Boston (BOS)	299	TOL	352	**MSP**	**340**
21.	Denver (DEN)	267	SEA	347	IAH	338
22.	**Minneapolis (MSP)**	**257**	DAY	334	HNL	338
23.	Portland (PDX)	255	DEN	317	IAD	331
24.	Phoenix (PHX)	252	IAD	308	CVG	322
25.	Forth Worth (AFW)	237	PHX	302	TOL	321
26.	Detroit (DTW)	233	**MSP**	**300**	PHX	312
	US Total	**29,297**		**29,894**		**27,998**

Source: FAA

Chapter 2 reviewed recent trends within the airline industry. **Exhibit 4-6** shows the number of airlines that have gone bankrupt each year since 1978 and provides a powerful visual statement of the degree to which the industry has experienced chronic instability and change. Since 1978, 184 airlines filed for bankruptcy, with no less than two airlines doing so each year.

Exhibit 4-6: Number of Airline Bankruptcies, 1979 - 2008



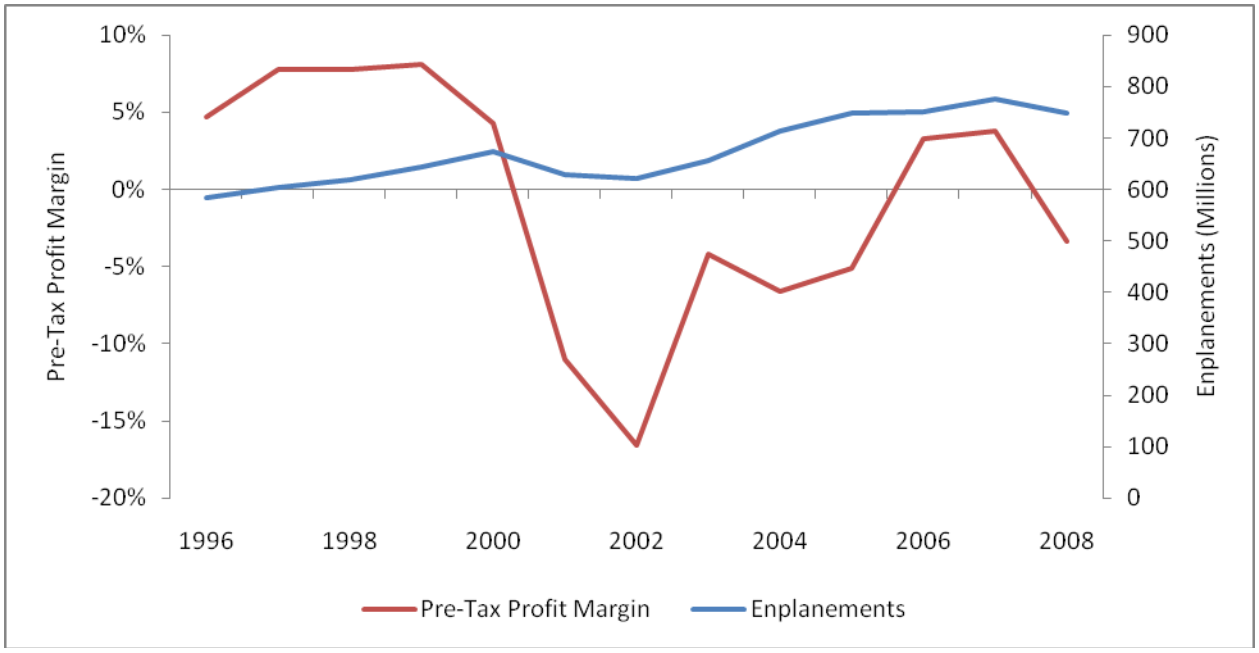
Source: KRAMER aerotek, inc.

In addition to many bankruptcies and liquidations since 2000, three airline consolidations occurred with considerable impact: the merger of Delta and Northwest, American Airlines' acquisition of Trans World Airlines (TWA) and the US Airways and America West merger. These consolidations have resulted in the following hub closures or reductions of connecting activity since 2001:

- In 2001, American downsized operations at St. Louis International Airport following its acquisition of TWA.
- In 2004, US Airways began closing its hub at Pittsburgh International.
- In 2005, Delta closed its Dallas-Ft. Worth hub where it had operated over 200 flights.
- Also in 2005, Delta cutback flights at Cincinnati and continues to do so.

Each of these changes had marked impacts on local enplanements, commercial operations and airport revenue, but at the national level, demand for air service has remained relatively stable especially when compared to airline profitability. **Exhibit 4-7** tracks both pre-tax profit margins for U.S. passenger airlines and national enplanement trends.

Exhibit 4-7: U.S. Carrier Pretax Margins and U.S. Enplanements, 1996 - 2008



Sources: Air Transport Association and Bureau of Transportation Statistics

Regions Defined

To examine further changes at the local airport level, MSA population estimates, enplanements and average fares were compiled for U.S. airports that function as connecting airports for either the network carriers or low cost carriers. These airports were grouped geographically to discern if any regional trends are apparent. FAA regions were used by consolidating the regions into three major groups as follows and shown in **Exhibit 4-8**.

- Eastern – FAA New England, Eastern, and Southern Regions
- Central – FAA Great Lakes, Central, and Southwest Regions
- Western – FAA Northwest Mountain and Western Pacific Regions.

Alaska airports were not included in this analysis. **Exhibit 4-8** shows the breakdown of states into the three consolidated regions, along with the 28 hub airports that are included in the analysis.

Exhibit 4-8: Regions and Airports for Hub Analysis

Source: Wilbur Smith Associates.

Regional Enplanements

Exhibit 4-9 shows the airports analyzed within each region. Enplanements for the 12 months ending September 30, 2000 and 2008 are also shown. The airports are listed starting with the airport that experienced the highest growth in each region during the eight years. These airports are also shown geographically in Exhibit 4-8. Also shown is the rate of change from 2007 to 2008 as conditions deteriorated abruptly starting in the fall 2008. The fastest growing airports, measured by absolute increases in enplanements are the following:

- New York (JFK)
- Charlotte (CLT)
- Denver (DEN)
- Atlanta (ATL)
- Las Vegas (LAS)
- Houston (IAH)
- Philadelphia (PHL)

With Exhibit 4-9, it is also possible to group connecting hub airports into small, medium and large.

Atlanta is the largest airport by far, followed by Chicago O'Hare, Dallas-Ft. Worth, Denver and Los Angeles. The second tier of connecting hub airports consists of a large group of airports that have 10 million to 20 million annual enplanements. These include: Charlotte, JFK, Philadelphia, Baltimore, Newark, Miami, Minneapolis, Detroit and most of the western hubs: Las Vegas, Phoenix, Salt Lake, San Francisco and Seattle. The smallest hub airports are also the airports that have experienced the greatest declines. Of the current group of connecting hubs with less than 10 million enplanements, St. Louis is the only airport to move down from the second tier and Salt Lake City is only airport to move up into the second tier. This trend indicates that the smallest connecting hubs appear the most vulnerable to carrier cutbacks (as do the smallest non hub airports in the national system).

Exhibit 4-10 shows the regional trends for 2000, 2007, and 2008. Hub airports in the eastern region are growing the fastest, followed by the western region. The central region has actually declined in enplanements due in part to capacity constraints imposed on Chicago O'Hare and the loss of enplanements at Dallas-Ft. Worth (Delta hub closure), Houston Hobby (American reductions), Kansas City (shutdown of Vanguard Airlines), St. Louis (TWA hub closure) and Cincinnati (Delta reductions). Detroit had the smallest gain in enplanements, followed by MSP. While it is certainly noteworthy that the central region is experiencing declines, the western region is being carried entirely by growth in the inland band of airports: Denver, Las Vegas, Phoenix and Salt Lake City. West Coast airports: Seattle, San Francisco, and Los Angeles are also all declining. These regional trends are certainly noteworthy and maybe critically important. Passenger activity continues to grow in the east where the highest concentration of population resides and in the mountain states where capacity is available, probably at a lower cost than the West Coast. Longer range aircraft can also provide flexibility to connect at inland airports in favor of traditional coastal gateways.

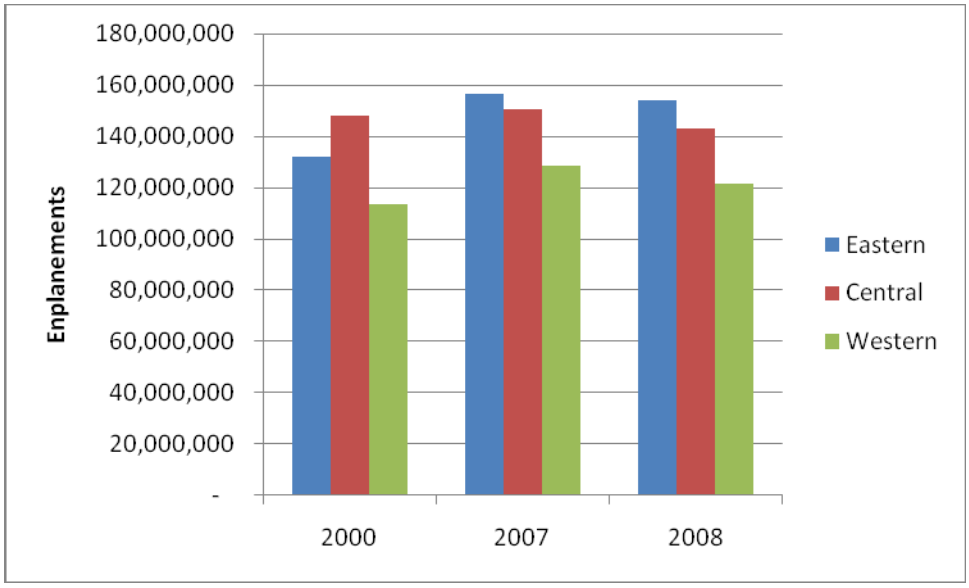
It may be that increased enplanements not only reflect carrier network decisions, but also reflect underlying population and economic growth in the local communities. To check for this possibility, MSA population estimates were collected for each hub airport. Ratios of enplanements to population were also calculated for 2000 and 2008. These ratios serve as good proxies for levels of connecting activity at an airport. Population changes and the ratios are shown in **Exhibits 4-11 and 4-12.**

Exhibit 4-9: Airport Enplanements at Hub Airports, 2000 and 2008

	Enplanements for 12 months Ending 3Q:				
	2000	2008	Actual Gain or Loss of Enplanements	00 - 08 Change	07 - 08 Change
Eastern					
New York (JFK)	10,301,251	16,713,653	6,412,402	62.2%	0.0%
Charlotte (CLT)	10,044,969	16,299,424	6,254,455	62.3%	0.9%
Atlanta (ATL)	38,232,332	42,419,185	4,186,853	11.0%	0.6%
Philadelphia (PHL)	10,726,205	14,263,773	3,537,568	33.0%	-6.7%
Washington Dulles (IAD)	6,912,479	9,558,077	2,645,598	38.3%	-8.8%
Baltimore (BWI)	8,686,831	10,161,312	1,474,481	17.0%	0.0%
Newark (EWR)	15,224,030	16,311,782	1,087,752	7.1%	-1.6%
Miami (MIA)	12,512,230	13,326,147	813,917	6.5%	1.6%
Memphis (MEM)	4,864,893	5,453,682	588,789	12.1%	-0.8%
Cleveland (CLE)	6,041,482	5,387,435	(654,047)	-10.8%	-2.2%
Pittsburgh (PIT)	8,334,946	4,136,524	(4,198,422)	-50.4%	-15.9%
Eastern Region Total	**131,881,648**	**154,030,994**	**22,149,346**	**16.8%**	**-1.5%**
Central					
Houston Intercontinental (IAH)	15,545,327	19,505,582	3,960,255	25.5%	-2.6%
Chicago Midway (MDW)	6,851,035	8,207,476	1,356,441	19.8%	-9.6%
Chicago O'Hare (ORD)	30,937,229	31,560,651	623,422	2.0%	-8.1%
Minneapolis-St. Paul (MSP)	16,057,204	16,509,284	452,080	2.8%	-2.0%
Detroit (DTW)	16,749,634	17,017,212	267,578	1.6%	-1.7%
Houston Hobby (HOU)	4,288,978	4,248,124	(40,854)	-1.0%	0.9%
Kansas City (MCI)	5,656,705	5,439,967	(216,738)	-3.8%	-5.3%
Dallas-Ft. Worth (DFW)	27,808,362	27,033,089	(775,273)	-2.8%	-3.3%
Cincinnati (CVG)	9,181,144	6,890,621	(2,290,523)	-24.9%	-11.5%
St. Louis (STL)	15,058,902	6,716,420	(8,342,482)	-55.4%	-3.7%
Central Region Total	**148,134,520**	**143,128,426**	**(5,006,094)**	**-3.4%**	**-4.8%**
Western					
Denver (DEN)	17,406,579	23,566,608	6,160,029	35.4%	1.0%
Las Vegas (LAS)	15,557,743	19,683,987	4,126,244	26.5%	-7.5%
Phoenix (PHX)	17,073,730	19,430,260	2,356,530	13.8%	-5.7%
Salt Lake City (SLC)	8,726,902	10,132,842	1,405,940	16.1%	-4.2%
Seattle (SEA)	13,261,069	12,261,921	(999,148)	-7.5%	-16.2%
San Francisco (SFO)	16,501,818	14,755,097	(1,746,721)	-10.6%	1.8%
Los Angeles (LAX)	24,865,818	21,907,287	(2,958,531)	-11.9%	-7.5%
Western Region Total	**113,393,659**	**121,738,002**	**8,344,343**	**7.4%**	**-5.3%**
Grand Total	**627,719,957**	**688,763,702**	**61,043,745**	**9.7%**	**-4.2%**

Source: Bureau of Transportation Statistics

Exhibit 4-10: Regional Growth/Decline in Enplanements, 2000 - 2008

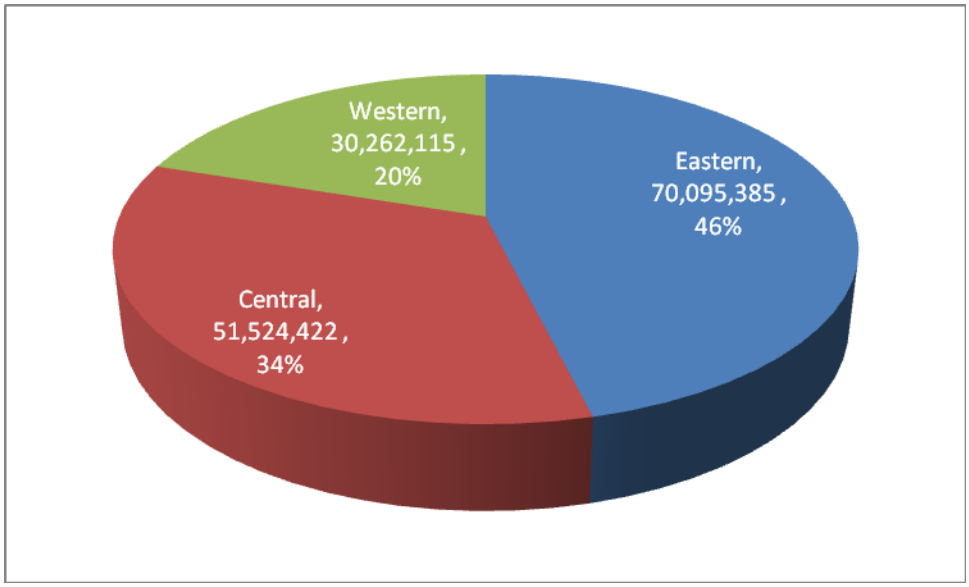


Source: Bureau of Transportation Statistics

Regional Population Growth

Exhibit 4-11 shows the combined MSA populations for hub airports in each region. The eastern region airports support the highest population, 70 million, followed by the central region. The western region has the smallest population base at approximately 30 million.

Exhibit 4-11: Distribution of MSA Population by Region, 2008



Source: U.S. Census Bureau

Exhibit 4-12 examines population trends in the MSA's surrounding hub airports. The MSA's are a good proxy of population trends although the actual service areas for these larger airports typically extend beyond the MSA. Individual airports are shown in descending order where the MSA with the largest population growth since 2000 on top. In the eastern region, the New York–New Jersey-Long Island MSA is far larger than any other MSA (19 million), but Atlanta, Dallas-Ft. Worth, Houston, and the Phoenix MSA's have all grown by approximately 1 million people. Of this group of airports, only Dallas-Ft. Worth has lost enplanements, primarily because of Delta closing its hub at DFW. The smaller MSA's of Charlotte, Denver and Salt Lake City have experienced both population and enplanement growth. MSA population declines are showing in Cleveland, Detroit and Pittsburgh. Both Cleveland and Pittsburgh also had enplanement declines. Northwest's use of Detroit as an international gateway and eastern hub stabilized enplanements through 2008. However, given economic hardship in the region and the Delta-Northwest merger, activity levels at this airport could well change.

Exhibit 4-12 also shows the ratio of enplanements to population for 2000 and 2008. A typical airport that supports a metropolitan area and has little connecting activity would have a ratio of 2.0 to 3.0 enplanements per person. This translates into one to one and a half trips per person. Connecting hubs have much higher ratios. So, for example, Atlanta had in 2008, 7.9 enplanements per person; Las Vegas, 10.6; Charlotte, 9.6; Salt Lake City, 9.1; and Denver, 9.4. The ratio works particularly well when a single airport serves the region. Where multiple airports serve a metropolitan area, the ratios tend to be lower. For example, JFK and Newark have relatively low ratios because the population base is very high and three commercial airports support the region. Similarly, three airports (Baltimore, Reagan, and Dulles) support the Washington metropolitan area. Houston is served by Houston Hobby and Intercontinental; Chicago by O'Hare and Midway. Airports that have lost their connecting hub status have low ratios. In 2000, St. Louis had a ratio of 5.6. This had fallen to 2.4 in 2008. MSP's ratio of enplanements to population has remained above 5.0 for the last eight years, even with an increase of almost a quarter million people in the MSA.

The relationship between population growth and airport enplanements is modulated by both local demand for air service and by carrier schedule and route decisions. As noted previously, the greatest cutbacks in connecting activity have occurred in the central region, at Dallas, Kansas City, Cincinnati, and St. Louis. That said, the largest actual population growth has also taken place in the central region.

Exhibit 4-12: MSA Population Changes and Enplanement to Population Ratios

	2000 Population	2008 Population	Actual Gain/Loss of Population	Change from 2000 to 2008	2000 Enp/Pop Ratio	2008 Enp/Pop Ratio
Eastern						
Atlanta	4,281,896	5,376,285	1,094,389	25.6%	8.9	7.9
New York (JFK)	18,353,354	19,006,798	653,444	3.6%	0.6	0.9
Newark	18,353,354	19,006,798	653,444	3.6%	0.8	0.9
Washington Dulles	4,821,195	5,358,130	536,935	11.1%	1.4	1.8
Miami	5,026,518	5,414,772	388,254	7.7%	2.5	2.5
Charlotte	1,340,283	1,701,799	361,516	27.0%	7.5	9.6
Philadelphia	5,692,916	5,838,471	145,555	2.6%	1.9	2.4
Baltimore	2,557,238	2,667,117	109,879	4.3%	3.4	3.8
Memphis	1,208,246	1,285,732	77,486	6.4%	4.0	4.2
Cleveland	2,147,944	2,088,291	-59,653	-2.8%	2.8	2.6
Pittsburgh	2,429,014	2,351,192	-77,822	-3.2%	3.4	1.8
Eastern Region Total	**66,211,958**	**70,095,385**	**3,883,427**	**5.9%**	**2.0**	**2.2**
Central						
Dallas-Ft. Worth	5,196,259	6,300,006	1,103,747	21.2%	5.4	4.3
Houston Intercontinental	4,739,625	5,728,143	988,518	20.9%	3.3	3.4
Chicago O'Hare	9,117,995	9,569,624	451,629	5.0%	3.4	3.3
Minneapolis-St. Paul	2,981,508	3,229,878	248,370	8.3%	5.4	5.1
Kansas City	1,842,814	2,002,047	159,233	8.6%	3.1	2.7
Cincinnati	2,014,615	2,155,137	140,522	7.0%	4.6	3.2
St. Louis	2,701,537	2,816,710	115,173	4.3%	5.6	2.4
Detroit	4,457,507	4,425,110	-32,397	-0.7%	3.8	3.8
Central Region Total	**46,909,480**	**51,524,422**	**4,614,942**	**9.8%**	**3.2**	**2.8**
Western						
Phoenix	3,278,776	4,281,899	1,003,123	30.6%	5.2	4.5
Las Vegas	1,393,240	1,865,746	472,506	33.9%	11.2	10.6
Los Angeles	12,401,030	12,872,808	471,778	3.8%	2.0	1.7
Denver	2,193,882	2,506,626	312,744	14.3%	7.9	9.4
Seattle	3,052,495	3,344,813	292,318	9.6%	4.3	3.7
Salt Lake City	972,606	1,115,692	143,086	14.7%	9.0	9.1
San Francisco	4,137,271	4,274,531	137,260	3.3%	4.0	3.5
Western Region Total	**27,429,300**	**30,262,115**	**2,832,815**	**10.3%**	**4.1**	**4.0**
Grand Total	**140,550,738**	**151,881,922**	**11,331,184**	**8.1%**	**4.5**	**4.5**

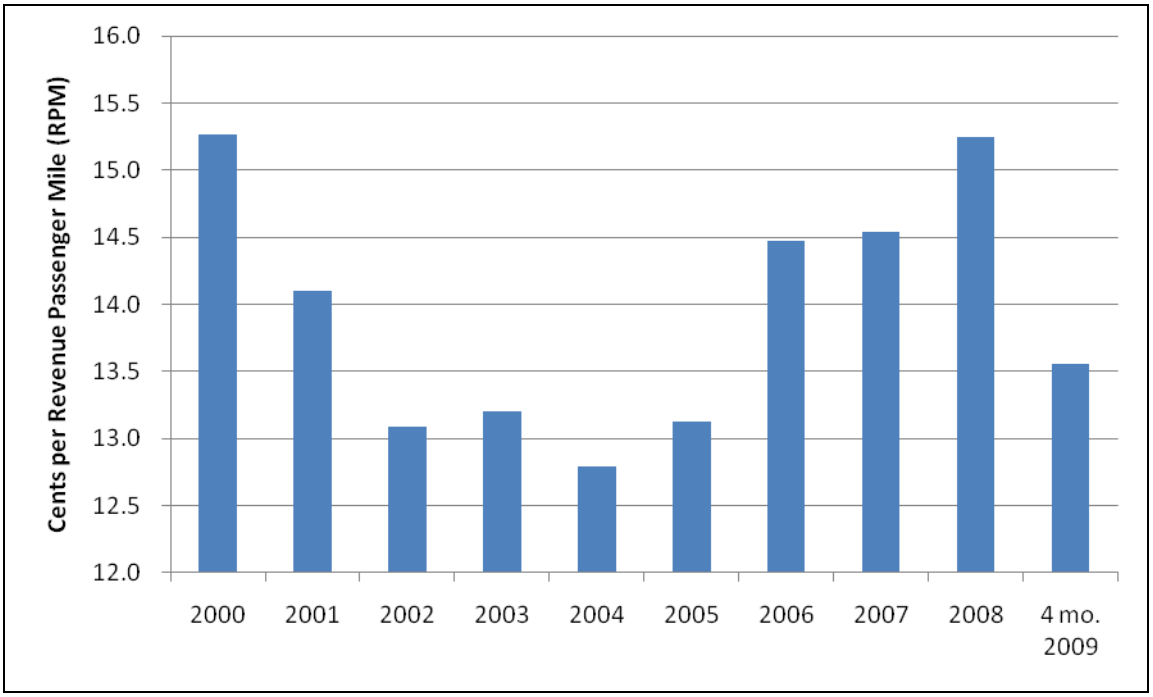
Sources: Bureau of Transportation Statistics and U.S. Census Bureau

Regional Passenger Yields

Exhibit 4-13 shows annual passenger yields (cents per revenue passenger mile) for travel in the United States on U.S. carriers. The national trend has been down from 2000 until 2008, when yields climbed to

roughly the same level in 2000. However, with the recession and declines in business and premium fare travel, the higher yields were not sustained in the initial months of 2009.

Exhibit 4-13: Annual Nominal Domestic Passenger Yields on U.S. Airlines, 2000 - 2009



Source: Air Transport Association

The analysis of individual hub airports suggest that average fares and passenger yields vary quite a bit, depending mainly on the presence of a low cost carrier at the individual hub airport. **Exhibit 4-14** shows average one way fares in current dollars (not adjusted for inflation), average miles per trip, and yield on a mileage basis. A quick scan of the table suggests that in 2000, many hub airports dominated by a single carrier were able to charge higher per mile fares than other cities with greater competition. Fortress hubs such as Charlotte (US Airways), Memphis (Northwest), Cincinnati (Delta), and Dallas (American) charged significantly more in 2000. **Exhibit 4-14** suggests that per mile yields are converging. By 2008, many hub airports that were previously dominated by low cost carriers saw average fares rise. Hub airports with dominant legacy carriers show a decline in average fares. So, for example, Baltimore, which had a large presence of both US Airways and Southwest in 2000, has experienced an average fare increase as Southwest came to dominate service there. (BWI is still one of the most inexpensive airports.) Denver is another former fortress hub where average fares have declined primarily because of market competition from Frontier and Southwest. MSP has also experienced a decline, however fares may continue to decline toward national averages as Southwest builds service.

Exhibit 4-14: Average Nominal Domestic One Way Fare Trends, 2000 and 2008

Enplanements for 12 months Ending September 30th								
	2000			2008			Change from 2000 to 2008	
	Average Fare	Average Miles per Trip	Fare Per Mile	Average Fare	Average Miles per Trip	Fare Per Mile	Average Fare	Fare per Mile
Eastern								
Atlanta	152	792	0.19	152	861	0.18	0	-0.02
Baltimore	128	1,116	0.11	135	1,065	0.13	7	0.01
Charlotte	214	859	0.25	172	930	0.18	-42	-0.06
Cleveland	159	945	0.17	164	999	0.16	5	-0.00
Memphis	188	854	0.22	197	858	0.23	9	0.01
Miami	170	1,322	0.13	167	1,345	0.12	-3	-0.00
New York (JFK)	232	1,949	0.12	188	1,770	0.11	-44	-0.01
Newark	200	1,400	0.14	184	1,446	0.13	-16	-0.02
Philadelphia	213	1,365	0.16	152	1,300	0.12	-61	-0.04
Pittsburgh	196	1,178	0.17	153	1,260	0.12	-43	-0.04
Washington Dulles	212	1,278	0.17	194	1,534	0.13	-18	-0.04
Central								
Chicago Midway	103	837	0.12	124	1,036	0.12	21	-0.00
Chicago O'Hare	190	1,179	0.16	159	1,206	0.13	-31	-0.03
Cincinnati	194	874	0.22	209	903	0.23	15	0.01
Dallas-Ft. Worth	201	997	0.20	174	1,053	0.17	-27	-0.04
Detroit	142	988	0.14	149	1,082	0.14	7	-0.01
Houston Hobby	110	776	0.14	131	861	0.15	21	0.01
Houston Int'l	184	1,050	0.18	185	1,112	0.17	1	-0.01
Kansas City	115	820	0.14	135	914	0.15	20	0.01
Minneapolis-St. Paul	190	1,136	0.17	180	1,124	0.16	-10	-0.01
St. Louis	129	707	0.18	136	775	0.18	7	-0.01
Western								
Denver	186	1,001	0.19	140	990	0.14	-46	-0.04
Las Vegas	92	851	0.11	119	958	0.12	27	0.02
Los Angeles	128	1,102	0.12	148	1,226	0.12	20	0.00
Phoenix	107	881	0.12	124	892	0.14	17	0.02
Salt Lake City	123	880	0.14	147	883	0.17	24	0.03
San Francisco	144	1,104	0.13	164	1,337	0.12	20	-0.01
Seattle	110	917	0.12	135	967	0.14	25	0.02
Grand Total	152	1,017	0.15	155	1,093	0.14	3	-0.01

Sources: Air Transport Association and US DOT, Origin and Destination Survey

Hub Closures or Reductions

In the last 30 years, there have been two waves of airline mergers that resulted in hub consolidations, restructurings, and hub abandonments. In the 1980's, hub and spoke systems were used by airlines to offer a full venue of domestic service to markets large and small. Hubs were often referred to as "fortress hubs" as airlines sought to control markets and price. However, too many hubs were established. During the first wave of mergers several of the secondary hubs were abandoned. When US Airways acquired Piedmont Airlines, it eventually abandoned Piedmont's Dayton and Syracuse hubs. American Airlines at one time operated North-South hubs at Raleigh-Durham, Nashville, and San Jose. These hubs were closed. More recently closure and restructuring of hubs involves larger hub airports. This section examines how activity levels and market shares changed when American acquired TWA, US Airways ceased hub operations at Pittsburgh, and Delta cutback service at Cincinnati.

Lambert-St. Louis International Airport (STL)

In the mid-1970's, Lambert-St. Louis International Airport completed a major expansion program that included extensions of its two parallel runways and installation of instrument landing systems. In addition, new taxiways and ramp space were added and the terminal was expanded to 81 gates. The program effectively increased airfield capacity by 50 percent. In 1982, TWA relocated its hub from Kansas City to St. Louis (STL) and became the dominant carrier at STL. Southwest Airlines began service in 1985. In 1986, TWA purchased Ozark Airlines which was the prime tenant of a new concourse and that same year TWA began flights from St. Louis to Paris, Frankfurt and London. Enplanements grew to approximately 10 million per year. The expansion continued. In 1987, construction began on MetroLink, an 18 mile long light rail transportation system that connected the airport to 20 stations between East St. Louis, downtown, and the airport. (The line has since been extended to 46 miles.) In 1998, the East Terminal was opened as a new home for Southwest Airlines and by 2006 the airport opened a new 9,000-foot parallel runway and two new taxiways.

TWA did not experience smooth sailing. It declared bankruptcy in 1992, 1995 and 2001. American Airlines acquired TWA following its final bankruptcy and substantially altered the role of St. Louis in the integrated American network. Lambert Airport is now American's fourth largest hub behind Chicago O'Hare, Dallas-Ft. Worth, and Miami. Air service is entirely domestic and enplanements are about one half of what they were in 2000. Southwest maintains a significant presence at the airport. Large sections of Concourses B, C, and D are no longer used for commercial air service.

Exhibit 4-15 provides a view of changes in the levels of aircraft departures and enplanements at St. Louis.

Exhibit 4-15: St. Louis Departures and Enplanements, 2000 and 2008

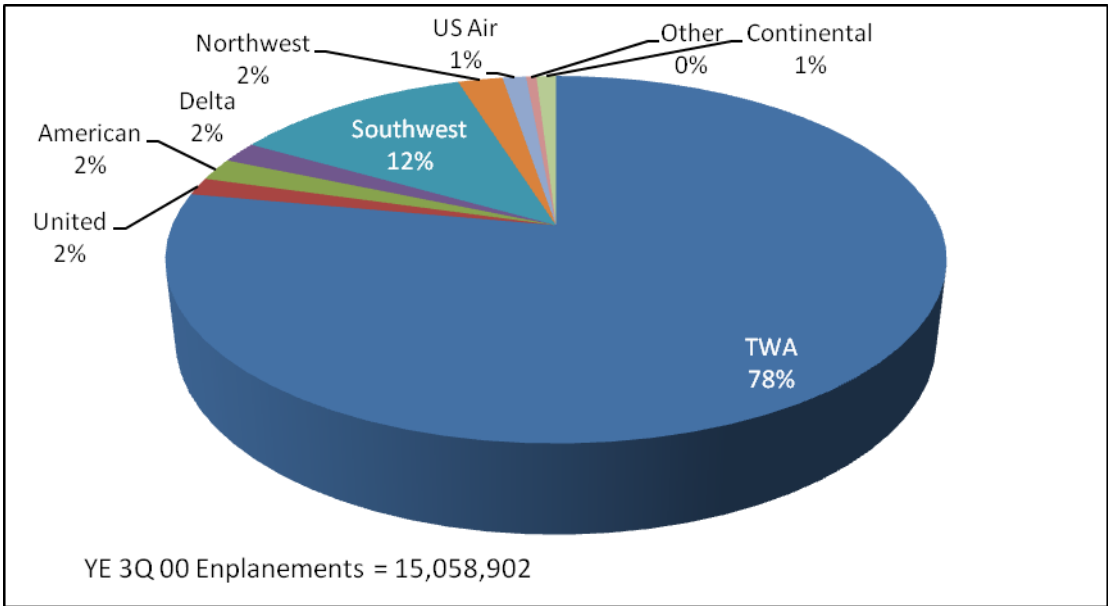
	12 Months Ending		
Activity	**3Q00**	**3Q08**	**Change**
Departures	210,535	108,805	-48.3%
Enplanements	15,058,902	6,716,420	-55.4%

Source: Form 41, Airport Traffic Report (T3)

The acquisition of TWA by American resulted in the elimination of transatlantic service, fewer connecting flights, more regional jet service and greater dominance of low cost carrier service. **Exhibits 4-16 and 4-17** compare market share (as measured by enplaned passengers) for 2000 and 2008. In 2000, enplanements by carrier show the clear dominance of TWA at STL. Southwest was the only low cost carrier in the market, carrying 1.8 million enplaned passengers on 29,000 departing flights. Because TWA served connecting passengers at St. Louis, Southwest only had a 12 percent market share. Regional carriers transported about 12 percent of passengers. Each of the other network carriers offered a relatively small amount of 'spoke' service between their hubs and STL.

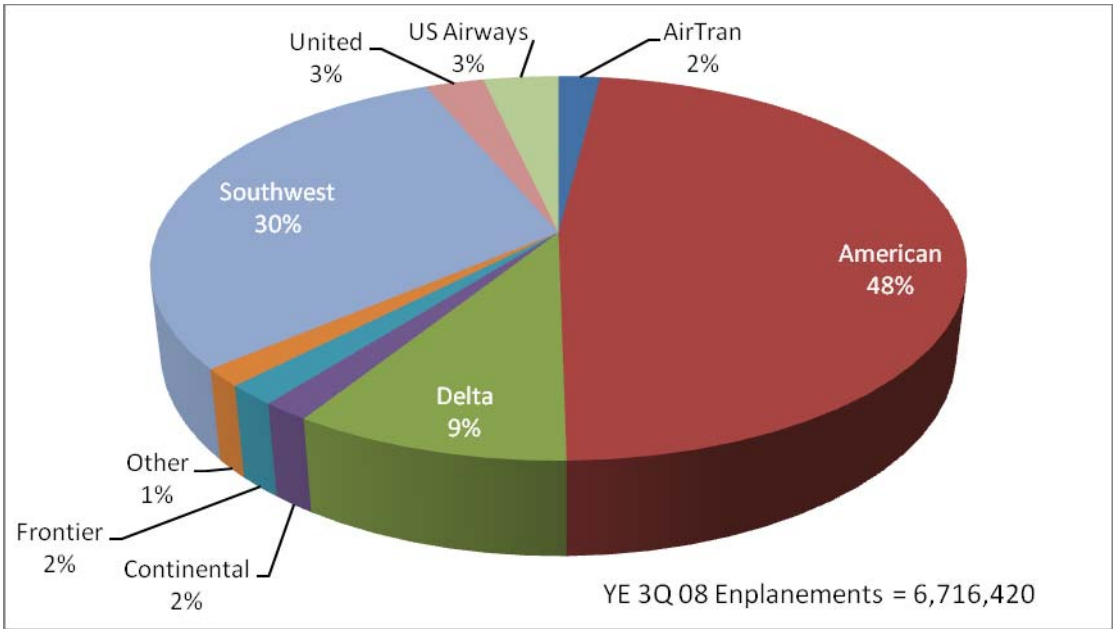
The situation at St. Louis couldn't be more different in 2008. Enplaned passengers and commercial aircraft departures were half of what they were in 2000. Airfares were about the same. However, in 2000, TWA was attempting to raise cash and avoid a third bankruptcy, so fares in 2000 were probably priced aggressively. In 2008, American Airlines carried 48 percent of passengers, but Southwest carried 30 percent. AirTran and Frontier were also in the market boosting low cost carrier market share to 34 percent, enough to effectively influence price in the market. Actual Southwest departures declined 11 percent, but load factors were up and Southwest was actually carrying more passengers than in 2000. Regional carriers were also handling more passengers, up from 5 percent in 2000 to 27 percent in 2008. **Exhibit 4-17** suggests a much more competitive environment for St. Louis, scaled back to serve predominantly as an origin and destination airport. From an airport standpoint, reuse of excess terminal space is undoubtedly a major issue.

Exhibit 4-16: St. Louis Enplaned Passengers by Carrier 12 Months Ending September 30, 2000



Source: Form 41, Airport Traffic Report (T3)

Exhibit 4-17: St. Louis Enplaned Passengers by Carrier 12 Months Ending September 30, 2008



Source: Form 41, Airport Traffic Report (T3)

Pittsburgh International Airport (PIT)

Pittsburgh International is Pennsylvania's second busiest airport. However, the airport operates at a fraction of its previous levels of activity when US Airways used Pittsburgh as a major 'fortress hub'. In April 2002, US Airways and its regional affiliates offered 481 daily departures from PIT. In April 2009, US Airways and its affiliates offered 47 daily departures, 10 percent of its former level of service. At one time, US Airways carried 88 percent of all passengers. **Exhibit 4-18** tells a story similar to the St. Louis experience.

Exhibit 4-18: Pittsburgh Departures and Enplanements, 2000 and 2008

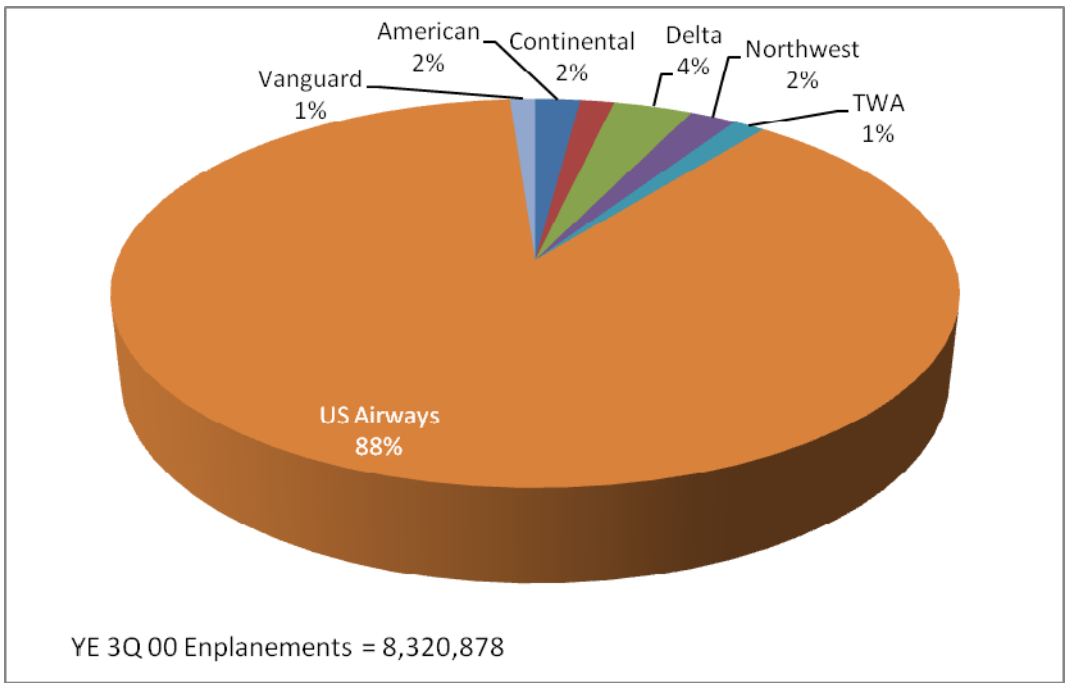
	12 Months Ending		
Activity	3Q00	3Q08	Change
Departures	117,091	63,794	-45.5%
Enplanements	8,334,946	4,136,524	-50.4%

Source: Form 41, Airport Traffic Report (T3)

Pittsburgh, like St. Louis, experienced the early expansion of commercial air service following airline deregulation when many of the legacy carriers built large hub and spoke systems to capture traffic and control markets, large and small, throughout the country. Pittsburgh International was also one of the first destination airports for transatlantic flights on Boeing 747 aircraft. To accommodate rapid expansion, Allegheny County Airport Authority opened a new Midfield Terminal in the fall of 1992. The terminal was designed specifically to handle large crowds of connecting passengers. The Midfield Terminal was one of the first in the nation to expand retail concessions, featuring an "Air Mall" for passengers to use between flights. As a new facility, the terminal also carried high costs per passenger. Some of these costs were passed on to passengers in the form of higher average fares, but US Airways also was operating numerous hubs, notably at Philadelphia, Dayton, Charlotte, Pittsburgh, and Baltimore. Pittsburgh's higher costs became an issue. In August, 2002 US Airways filed for Chapter 11 bankruptcy. Late in 2003, US Airways requested landing fee and lease rate reductions at Pittsburgh. US Airways and the Airport Authority could not agree on new terms and beginning in November, 2004, US Airways began to reposition its network across Philadelphia and Charlotte.

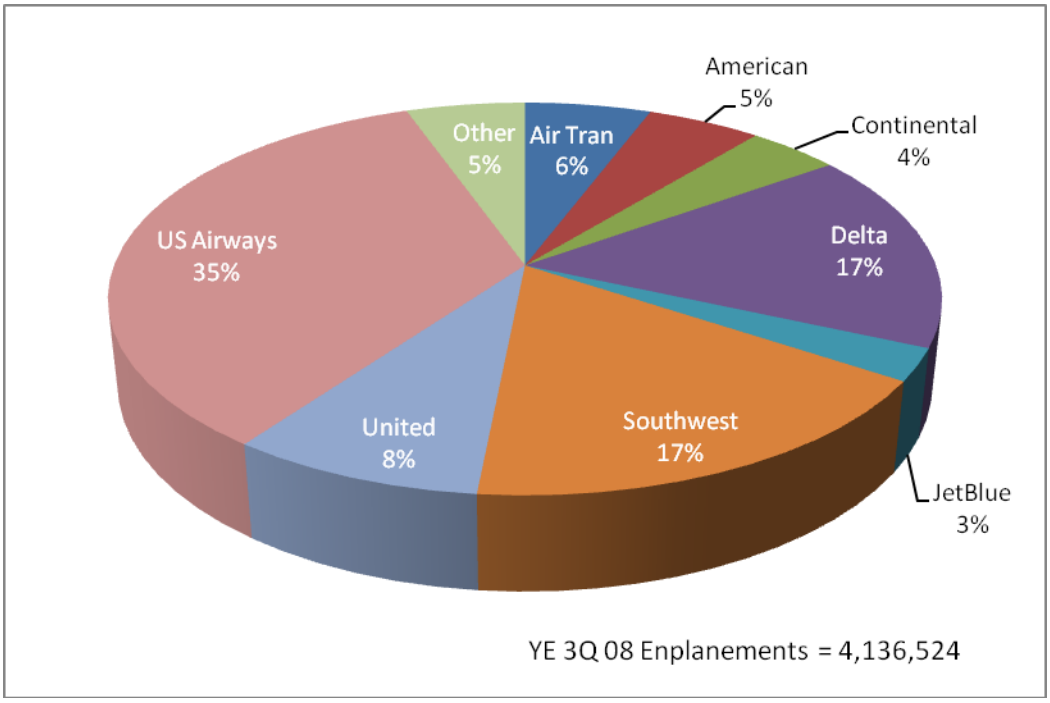
Pittsburgh has four concourses and 75 gates. To reduce expenses, the Authority has closed all 22 gates on Concourse E; 13 of 25 on Concourse A, and 12 of 25 gates on Concourse B. The Authority is consolidating commercial service activities and actively pursuing other economic development at the airport. Today regional carriers serve 32 percent of passengers, up from 3 percent in 2000. The Authority also recruited Southwest Airlines, AirTran and JetBlue to serve the airport. Today, low cost carriers haul 26 percent of all passengers. In 2000, US Airways carried 88 percent of all passengers. Vanguard was the only low cost carrier to serve the market. **Exhibits 4-19 and 4-20** compare market shares in 2000 and 2008.

Exhibit 4-19: Pittsburgh Enplaned Passengers by Carrier, 12 Months Ending September 30, 2000



Source: Form 41, Airport Traffic Report (T3)

Exhibit 4-20: Pittsburgh Enplaned Passengers by Carrier, 12 Months Ending September 30, 2008



Source: Form 41, Airport Traffic Report (T3)

Cincinnati/Northern Kentucky International Airport (CVG)

Cincinnati Airport remains one of the few fortress hubs in the country. However, Delta has been restructuring this hub into a regional hub. Delta's market share as of September 30, 2008 was still 93 percent. Nevertheless enplanements were down 25 percent since 2000, but departures were up by almost the same amount. In 2000, passengers traveling on regional carriers represented 20 percent of the market; in 2008 passengers on regional affiliates represented 63 percent of all enplanements. **Exhibit 4-21** provides the overview of departures and enplanements.

Exhibit 4-21: Cincinnati Departures and Enplanements, 2000 and 2008

	12 Months Ending		
Activity	3Q00	3Q08	Change
Departures	111,388	137,930	23.8%
Enplanements	9,181,144	6,890,621	-24.9%

Source: Form 41, Airport Traffic Report (T3)

Exhibit 4-22 shows the changes in passenger levels by the marketing airline (network carrier combined with their code-sharing partners). With the exception of USA3000 Airlines, Cincinnati has no low cost carriers and remains, along with Memphis, one of the highest fare hub airports in the country.

Exhibit 4-22: Changes in Enplanements by Carrier, 2000 and 2008

	Year Ending		Change from 2000 to 2008	
Marketing Airline	3Q 00	3Q08	Actual	Percent
American	103,142	147,639	44,497	43%
Continental	75,310	70,982	-4,328	-6%
Delta	8,621,144	6,437,521	-2,183,623	-25%
Northwest	164,436	0	-164,436	-100%
United	119,526	57,585	-61,941	-52%
US Airways	0	100,017	100,017	100%
Other	97,586	76,877	-20,709	-21%
Total Enplanements	**9,181,144**	**6,890,621**	**-2,290,523**	**-25%**
Passengers on Regional Affiliates	**1,830,405**	**4,319,155**	**2,488,750**	**136%**
Percent Regional Passengers	**20%**	**63%**		

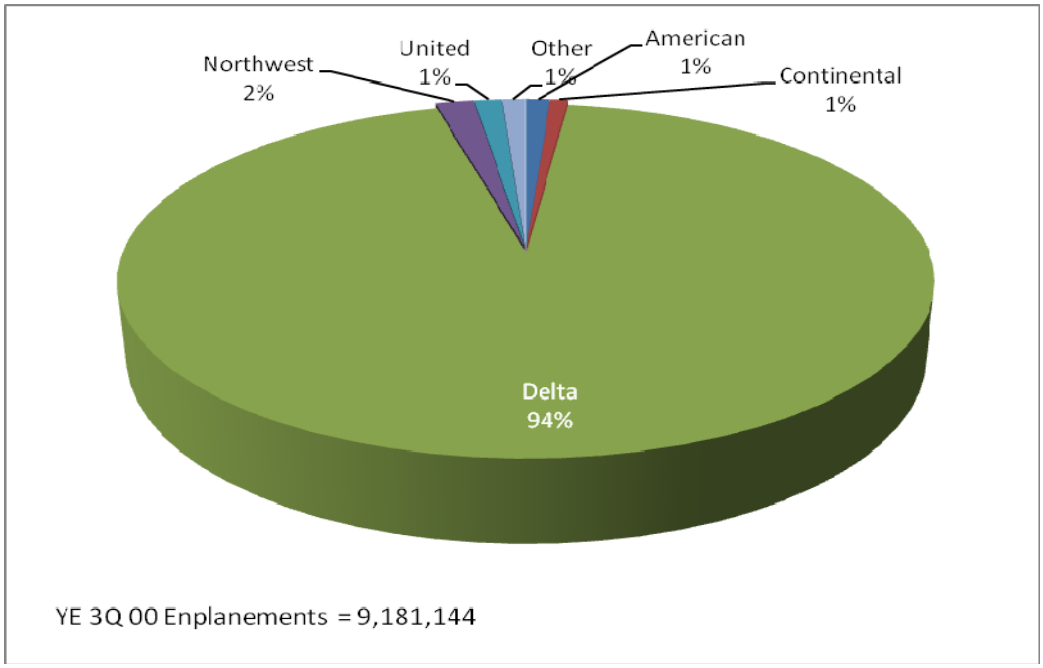
Source: Form 41, Airport Traffic Report (T3)

Exhibits 4-23 and **4-24** show changes in the marketing share. Following the merger, Northwest Airlines service was dropped. A small amount of Mesaba service remains. United also reduced its service. The sheer number of Delta's regional affiliates operating at Cincinnati demonstrates the complexity of the Delta-Northwest merger and the challenges of integrating the two airlines. Delta and Northwest have the following regional partnerships:

- Atlanta Southeast Airlines (DL)
- Chautauqua Airlines (DL/AA/CO/UA/US)
- Comair (DL)
- Compass (NW)
- Freedom Airlines (DL)
- Mesaba (NW)
- Pinnacle Airlines (DL/NW)
- Shuttle America (DL/UA)
- SkyWest (DL/UA)

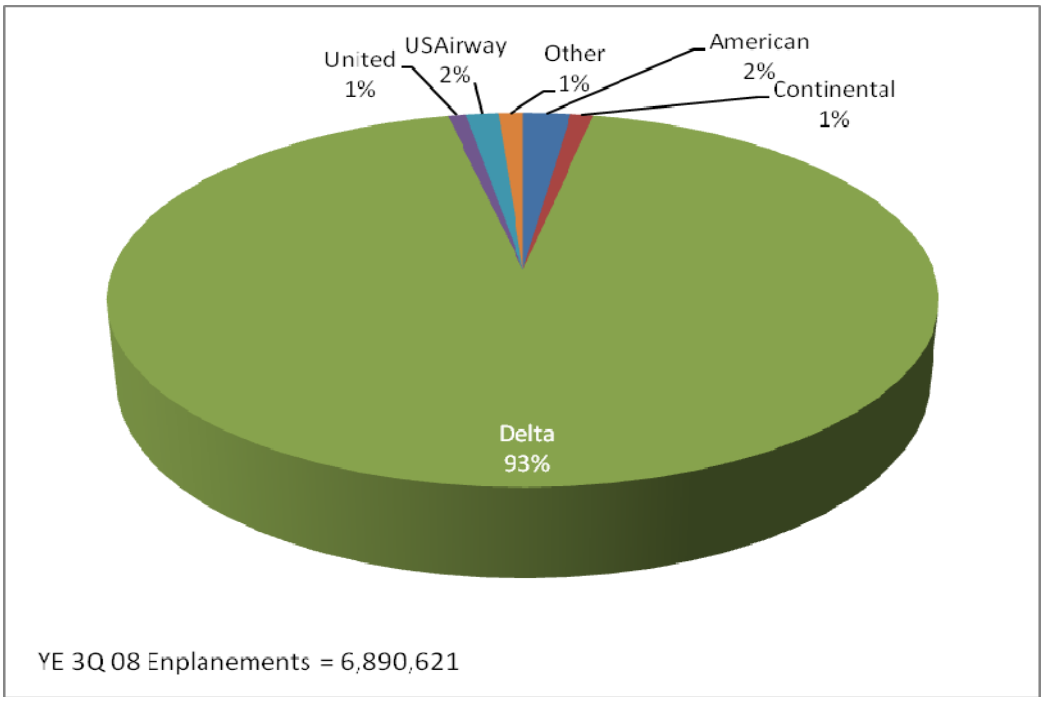
Of these regional carriers, all but Compass and Shuttle America were operating at CVG in the third quarter of 2008 under the Delta-Northwest brand.

Exhibit 4-23: Cincinnati Enplaned Passengers by Carrier 12 Months Ending September 30, 2000



Source: Form 41, Airport Traffic Report (T3)

Exhibit 4-24: Cincinnati Enplaned Passengers by Carrier 12 Months Ending September 30, 2008



Source: Form 41, Airport Traffic Report (T3)

Recent Experiences of Southwest Entry at other Airports

Southwest Airlines began service at MSP to Chicago Midway Airport in March 2009. On April 1st, the airline announced the addition of three flights to Denver, starting at the end of May. This section examines how Southwest Airlines developed service recently at four airports: Denver (2006), Philadelphia (2004), Pittsburgh (2005), and Washington Dulles (2007). To set the context for comparison, **Exhibit 4-25** compares total origin and destination (O&D) traffic at each of these airports. This metric is useful as it measures the total number of passengers that begin or end their trip at a particular airport. O&D traffic filters out passengers that are connecting only at an airport and provides a better measure of local market size than enplaned passengers which measures both originating and connecting passengers. In MSP's case, O&D passengers represent about 52 percent of total passengers.

Exhibit 4-25: O&D Passengers, YE 3Q 2008 (Both Directions)

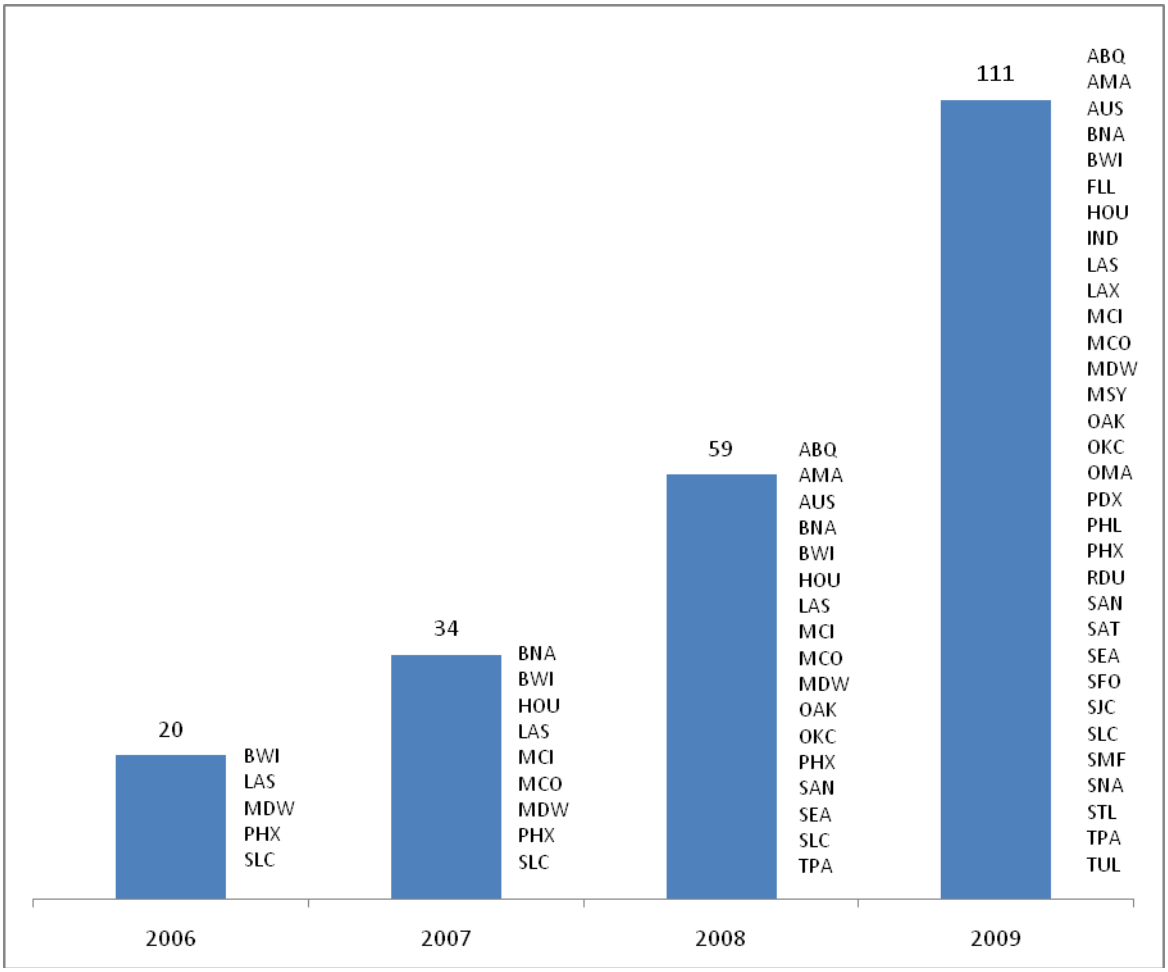
Airport	O&D Passengers
Denver	25,767,814
Philadelphia	18,998,077
Minneapolis-St. Paul	16,918,672
Washington-Dulles	11,815,716
Pittsburgh	8,112,682

Source: U.S. DOT O&D Market Report for YE 3Q08

Denver

Denver was selected as a recent Southwest entry into the mountain states. It is a much larger market than MSP, but both airports serve as the principal large hub airport in their respective regions. There is strong traffic between the two cities. In January, 2006, Southwest began service at Denver with four daily nonstop flights to Chicago Midway, four to Phoenix and five to Las Vegas. In March of the same year, Southwest added four flights to Salt Lake City, one to Baltimore, and an additional flight to Phoenix and one to Las Vegas for a total of 20 daily nonstop flights. By April of the following year, Southwest added nonstop service to Nashville, Houston, Kansas City and Orlando for a total of 34 daily departures. The following year, nonstop markets served went from 9 to 17 and in 2009, Southwest served 32 nonstop markets out of Denver. **Exhibit 4-26** shows the progression of service development.

Exhibit 4-26: Southwest Airlines Daily Nonstop Departures from Denver, April, 2006 - 2009[2]



Source: Official Airline Guide

By all measures, the Southwest entry and expansion at Denver is aggressive. In terms of seats offered at Denver, Southwest entered with a 4 percent share of total Denver seats in 2006 and by April, 2009, held a 19 percent share of seats as **Exhibit 4-27** summarizes. The rapid buildup of service suggests that Denver will function as a focus city for Southwest.

Exhibit 4-27: Southwest Airlines Share of Denver Capacity – Scheduled Seats in April

Seat Metric	2005	2006	2007	2008	2009
Southwest Seats		19,454	32,470	56,557	104,977
All Domestic Seats	479,246	525,448	557,697	568,101	561,655
Southwest Share	0	4%	6%	10%	19%

Source: Official Airline Guide

[2] A list of cities that correspond with the three letter city codes are in the Appendix.

Historically, Denver had relatively high fares and was dominated by United Airlines or United and Continental Airlines. Unlike many other airports, enplanements at Denver are growing at an average annual rate of 4 percent since 2000. As **Exhibit 4-28** shows, almost all of this growth is attributable to low cost carrier passengers. United's market share has declined by almost 10 percent, not because onboard passengers are significantly down, but because other carriers are gaining. As of the end of 2008, low cost carriers were handling over 40 percent of on-board traffic.

Exhibit 4-28: Denver On-Board Passengers, 2005 - 2008

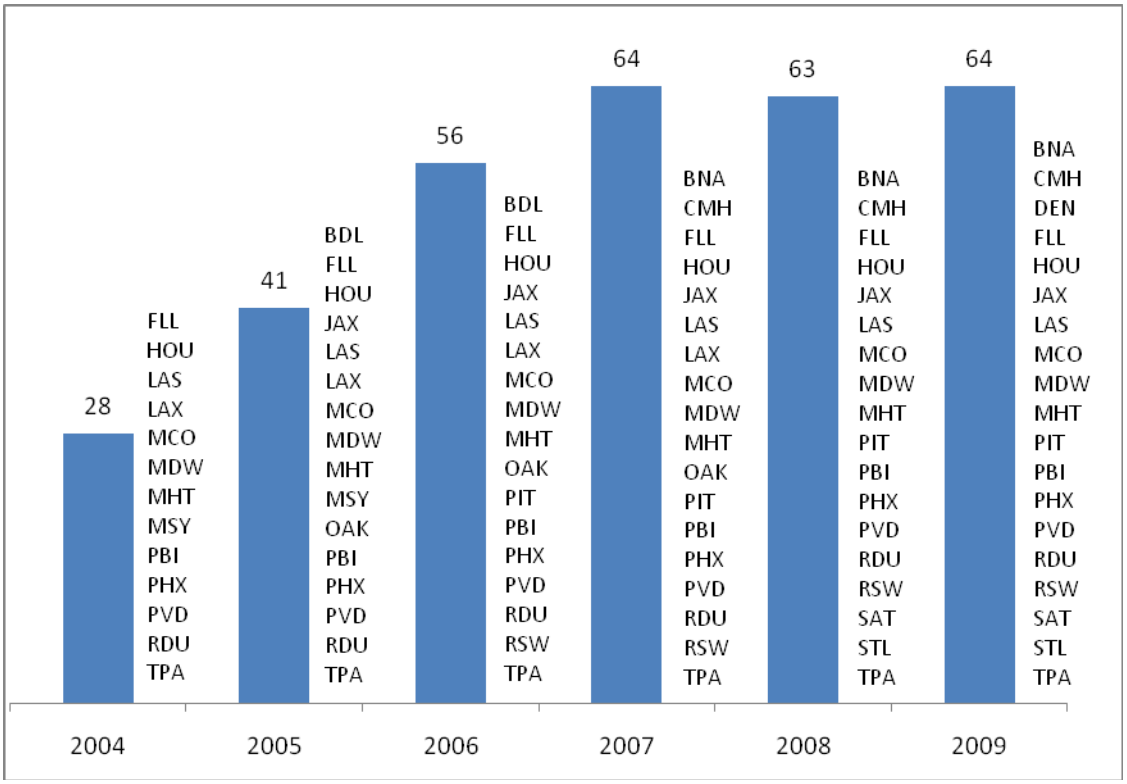
	Domestic Onboard Passengers - Year Ending Dec 31			
Airline	**2005**	**2006**	**2007**	**2008**
AirTran	117,244	132,548	151,123	150,539
Frontier	4,058,377	4,673,687	5,125,556	5,633,446
JetBlue	135,727	138,425	123,228	118,244
Southwest	-	808,770	1,438,077	3,890,651
United	11,511,438	12,328,387	12,375,533	11,473,172
Total Passengers	**20,182,681**	**22,003,051**	**23,324,415**	**23,668,341**
Low Cost Carrier Passengers	**4,311,348**	**5,753,430**	**6,837,984**	**9,792,880**
Low Cost Carrier Share	21.4%	26.1%	29.3%	41.4%
United Share	57.0%	56.0%	53.1%	48.5%
Southwest Share	0.0%	3.7%	6.2%	16.4%
Frontier Share	20.1%	21.2%	22.0%	23.8%

Source: U.S. Onboard (T100) Region Report for scheduled flights between DEN and United States

Philadelphia

Philadelphia has fewer total passengers than MSP, but a larger local traffic base. Southwest entered the Philadelphia market in May, 2004 with 14 daily departures. In July of the same year, Southwest doubled daily departures to 28 serving 13 cities. Entry into the Philadelphia market signaled a change in Southwest Airlines strategy to operate from perimeter airports in metropolitan areas. Going forward Southwest had enough national presence to enter major metropolitan airports directly. In Philadelphia's case, Southwest was already offering an extensive schedule of 156 daily departures out of Baltimore just over 100 miles away. Southwest's entry into Philadelphia was its second competitive move against a US Airways hub. In 2005, the airline offered 41 daily flights, five weekday flights each to Manchester, Hartford, Providence, Raleigh Durham, Orlando and Chicago Midway; two daily flights to Fort Lauderdale and two to Los Angles; one nonstop daily flight to seven other cities. Daily flights the next year increased to 56 and the following year to 64 daily departures serving 19 cities where it has remained. **Exhibit 4-29** shows the progression.

Exhibit 4-29: Southwest Airlines Daily Nonstop Departures from Philadelphia, April, 2005 - 2009



Source: Official Airline Guide

Exhibit 4-30 shows weekly scheduled Southwest seats at Philadelphia. Service levels were built in the first two and half years (starting in May, 2004). By 2009, Southwest was offering about 15 percent of the seats at PHL in the domestic market which was a little lower than its share of Denver seats (19 percent). Note also that Southwest capacity was increasing as was all of the other carriers with the exception of Continental.

Exhibit 4-30: Southwest Airlines Share of Philadelphia Capacity – Weekly Scheduled Seats

	2005	2006	2007	2008	2009
Southwest Seats	39,351	54,115	61,663	60,326	61,851
All Domestic Seats	476,480	428,839	431,983	424,262	399,500
Southwest Share	8%	13%	14%	14%	15%

Source: Official Airline Guide

Reductions in capacity are reflected in the average aircraft size which has gone from 127 seats in 2000 to 95 in 2008. Average load factors were up from 67 percent to 80 percent, explaining in part how reduced capacity has handled increased passenger loads. **Exhibit 4-31** profiles passenger loads on low

cost carriers and US Airways at PHL. Low cost carriers carried 19 percent of onboard passengers. US Airways maintained an approximate 60 percent share; Southwest grew to 15 percent.

Exhibit 4-31: Philadelphia On-Board Passengers, 2004 - 2008

	Domestic Onboard Passengers - Year Ending Dec 31				
Airline	**2004**	**2005**	**2006**	**2007**	**2008**
AirTran	497,966	583,069	578,182	564,199	418,109
Frontier	54,392	91,375	76,933	78,697	72,665
Southwest[3]	563,259	1,486,338	1,785,634	2,003,846	2,087,380
US Airways	7,001,669	8,159,239	7,677,346	7,032,671	8,316,079
Total Passengers	**11,416,875**	**13,660,488**	**13,394,097**	**13,912,427**	**13,915,428**
Low Cost Carrier Passengers	**1,115,617**	**2,160,782**	**2,440,749**	**2,646,742**	**2,578,154**
Low Cost Carrier Share	10%	16%	18%	19%	19%
US Airways Share	61%	60%	57%	51%	60%
Southwest Share	5%	11%	13%	14%	15%
Frontier Share	0.5%	1%	1%	1%	1%

Source: U.S. Onboard (T100) Region Report for scheduled flights between PHL and United States

Pittsburgh

Southwest started service at Pittsburgh International in October, 2005 less than a year after US Airways began to reduce hub operations at PIT. The schedule was actually accelerated following Hurricane Katrina and changes in service in New Orleans. Initial service included 19 daily flights to six destinations: Las Vegas (2), Orlando (3), Chicago Midway (6), Philadelphia (6), Phoenix (1), and Tampa (1). In 2007, Southwest added three daily flights to Baltimore.

Southwest's service at Pittsburgh has been stable at 22 daily flights to 7 destinations. Its market share has increased because US Airways has reduced its capacity by more than two thirds. Today Southwest has 20 percent of weekly seats in the market and carries about 17 percent of passengers as **Exhibit 4-32** shows. Combined, AirTran, JetBlue and Southwest carried 26 percent of onboard passengers.

[3] Southwest Airlines began service in PHL in May, 2004.

Exhibit 4-32: Pittsburgh On-Board Passengers, 2004 - 2008

	Domestic Onboard Passengers - Year Ending Dec 31				
Airline	**2004**	**2005**	**2006**	**2007**	**2008**
AirTran	152,124	191,078	157,607	203,039	262,035
JetBlue	0	0	64,307	135,646	99,328
Southwest	0	298,012	621,398	733,139	734,477
US Airways	4,431,606	3,044,140	2,363,629	1,889,851	1,410,839
Total Passengers	**5,821,458**	**4,970,753**	**4,695,689**	**4,806,841**	**4,231,404**
Low Cost Carrier Passengers	**152,124**	**489,090**	**843,312**	**1,071,824**	**1,095,840**
Low Cost Carrier Share	3%	10%	18%	22%	26%
US Airways Share	76%	61%	50%	39%	33%
Southwest Share	0%	6%	13%	15%	17%
AirTran Share	3%	4%	3%	4%	6%

Source: U.S. Onboard (T100) Region Report for scheduled flights between PIT and United States

Washington Dulles (IAD)

Washington Dulles International Airport represents an unusual Southwest entry point. Independence Air, formerly Atlantic Coast Airlines, was the first regional airline to become a low cost carrier. It began operations as a low cost carrier in June, 2004 and ceased operations in January, 2006. At its peak, Independence Air enplaned almost 2.8 million passengers at IAD in the 12 months ending September, 2005. The second largest low cost carrier in the market was JetBlue who offered 10 daily nonstop flights. AirTran also offered 5 daily nonstops. Southwest announced service in July, 2006 and began in October 2006 with 12 daily departures to: Chicago Midway (7), Las Vegas (1), Orlando (2), and Tampa (2). Service has remained at these levels. In 2008, Southwest enplaned about 3.4 percent of onboard passengers at Washington Dulles.

Implications for Minneapolis-St. Paul

Prior to the recession, Southwest typically entered a market by establishing three to four flights to their major network airports which would include: Chicago Midway, Denver, Baltimore, Las Vegas, and Phoenix. The Denver and Philadelphia startups were much faster and larger in scope. The MSP entry may have been accelerated because of the Delta-Northwest merger and in that sense is similar to Southwest's entry at Washington Dulles. However, since Southwest appears restrained in adding new system capacity, aircraft available for MSP may, in the short term, come from capacity reductions at other airports. In the Pittsburgh, Philadelphia, and Denver cases, Southwest established early on a 15 percent market share which, when extrapolated for Minneapolis, could mean 35 to 40 daily departures from MSP.

Summary

As of the summer 2009, MSP and the metropolitan regional system are tracking reasonably well with respect to other comparable systems and other hub airports, which indicates that it is a mature system that needs little in the way of expanded facilities. Declines in activity reflect a national response to a deep and likely prolonged recession and volatile fuel prices. Airlines continue to cut or redirect capacity. Discretionary business and general aviation activity is down significantly. The peer review of other airports suggest that Delta has in the past made hard decisions to close or scale back connecting hubs at Dallas-Ft. Worth and Cincinnati. These network changes resulted in considerable loss of enplanements (and revenues) at the affected airports. St. Louis, Pittsburgh and Cincinnati are all grappling with excess terminal space following changes in hub status. Revenue diversification and redevelopment of airport property are top priorities at these and other airports that have experienced cutbacks in aviation activity. Review of airport hubs by region indicates that the eastern region and mountain states are experiencing the largest growth. Further analysis into fleet mix, service levels, and economic conditions are needed to better assess why the airports on the West Coast and in the central region appear to be growing more slowly or languishing. Finally, Southwest's entry into the MSP market is very positive. Experience at other airports where Southwest has recently started service suggests that additional non-stop cities are likely to be added at MSP once the economy improves or Southwest can redeploy existing aircraft.

Chapter Five – Airport Classification

Role Analysis

An integral part of system planning is the periodic review of the roles each airport serves in the system. The Metropolitan Council was authorized to conduct regional aviation system planning in 1967 when the Minnesota Legislature, under Minnesota Statute 473.145, directed the Council to create a development guide on transportation, including airport development. The statute reads:

> *The Metropolitan Council shall prepare and adopt, after appropriate study and such public hearings as may be necessary, a comprehensive development guide for the metropolitan area. It shall consist of a compilation of policy statements, goals, standards, programs, and maps prescribing guides for the orderly and economical development, public and private, of the metropolitan area.*
>
> *The comprehensive development guide shall recognize and encompass physical, social, or economic needs of the metropolitan area and those future developments which will have an impact on the entire area including but not limited to such matters as land use, parks and open space land needs, the necessity for and location of airports, highways, transit facilities, public hospitals, libraries, schools, and other public buildings.*

One step toward meeting this legislative requirement is developing a plan for the Twin Cities Regional Airport System, including identifying and classifying each airport by the role it plays in the system. By identifying the role an airport plays in a system, its performance in terms of the facility and services it provides can be benchmarked against a set of defined facility and service criteria. Shortfalls in facilities and services can be identified and improvements recommended. This is a normal part of the system planning process that provides a periodic opportunity to re-evaluate the conditions at each airport from a system perspective, and determine if any of the designated airport roles need to change, which could result in a change in the recommended facilities and services at that airport.

The airports in the Twin Cities Regional Airport System are classified by a number of different methods:

- At a national level, many of these airports are classified in the FAA's National Plan of Integrated Airport Systems (NPIAS).
- Minnesota has a state level classification method, applied to all system airports in the state, as defined in Commissioner's Order Number 587, *Order Amending the Airport System of the State of Minnesota*, October 30, 2003. State plans usually include more airports than the National plan.
- The Metropolitan Council uses a separate system in its Regional Aviation System Plan to reflect metropolitan region airport considerations.

Historical Role Changes

Over the years, the Twin Cities has grown and evolved like many other large urban areas around the country. Constant changes in demand for air service, urban growth pressures, and policy restrictions have led to several key reassessments of the region's aviation system and airport roles.

The airport and airspace interaction within the regional system and its relationships to the state and national systems is somewhat like a chess board in that what is changed at one facility can have ramifications in terms of user behavior, business decisions, airport management actions, and government policy decisions for any number of other facilities in the system. Moving or changing Minneapolis-St. Paul International (MSP), the Major Airport, which is the key piece in the system, was the main factor in the three metropolitan region system reassessments described below, and illustrated in Exhibit A-1 in the Appendix.

The initial classification scheme for the metropolitan region in 1968 was derived from federal terminology used in the 1970 National Airport System Plan (NASP), predecessor to the NPIAS. In the late 1960's the introduction of jet aircraft into air carrier service, and also substantial growth in the general aviation fleet, resulted in forecasts of significant demand for airport capacity. It included a proposed new commercial reliever airport for MSP and eight new general aviation airports. This had a system-wide effect on proposed airport locations, function and operational role.

In 1978 the Metropolitan Council completed an overall system update. It included substantially reduced demand forecasts and proposed facility development. Most search areas for new airports were removed from the plan.

By 1986, both Republic and Northwest Airlines were operating passenger hubs at MSP. The increased congestion and concern over noise impacts resulted in legislative action in 1988 to evaluate the long-term adequacy of MSP to serve as the region's major airport. A dual-track major-airport planning strategy was required by an act of the legislature in 1989. This required a comparison of expanding MSP in its existing location against relocating MSP to a new site to meet expected demand. Either action had system-wide implications for potential changes in airport roles. The current airport classification has been in place since completion of the dual-track process in 1996, with the legislative decision to expand MSP at its current location.

Classification – Purpose and Limitations

This section summarizes the national, state and current regional classifications and explains why they are useful for their intended purpose. The discussion also addresses how the airports of the Twin Cities Regional Airport System fit within each system and the reasons for developing a classification system tailored to the regional system.

National Plan of Integrated Airports

The NPIAS is a FAA plan that identifies airport facilities considered important to the national airport system. Airports included in the NPIAS are eligible for FAA funding for improvement and development of public use facilities. NPIAS airports are divided into two categories that reflect the type of service provided to the community. Those two categories are commercial service and general aviation. Within each major category, airports are further classified based on the types and levels of activity occurring at each facility. The NPIAS major categories and subcategories are described below:

- Commercial Service Airports are publicly owned airports that enplane 2,500 or more passengers annually and receive scheduled passenger service. Commercial service airports are either:
    - Primary – an airport that receives scheduled commercial passenger service and enplanes more than 10,000 passengers annually; or
    - Non-primary – an airport that receives scheduled commercial passenger service and enplanes between 2,500 and 10,000 passengers annually.
- General Aviation Airports: NPIAS airports that do not receive scheduled passenger service are categorized as general aviation airports. Within the general aviation category, subcategories include reliever airports and general aviation airports.
    - Reliever – an airport designated by the FAA as having the function of relieving congestion at a commercial service airport and providing more general aviation access to the community. Privately owned airports may be identified as reliever airports. Reliever airports provide the general aviation user with an attractive alternative airport to divert their operations from a larger, more congested, scheduled service airport.
    - General Aviation – Public use airports that are part of the FAA's NPIAS but do not support scheduled commercial service airline operations and are not identified as reliever airports are categorized as general aviation airports.

Of the 11 airports in the Twin Cities Regional Airport System, eight are included in the NPIAS. With the exception of Minneapolis-St. Paul International Airport, which is a Commercial Service Primary Airport, the other seven NPIAS airports are classified as Reliever Airports, as shown in **Exhibit 5-1**. The NPIAS classification system is useful for allocating federal funding, but it does not provide sufficient differentiation among airports to properly define the different roles found in various state and metropolitan areas such as the Twin Cities Region.

Minnesota State Aviation System Plan

The Minnesota State Aviation System Plan (SASP) has established three airport categories, based upon the size and function of the airport. Those three categories are[1]:

[1] From the *Technical Report 2006 Minnesota Aviation System Plan*, pg. 2-2.

- **Key Airports** – These airports provide air access for large urban areas and regional trade centers, primarily for scheduled air service users, and have paved and lighted primary runways 5,000 feet or longer in length. They are capable of accommodating all single engine aircraft along with larger multi-engine aircraft and most corporate jets.
- **Intermediate Airports** – These airports provide air access for medium sized communities, primarily for general aviation users, and have paved and lighted primary runways that are less than 5,000 feet long. Intermediate Airports can accommodate all single engine aircraft, most multi-engine aircraft and most corporate jets.
- **Landing Strips** – These airports provide minimum air access to small communities, for general aviation users, and have turf runways which can accommodate most single engine aircraft and some twin engine aircraft. They may be unusable during wet weather, winter months, and during the spring melt.

Exhibit 5-1: System Classifications

Airport Name	NPIAS Status	Minnesota SASP Classification[2]	Metropolitan Council Regional System Plan
Minneapolis-St. Paul International	Commercial Service Primary	Key	Major
St. Paul Downtown	Reliever	Key	Intermediate
Anoka County-Blaine	Reliever	Intermediate	Minor
Flying Cloud	Reliever	Key	Minor
Airlake	Reliever	Intermediate	Minor
South St. Paul Municipal	Reliever	Intermediate	Minor
Lake Elmo	Reliever	Intermediate	Minor
Crystal	Reliever	Intermediate	Minor
Forest Lake	NPIAS Submittal	Landing Strip	Special Purpose
Wipline Seaplane Base	Not in NPIAS	Landing Strip[3]	Special Purpose
Surfside Seaplane Base	Not in NPIAS	Landing Strip[3]	Special Purpose

Source: FAA, Minnesota Aviation System Plan, Metropolitan Council, and Wilbur Smith Associates

[2] Designations per Commissioner's Order Number 587, *Order Amending the Airport System of the State of Minnesota*, October 30, 2003.
[3] This airport was not included in Commissioner's Order Number 587, but its users and facilities best match the definition of Landing Strip

The Minnesota SASP did not include the airports in the Twin Cities Regional Airport System in its analysis because the state is not responsible for system planning for those airports. However, in 2003, Commissioner's Order Number 587 classified nine of the system airports as shown in Exhibit 5-1. That order classified three of the system airports as Key Airports – Minneapolis-St. Paul International, St. Paul Downtown, and Flying Cloud. Another five airports listed in the Commissioner's Order – Airlake, Anoka County-Blaine, Crystal, Lake Elmo, and South St. Paul Municipal – were classified as Intermediate Airports. Forest Lake was classified as a Landing Strip. The two seaplane bases in the system were not listed in the Commissioner's Order, but fit best under the definition of Landing Strips.

While this classification system provides more categories than the NPIAS system, it still places five airports in the Intermediate category. Additionally, statutory requirements imposed by the Minnesota legislature place limits on runway lengths in the Twin Cities region, effectively preventing certain airports from ever being assigned a Key Airport classification.

Metropolitan Council Regional Aviation System Plan (RASP)

This system was developed by the Metropolitan Council in 1978 because of "…a need to clarify the existing state and federal classification systems."[4] The classification method is based on each airport's primary user, related service area, the types of aircraft accommodated, the size of the facility, and the extent of the facility influence area. The Council's airport classification goes one step further than the Minnesota SASP by defining four airport categories instead of three. As shown in Exhibit 5-1, the Metropolitan Council Regional Aviation System Plan has three Special Purpose Airports, one Major Airport (Minneapolis-St. Paul International), one Intermediate Airport (St. Paul Downtown), and six Minor Airports.

The Metropolitan Council 2030 Transportation Policy Plan (TPP), which presents policies and plans to guide development of the region's airports, highways, and other transportation systems, defines these airport categories as follows:

- **Major Airport** – A Major Airport serves a primary air service access area that is international and national in scope. Its role in the airport system is to provide facilities and services primarily to scheduled air carrier and regional commuter users, but also includes air cargo and charter carriers.
- **Intermediate Airport** – The role of an Intermediate Airport is to provide facilities and services primarily to corporate and business general aviation aircraft. Typical users of these airports fly a variety of business jets, turboprop aircraft, and single- and twin-engine piston aircraft.
- **Minor Airport** – An airport whose system role is to provide general aviation facilities and services primarily to personal, business, and instructional users. The most common users of these airports fly single-engine and light twin-engine aircraft.

[4] Metropolitan Council, 1978, *Aviation System Development Guide*, p.11.

- **Special Purpose Airport** – A facility open to public-use, including heliports, seaplane bases, or airport landing areas whose primary geographic and service focus is normally state and metropolitan in scope. Personal, business, and instruction uses are accommodated at these facilities.

The system airports are all public-use facilities; private, restricted and personal-use facilities are not included in the system.

The TPP also assigns a system role to each airport based upon the type of users the airport accommodates and the type of air service access the airport provides. That information is summarized in **Exhibit 5-2**.

Exhibit 5-2: Current Twin Cities Airport Classification/Role

Airport Class	Airport	Users Accommodated	Air Service Access Provided	System Role
Major Airport	Minneapolis-St. Paul International	Scheduled Passenger and Cargo, Charter, Air Taxi, Corporate GA, Military	International, National, Multi-State, Regional	Commercial Air Service Hub
Intermediate Airport	St. Paul Downtown	Regional/Commuter, Air Taxi, Corporate Jet, Military, GA	International, National, Multi-State, Regional	Corporate Jet Reliever
Minor Airports	Anoka County-Blaine	Air Taxi, Business Jet	National, Multi-State	Business Jet Reliever
	Flying Cloud	Air Taxi, Business Jet	National, Multi-State	Business Jet Reliever
	Airlake	Recreation, Training, Business	Multi-State, State	General Aviation Reliever
	South St. Paul Municipal	Recreation, Training, Business	Multi-State, State	General Aviation Reliever
	Crystal	Recreation, Training, Business	Multi-State, State	General Aviation Reliever
	Lake Elmo	Recreation, Training, Business	Multi-State, State	General Aviation Reliever
Special Purpose Airports	Forest Lake	Recreation, Training	State, Region	Recreational/Business
	Surfside SPB	Recreation, Training,	Multi-State, State	Recreational/Business
	Wipline SPB	Training, Business	National, Multi-State	Recreational/Business

Source: Metropolitan Council 2030 Transportation Policy Plan, Table 10-24, April 2009

Despite having more categories than the Minnesota SASP, the existing Metropolitan Council Regional System Plan places six out of the 11 airports in a single category – Minor Airports. While these airports have several similar characteristics, such as a NPIAS Reliever designation and paved runways, they actually cater to different market segments and have a variety of physical differences and operational capabilities, as shown in Exhibit 5-2. The system roles assigned to each airport in the TPP suggest that greater differentiation is needed, especially in terms of classifying the Minor Airports.

Legislative Restrictions on Airport Development

In addition to the physical, technical, geographical, and financial constraints on airport development, certain airports in the Twin Cities region also have development restraints placed on them by the Minnesota Legislature. Minnesota Statute 473.641, Subdivision 4, enacted by the Minnesota Legislature in 1980, effectively prohibits the Metropolitan Airports Commission from expending any revenues for expanding or upgrading a metropolitan airport from Minor Airport status to Intermediate Airport status, as then defined in the Metropolitan Development Guide.

An amendment to the statute in 2000 eliminated the reference to the Metropolitan Development Guide and defined a Minor Airport as one with runways all of which are 5,000 feet in length or less. The effect of this legislation is to prevent any of the Minor Airports from extending any of their runways beyond 5,000 feet. The legislation can only be changed by the State Legislature.

Assessment of Current Airport Classification

A number of elements drive the 2008 reassessment of existing airport roles. The following items were examined for each airport and for combined system effects as part of the reassessment.

- Technical and operational improvements to airports, airspace, and air traffic control
- Land use compatibility, ground access, and airport services
- Potential changes in the list of airports that are included in the NPIAS
- Potential effects of the FAA's establishing a new category of pilot and aircraft for Sport Aviation
- Encouragement by the FAA for airports to be business-jet ready, and establishing a new category of Very Light Jets
- Legislative directive to Metropolitan Airports Commission to develop a plan to divert the maximum feasible number of general aviation aircraft operations from MSP to the reliever airports
- Providing adequate aviation resources to plan and maintain a viable, state-of-the-art airport system

As indicated earlier, the current assessment of airport roles involves a number of elements. One aspect is an examination of the expansion potential for each airport on both the airside and landside. Exhibit A-2 in the Appendix gives a broad system comparison for their metropolitan region airports in relation to their general airside development capability based upon ranking by runway length.

The existing system airports have or are reaching the extent of their possible airside development due to physical limits and legal restraints. Several airports are removing runway projects that have long been shown on airport layout plans, but have never been developed. Several airports have updated their long-term comprehensive plans (LTCP's) that identify some remaining airside expansion potential, but environmental and funding issues remain. The overall metropolitan region system has matured, with the focus on protection, preservation and selected enhancements.

A key question is whether the current classification system provides enough definition to address the types of changes that the trends and forecasts, discussed earlier in Chapters 2 and 3, portend. The ability to evaluate system performance, devise appropriate future implementation strategies and priorities is shaped, in great part, on how an airport's role is determined.

Proposed Refinements to Current RASP Classification

This study evaluates splitting the Minor Airports into two groups. Stratifying the Minor Airports into Minor I and Minor II Airports will permit greater differentiation of these airports in terms of the types of aircraft they serve, and the facility and services they offer. It also permits establishment of a lower set of development criteria at the Minor I Airport level, making it easier for airports to enter into the Metropolitan Council Regional Aviation System, if desired.

Since the type of aircraft an airport is designed to serve is a fundamental part of defining what role the airport plays in a system, an understanding of the means by which aircraft types drive airport parameters is needed. The following explanation highlights the key relationships between aircraft and airport design.

Exhibit 5-3: Aircraft Categories and Airplane Design Groups

		Aircraft Category				
Airplane Design Group	Wingspan	A < 91 Knots	B 91 to < 121 knots	C 121 to < 141 knots	D 141 to < 166 knots	E 166 knots or more
I	< 49 feet	Cessna 150, 172, Beech Bonanza, Piper Archer	Beech King Air 100, Cessna 402, Piper Navajo, Citation I	Learjet 25, Learjet 55, Israeli Westwind,	Learjet 35	
II	49 to < 79 feet	DHC-6-300 Twin Otter	King Air C90, Citation II, Citation III	Gulfstream III, Canadair 600	Gulfstream II, Gulfstream IV	Military
III	79 to < 118 feet	Douglas DC-3	Fokker F-27	Airbus A320, Boeing 727, Boeing 737	Gulfstream V	
IV	118 to < 171 feet			Boeing 757 Boeing 767	Boeing 707, DC-8, DC-10	
V	171 to < 197 feet			Boeing 747 SP	Boeing 777, Boeing 747	
VI	197 to < 262 feet			Antonov AN-124, Lockheed C-5	Airbus A380	

Source: FAA

A critical aircraft is identified for each airport (defined as the largest aircraft that has at least 500 operations per year at that airport), which is then used to determine the facility's airport reference code (ARC). **Exhibit 5-3** provides examples of common aircraft for different ARCs. An airport's ARC is a composite designation based on the Aircraft Category and Airplane Design Group of that airport's critical aircraft. The FAA groups aircraft into Aircraft Categories and Airplane Design Groups based on their

approach speed and wingspan, respectively. For example, an airport with a Beech King Air C90 as the critical aircraft (approach speed – 100 knots and wingspan – 50.2 feet according to FAA documents) would be designated with an ARC of B-II.

Under a proposed refined classification approach, system airports would be classified into one of five categories, generally based upon their critical aircraft type (and corresponding ARC) and associated primary runway length (see **Table 5-4**). Each of those categories is defined below Table 5-4 and described in more detail. Again, the only proposed variation from previous regional plans is the division of Minor Airports into Minor I and Minor II categories.

Exhibit 5-4: Proposed System Classifications

Airport Name	Metropolitan Council Regional System Plan - Refined
Minneapolis-St. Paul International	Major
St. Paul Downtown	Intermediate
Anoka County-Blaine	Minor II
Flying Cloud	Minor II[5]
Airlake	Minor I[6]
South St. Paul Municipal	Minor I
Lake Elmo	Minor I
Crystal	Minor I
Forest Lake	Special Purpose
Wipline Seaplane Base	Special Purpose
Surfside Seaplane Base	Special Purpose

Source: Wilbur Smith Associates

- **Major Airport** – Minneapolis-St. Paul International Airport's ARC is a D-V, although it has minimal D-VI capability to serve as a diversion airport for the Airbus A380. An 8,000' runway and precision instrument approach is the minimum for all-weather operation of this aircraft group. MSP is the only scheduled service airport in the metropolitan region system, and no significant

[5] Flying Cloud is designated a Minor II Airport based on plans to extend its main runway to 5,000 feet.
[6] The approved 2025 LTCP for Airlake envisions extending the runway to 5,000' (a Minor II) in the long-term if demand warrants; this assumes environmental and funding issues are successfully addressed.

changes to its functional and operational characteristics are proposed. The level of based general aviation aircraft at this facility is limited by policy.

- **Intermediate Airport** – St. Paul Downtown Airport is the only Intermediate Airport in the metropolitan region system and serves as the primary general aviation reliever to MSP. The primary runway was 6,711' long, but due to FAA safety requirements has been shortened to 6,491' in length. Facilities and services are focused on corporate aviation, since these airports tend to cater toward business travel. These airports are designed to accommodate the largest business jets; nevertheless, there is typically a significant presence of smaller aircraft, including piston-engine singles and twins.
- **Minor II Airport –** A Minor II Airport is proposed as having an ARC of B-II, including precision instrument approach and a primary runway for all-weather service with a minimum length of 4,500 feet. There is usually a mix of piston-powered and turbine-powered aircraft at these airports. Minor II airports typically serve aircraft used for personal business and corporate functions, as well as recreational aviators.
- **Minor I Airport** – A Minor I Airport is proposed as having an ARC of B-I, usually with a non-precision approach to a primary runway with a hard surface that is a minimum of 2,500 feet in length. These airports typically serve training and recreational aviators flying single-engine piston and light twin-engine piston aircraft, with some business users to a lesser extent.
- **Special Purpose Airport** – A Special Purpose Airport is defined as any airport, seaplane base, glider port, or heliport that does not meet the definition of any other airport role. This category includes any facility without a hard surface runway. As the name implies, these facilities serve unique aviation needs and typically have facilities and services tailored for that specific need, such as seaplane bases and heliports. As a result, it is difficult to generalize the facility needs.

In the next section, each of these categories is further defined through the proposed facility and service objectives that are tailored to the aviation market segment that each airport role is intended to serve.

Proposed Facility and Service Objectives

With system airports assigned to a role, it is desirable to identify facilities and services that should be available. Facility and service objectives delineated in this section are just that, objectives; they are not standards or requirements. It is possible that airports included in, or recommended for, an elevated functional role may be unable to achieve certain facility and service objectives. An airport's inability to meet all facility and service objectives for its functional role does not necessarily preclude that airport from filling its recommended role within the system. It should be noted that the concept of dividing Minor Airports into two subcategories is further explored in this evaluation.

The proposed objectives present the minimum level of development that the airport should have in order to meet its proposed system role. It is possible that some airports may have facilities or services that have been developed beyond those attached to its functional role. Actual reduction or removal of facilities and services was not considered in this system analysis. However, the need to consider facility redevelopment to meet changes in design standards, changes in user demand, etc., is fundamental to the individual planning efforts undertaken by each airport.

Exhibit 5-5 proposes minimum facility and service objectives for each of the five role categories, based on discussions with the advisory task force representatives, as well as data from similar system evaluations. Each of the facility and service objectives identified in Exhibit 5-5 is discussed below. It is important to understand that the facility and service objectives are not requirements. Each airport's long-term comprehensive plan (LTCP), as well as unique circumstances, will dictate what type of facilities will be in place at an individual airport. Services for based aircraft owners can vary from what a transient user may need. From a system perspective, however, these objectives allow a broad-brush evaluation of the current system to be made as well as general system recommendations to be prepared.

Airport Reference Code: The Airport Reference Code (ARC) is based on the largest aircraft, referred to as the critical aircraft, that regularly uses the airport. The ARC is defined by two parameters of the critical aircraft – its approach speed and wingspan. The approach speed determines certain dimensions of safety areas surrounding the runway. The wingspan is a factor in some of these safety area dimensions, as well as setting distances between parallel runways, parallel taxiways, holdline distances from runways and other aspects of the airport design. Airports need to be able to accommodate the aircraft expected to use the facility with a primary runway of an appropriate length to support its system role.

Primary Runway Length: The length of an airport's primary runway is a critical factor in providing for the types of aircraft using the airport. It affects whether aircraft can operate from the airport at full capacity, or must operate at a reduced weight by limiting fuel or payload. It affects the length of crosswind runways, and with associated levels of instrumentation the overall utilization of the airside capacity.

Taxiway Type: The type of taxiway system at an airport largely determines runway occupancy times of arriving aircraft. At busier airports, it is desirable to minimize runway occupancy times in order to minimize the risk of aircraft collisions on the runway, which can best be accomplished with a full parallel taxiway. Airports with less activity have a reduced risk of aircraft collisions on the runway, so partial parallel taxiways and turnarounds, which require aircraft to back-taxi on the runway, are often used.

Exhibit 5-5: Airport Facility and Service Objectives Analyzed for Proposed Airport Role

Facility/Service	Major	Intermediate	Minor II	Minor I	Special Purpose
Airside Facilities					
Airport Reference Code	D-V	C-III	B-II	B-I	A-I
Primary Runway Length	8,000' paved	6,000' paved	4,500' paved	2,500' paved	Any unpaved or < 2,500' paved
Taxiway Type	Full parallel	Full parallel	Full parallel	Partial parallel	Turnaround, if paved
Instrument Approach	Precision	Precision	APV	Nonprecision	None
Runway Lighting	HIRL	HIRL	HIRL	MIRL	LIRL
Approach Lighting System	ALSF	MALSR	MALSR	REIL	None
VGSI	Yes	Yes	Yes	Yes	No
Other Visual Aids	Rotating beacon, lighted windsock	Rotating beacon, lighted windsock	Rotating beacon, lighted windsock	Rotating beacon, windsock	Windsock
Air Traffic Control Tower	Yes	Yes	Yes	If operational activity warrants	No
Weather Reporting	Yes	Yes	Yes	Yes	No
Landside Facilities					
Paved Aircraft Parking	Yes	Yes	Yes	Yes	No
FBO	24 hour service	24 hour service	Business hours	Business hours	None
Auto Parking	Parking structure	Surface paved	Surface paved	Surface paved	Surface unpaved
Services					
Fuel	Jet-A and 100LL 24 hour service	Jet-A and 100LL 24 hour service	Jet-A and 100LL	100LL	100LL
Ground Transportation	Multimodal, rental car, and taxi	Rental car and courtesy car	Rental car or courtesy car	Rental car or courtesy car	None
Food Services	Restaurant, catering	Restaurant, catering	Catering, vending	Vending	None
Phone	Yes	Yes	Yes	Yes	No
Snow Removal	Yes	Yes	Yes	Yes	None

Source: Wilbur Smith Associates

Instrument Approach: The type of instrument approach at an airport affects the overall utility of an airport and can make it possible to land at the airport during inclement weather. Therefore, the more critical a role an airport plays in the system, the more robust the approach should be at the airport. Instrument approaches are characterized by their minimums, which describe both the minimum cloud ceiling and minimum visibility required in order for the aircrew to complete the approach to landing. Approaches are broken down into three basic types, listed below in decreasing order of utility.

- **Precision** – Precision approaches offer both horizontal and vertical guidance and can, with special aircrew and aircraft certification, enable landings in zero-zero conditions – effectively no visibility. Typically, precision approaches have minimums of a 200-foot ceiling and a ½ mile visibility. The instrument landing system (ILS), a ground based navigation system, is the most common system for providing a precision approach to a runway.
- **Approaches with Vertical Guidance (APV)** – These approaches make use of satellite global positioning systems (GPS) to provide both horizontal and vertical guidance. They can provide minimums as low as 200-foot ceilings and ½ mile visibility, although higher minimums are more common. LPV (localizer performance with vertical guidance) and LNAV/VNAV (lateral navigation/vertical navigation) are typical approaches with vertical guidance.
- **Nonprecision** – Nonprecision approaches provide horizontal guidance only (no vertical navigation) and may offer minimums as low as a 300-foot ceiling and ½ mile visibility. These approaches may rely upon ground based navigation equipment (such as VORs, or NDBs), or satellite based systems (such as LNAV approaches).

Runway Lighting: All system airports should have some type of runway lighting, allowing night operations. Airports that cater to higher end aircraft are expected to have higher intensity lighting, suitable for both night and low visibility operations. Airport lighting systems are either high intensity runway lighting (HIRL), medium intensity runway lighting (MIRL), or low intensity runway lighting (LIRL).

Approach Lighting Systems: Approach light systems provide the basic means to transition from instrument flight to visual flight for landing. Operational requirements dictate the sophistication and configuration of the approach light system for a particular runway. The most sophisticated approach lighting systems are approach light systems with sequence flashing lights (ALSF). Less complicated systems include medium intensity approach lighting system with runway alignment indicator lights (MALSR) and runway end identifier lights (REIL).

Visual Glide Slope Indicators (VGSI): A visual glide slope indicator provides pilots with visual feedback on their vertical position relative to their distance to the runway. The systems, either a visual approach slope indicator (VASI) or precision approach path indicator (PAPI), consist of lights located next to the approach end of the runway and can be seen by the pilot from up to five miles away during the day and up to 20 miles away at night.

Other Visual Aids: In addition to the lighting systems listed above, airports also employ rotating beacons to aid pilots in finding the airport at night, as well as providing an indication of when observed weather

conditions have deteriorated beyond a specific point. Airports also make use of wind socks (which may be illuminated for use at night) to provide visual indications of wind direction.

Air Traffic Control Tower: An air traffic control tower is a significant contributor to safety and efficiency at an airport, especially at busier airports. Because of the significant costs involved with building and operating an air traffic control tower, its use is reserved for those busy airports that demonstrate a need for it.

Weather Reporting: Weather conditions determine if an aircraft is capable of getting into an airport. Knowing what those weather conditions are ahead of time greatly assists pilots with flight planning. It is also of use when making a diversion decision. Weather reporting at most airports is automated, using an Automated Weather Observation System (AWOS), an Automated Surface Observing System (ASOS), or an Automated Weather Sensor System (AWSS). Some airports have human weather observers. In addition to on-airport weather reporting, the Minnesota Department of Transportation provides computer weather access through a contract with Meteorlogix. This weather information, dubbed the Minnesota Weather Access System (MnWAS) is available at 135 airports throughout Minnesota, including all of the Twin Cities Regional Airport System airports (but not the two seaplane bases).

Paved Aircraft Parking: Transient aircraft need a place to park while at an airport. For some airports, parking on grass is sufficient. But for other airports, especially those serving turbine-powered aircraft, paved aircraft parking is the standard.

FBO: A fixed base operator (FBO) provides basic aviation services to general aviation aircraft, and, in some cases, to commercial airlines. At the most basic airports, these services generally include fuel, some aircraft maintenance, and a terminal building where pilots and passengers can meet. Additional services that FBOs may offer include meeting rooms, catering, rental aircraft, flight instruction, rental and/or courtesy cars, and charter flights. The availability of these services depends upon the nature of the airport. Busier airports are apt to find the FBO building and its fueling and maintenance services available 24 hours. Airports with less activity typically provide their services during specific business hours, and supplement that with on-call services outside those hours.

Auto Parking: Users of the airport typically arrive by car and require a place to park that car while using the airport facilities. Parking facilities can range from garage structures, designed to provide a large quantity of parking capacity without taking up excessive land area, to paved surface parking lots, designed for heavy use in all kinds of weather, to unpaved parking lots that may not be usable in certain kinds of weather.

Fuel: In order for an airport to fulfill its designated role, it must be able to provide the basic services to the users of the airport. Fuel is the most fundamental of these services, with users of turbine engine aircraft needing Jet-A and the users of nearly all piston engine aircraft needing 100LL. All system airports are expected to be able to fuel piston aircraft, and those airports with significant amounts of jet traffic are expected to have Jet-A fuel. The busier airports are expected to provide fueling services around the

clock, while other airports are expected to be able to provide fueling services on a self-serve, a call-out basis, or just during specified business hours.

Ground Transportation: Airports can further encourage convenience for transient airport users by offering some type of ground transportation service, such as rental car facilities, an airport courtesy car, or taxi/shuttle service. Major airports with sufficient traffic can justify multimodal connections.

Food Services: Food services are largely a function of the traffic that passes through the airport. Busier airports can support restaurants, while airports with less traffic may only be able to provide vending machines that provide food and drinks. Airports that regularly serve business aircraft typically have catering services that provide food and beverages for departing aircraft.

Phone: Phone service is needed at airports to provide a communication link between pilots and air traffic control in the event that radios fail and cell phone communications are not available or reliable. Without this service, unnecessary delays can develop if an aircraft is unable to communicate with air traffic control. Additionally, aircraft passengers may find phone service convenient.

Snow Removal: Winter use of airports around the Twin Cities depends upon the ability to remove snow from the airfield. The more critical an airport is to the economic vitality of the region, the more important it is to have the ability to keep the airport operating regardless of heavy snowfall.

Planning Objectives

In addition to the service and facility objectives described above, prudent airport management calls for periodic evaluation of the airport's performance and assessment of the airport's goals. Regardless of the airport's role in a system, it should have mechanisms in place to aid in reaching its goals and protecting against outside hazards that can impede the airport's performance. Two such mechanisms are airport planning methods and zoning regulations that protect the airport and its airspace.

Airport planning is a necessary component for an airport to set goals, and determine the steps necessary to reach those goals. The next chapter will examine the airport planning activities for each of the system airports.

The long-term viability of airports in most systems can be threatened or endangered by encroachment from land uses or activities that are incompatible with an airport and its operation. For many airports, their zone of influence and potential impact extend beyond the property that is actually owned or controlled by the airport. To protect against undue external influences, the airport must work with surrounding municipalities to implement land use controls or zoning that recognize the presence of the airport and its potential areas of impact. A means of measuring this is examining the degree to which the airport and community have established zoning regulations that protect the airport. The next chapter will also evaluate the zoning protections each system airport has in place.

Summary

The airports in the Twin Cities Regional Airport System are classified by a variety of different methods, each tailored to its specific purpose. The system has evolved to the point where there are more distinct roles than exist in the previous system plan. This section proposed an airport role suitable for bringing a new airport into the system without imposing burdensome facility and service objectives. Additionally, a distinction between the Minor Airports that primarily serve business aviation and those that focus on personal and recreational aviation was proposed. The previous regional aviation system plan was modified to account for these needs and facility and service objectives were proposed for each of these airport roles. Based upon the information gathered in the Inventory chapter and the criteria established in this chapter, each airport was assigned to one of the proposed roles.

In the next section, each airport will be assessed for their respective performance in relation to the proposed facility and service objectives that are based on the roles assigned in this chapter. Each airport's planning and zoning efforts will also be examined.

Chapter Six – System Performance Evaluation

The proposed classification of the airports within the Twin Cities Regional Aviation System, identified in Chapter Five, provides a baseline for evaluating the existing airport system. Facility and service objectives were established for each proposed airport role to help analyze how each airport functions in the regional aviation system. The five airport role classifications proposed are: Major, Intermediate, Minor II, Minor I, and Special Purpose. These functional roles within the regional airport system also provide a baseline for evaluating the performance of the Twin Cities' existing airport system. It should be noted that the Twin Cities regional airport system is a well developed aviation system that has been properly managed and maintained. As a result, it should be no surprise that the airports within the system already meet most of the recommended facility and service objectives, and that any major changes or developments at these airports would only result from a change in aviation demand.

This evaluation seeks to accomplish the following:

- Provide an indication of where the airport system is adequate to meet near- and long-term aviation needs,
- Identify specific airport or system deficiencies, and;
- Help to determine if there are surpluses or duplications within the system.

This evaluation provides the foundation for subsequent recommendations for the Twin Cities Regional Aviation System, as well as for individual study airports. In addition to improvements at individual airports, the issue of which airports should be included in the National Plan of Integrated Airports Systems (NPIAS) should be addressed, as this can be an important factor in funding for airport improvements.

This section begins with a discussion of the NPIAS, and summarizes the factors that are considered when determining NPIAS eligibility. It concludes with an assessment of the proposed facility and service objectives for each category of airport.

Significance of NPIAS

The NPIAS helps to establish a priority grouping for funding initiatives for those airports included in the federal system. One consideration for the Twin Cities Regional Aviation System is which airports should be included in the NPIAS. Out of the 11 system airports, eight are part of the NPIAS. The three airports that are not in the NPIAS (Forest Lake, Surfside Seaplane Base, and Wipline Seaplane Base) are all classified as Special Purpose Airports in the metropolitan system. Should the role of any of these airports change, inclusion in the NPIAS would be a natural consideration. Inclusion in the NPIAS typically allows an airport to be eligible to receive federal funding. A general explanation of NPIAS, and how airports enter the program, follows.

In an effort to group similar airports into categories, classifications exist to distinguish between the different service roles among NPIAS airports. Airport classifications in the NPIAS also represent different

funding categories under which the distribution of federal aid, through the Airport Improvement Program (AIP), is determined.

Entry into the NPIAS is established by specific criteria and procedures. NPIAS airports are categorized by the type and level of service they provide to a community. These services levels, which were defined in Chapter Five, include:

- Commercial Service Airports
- Primary Commercial Service Airports
- Non-Primary Commercial Service Airports
- General Aviation Airports
- Reliever Airports

NPIAS Eligibility Criteria

The FAA's criteria for an airport's inclusion in the NPIAS are based on a variety of factors such as airport demand, geographic location, airport sponsorship, as well as other criteria. The following sections discuss NPIAS entry criteria.

- **Airports formerly in the NPIAS** – Airports that have been included at one time in the NPIAS but have been eliminated from the program are eligible for inclusion. These airports must meet other NPIAS criteria; however, such as a minimum level of based aircraft. An exception to this criterion includes airports not included in a State Airport System Plan, or airports where there is clearly no longer a continuing national interest in the airport.
- **Airport's location in relation to the nearest NPIAS airport** – An airport that is included in a State Airport System Plan may be included in the NPIAS if it has 10 or more based aircraft and serves a community located at least 20 miles or a 30-minute drive from the nearest existing or proposed NPIAS airport.
- **Reliever Airport** – An existing or proposed airport may be included in the NPIAS if it relieves airport congestion in a metropolitan area by providing general aviation users with an alternative landing location. The purpose of the reliever airport is to provide substantial capacity or instrument training relief.
- **Airports receiving U.S. Mail Service** – Any public airport where a scheduled air carrier transports mail to an airport or where an independent carrier, freight forwarder, FBO, etc. is under contract with the U.S. Postal Service (USPS) to carry mail may be included in the NPIAS. The airport must be adequate to satisfy the needs of the USPS.
- **Airports with a National Defense Role** – Any public-use airport where a unit of the Air National Guard or of a reserve component of the Armed Forces of the United States is permanently based or is adjacent to and who operates permanently assigned aircraft directly related to its mission is included in the NPIAS.

An existing or proposed airport not meeting the criteria above may be included in the NPIAS if it meets all of the following:

- It is included in the State Airport System Plan
- It serves a community more than 30 minutes from the nearest NPIAS airport
- It is forecast to have 10 or more based aircraft within the short-term planning period (five years)
- There is an eligible public sponsor willing to undertake the ownership and development of the airport

Airports that do not meet any of the previously discussed entry criteria may be considered for inclusion in the NPIAS on the basis of a special justification. This justification must show that there is a significant national interest in the airport. Such special justifications include:

- A determination that the benefits of the airport will exceed its development costs
- Written documentation describing isolation
- Airports serving the needs of Native American communities
- Airports needed to support recreation areas
- Airports needed to develop or protect important national resources

Benefit-Cost Analysis

If an airport is included in a State Airport System Plan, but the community it serves is within 20 miles or a 30-minute drive of an existing or proposed NPIAS airport, or if it is forecast to have less than 10 based aircraft in the short-term planning period, an analysis may be conducted to determine if the benefits of the airport exceed its cost.

A benefit-cost analysis measures the benefits accruing to airport users. Benefits are defined by the FAA as the time saved by using an airport and the net costs of such use relative to travel to the next best alternative airport. The rationale is that time saved can be devoted to other endeavors, resulting in a net increase in the production of goods and services in the national economy.

It is important to note that the FAA's entry equation for NPIAS inclusion is most sensitive to three factors. These factors are:

- Based aircraft
- Access time and distance to other NPIAS airports
- Airport costs

All three of the non-NPIAS airports in the Twin Cities Regional Aviation System might need a benefit-cost analysis based on their close proximity to existing NPIAS airport. Further examination of ground access occurs in Chapter 7. **Exhibit 6-1** shows that Wipline SPB is the only one of the three that does not meet the based aircraft threshold, since it is not expected to exceed 10 based aircraft during the planning period.

Exhibit 6-1: Non-NPIAS Airport Eligibility Criteria

Non-NPIAS Airport	Based Aircraft	Distance to Nearest NPIAS Airport
Forest Lake	26	15 miles to Anoka County -Blaine
Surfside SPB	45	6 miles to Anoka County -Blaine
Wipline SPB	5	5 miles to South St. Paul Municipal

Source: Wilbur Smith Associates, October 2008

Additionally, all three airports are within 20 miles of a NPIAS airport, the other criteria for determining the need for a benefit-cost analysis. With Forest Lake's northeastern location in the metropolitan region, it could be considered that, while the airport is within 20 miles of a NPIAS airport, the community it serves falls outside the 20-mile limit.

Evaluating Proposed Facility and Service Objectives

The following sections of this chapter analyze the degree to which the Twin Cities Regional Aviation System meets the proposed facility and service objectives established in Chapter Five, based on the proposed roles assigned to each airport. Each objective is explained and a chart shows what percentage of the airports in the system meet the recommended objective. Additionally, the percentage of airports meeting the proposed objective in each role category is shown. The proposed categories of airports and their respective airports are:

- Major Airport: Minneapolis-St. Paul International
- Intermediate Airport: St. Paul Downtown
- Minor II Airports: Anoka County-Blaine and Flying Cloud
- Minor I Airports: Airlake, Crystal, Lake Elmo, and South St. Paul Municipal
- Special Purpose Airports: Forest Lake, Surfside SPB, and Wipline SPB

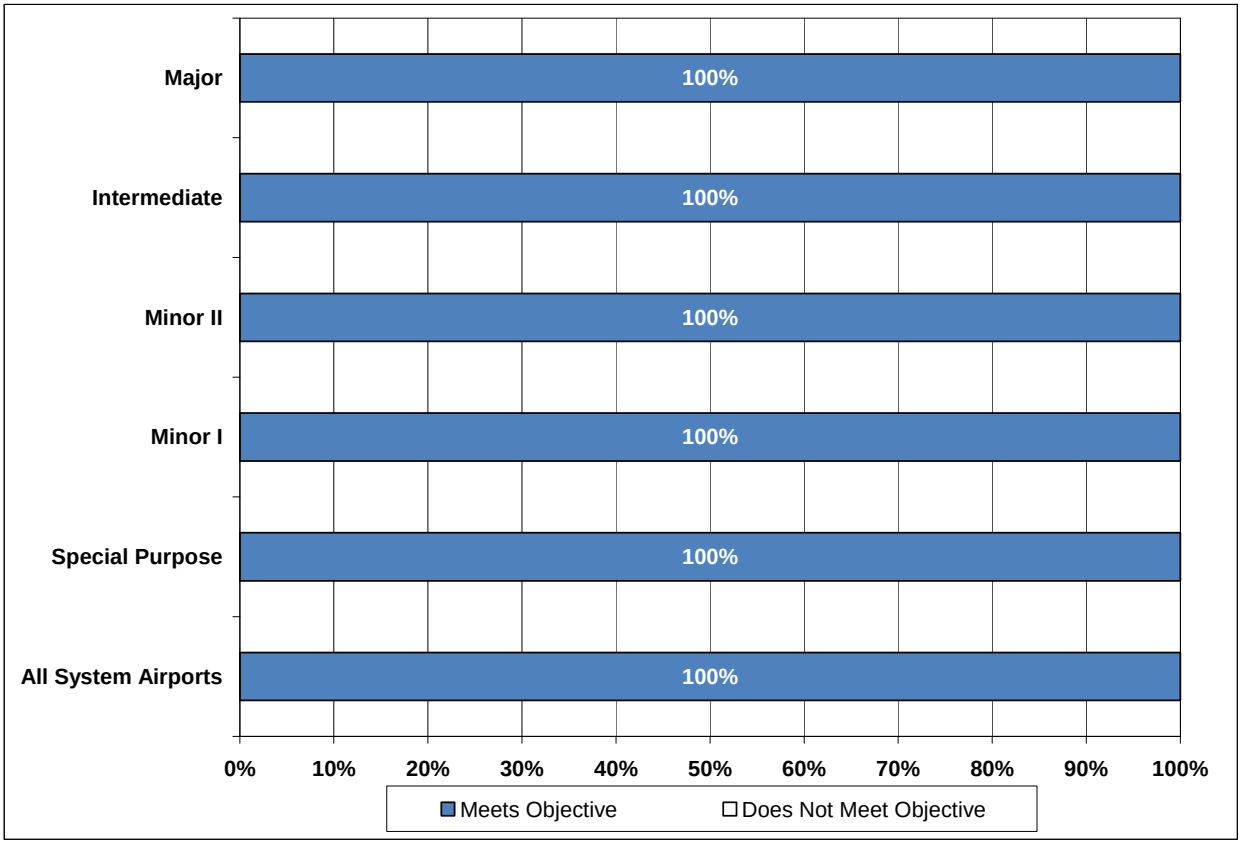
Airport Reference Code

The FAA's airport reference code (ARC) defines many airport design criteria, such as safety and obstacle free areas, runway width, separations between runways and taxiways, and other geometric aspects of the airport. While aircraft that exceed an airport's ARC can use that airport occasionally, the risk of damage to pavement, the aircraft or other aircraft is reduced if all the aircraft using the airport fall within the designated ARC.

The ARC objective for Major Airports was set at D-V, since this includes nearly all widebody commercial airliners, which only use Major Airports. An ARC objective of C-III was selected for Intermediate Airports since this covered all but the largest corporate jets. Minor II Airports are expected to handle smaller sized corporate jets and turboprop aircraft, so its ARC objective was set at B-II. The ARC objective for Minor I Airports was set at B-I in order to accommodate light twin engine aircraft, some small jets, and nearly all single-engine piston aircraft. Special Purpose Airports were assigned an ARC objective of A-I to coincide with their focus on light single engine aircraft.

All airports in each role meet their proposed ARC objective, as shown in **Exhibit 6-2**.

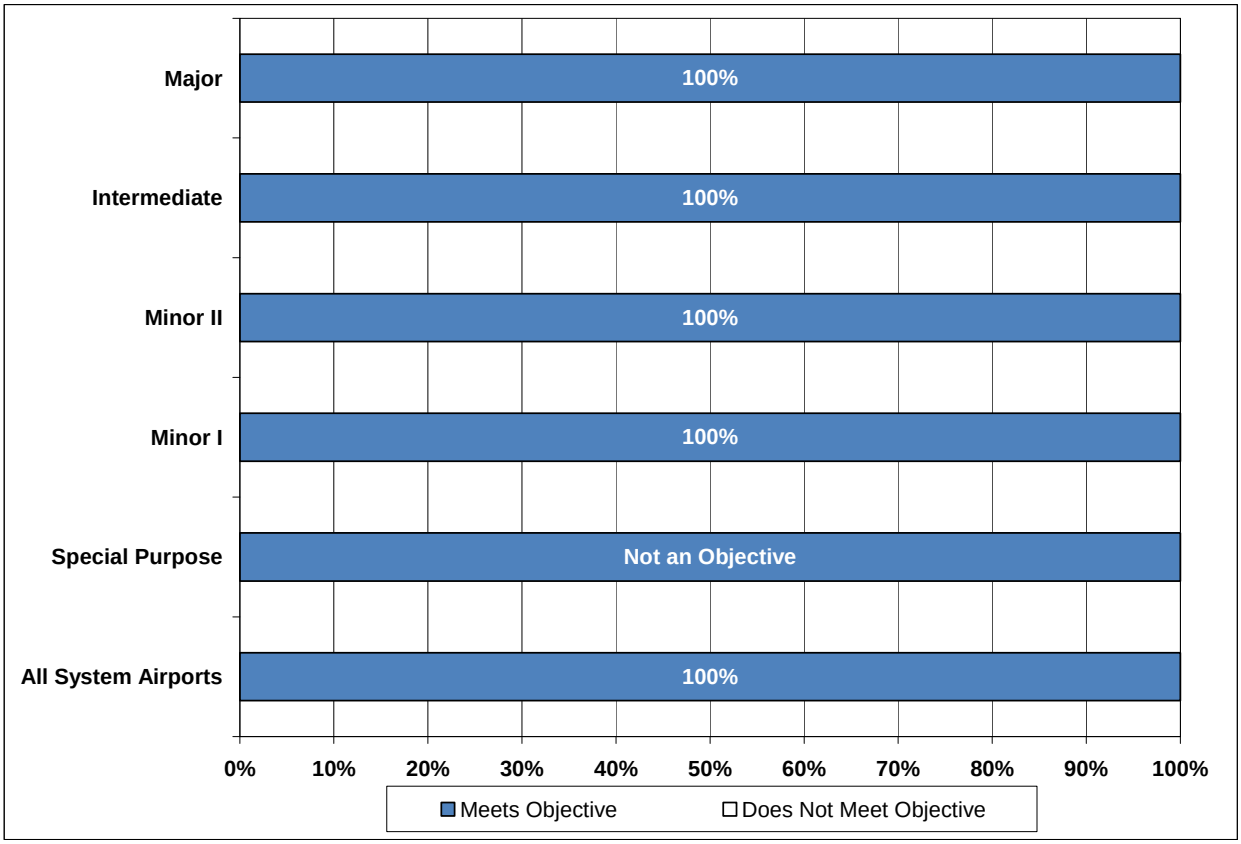
Exhibit 6-2: Airport Reference Code Objective



Runway length

Adequate runway lengths are one of the most important components of an aviation system in terms of providing facilities that meet the needs of various aviation users. The length of the airport's primary runway is a major factor in determining what types of aircraft may safely and reliably use the airport. In general, the longer the runway, the larger the aircraft that uses the airport. **Exhibit 6-3** shows that all the airports in the Twin Cities Regional Aviation System meet the current proposed objective of runway length as determined by their assigned role. The proposed minimum runway length for Major Airports is 8,000 feet. For Intermediate Airports, the minimum proposed runway length is 6,000 feet. Minor II Airports have a minimum proposed runway length of 4,500 feet, and Minor I Airports have a minimum proposed runway length of 2,500 feet. Special Purpose Airports do not have a proposed runway length. One of the Minor II Airports, Flying Cloud Airport, meets its objective since it recently extended its runway to 5,000 feet.

Exhibit 6-3: Runway Length Objective

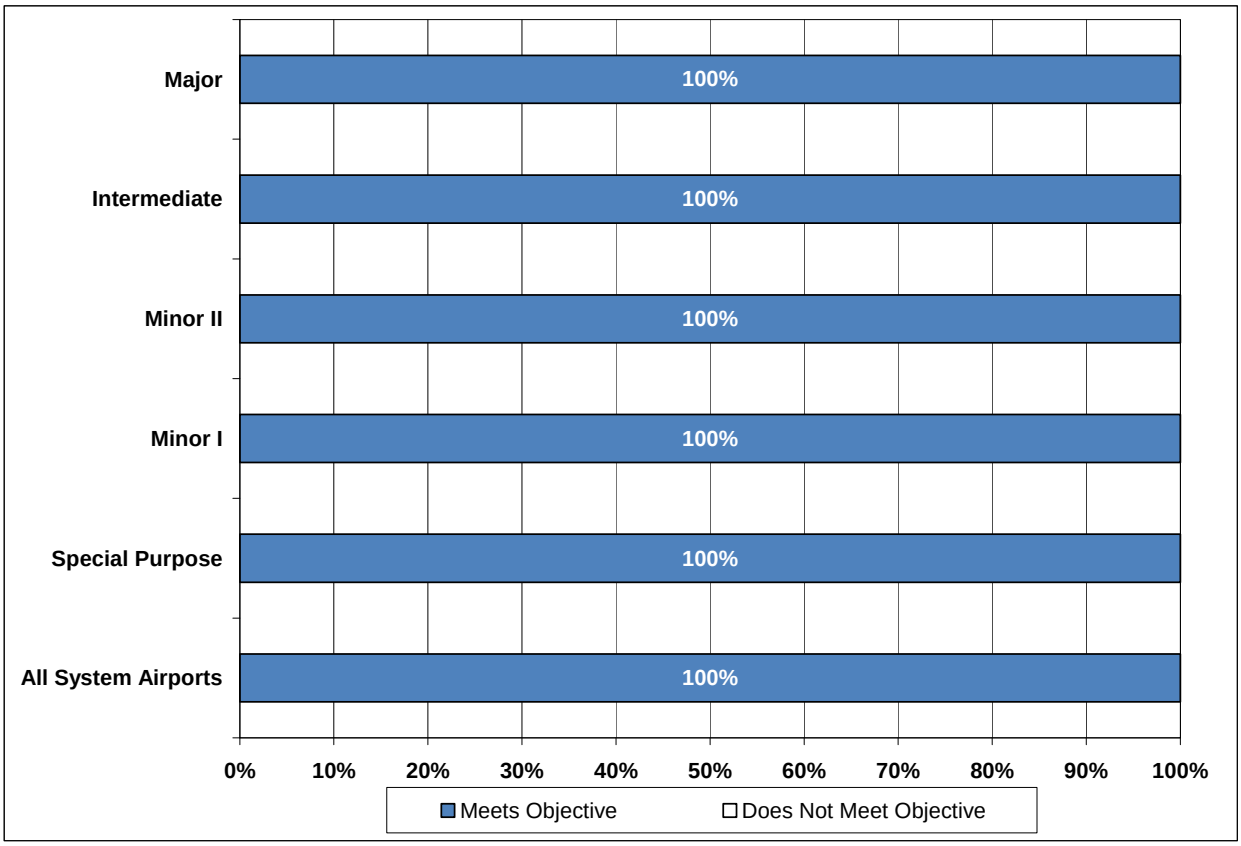


Taxiway type

Exhibit 6-4 shows the percentage of airports that meet the taxiway objective. Because of the need to avoid backtaxiing on runways at busier airports, it was determined that Major, Intermediate, and Minor II Airports should have full parallel taxiways. Partial parallel taxiways were deemed adequate for Minor I Airports and taxiway turnarounds for Special Purpose Airports that have paved runways.

All airports meet the proposed taxiway type objective, as shown in Exhibit 6-4.

Exhibit 6-4: Taxiway Type Objective

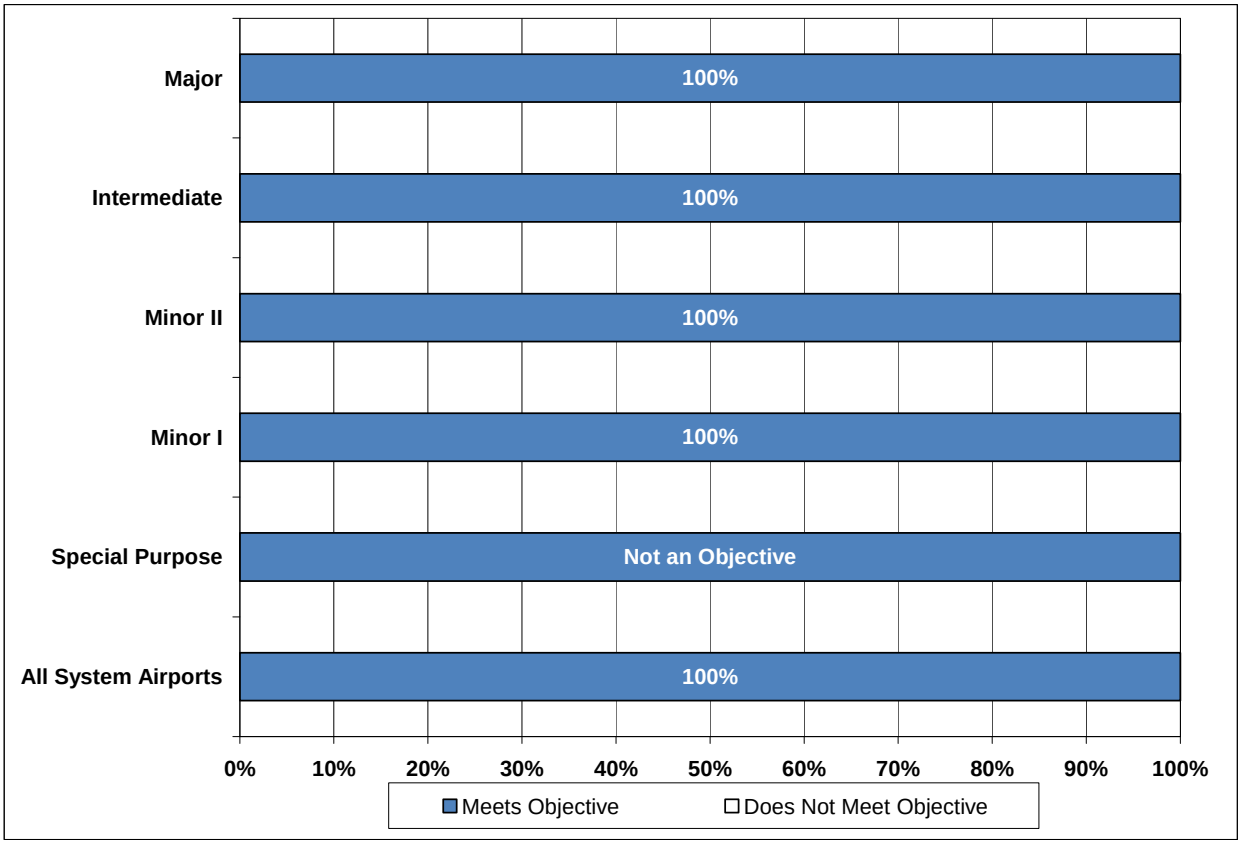


Instrument Approach

Since the type of instrument approach can impact the overall utility of an airport, it was proposed that both Major and Intermediate Airports have the most sophisticated instrument approach – a precision instrument approach – to maximize the use of the airport, particularly in poor weather conditions. It was proposed that Minor II Airports, at a minimum, have only an instrument approaches with vertical guidance (APV). Nonprecision approaches were proposed for Minor I Airports, and no instrument approach was proposed for Special Purpose Airports.

Exhibit 6-5 shows that all airports meet the instrument approach objective. The Minor II Airports in the system and one Minor I Airport (Airlake) are equipped with precision instrument approaches, which exceed the APV approach proposed for Minor II Airports and nonprecision approach proposed for Minor I Airports.

Exhibit 6-5: Instrument Approach Objective



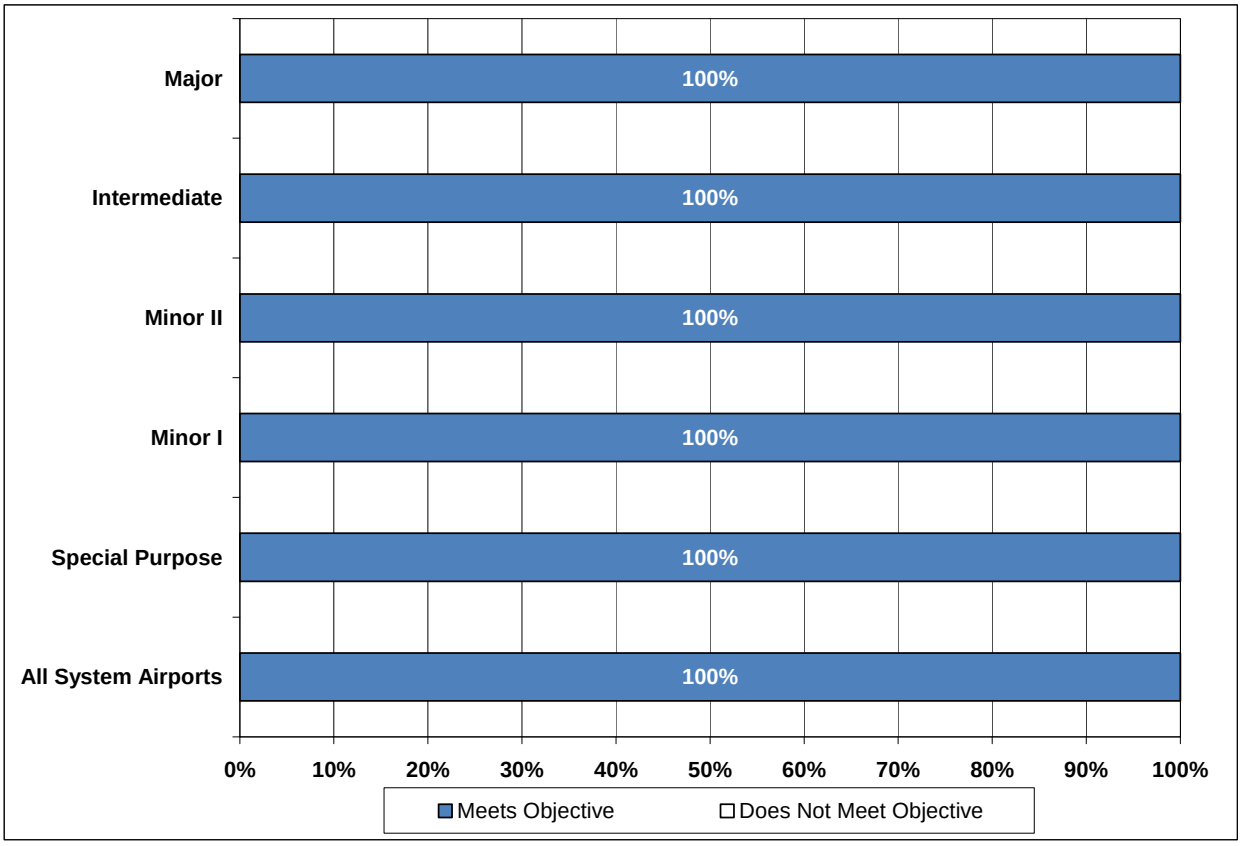
Runway Lighting

Runway lighting is important for conducting operations at night and in low visibility, especially at airports in developed areas where background lighting can distract aircrews and make it difficult to identify the airport. Since Major Airports tend to have a great deal of development around them, it was proposed that runways be equipped with high intensity runway lights to aid in distinguishing those runways from other lights. The same logic was applied to Intermediate and Minor II Airports. Medium intensity runway lighting was proposed for Minor I Airports and low intensity runway lighting was proposed for Special Purpose Airports.

Runway lighting was not regarded as necessary for the two Special Purpose seaplane bases, so those two facilities are not included in the evaluation of this objective.

Exhibit 6-6 shows that all airports meet or exceed the proposed runway lighting objective.

Exhibit 6-6: Runway Lighting Objective

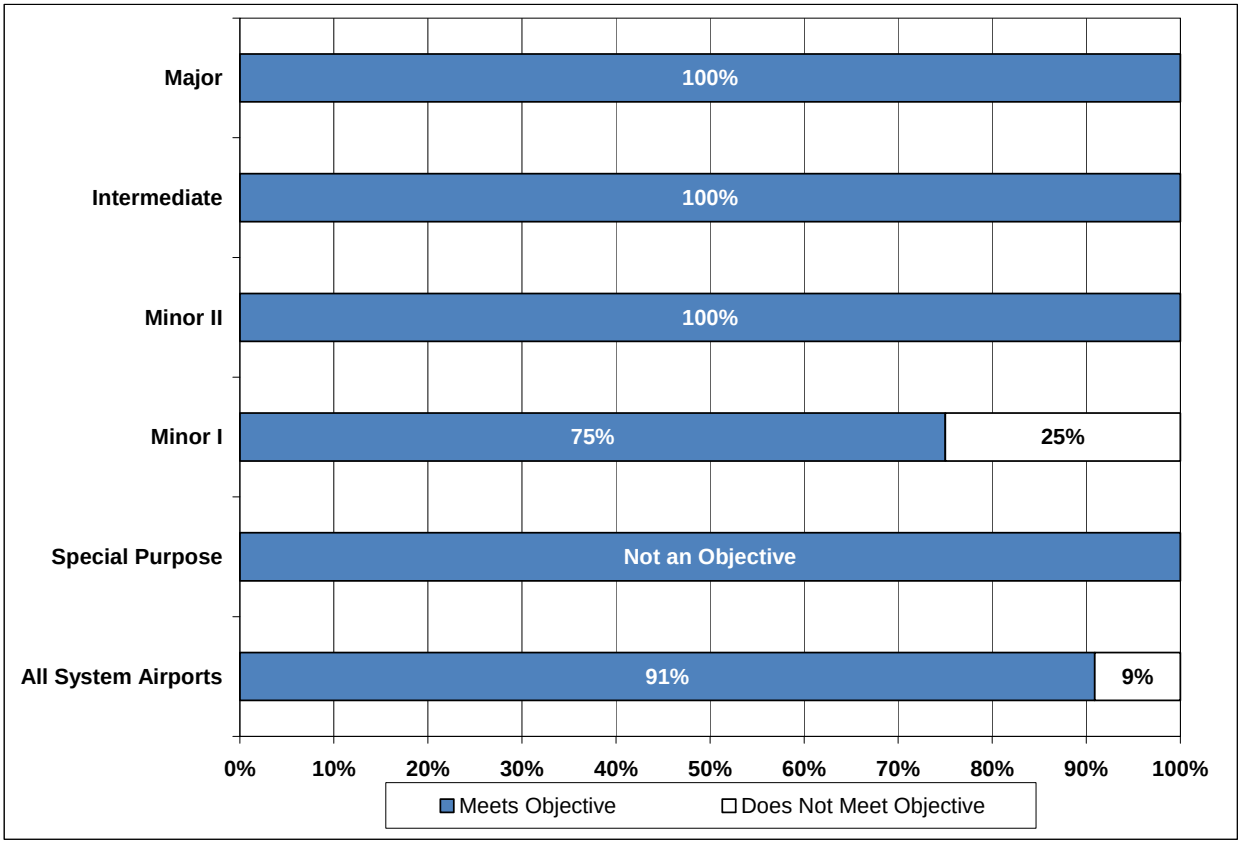


Approach Lighting System

Similar to the runway lighting system, an airport's approach lighting system can guide aircrews to the runway environment at night and during periods of poor visibility. The more sophisticated lighting systems make it easier to identify the runway environment in worse weather conditions, but are also more expensive and require a large real estate footprint. Since Major Airports typically have the funds and the space for these sophisticated approach lighting systems, it was proposed that they have an approach lighting system with sequenced flashing lights. The more economical medium intensity approach lighting system, which also can support instrument approaches, was proposed for Intermediate and Minor II Airports. Minor I Airports, which do not always have the necessary real estate for large approach lighting systems, were proposed for runway end identifier lights. No approach lighting system was proposed for the Special Purpose Airports.

With the exception of one Minor I Airport, all system airports meet the proposed approach lighting system objective, as shown in **Exhibit 6-7**. South St. Paul Airport, a Minor I Airport, does not have an approach lighting system, so only 75 percent of the Minor I Airports meet the proposed approach lighting system objective. As a result, 91 percent of all system airports meet the proposed objective.

Exhibit 6-7: Approach Lighting System Objective

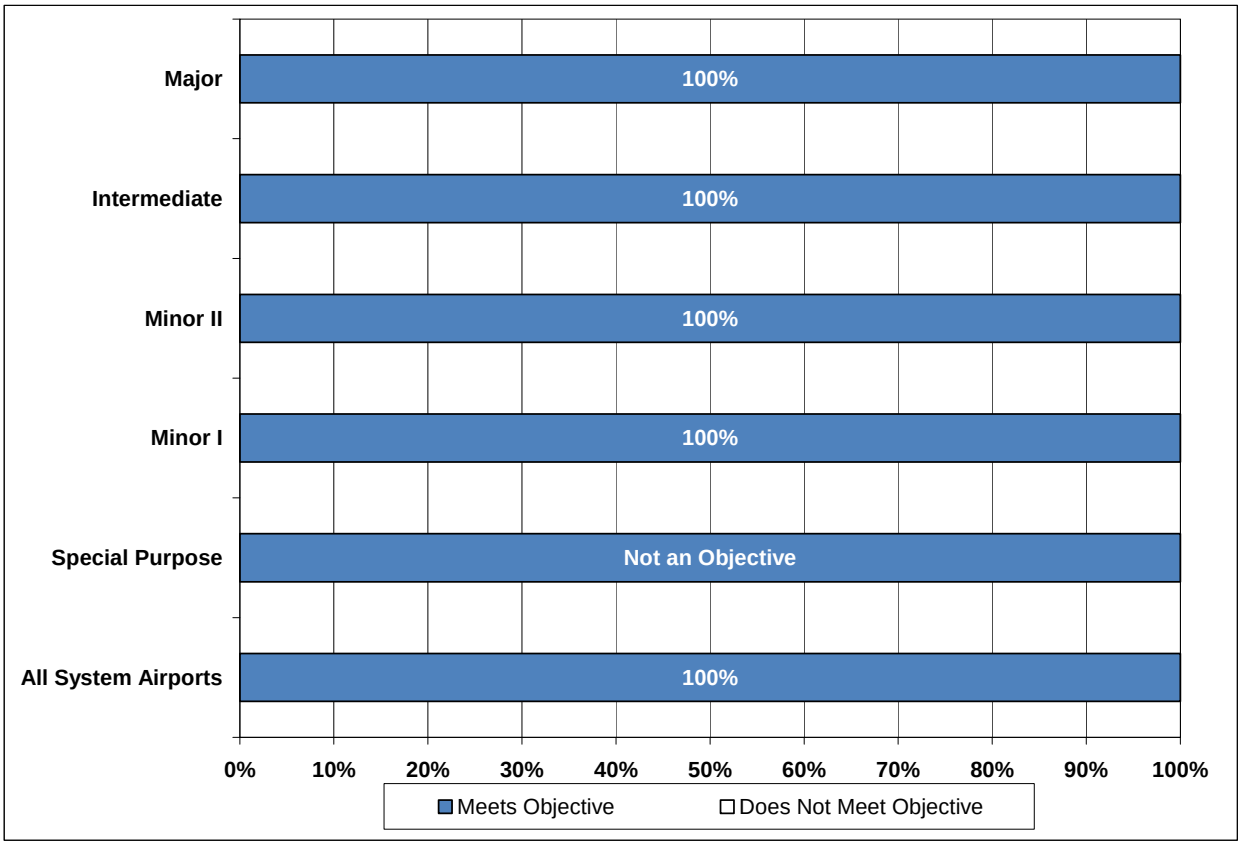


Visual Glide Slope Indicators (VGSI)

Having a VGSI (either a visual approach slope indicator, VASI, or precision approach path indicator, PAPI) on the airport's primary runway was regarded as an important feature because of the benefits VGSI provide during both good and poor visibility conditions. Adhering to the glide path projected by a VGSI ensures that the aircraft will remain clear of all obstacles to arrive safely on the runway. They operate by sending a light signal to the pilot, so no additional equipment – or cost – is needed in the aircraft for the VGSI to operate. For this reason, VGSI on the primary runway at all but Special Purpose Airports was proposed.

Exhibit 6-8 shows that all airports proposed for VGSI have either a VASI or PAPI on their primary runway.

Exhibit 6-8: VGSI Objective



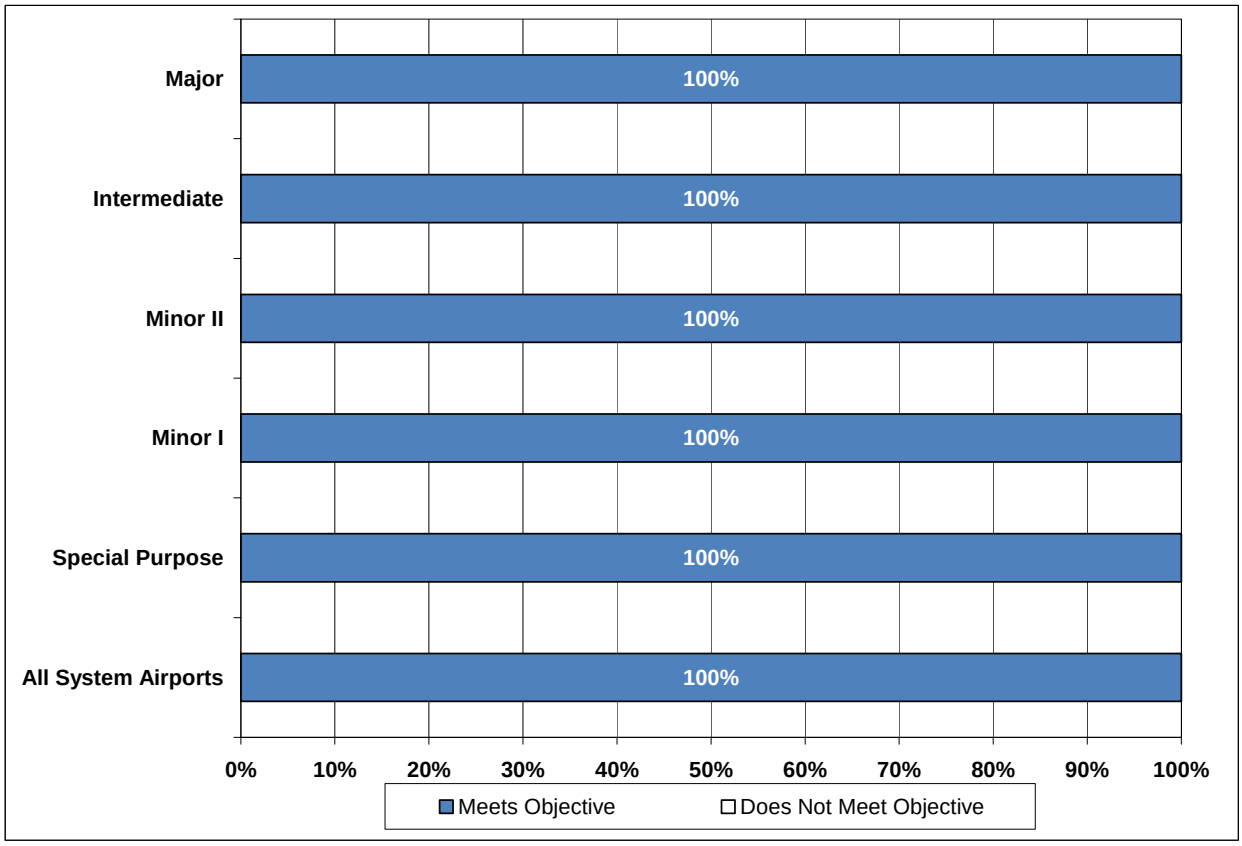
Other Visual Aids

In addition to runway and approach lighting systems, there are other visual aids that can assist aircrews with operations in the airport environment. One such aid is a windsock, which was deemed important to all categories of airports. At Major, Intermediate, and Minor II Airports, a lighted windsock was proposed to support night and low visibility operations.

All airports except Special Purpose Airports were proposed for airport beacons, which are alternating green and white flashing lights that aid aircrews in identifying the general location of the airport.

As shown in **Exhibit 6-9**, all airports meet the proposed other visual aids objective.

Exhibit 6-9: Other Visual Aids Objective

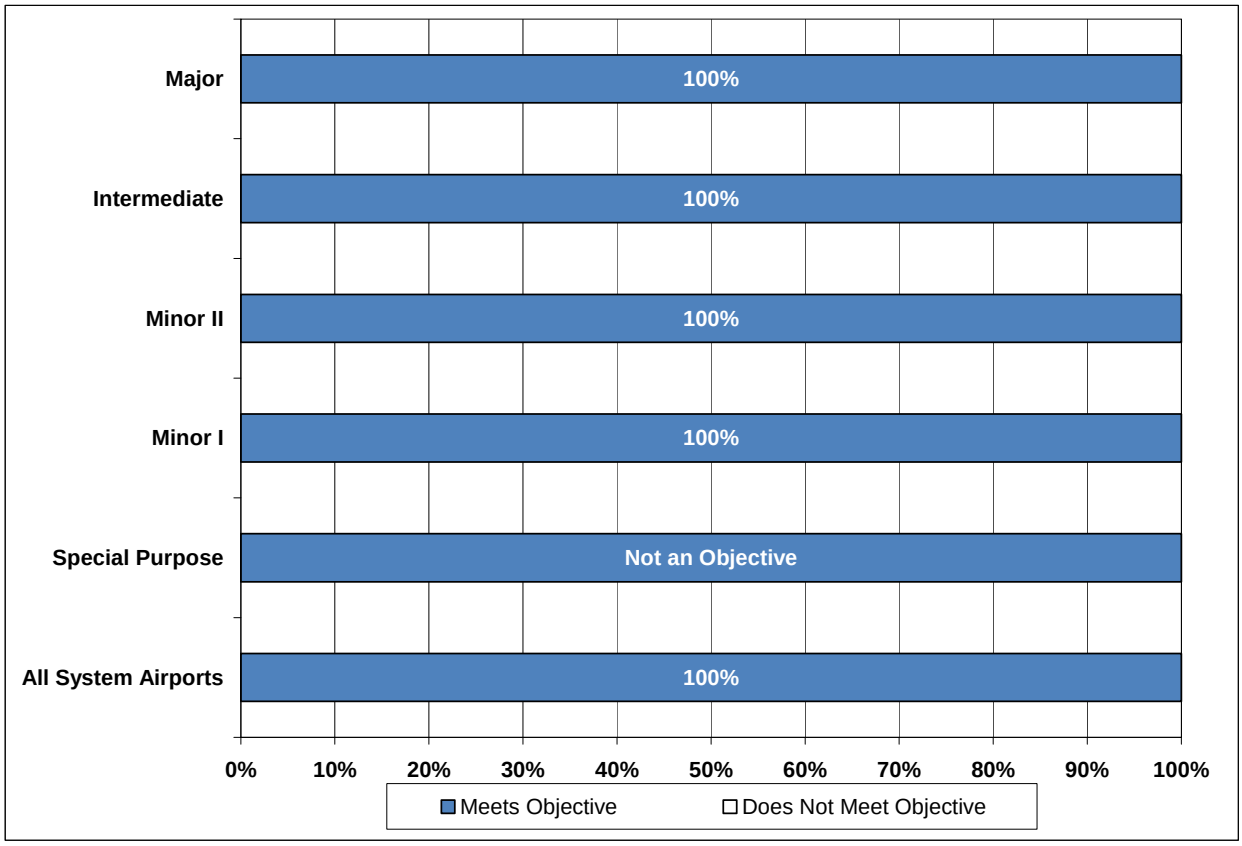


Air Traffic Control Tower

Air traffic control towers (ATCT) function to enhance safety at busy airports and improve the efficiency of operations through the central coordination of aircraft movement around the airport. For both of these reasons, ATCTs are proposed objectives for Major, Intermediate, and Minor II Airports. ATCT are proposed at Minor I Airports where sufficient operational activity indicates a need for enhanced safety measures. No ATCT is proposed for Special Purpose Airports.

As shown in **Exhibit 6-10**, all airports meet the proposed ATCT objective. Of the four Minor I Airports in the system, only one, Crystal Airport, is regarded as having sufficient aircraft operations to need an ATCT, which it does.

Exhibit 6-10: Air Traffic Control Tower Objective

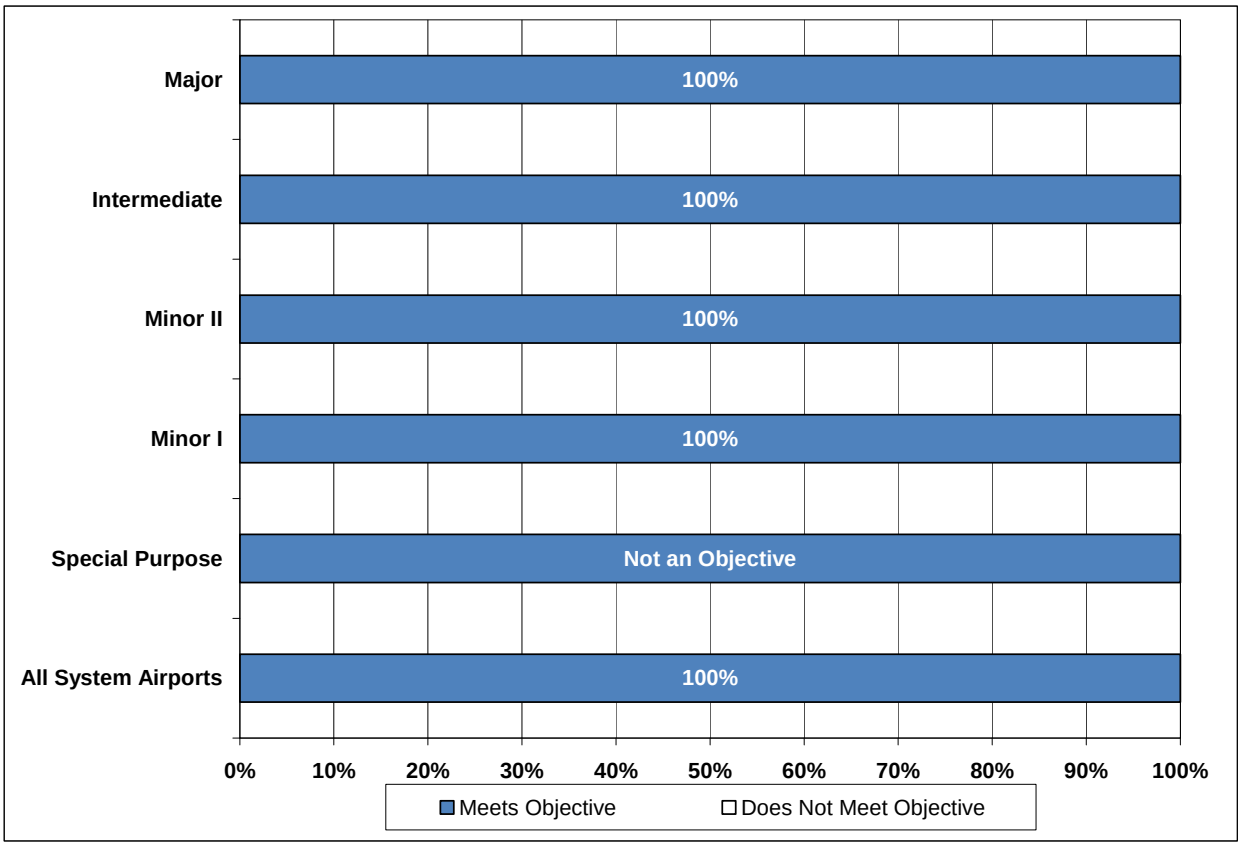


Weather Reporting

Weather reporting is crucial for all types of aircraft operations, but it is a regulatory requirement at airports for certain types of commercial operations, including charter operations conducted under limited visibility conditions, making it even more important at those airports. For this reason, some type of weather reporting was proposed for all types of airports, except Special Purpose Airports.

With the exception of the Special Purpose Airports, all of the system airports have some type of automated weather reporting system. All airports in the system meet this proposed objective, as shown in **Exhibit 6-11**.

Exhibit 6-11: Weather Reporting Objective

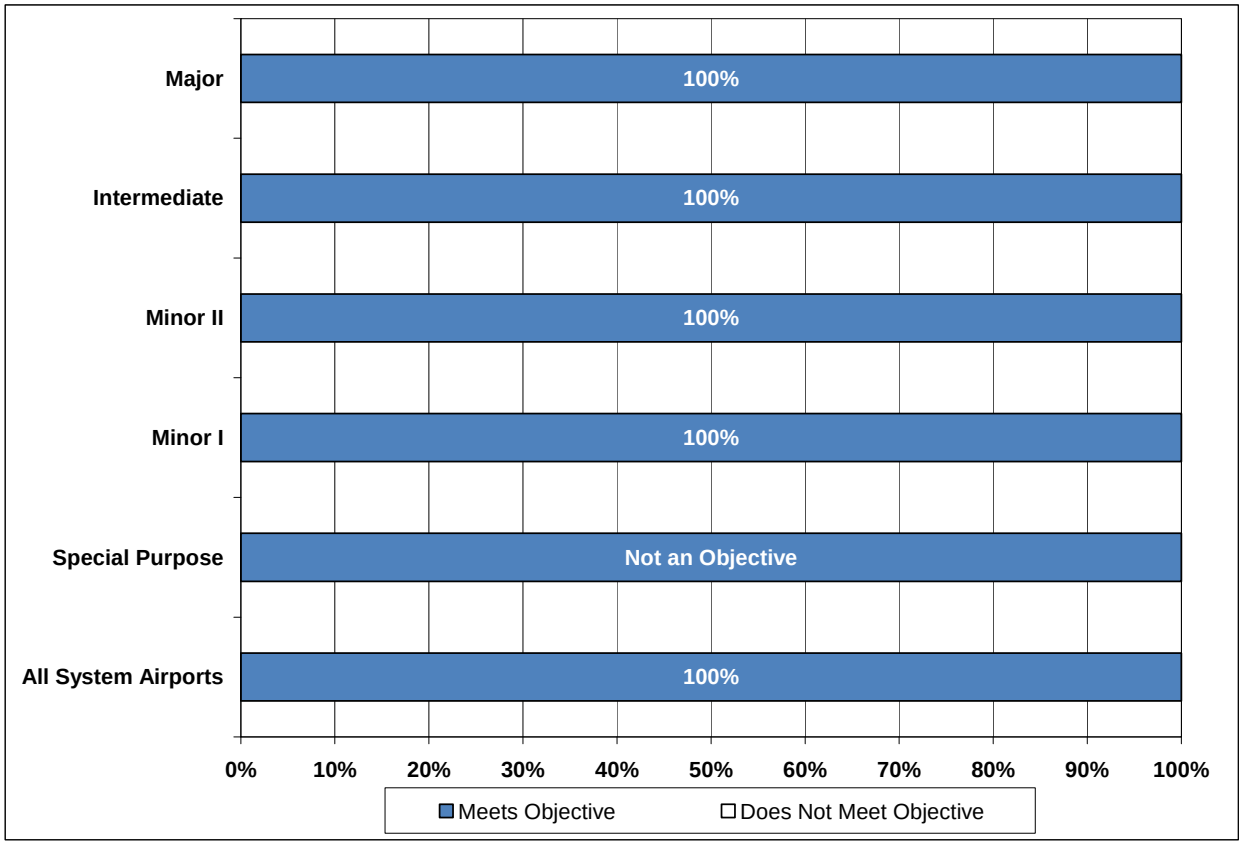


Paved Aircraft Parking

Airports with significant amounts of transient traffic need paved aircraft parking to accommodate those aircraft. Not only is it easier to move aircraft across a paved surface, but rain won't render the surface unusable to aircraft. Additionally, paved surfaces can be plowed so they can be used regardless of snowfall. For these reasons, all airport categories were proposed for paved aircraft parking areas, except for Special Purpose Airports.

As shown in **Exhibit 6-12**, all airports in the system meet the proposed paved aircraft parking objective.

Exhibit 6-12: Paved Aircraft Parking Objective

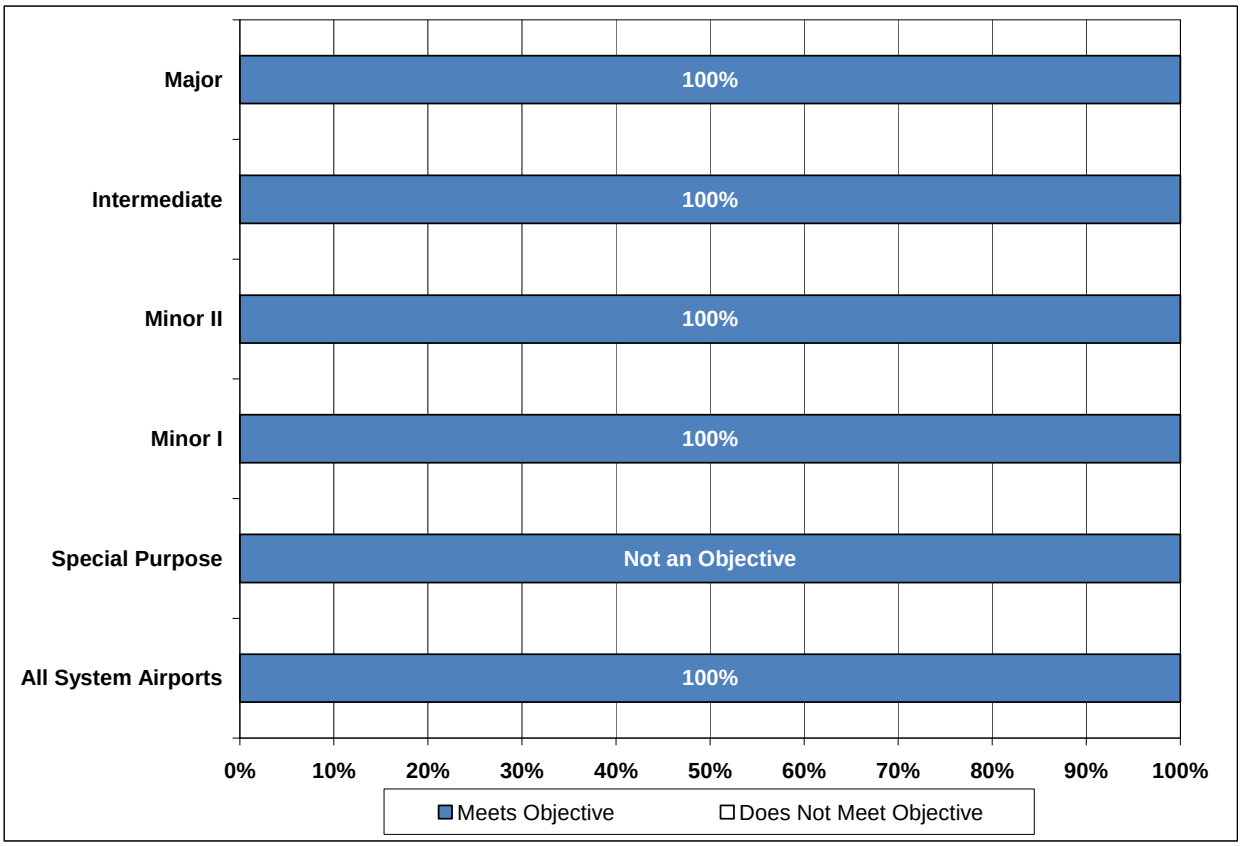


Fixed Base Operator

The fixed base operator (FBO) at the airport primarily provides fuel for aircraft at the airport, but it also provides other services, such as powerplant and airframe maintenance, avionics repair, and hotel and rental car arrangements. The role of the airport helps determine what hours FBOs offer these other services. At Major and Intermediate Airports, it was proposed that these other services be provided 24 hours per day. Minor I and Minor II Airports are proposed to provide these services during business hours, while Special Purpose Airports are not expected to have an FBO providing services.

As shown in **Exhibit 6-13**, all of the airports meet the proposed FBO objective.

Exhibit 6-13: Fixed Base Operator Objective



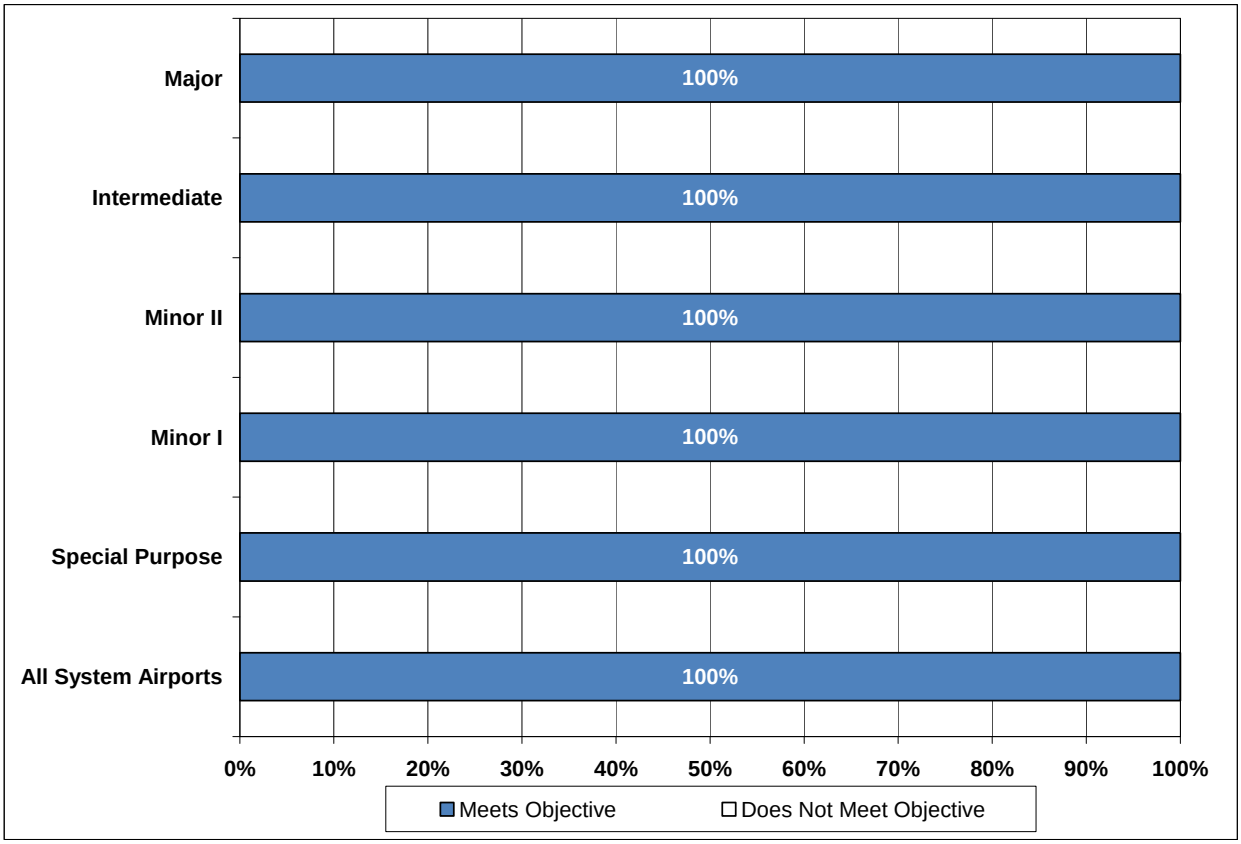
Auto Parking

The type of auto parking available to airport users is a reflection of the type and frequency of user at the airport. At Major Airports, the predominant user is the airline passenger. A parking structure is proposed to handle the large volume of airline passengers at these airports. At Intermediate, Minor II, and Minor I Airports, paved surface parking lots are proposed because a surface lot is generally sufficient to handle the volume of users. It needs to be paved so that it can be used in all weather conditions.

Unpaved parking lots were proposed for Special Purpose Airports because of the reduced cost of maintaining an unpaved parking surface and the reduced need for all-weather parking at these facilities since they are predominately used during periods of fair weather.

All of the airports in the system meet the proposed auto parking objective, as shown in **Exhibit 6-14**.

Exhibit 6-14: Auto Parking Objective



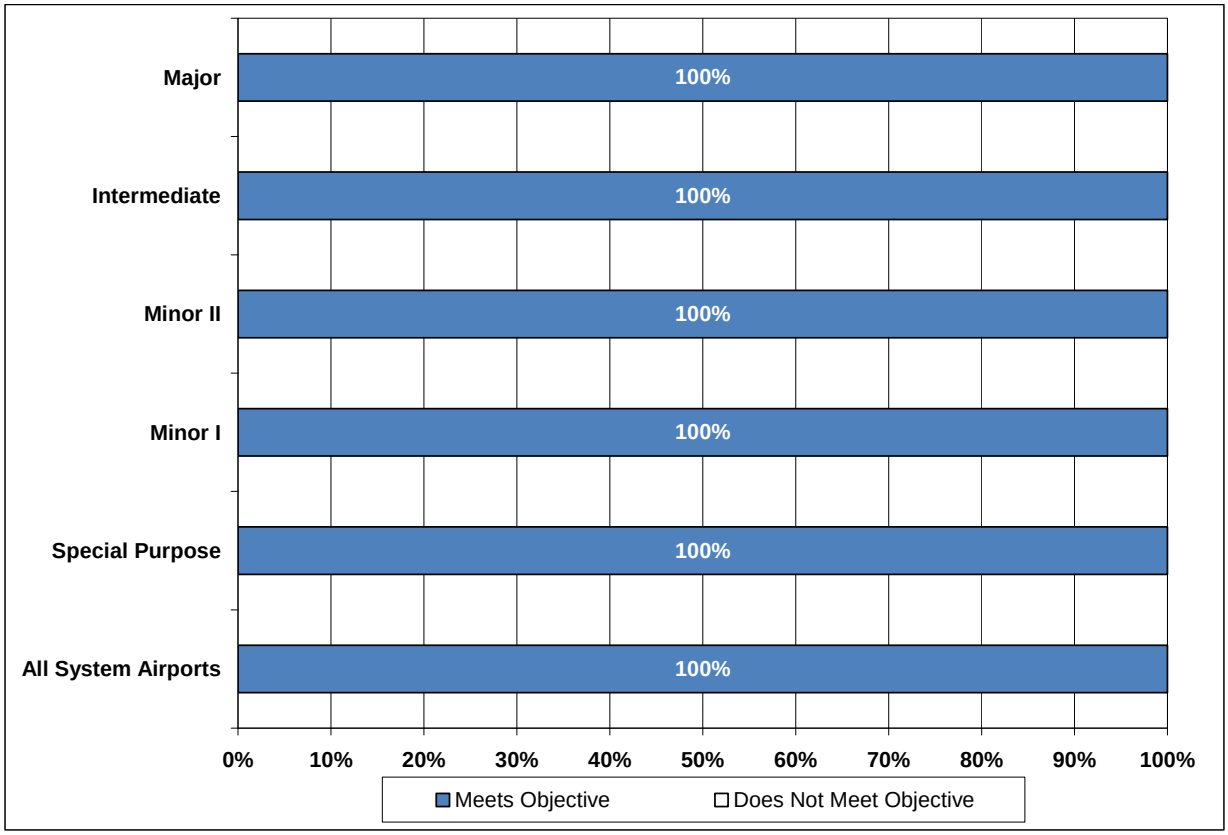
Fuel

Fuel is a significant need for aircraft operations. To fulfill its expected role, airports need to provide specific types of fuel for their customers, and make it available when users generally want it. In general, large aircraft need Jet-A fuel to operate, while smaller aircraft need 100LL (Avgas).

To meet this objective, proposed fuel types were developed for each airport role, with certain airport roles expected to make that fuel available around the clock. It was proposed that Major and Intermediate Airports provide both Jet-A and 100LL at any hour of the day. These airports serve a wide variety of aircraft and should be able to meet the fuel needs of all of them. Additionally, these airports operate around the clock, so users expect to be able to get fuel any time of the day without delay.

It was proposed that Minor II Airports also provide both Jet-A and 100LL during normal operating hours. However, it would not be unusual for a Minor II Airport to make fuel available outside of normal operating hours, either through self-service pumps or with a callout, resulting in a slight wait and possibly additional charges to the fuel purchaser. Minor I and Special Purpose Airports, with their focus on smaller aircraft, had a proposed objective of providing 100LL during normal operating hours. Additionally, while not a proposed objective, Minor I Airports may consider self-service fuel as a revenue enhancement. As shown in **Exhibit 6-15**, all of the airports meet their proposed fuel objective.

Exhibit 6-15: Fuel Objective

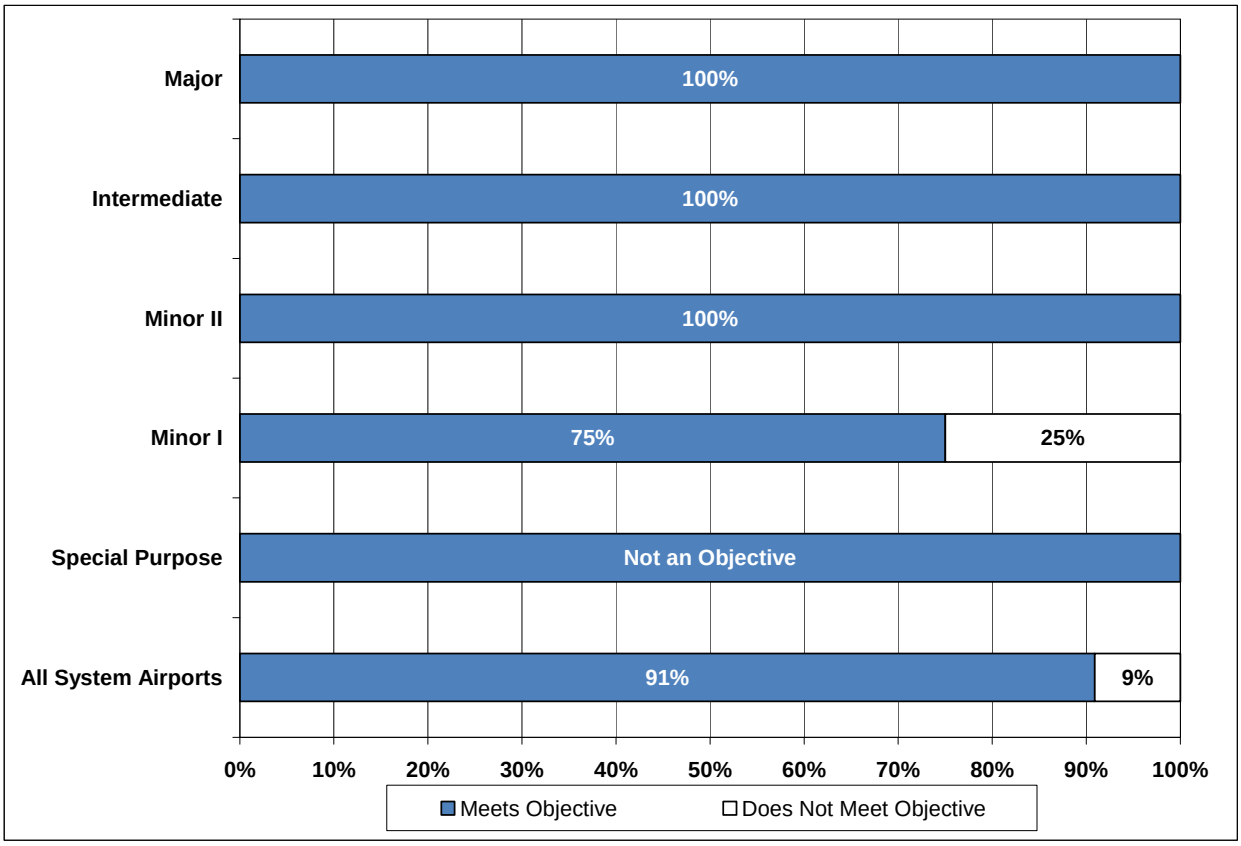


Ground Transportation

The level of ground transportation services that an airport should offer depends largely upon the nature of visitors to the airport. Major Airports need to offer an array of options to visitors because of the large number of passengers, so both rental cars and taxis should be options. Additionally, multimodal options are proposed since they can help reduce congestion at Major Airports.

At both Intermediate and Minor II Airports, rental car service and a courtesy car service are proposed. The business travelers that these airports typically serve need the dependable ground transportation that rental car service provides. Air crews of business aircraft and recreational pilots tend to rely on courtesy car services for their short trips and don't warrant the use of rental cars.

Exhibit 6-16: Ground Transportation Objective



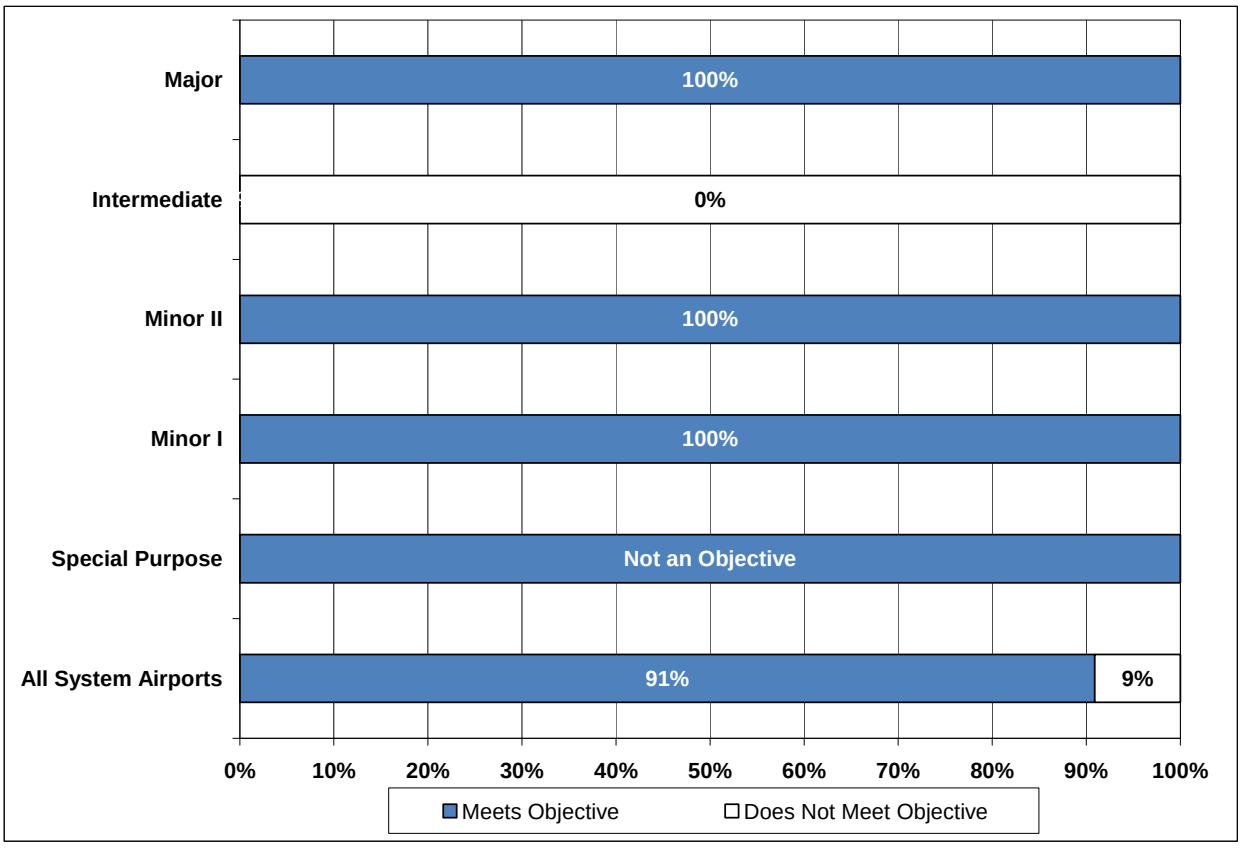
Minor I Airports are not expected to have the demand for rental car services found at Minor II, Intermediate, and Major Airports, so courtesy car service or rental car service is the ground transportation service objective proposed for these airports. Courtesy car service should meet the needs of most users of these airports, who are predominately engaged in recreation and flight instruction, but rental car service can also meet this need if it is available.

As shown in **Exhibit 6-16**, all but one airport in the system meets the proposed ground transportation objective. The airport that does not meet this objective, Lake Elmo, is a Minor I Airport. The other three Minor I Airports meet this objective, with Airlake providing courtesy car service, and rental cars available at Crystal and South St. Paul Municipal. A courtesy car is also available at South St. Paul Municipal. In the entire system, 91 percent of the airports meet the proposed ground transportation objective.

Food Services

The food service at an airport is a reflection of the volume and type of visitors passing through the airport. Major Airports, with their large volume of passengers and airlines that provide in-flight meals, ought to provide food service in the form of restaurants (for passengers) and catering (for airline meals). The same proposal is made for Intermediate Airports, where the large number of operations by business aircraft should be able to support an airport restaurant and corporate aircraft will generate demand for catering services.

Exhibit 6-17: Food Services Objective



Food service at Minor II Airports is proposed as either catering, if there is sufficient business activity, or vending machines, for all other airport users. Minor I Airports would not be expected to have sufficient business activity to support a catering service, so vending machines are proposed as adequate food service. No food service objective was proposed for Special Purpose Airports.

As shown in **Exhibit 6-17**, the only airport that did not meet its food service objective was the region's only Intermediate Airport, St. Paul Downtown. Although the airport has had an on-site restaurant in the past, one does not currently operate at the airport. As a result, 91 percent of all system airports meet the proposed food service objective.

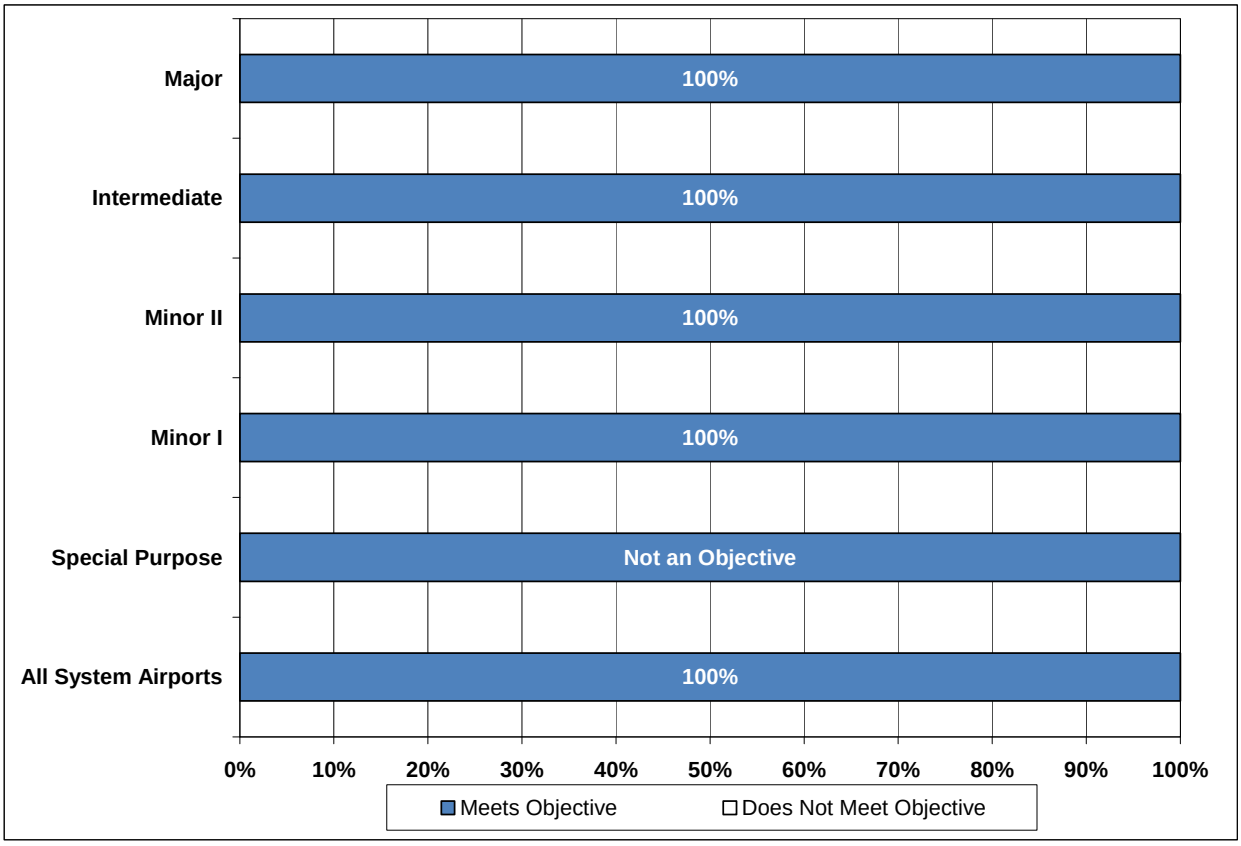
Phone

With the cell phone as commonplace as it is today, phone availability may not seem all that important. However, it was proposed for Major Airports since the large volume of passengers could easily translate into a number of passengers without cell phone service that still need to communicate.

For Intermediate, Minor II, and Minor I Airports, phone availability was proposed because of the necessity for communications with air traffic control. If an aircraft loses communication with air traffic control (e.g., radio failure), the crew needs to inform air traffic control quickly once they are on the ground. Cell phones can be used for this purpose, but if cell service is not available or reliable, having a phone on the field can expedite the communication between the air crew and air traffic control.

As shown in Exhibit **6-18**, all airports in the system meet the proposed phone objective.

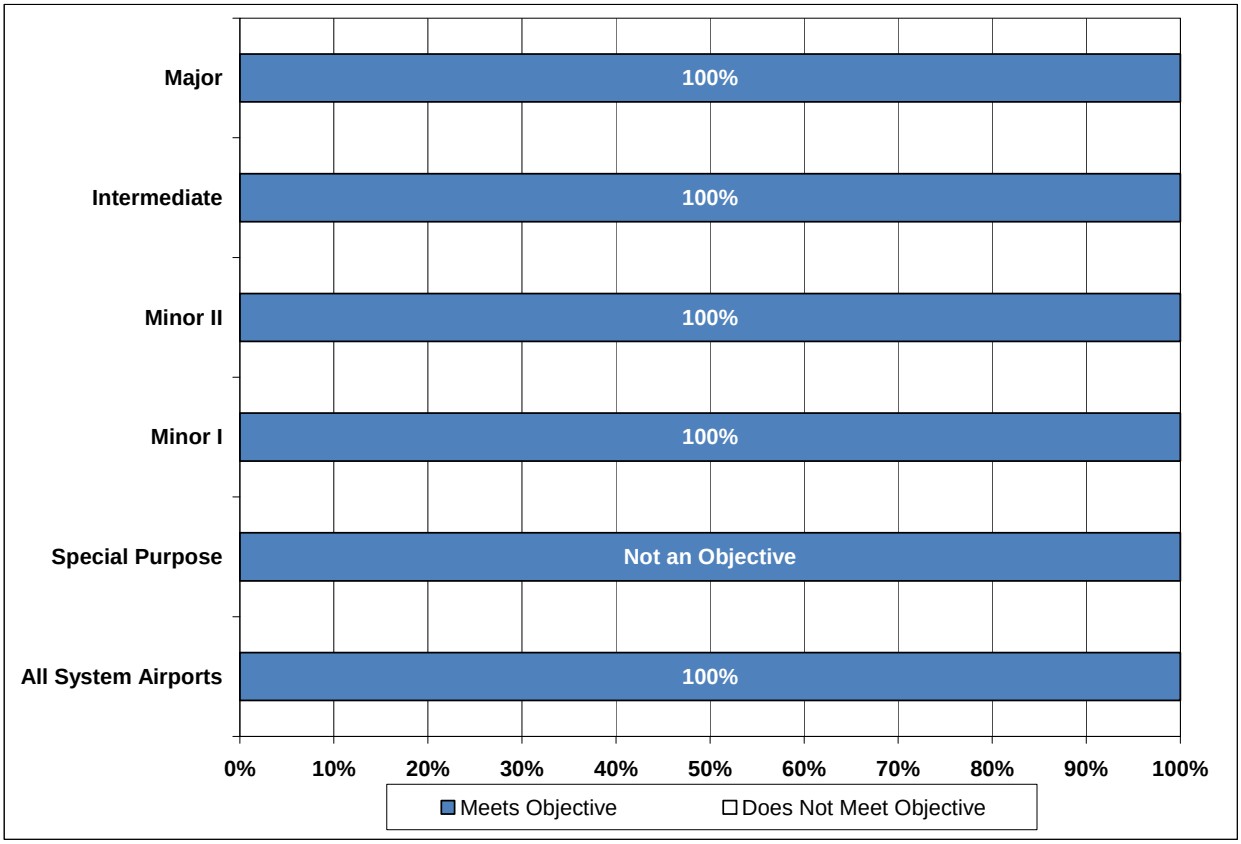
Exhibit 6-18: Phone Objective



Snow Removal

Airports in Minnesota need snow removal if they plan to operate during the winter. The system's Major Airport ought to have 24-hour snow removal so that it can remain open and available to commercial aircraft as much as feasible. The cost of round the clock snow removal capability is part of the expense of being a Major Airport.

Exhibit 6-19: Snow Removal Objective



All categories of airports, with the exception of Special Purpose Airports, are proposed for snow removal capabilities. The necessity to operate during winter months at Major, Intermediate, Minor II, and Minor I Airports suggests all these airports should have this capability. Special Purpose Airports, because of their unique role, seasonal operation, limited resources, or any combination of these reasons, were not proposed for snow clearing capabilities.

Not surprisingly, all airports in the system meet the proposed snow removal objective, as shown in **Exhibit 6-19**. Airports in the region have a reputation for knowing how to handle snow. Minneapolis-St. Paul International, in particular, is frequently praised for how efficient its snow clearing operations are. Studies have found that the airport is so good at dealing with snow, that it averages less than two hours of closure per year because of snow.

Planning Objectives

In addition to the facility and service objectives assessed above, each airport should have mechanisms in place that provide for long-term planning of the airport facilities, use, and airspace. Minnesota state law requires an update of long term community, county and special district plans every 10 years. Appropriate plans are reviewed by the Metropolitan Council for conformance with regional system plans and consistency with regional policy. **Exhibit 6-20** summarizes the status of airport long term comprehensive plans (LTCP) and whether an airport has a joint zoning board and appropriate zoning regulations in place that protect the airport and its airspace from surrounding encroachment.

Exhibit 6-20: Status of System Planning Activities

Airport	Long Term Comprehensive Plan (LTCP)	Zoning
Minneapolis-St. Paul Intl.	2030 LTCP in - progress 2009	JZB established, zoning approved, 2004
St. Paul Downtown	2025 LTCP in - progress 2009	JZB established, zoning in -progress 2009
Anoka County – Blaine	2025 LTCP in - progress 2009	JZB and zoning in - progress 2009
Flying Cloud	2025 LTCP in - progress 2009	JZB established, zoning in - progress 2009
Airlake	2025 LTCP approved 2009	JZB and zoning scheduled 2010
Lake Elmo	2025 LTCP approved 2009	JZB and zoning scheduled 2010
Crystal	2025 LTCP approved 2009	JZB and zoning scheduled 2010
South St. Paul Municipal	2030 CPU approved 2009	JZB established, zoning approved, 1975
Forest Lake	2030 CPU approved 2009	JZB established, zoning approved, 2001
Surfside Seaplane Base	2030 CPU approved 2009	Licensing by MnDOT Aeronautics
Wipline Seaplane Base	2030 CPU approved 2009	Licensing by MnDOT Aeronautics
CPU – Comprehensive plan update JZB – Joint zoning board		

Source: Metropolitan Council, October 2008

All of the listed airports either have an approved LTCP (or CPU) or have a LCTP under development. The majority of airports have a joint zoning board in place. MSP, St. Paul Downtown, Flying Cloud, South St. Paul, and Forest Lake all have joint zoning boards, and, with the exception of St. Paul Downtown and Flying Cloud, all of these airports also have zoning regulations in place. Both St. Paul Downtown and Flying Cloud are in the process of developing zoning regulations for the airports. Other airports are in the process of establishing zoning protocols or plan to do so. Anoka County – Blaine is in the midst of establishing a joint zoning board and appropriate zoning regulations. The other airports – Airlake, Lake Elmo, and Crystal – are scheduled to set up joint zoning boards and zoning regulations in 2010.

The two seaplane bases operate as conditional uses under community zoning regulations. The Metropolitan Council approves the respective CPU that includes information about each seaplane base and acknowledges that each seaplane base is operated on a state-designated seaplane lake or

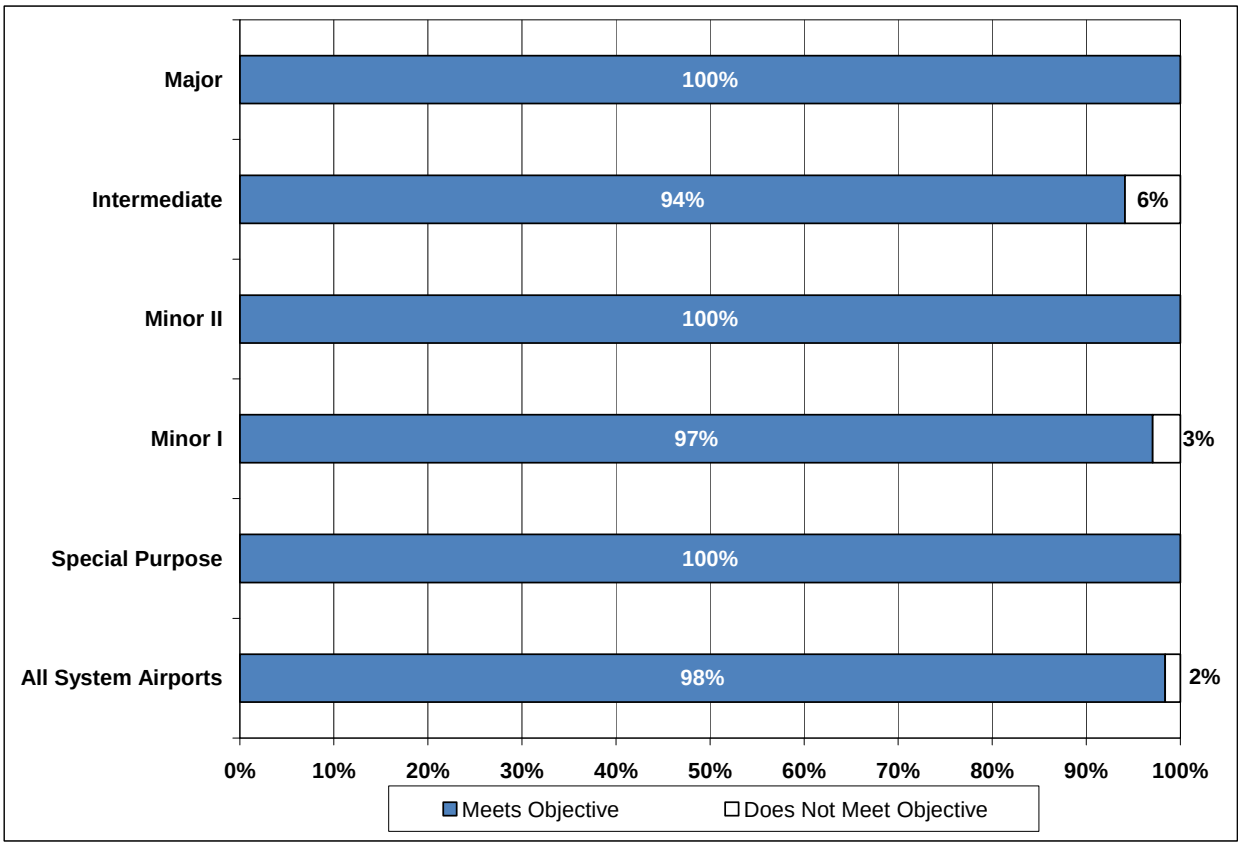
waterway, is licensed by the state (through the Minnesota Department of Transportation Aeronautics Division), and that the respective city provides general airspace protection for the seaplane base.

Summary

The previous sections examined the eligibility requirements for inclusion in the NPIAS and compared the proposed facility and service objectives with the actual facilities and services at each of the system airports. The three metropolitan region airports that are not part of the NPIAS – Forest Lake, Surfside SPB, and Wipline SPB – would need a benefit-cost analysis to substantiate their addition to the NPIAS.

The facility and service objective evaluation found few shortfalls in the system. This is not surprising, since the Twin Cities Regional Aviation System is a mature and well developed airport system. **Exhibit 6-21** summarizes the extent to which each proposed airport role in the system meets its proposed objectives.

Exhibit 6-21: All Objectives



Only a few proposed facility and service objectives were not met, and these were generally not items of major significance. The system's Major Airport, Minneapolis-St. Paul International, meets all of its proposed objectives.

The system's Intermediate Airport, St. Paul Downtown, meets 94 percent of its proposed objectives. The only proposed objective it failed to meet was the food service objective because of the lack of an airport restaurant.

The Minor II Airports in the system meet 100 percent of their proposed objectives.

The Minor I Airports meet 97 percent of their proposed objectives. Crystal Airport meets all of its proposed objectives. Lake Elmo fails to meet only one of its proposed objectives, ground transportation, by lacking courtesy car service. South St. Paul Airport falls short of a single proposed objective. It does not meet the approach lighting system objective, since it does not have any approach lights or runway end identifier lights.

Collectively, the Minor Airports meet nearly all of the proposed facility and service objectives. This indicates that there is not nearly as much differentiation between the two airport roles as originally postulated, which indicates that the need for separate Minor I and Minor II roles is diminished.

The Special Purpose Airports meet 100 percent of their proposed objectives.

In terms of planning and zoning, all of the airports have, or are developing, long term plans. Many have joint zoning boards and associated zoning regulations in place. Those that don't have plans in place to establish joint zoning boards and regulations no later than 2010.

Overall, the system airports meet 98 percent of their proposed objectives. This illustrates that the Twin Cities Regional Aviation System is a mature, well developed airport system made up of airports that do not lack in any significant development areas for the proposed roles they have been assigned. Those few areas where shortfalls have been identified will be addressed in the next section, which will detail what improvements to the aviation system are recommended.

Chapter Seven – Ground Travel and Airport Service Area Evaluation

Ground Travel Time Analysis

The provision of convenient access to the region's airports is an important goal for the Metropolitan Council Regional Airport System. Accessibility to an airport can be defined in terms of access both from the ground and from the air, effectively defining its service area. The FAA, through the National Plan of Integrated Airport Systems (NPIAS), has established guidelines to evaluate the accessibility of airports by ground. These standards will help to identify the percent of the region's population and land area that is within a typical drive time of each category of airport.

The support in the development of an airport system that serves the largest possible number of citizens and businesses is an important goal. The primary benchmark by which airport accessibility is measured is by their proximity to population centers. This is true not only of the Twin City's commercial service airport, which is important to businesses and individuals for airline travel worldwide, but also of its general aviation airports, which accommodate a far wider set of aviation activities. Thus, the proximity of airports that accommodate a full range of the general aviation fleet to metropolitan populated areas is key.

To evaluate the adequacy of Metropolitan Council's aviation system as it relates to its ability to provide adequate ground access, the following benchmarks are used:

- Percent of population and area within 60 and 90 minutes of a Major Airport
- Percent of population and area within 45 minutes of a Intermediate Airport
- Percent of population and area within 30 minutes of a Minor II Airport
- Percent of population and area within 30 minutes of a Minor I Airport
- Percent of population and area within 30 minutes of a Special Use Airport

Special Use Airports, due to the nature of their operations, draw users from an indeterminate area. For analysis purposes, this study used an area encompassed by a 30-minute drive time.

These benchmarks were evaluated for airports in the Twin Cities Regional Aviation System. Drive-times were not calculated for collar county airports, although their influence was considered in the evaluation of Search Area A, which is discussed later.

Major Airport Drive Time Coverage

To the general public, perhaps the most important measure of accessibility of a region's airport system is the extent to which the region is served by commercial passenger airlines. As the most prominent

segment of air transportation and the segment most used by individual consumers, the degree to which commercial service is conveniently located has a large bearing on how satisfactorily the airport system is viewed.

Another important aspect of analyzing travel time coverage by airport category is to identify potential system gaps and overlaps that may exist. In addition, population density coverage is analyzed to determine the percent of the seven county metropolitan area population that has convenient access to each airport category.

Metropolitan Council analyzes its seven county region using Transportation Analysis Zones (TAZ). TAZs are the unit of geography generally based on population density from the 2000 census and used for transportation planning applications such as travel demand modeling. Once every 10 years, states and metropolitan planning organizations (MPOs) are given the opportunity by the US DOT and Census Bureau to update and change their TAZ structure based on updates to census geography, land use changes, new roads, and other transportation planning considerations.

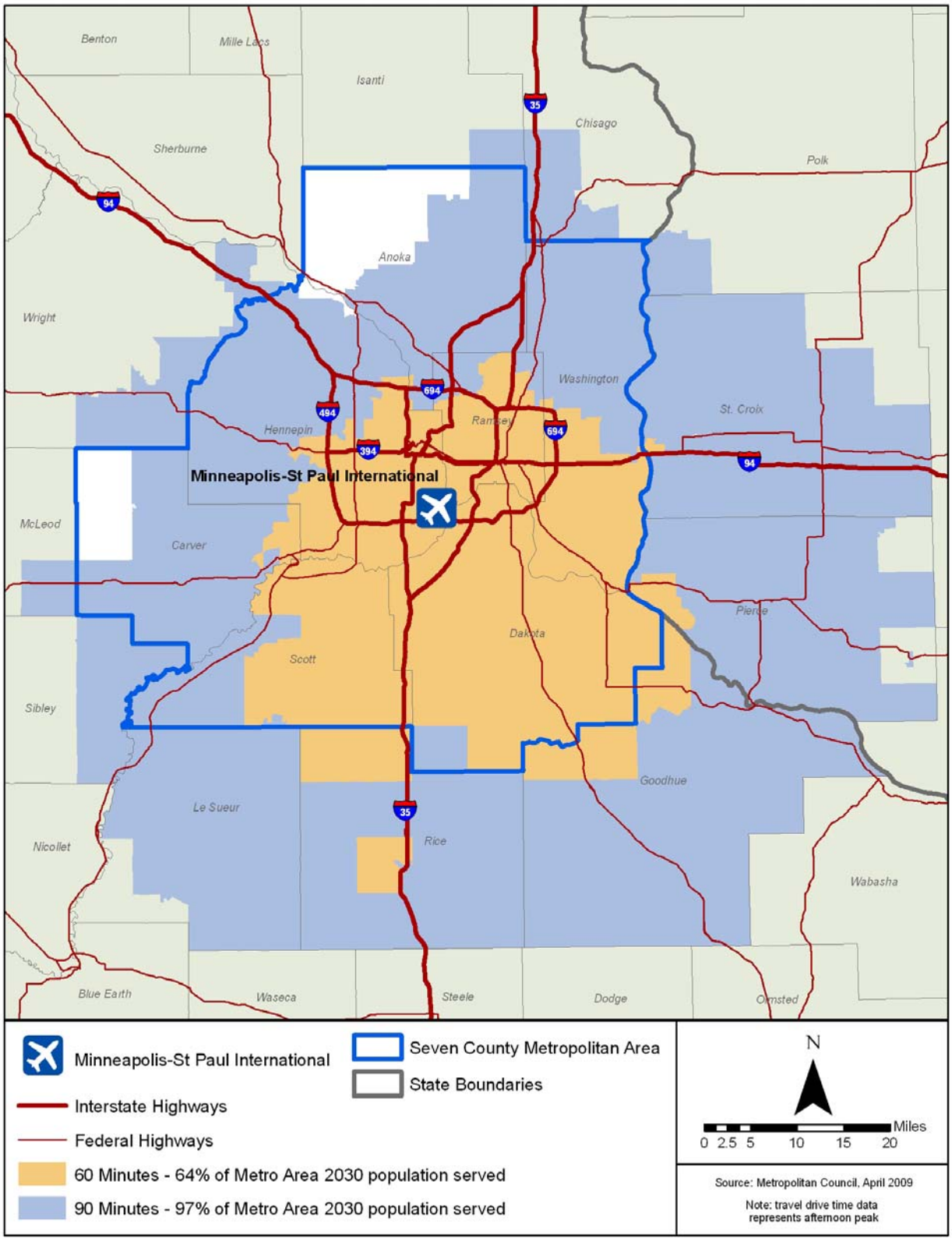
Metropolitan Council generated the travel times for the airports included in the existing Regional Aviation System Plan. The data include shapefiles of the nodes in the model network. To each node is attached the time it takes to travel from that point to the airport in question. The times are based on the congested network times from the afternoon peak hour for 2030. In addition, the population analysis is based on the 2030 population forecast by TAZ, from local communities' comprehensive plans.

The goal of 60 minute drive times established for a Major Airport is a typical standard for commercial service airports. Commercial service airports with low fare carriers have been shown to have much larger service areas than commercial service airports without low fare carriers. It is recommended that 90 minute drive times be used to depict this larger service area for low cost airlines like Sun Country and Southwest Airlines that currently serve MSP. The combined results of the 60 and 90 minute drive time analysis are depicted in **Exhibit 7-1**. The seven county metropolitan area, consisting of Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington Counties, is also depicted in the exhibit.

As can be seen for the 60 minute drive time area, during the afternoon peak hour in the year 2030, residents to the south of MSP can live farther away than those living to the north. In the afternoon peak, residents from the south would travel in a "counter flow" with less congestion than from the north. The 60 minute area encompasses 64 percent of Metropolitan Council area's population in 2030.

The 90 minute drive time area is more evenly distributed, but extends further to the east and south versus to the north and west. The area, associated with the lure of low cost airlines, provided 97 percent coverage of Metropolitan Council's region based on population. Only a small portion of western Carver County and northwestern Anoka County is beyond the 90 minute drive time during future afternoon peak hour driving conditions.

Exhibit 7-1: MSP Drive Times



While the focus of these drive time areas is commercial passengers using MSP, it should be noted that MSP does serve some general aviation users. However, general aviation facilities are restricted by policy at MSP in an effort to limit current based aircraft and future transient traffic by diverting such traffic to the reliever general aviation airports.

Intermediate Airport Drive Time Coverage

The airports included in the Intermediate category are those that offer among the highest levels of service to general aviation users. In the Twin Cities, this represents St. Paul Downtown Airport (STP). These airports possess features sought by users of larger corporate aircraft, such as FBOs with extensive service offerings, ground transportation, and so on. As a result, it is important that airports offering the facilities and services recommended for Intermediate Airports be distributed geographically such that they are near important population centers. The convenience and flexibility of accommodating larger general aviation aircraft are key to their appeal, and a region where business aircraft can be accommodated enhances the utility of such aircraft. As a result, the drive time coverage within 45 minutes' drive of Intermediate-category airports is appropriate for the regional airport system.

Exhibit 7-2 shows the location of STP and MSP in the regional system and the associated 45 minute drive times. As shown, 73 percent of the region's population is included within a 45-minute drive of STP and MSP, which takes into account the ability of MSP to act as an Intermediate Airport in terms of serving a limited segment of general aviation.

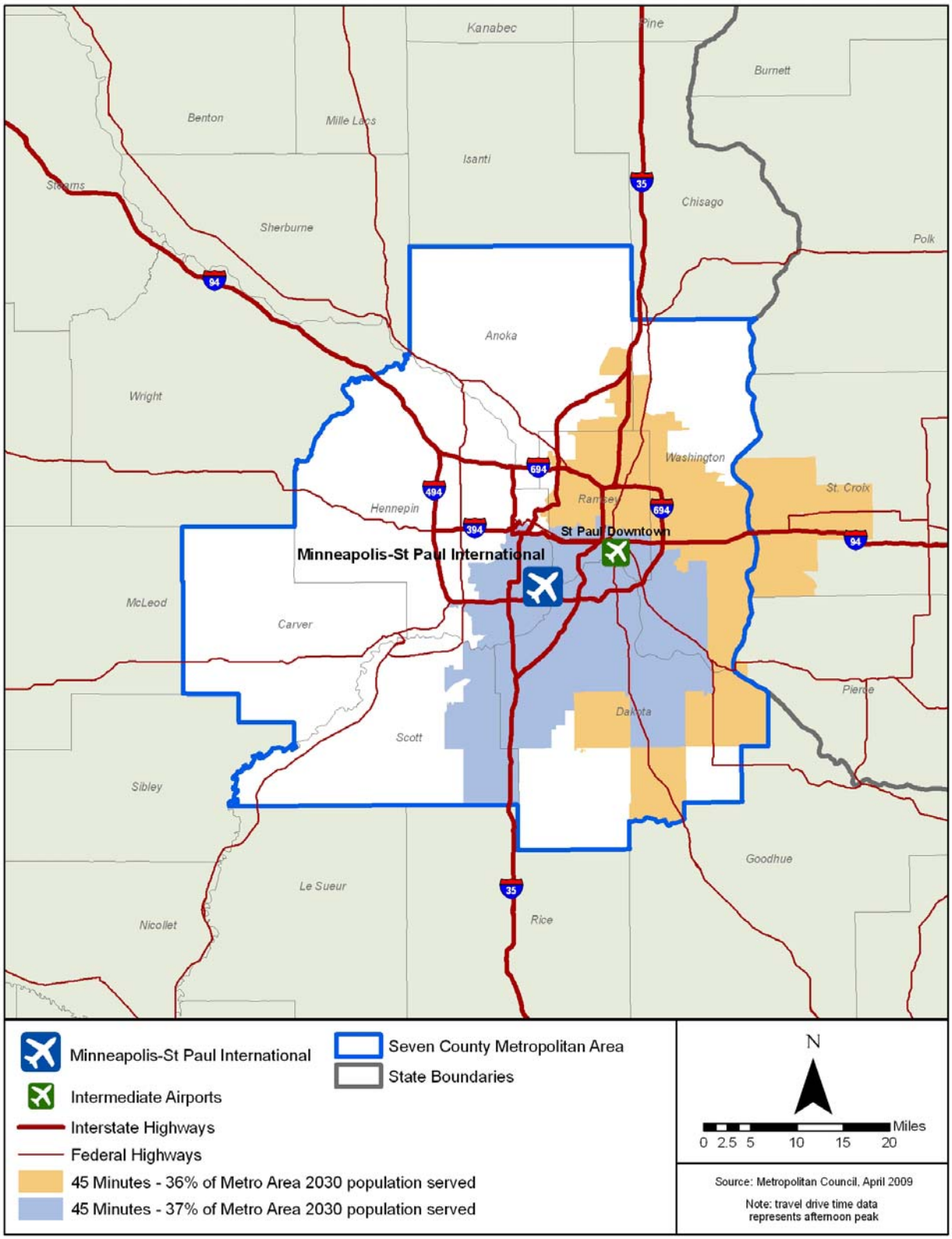
Minor II and Minor I Airport Drive Time Coverage

An important goal of any airport system is to maximize the extent to which the overall system is geographically distributed to serve the region's population. Specifically, the residents and businesses in the region should have an airport within a reasonable distance to connect to the national air transportation system.

The FAA has issued system planning guidelines that recommend that general aviation airports be located within 30 minutes of users. **Exhibit 7-3** shows the distribution of Minor II and Minor I Airports in the metropolitan region for this ground travel time. Airports categorized as Minor II provide high levels of service to general aviation users and can accommodate small to medium sized business jets. These airports cater to some of the same aircraft clients as Intermediate Airports, but also provide services and facilities for other business and recreational aviation users. As such, the drive time coverage recommended for Minor II airports is 30 minutes. The Minor I Airports serve a variety of aviation users as well, but tend to focus more on the recreational user. Because of the overlap with Minor II Airports, the drive time coverage recommended for Minor I Airports is also 30 minutes.

As shown in Exhibit 7-3, the Minor II and Minor I Airports provide significant coverage of the metropolitan region. The group of airports provides coverage for 50 percent of the region's population, based on afternoon peak hour congestion in 2030.

Exhibit 7-2: Intermediate and Major Airport Drive Times



Special Purpose Airport Drive Time Coverage

Special purpose airports serve a variety of users from area-wide for transient aircraft to very local for based aircraft, often within a few minutes of their homes and businesses. **Exhibit 7-4** shows the location of these types of facilities in the region. In the event that any of these facilities would become qualified for inclusion in the NPIAS, the 30 minute ground access criteria would apply, which is depicted in Exhibit 7-4.

Overall Drive Time Coverage

The coverage provided by all airports (except Special Purpose Airports) in the Twin Cities Regional Aviation System is shown in **Exhibit 7-5**. Coverage shown is based on 45 minute drive times from MSP and 30 minute drive times from all other airports. Nearly the entire metropolitan region is within the service area of a system airport, with 83 percent of the metropolitan region covered. The vast majority of the region's projected 3.7 million population falls within the service area of the system airports. Based upon the 2030 population projection for the metropolitan region, 76 percent of the population is expected to be within the service area of a system airport.

Exhibit 7-3: Minor II and Minor I Airport Drive Times

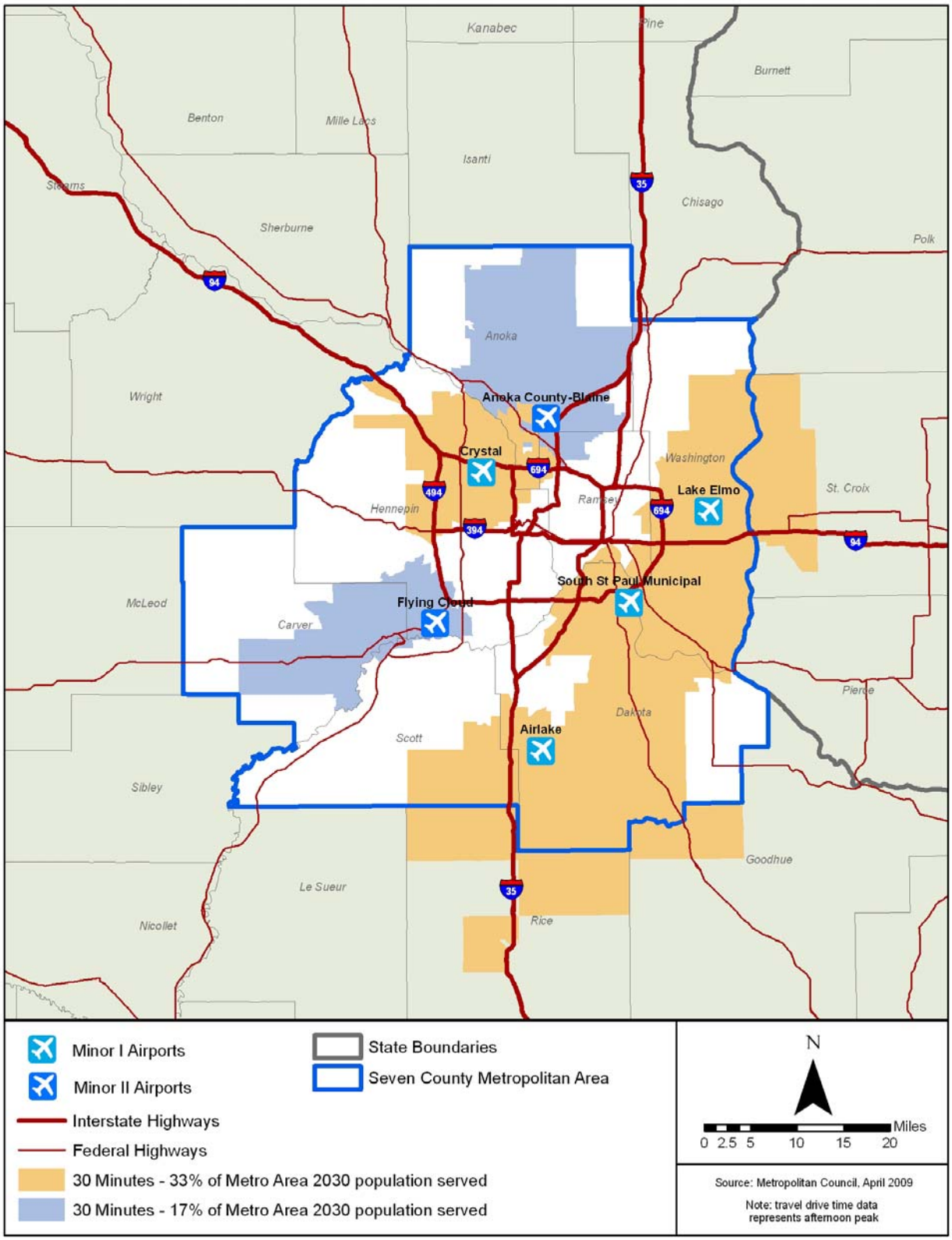


Exhibit 7-4: Special Purpose Airport Drive Times

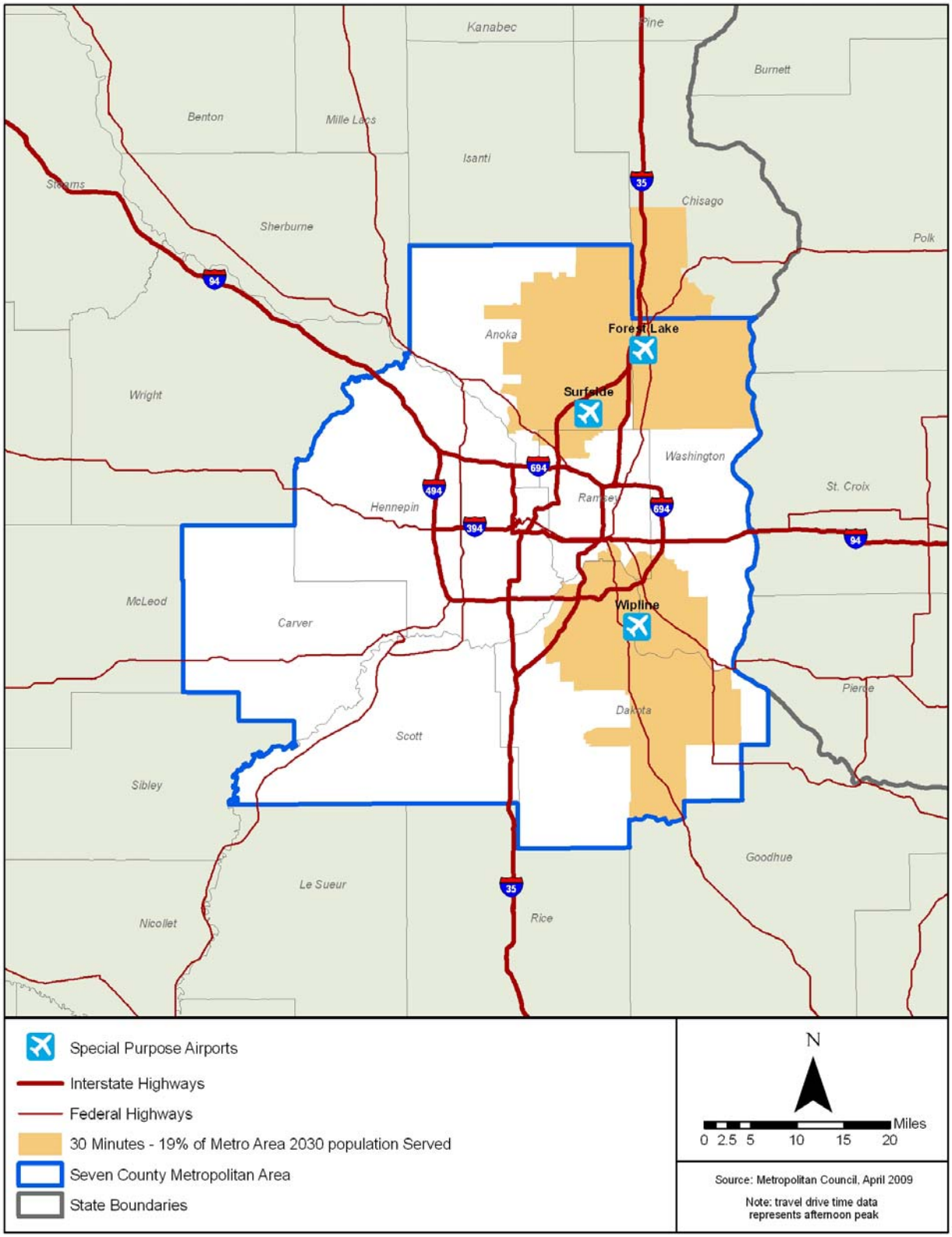
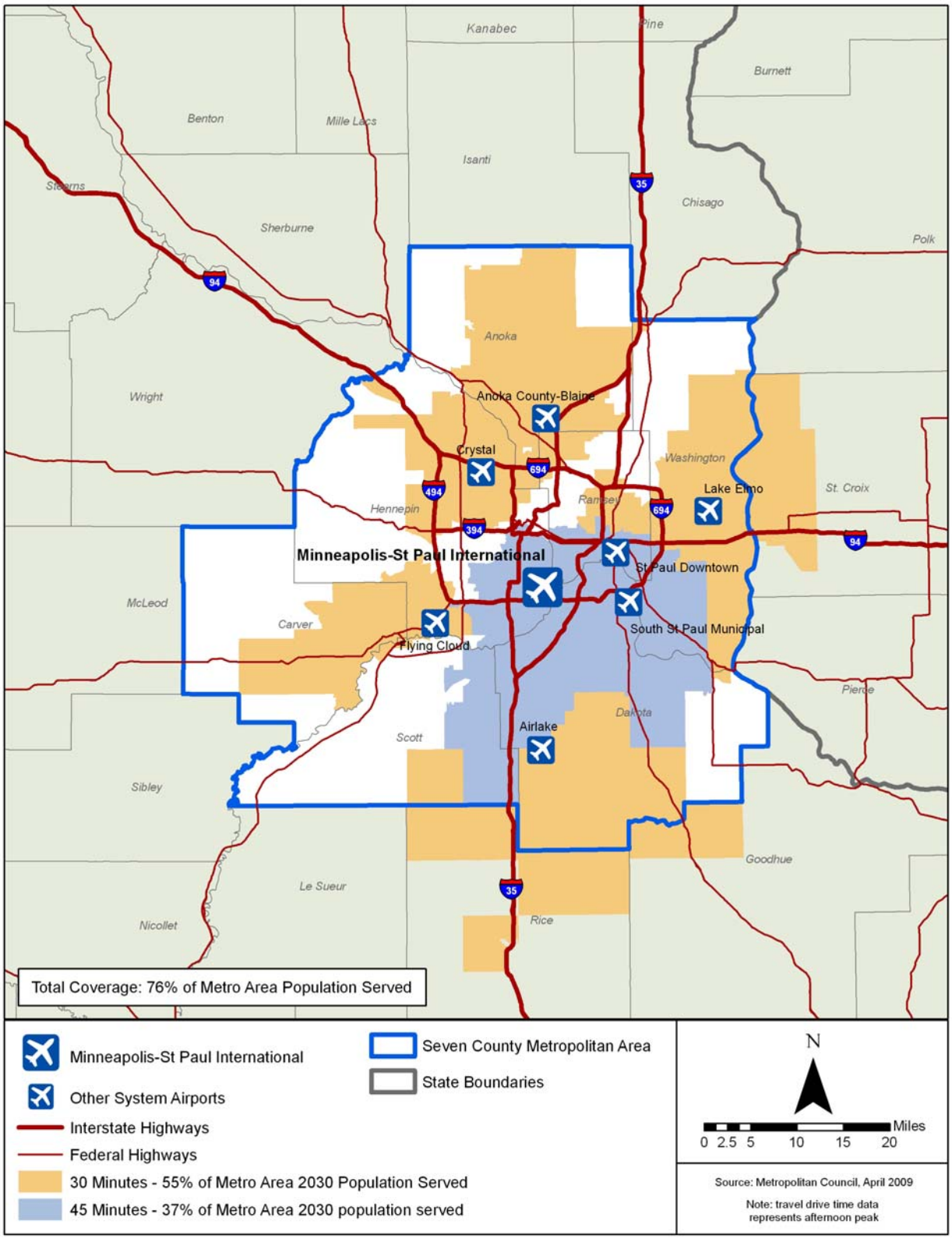


Exhibit 7-5: All System Airports Drive Times



Airport Search Area A

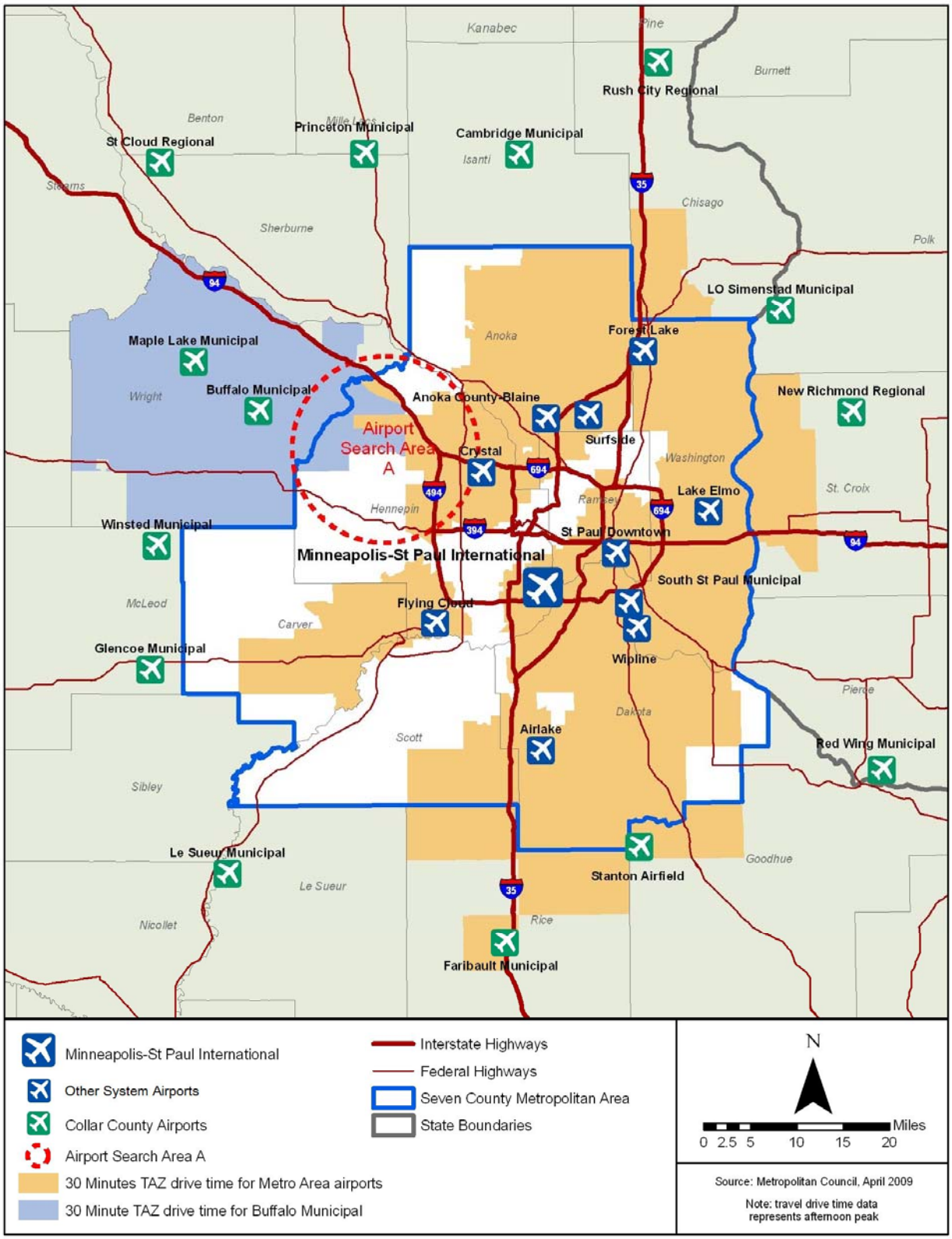
In the past, a new general aviation airport was recommended to serve the western portion of Hennepin County as presented in the previous regional airport system plan. The area identified for a potential future airport was designated as "Search Area A" which covered a 10-mile radius, centered roughly between Crystal Airport and Buffalo Municipal Airport.

In the past, general aviation forecast projections for based aircraft and aircraft operations indicated that the capacity of the existing airports may not be able to accommodate this growth. Thus the need to preserve the area and option for a new airport was established until certain conditions were met. Additional capacity for the Hennepin County area has been developed at Flying Cloud and Anoka County-Blaine, and runway capacity has been decreased at Crystal to reflect 2030 demand forecasts.

Currently and as projected in the updated regional system plan, the general aviation industry has matured, particularly in the Minneapolis area. Large increases in based aircraft and operations are no longer projected, thus the need for a new airport has diminished. A drive time analysis was conducted using the same TAZ data provide by Metropolitan Council to examine the extent of coverage in this area and further evaluate the need for a new general aviation airport.

Exhibit 7-6 presents the 2030 drive time for the current metropolitan region airports, plus Buffalo Municipal Airport, based on 30 minutes for general aviation airports. As can be seen, much of the area is covered, in part because of the presence of the collar county airport, Buffalo Municipal. Collar county airports, because of their proximity to the metropolitan region, also serve other parts of the region.

Exhibit 7-6: Collar County Airports in Relation to Metropolitan System



Summary

The ground drive time coverage for MSP, the single Major Airport in the regional system, provides adequate access for commercial passenger travel for the region's citizens during non-peak travel times and provides 97 percent population coverage during the afternoon peak congestion period, as shown in **Exhibit 7-7**. The general aviation airports – Intermediate, Minor I, Minor II, and Special Purpose Airports – provide varying ground travel time coverage to different portions of the metropolitan region. However, accumulatively, these airports, along with coverage provided by MSP, provide 76 percent of convenient ground travel time coverage to the 2030 projected population of the region, as Exhibit 7-7 shows. The areas not covered are portions of western Hennepin County, Anoka County, and Scott County, along with some of the downtown Minneapolis area and the southeastern corner of Dakota County. The collar county airports provide some additional coverage for these areas with 30 minute ground travel time access.

Exhibit 7-7: Coverage of Metropolitan Region

Drive Time Coverage	Major 90 min.	Major 60 min.	Intermediate 45 min.	Minor 30 min.	Special Purpose 30 min.	All GA Airports
Percent of Region Area	92%	47%	39%	64%	28%	83%
Percent of Region Population (2030 Pop.)	97%	64%	73%	50%	19%	76%

Source: Metropolitan Council

Chapter Eight – System Changes and Improvements

Previous chapters evaluated how the current airport system is performing in terms of forecasts, comparison to similar systems, facility and service objectives based on proposed airport roles, and geographical coverage of the metropolitan region including the collar counties. A brief summary of those findings for each airport follows.

Summary of System Airports

Minneapolis-St. Paul International: The Metropolitan Airports Commission (MAC) owns the regional system's only commercial service airport. Minneapolis-St. Paul International (MSP) is classified as a Major Airport. The airport has relatively few based aircraft, with only 24 (approximately 1.3 percent of all system airport based aircraft), but is the busiest airport in the system with approximately 450,000 annual operations in 2008. The forecast for MSP shows based aircraft increasing slightly during the forecast period. Operations at MSP have several different scenarios, but each expect growth through the forecast period, ranging between 0.6 percent and 2.0 percent, depending upon a variety of factors. MSP is in the process of completing a long term comprehensive plan. MSP is a well developed airport and many of its planned capital improvements relate to maintaining or rehabilitating its existing facilities. Some of its planned major improvements include extensive noise mitigation projects in surrounding neighborhoods, installation of an in-line baggage screening system in the Lindbergh Terminal, remodeling and expansion of Concourse E in the Lindbergh Terminal, additional equipment for the Concourse G tram in the Lindbergh Terminal, parking improvements, an improved baggage system in the Humphrey Terminal, and expansion of the Humphrey Terminal.

St. Paul Downtown: The St. Paul Downtown Airport is a MAC-owned airport and classified as the only Intermediate Airport in the regional system. The airport is home to 83 based aircraft (only 4.3 percent of all system airport based aircraft) and reported 128,250 annual operations in 2007, more general aviation operations than any airport in the regional system. Both based aircraft and operations are expected to grow slightly by the end of the forecast period. The airport is in the process of completing a long term comprehensive plan. Significant capital improvements expected during the forecast period include maintenance and upkeep projects such as pavement rehabilitation.

Airlake: The airport is owned by MAC and classified as a Minor Airport. Airlake is home to 162 based aircraft, or approximately 8.5 percent of all system airport based aircraft. In 2007, the airport reported 65,000 annual operations. Both based aircraft and operations are forecast to grow at an annual rate of 1 percent through 2030. In 2009, the airport completed a long term comprehensive plan that recommended extending the runway out to 5,000 feet in the next 10 to 15 years, and completing the south hangar area, including the installation of some water and sewer services. Other major projects include rehabilitating the airport pavement.

Anoka County-Blaine: Classified as a Minor Airport, this airport is owned by MAC. It has the largest inventory of based aircraft among all the system airports, with 437 based aircraft (22.8 percent of system based aircraft). The airport reported 86,840 annual operations in 2007. Both based aircraft and

operations are projected to decline from present levels over the forecast period. The airport is in the process of completing a long term comprehensive plan. Included among the major capital development projects under consideration are pavement rehabilitation, development of the East Annex area, and replacement of a security gate.

Crystal: Crystal Airport is owned by MAC and classified as a Minor Airport. With 244 based aircraft, the airport shelters 12.8 percent of all system based aircraft. The airport reported 53,580 annual operations in 2007. Forecasts for the airport indicate that, by the end of the planning period, both based aircraft and operations will be fairly unchanged from current levels. The airport completed a long term comprehensive plan in 2009. Because forecasts for the airport do not foresee a significant increase in activity, the airport plans to close its turf runway (Runway 6R/24L) and convert one of its parallel paved runways (Runway 14R/32L) into a parallel taxiway. Other major capital projects include pavement rehabilitation.

Flying Cloud: This MAC-owned airport is classified as a Minor Airport. With 421 based aircraft (22.0 percent of all system airport based aircraft), it is home to the second largest concentration of aircraft in the system. The airport reported 124,570 annual operations in 2007, placing it just behind St. Paul Downtown Airport. The forecast for Flying Cloud anticipates that both based aircraft and operations will decline somewhat by the end of the forecast period. The airport is in the process of developing a long term comprehensive plan, which is expected to recommend the reconstruction of Runway 18/36, rehabilitation of other airport pavement and alleyways, and development of the South Building Area.

Forest Lake: This airport is owned by the City of Forest Lake. It is classified as a Special Purpose Airport, primarily because of its turf runway. The airport has 26 based aircraft and reported 8,000 annual operations in 2007. The forecast for the airport calls for modest growth in both based aircraft and operations. The City completed a comprehensive plan update in 2009 that included the airport. Some of the planned major improvements at the airport include paving and extending the runway out to 3,300 feet, and constructing a parallel taxiway.

Lake Elmo: This airport, owned by MAC, is classified as a Minor Airport. There are 229 based aircraft, or about 12 percent of all the aircraft based at system airports, stored at Lake Elmo. In 2007, this airport reported 74,230 annual operations. Forecasts for the airport anticipate a slight increase in based aircraft and virtually no change in operations by the end of the forecast period. The airport completed a long term comprehensive plan in 2009 that recommended extending the crosswind runway (Runway 4/22) to 3,200 feet, making it the longest runway at the airport. Extending the primary runway (Runway 14/32) to 3,200 feet was deemed cost prohibitive. Other capital improvements included a parallel taxiway for the extended runway and hangar development on the east side of the airport to accommodate demand for aircraft storage.

South St. Paul Municipal: The City of South St. Paul owns this airport, which is classified as a Minor Airport. The airport has 237 based aircraft (12.4 percent of all system airport based aircraft) and reported 51,000 annual operations in 2007. Forecasts for the airport indicate that both based aircraft and operations are expected to increase slightly over the forecast period. The City completed a

comprehensive plan update in 2009 that addressed airport issues. Among the planned capital improvement projects are hangar development, ramp reconstruction, and construction of a maintenance building.

Surfside Seaplane Base: Surfside Seaplane Base is a privately-owned facility that permits public use of its water runway and other facilities. Because of the unique segment of aviation that it serves, it is classified as a Special Purpose Airport. It is home to 45 based aircraft (just 2.4 percent of all system airport based aircraft) and reported 4,100 annual operations in 2007. Forecasts for the seaplane base expect both based aircraft and operations to dip slightly by the end of the forecast period. Because it is a private facility, it is not required to submit any type of capital plan, so it is not known what capital improvement projects it may pursue during the forecast period.

Wipline Seaplane Base: Wipline Seaplane Base is a privately owned seaplane base that permits the public to use the water runway and other airport facilities, with the exception of a turf airstrip that is reserved for private use. Like the other seaplane base in the system, Wipline is classified as a Special Purpose Airport because of the aviation niche it serves. The seaplane base hosts only 5 based aircraft (less than 0.3 percent of all system airport based aircraft) and reported 130 annual operations in 2007. Little change is expected in either of these numbers over the forecast period. As a private facility, it is not required to submit planning documentation, so it is not known what, if any, capital improvement plans it has for the forecast period.

The next step in the analysis of the Twin Cities Regional Aviation System is to identify the alternatives available to improve the system. For the most part, while deficiencies were noted for a small number of the facility and service objectives, the analysis also revealed that the airport system, as currently stratified, generally meets the region's demand for aviation services and provides adequate geographic coverage. Approximately 76 percent of the population within the metropolitan region is within the service area of a Twin Cities region airport. Chapter 6 determined that the system airports met 98 percent of all facility and service objectives, indicating that the Twin Cities Regional Aviation System is a mature and well developed system, with only a small number of recommended system improvements.

Recommended Actions

The actions recommended below were developed after careful consideration of the information presented in previous chapters, discussions with Metropolitan Council staff, and input from the TAC Aviation Technical Task Force. These actions are intended to address recommended changes at the system level. Changes and improvements deemed necessary at the local level are separate from this system level analysis. **Exhibit 8-1** shows the system airports for reference purposes.

Retain the Existing Regional Airport Classification System

The proposed airport classification system modified the existing airport classification system by splitting the Minor Airport categories into two distinct groups. The reasons for doing so were to provide some differentiation between those Minor Airports that largely served business users and those that largely

served recreational users, and to provide a lower threshold classification for airports entering the Twin Cities Regional Aviation System.

The advantages of this proposed airport classification system proved to be less than anticipated. An analysis of proposed facility and service objectives found that the Minor Airports met nearly all of the proposed objectives. From this finding, it appears that the creation of the additional airport role did not enhance the ability to identify shortfalls in the system. Additionally, discussions with Metropolitan staff and advisory committee members determined that the creation of additional airport roles was not beneficial to evaluating the system.

Because the perceived advantages of the proposed airport roles did not materialize, it is recommended that the existing regional airport classification system be retained.

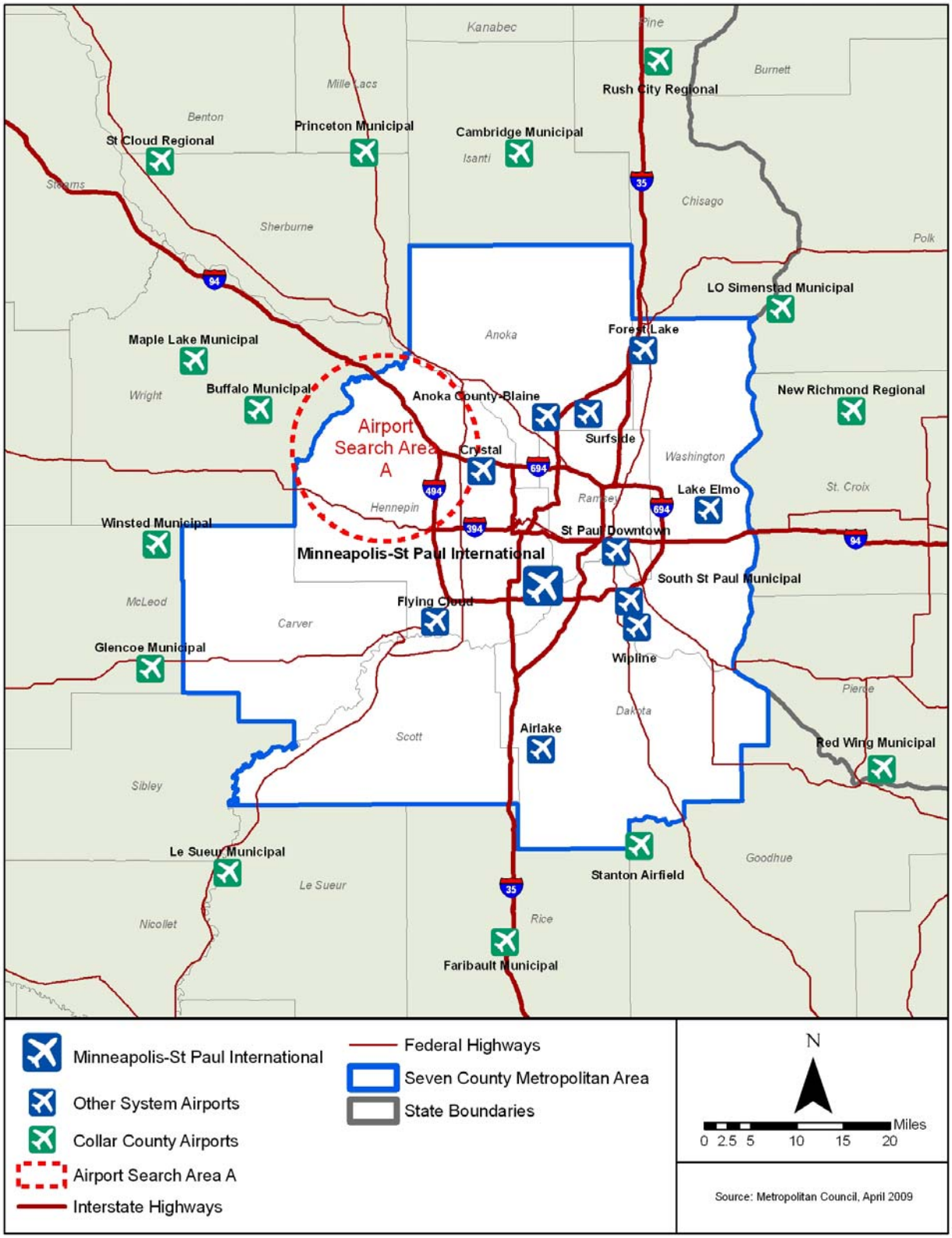
Fulfill Long Term Comprehensive Plan Objectives

The recommendations in this analysis are based on a system level examination of the Twin Cities Regional Aviation System. This type of planning is not intended to supplant planning efforts undertaken at the local level. In fact, such efforts are to be encouraged, especially in the form of long term comprehensive plans. The details of these efforts are not listed in this chapter since they deal with local and not system issues. However, the costs associated with these efforts are estimated in the next chapter in order to provide an overall estimate of capital improvement expenditures required at each system airport. Information on planned capital expenditures came from different sources. It is recommended that any objectives established in a long term comprehensive plan be supported as part of the overall system plan.

Consider Eliminating Search Area A from the Plan

As explained in a previous chapter, Search Area A was established as the preferred location for a potential new general aviation airport. When Search Area A was identified more than 20 years ago, the general aviation airports of the Twin Cities Regional Aviation System were expected to face capacity constraints in their near future. Anoka County-Blaine in particular was forecast to have severe capacity constraints, with annual operations projected to exceed the airport's maximum annual operations capacity. Such a situation results in excessive delays for users of the airport. The potential new general aviation airport would provide additional capacity for the system, allow overburdened airports the chance to transfer some of their activity, and increase the geographic coverage of the Twin Cities Regional Airport System. Since that time, general aviation activity in the metropolitan area has not grown to the levels expected. Instead operations are significantly below what they were 20 years ago and overall airside capacity constraints are no longer an issue for the Twin Cities Regional Aviation System. Additionally, continued development of Buffalo Municipal Airport, as well as other collar county airports, has reduced the need for an airport in the geographic area of Search Area A. Residents and businesses located within Search Area A that desire to fly can reach either Buffalo Municipal or Crystal Airport in under 45 minutes ground drive time, which is considered reasonable. Further, the cost and timed needed to construct a new airport for a gain of less than 15 minutes of drive time benefit does

Exhibit 8-1: System Airports



not appear to be warranted at this time. Therefore, it is recommended that a new airport located in Search Area A be removed from further consideration for the regional airport system plan.

Consider Changing Forest Lake Airport's role

Forest Lake Airport is classified as a Special Purpose Airport in the regional system plan. This is a publicly-owned, public-use facility and is classified as a Special Purpose Airport because of its turf runway. It is located a mile east of the I-35/MN97 interchange within the metro growth corridor extending from White Bear Lake to southern Chisago County.

The City of Forest Lake has fully incorporated the airport into its community comprehensive plan and has an approved Alternative Urban Areawide Review that reflects airport development plans and compatible land use requirements. The city airport commission has established a joint zoning board and has a MnDOT approved airport zoning ordinance. Land acquisition and other development items have been funded to date through local and state funding; additional funding sources will be needed for the long-term.

No new airports are proposed in the 2030 system update; preservation and enhancement of existing system facilities is the remaining avenue to maintain system investments, provide needed services, and safety improvements. There are preparatory steps needed to achieve these conditions at the Forest Lake Airport. The first step involves changing the role of the Forest Lake Airport from a Special Purpose Airport to a Minor Airport classification. As a Minor Airport, additional improvements would be needed to meet the recommended facility and service objectives identified in Chapter 5.

Following its role change the next step is to be included in the National Plan of Integrated Airport Systems (NPIAS), so as to make the airport eligible for federal funding. As stated in Chapter 6, there are several paths for entry into the NPIAS. The most likely path for Forest Lake would be to meet the criteria necessary for inclusion as a General Aviation airport capable of improved service to its current communities but also a larger future service area.

The Twin Cities 2030 Aviation System Plan – Technical Update has documented that Forest Lake Airport generally meets the NPIAS threshold criteria of 10 based aircraft, is part of a regional or state system plan, and serves a community located an average 30-minute drive time (or about 20 miles) from the nearest existing or proposed NPIAS airport. A more detailed drive-time evaluation is needed to fully assess the nearest NPIAS airports in both the Minnesota and Wisconsin system plans. Another option would be to demonstrate its inclusion in the NPIAS through a benefit-cost analysis.

As a Minor Airport, the airport would need numerous improvements to meet the recommended Minor Airport facility and service objectives identified in Chapter 5. Among the recommended improvements

are a paved runway, a partial parallel taxiway, an approach lighting system, a PAPI, and some type of weather reporting installation.

Install a Runway End Identifier Lighting System at South St. Paul Municipal Airport

South St. Paul Municipal Airport is the only Minor Airport in the system that lacks either runway end identifier or approach lights. Lights of this sort provide the basic means to transition from instrument flight to visual flight for landing. South St. Paul Municipal Airport has three instrument approach procedures, including a localizer approach (a localizer is the part of the instrument landing system that provides lateral guidance). The installation of a runway end identifier light system at South St. Paul Municipal Airport would enhance safety for those using the airport at night and flying in instrument weather conditions. A runway end identifier light system takes up very little real estate. It is recommended that a lighting system be installed for use on Runway 34 at South St. Paul Municipal Airport, since this is the runway with the localizer approach.

Examine Feasibility of Intermodal Connectivity Options to System Airports

Metropolitan Council manages and operates the region's largest transit systems, and it provides multi-modal connectivity with MSP. Both light rail and bus lines serve the international airport. Metropolitan Council should consider the feasibility of extending bus service to its other system airports, especially St. Paul Downtown. Bus route #452 runs past St. Paul Downtown Airport on Airport Drive, but the route is non-stop along that segment, and so users of the airport are not able to access bus service. Providing a bus stop at St. Paul Downtown, as well as other airports where it would be deemed useful, would encourage the use of mass transit by airport users and reduce traffic congestion and environmental impacts in the Twin Cities region.

Summary

The Twin Cities Regional Aviation System is a well developed aviation system that amply serves the needs of the metropolitan region. The continued maintenance of this system is an important aspect of the Twin Cities transportation infrastructure. This chapter identified a number of recommendations to further enhance the regional aviation system. Briefly, those recommendations are:

- Retain the existing regional airport classification system
- Fulfill long term comprehensive plan objectives
- Consider eliminating Search Area A from the Plan
- Consider changing Forest Lake Airport's role
- Install an approach lighting system at South St. Paul Municipal Airport
- Examine the feasibility of intermodal connectivity options to all system airports

These recommendations were derived from a system level analysis of the Metropolitan Council airports. Other improvements for individual airports have been developed at the local level to address needs that

are not identifiable from a system perspective. While these local improvements are not listed in this chapter, their costs are addressed in the next chapter.

Chapter Nine – System Financing

In order for airports in Metropolitan Council's jurisdiction to meet their facility and service objectives outlined in this study and for the airport system to maintain its performance and function, continued investment in system airports will be needed over the 20-year planning period. In addition, it is important to understand the funding process and sources available to airports to implement these recommendations and the airports' capital improvement programs.

This chapter discusses the funding process and sources available to airports for capital improvements, the recommended system plan proposed development costs and individual airport capital improvement programs (CIP).

Funding Sources

Historically, federal, state, and local funding sources all contribute to the support of airports in the Twin Cities Regional Aviation System. As a result of changes in both the general aviation and the commercial aviation industries, levels of federal and state funding that historically have been available for airport development are shrinking. Maintaining historic levels of funding is vital to the airports that support the economy of the metropolitan region.

FAA Funding

To promote the development of airports to meet the nation's needs, the federal government embarked on a Grants-In-Aid Program to units of state and local government after the end of World War II. This early program, the Federal Aid Airport Program (FAAP), was authorized by the Federal Treasury Act of 1946 and provided its funding from the Treasury.

In 1970, a more comprehensive program was established with the passage of the Airport and Airway Development Act of 1970. The Act provided grants for airport planning under the Planning Grant Program (PGP) and for airport development under the Airport Development Aid Program (ADAP). These programs were funded from a newly established Airport and Airway Trust Fund, which received funds from taxes on airline tickets, air freight, and aviation fuel.

The authority to issue grants under these two programs expired on September 30, 1981. During this 11-year period (1970-1981), a total of 8,809 grants were awarded for a total of $4.5 billion for airport planning and development.

The Airport Improvement Program (AIP) was established by the Airport and Airway Improvement Act of 1982. The initial AIP provided funding legislation through fiscal year 1992. Since then, the AIP has authorized and appropriated funds for projects on a yearly basis. Funding for this program is generated

from a tax on airline tickets, freight way bills, international departure fees, general aviation fuel, and aviation jet fuel. The FAA uses these funds to provide 95 percent funding at eligible airports for eligible items under the AIP.

Federal Airport Improvement Funds must be spent on FAA eligible projects as defined in FAA Order 5100.38 "Airport Improvement Program (AIP) Handbook." In general, the handbook states that:

- An airport must be in the currently approved National Plan of Integrated Airport Systems (NPIAS). With the exception of the three Special Purpose Airports, all of the Twin Cities Metro system airports are NPIAS airports and are eligible for AIP funding.
- Most public-use airport improvements are eligible for 95 percent federal funding
- General Aviation terminal buildings, T-hangars, and corporate hangars and other private-use facilities are not eligible for Federal Funding.

In addition, revenue-producing items typically are not generally eligible for federal funding, and all eligible projects must be depicted on an FAA-approved Airport Layout Plan. Other sources of FAA funding include Facilities and Equipment (F&E) funding for facilities such as air traffic control towers and some runway instrumentation. This funding is separate from the AIP program and typically requires no local match. Federal noise funds (Part 150 funds) may also be available for noise mitigation with an 80 percent federal and a 20 percent state and/or local share.

In 2001, a non-primary entitlement program was authorized. This program provided up to $150,000 in FAA grant funds each year to general aviation airports that were listed in the NPIAS and were not a primary airport providing airline service for passengers. Under this program, the FAA pays 95 percent of all engineering, inspection, testing, land acquisition, administrative, and construction costs for projects that are eligible. The sponsor/State pays a local 5 percent match. When this program was renewed in 2004, certain revenue producing items of work, like T-hangars and fuel facilities, could be funded by this program once all safety related improvements had been completed.

State of Minnesota Funding

Minnesota's state-funded aeronautics system consists of 136 airports throughout the state. Aeronautics funding for the state comes from three sources – an aviation fuel tax, an aircraft registration tax, and an airline flight property tax. Collectively, these taxes, combined with interest and other sources, totaled $21.1 million in 2008.

The state airports fund is the primary state funding source for aeronautics. By law, revenues from the taxes on aviation fuel, aircraft registration, and airline flight property are dedicated to the fund. Money in the fund is appropriated biennially to MnDOT as part of the transportation budget.

Although the airport sponsor is responsible for project design and construction management, many project-related costs, including consultant services, are eligible for state and/or federal aid as described below.

Airport Construction Grant Program: The State Construction Grant Program funds most capital improvements at state system airports based on a determination that the improvement is a justifiable benefit to the air-traveling public. Airports that are in the NPIAS are eligible for federal funding. State funding participation at NPIAS airports is 70 percent of eligible costs. State funding at non-NPIAS airports is 80 percent of eligible costs. Projects that have revenue-generating potential are funded at 50 percent. This program also funds airport maintenance equipment at a two-third state one-third local participation rate.

Airport Maintenance and Operation Program: The State Airport Maintenance and Operation Grant Program provides two-third state reimbursement to the state system airports for their documented, routine maintenance expenses up to a certain ceiling amount that is categorized by airport infrastructure.

Hangar Loan Revolving Account Program: The State Hangar Loan Revolving Account Program provides an 80 percent interest-free loan to state system airports for building new hangars. The loans are paid back in equal monthly installments over 10 years. Payment receipts, as they become available, are then loaned out again to other airports needing hangars.

Sponsor Funding

Local/sponsor funding is used to make up the balance after FAA and MnDOT participation for the grant-eligible project costs. Sponsor funds are generated by the airport from fuel sales, lease fees, and other similar incomes, and/or from the local governing body. Sources of sponsor funding largely depend upon which of three types an airport is.

- Municipal Airports – these airports are owned by counties, cities, or other local municipalities. Sponsor funding includes the sources of revenue from the airport (fuel sales, rents, etc.) as well as any funding external to the airport the municipality elects to provide. For instance, municipal bonds and municipal taxes may be used to fund airports. An example of a municipal airport in the Twin Cities airport system is South St. Paul.
- Private Airports – these airports can fund projects from their revenue streams (i.e. fuel sales, rents, etc.). The owners may also be a source of funding, although this typically is more limited. Surfside and Wipline Seaplane Bases are examples of private airports.
- Metropolitan Airports Commission (MAC) – airports owned by the MAC can be funded by revenues generated at any of the MAC-owned airports. This cross-funding helps airports adequately support the system by funding the facilities they need to perform their mission.

However, in recent years, MAC philosophy has shifted toward a more self-sufficient system for the reliever airports. In 2006, MAC established new ground rental rates at the reliever airports that were, in some cases, twice the old rate. MAC also has the ability to issue bonds to support the funding of airport projects.

Other Funding

A potential source of funds for airport improvements is from private investors. Private investors may construct needed facilities as part of a lease agreement with the airport that will allow time to amortize their investments. This type of funding is particularly suitable for corporate hangar development and other privately owned projects. These types of projects are not eligible for FAA or state funding. However, this funding source does allow non-municipal owned sponsors/investors to leverage funding capabilities not available to the airport.

The combination of these funding sources allow the airports in this mature regional airport system to maintain and, when justified, enhance their facilities to serve their customer's needs and allow them to be as financially self sufficient as possible.

Allocation of CIP Costs

Projects eligible for federal and state funding include improvements to runways, taxiways, and aprons; environmental assessments, master plans, and airport layout studies, land acquisition, terminal buildings, visual aids, and lighting. Eligible projects usually preserve or improve safety, security or capacity of the airport and aviation system. Eligible projects also include those that mitigate noise or other environmental impacts due to an airport, and in some cases include projects which provide opportunity to enhance competition at the airport.

Conversely, projects that are revenue producing or proprietary in nature for the exclusive use of management or tenants are not eligible for federal or state grants. Some ineligible projects include restaurants, concession facilities, hangars, and airline leased spaces. Though federal and state funding are similar, overall differences remain and must be addressed on an individual project basis.

This analysis does not address the probability of a project actually receiving funding. That determination is beyond the scope of this study and is usually based on a case-by-case analysis.

Determination of System Recommendation Costs

Development costs presented in this chapter are estimated for each system airport by comparing existing airport facilities with proposed system level facility and service objectives. These development costs include projects recommended in the previous chapters of this study to enable system airports to

meet the established objectives and benchmarks. In addition, costs for projects that may be required to implement recommendations stemming from airport-specific master plans or CIPs are also identified.

Only a few facility and service objectives were not met, and these were generally not items of major significance. The system's Major Airport, Minneapolis-St. Paul International, meets all of its proposed objectives, as shown in **Exhibit 9-1**.

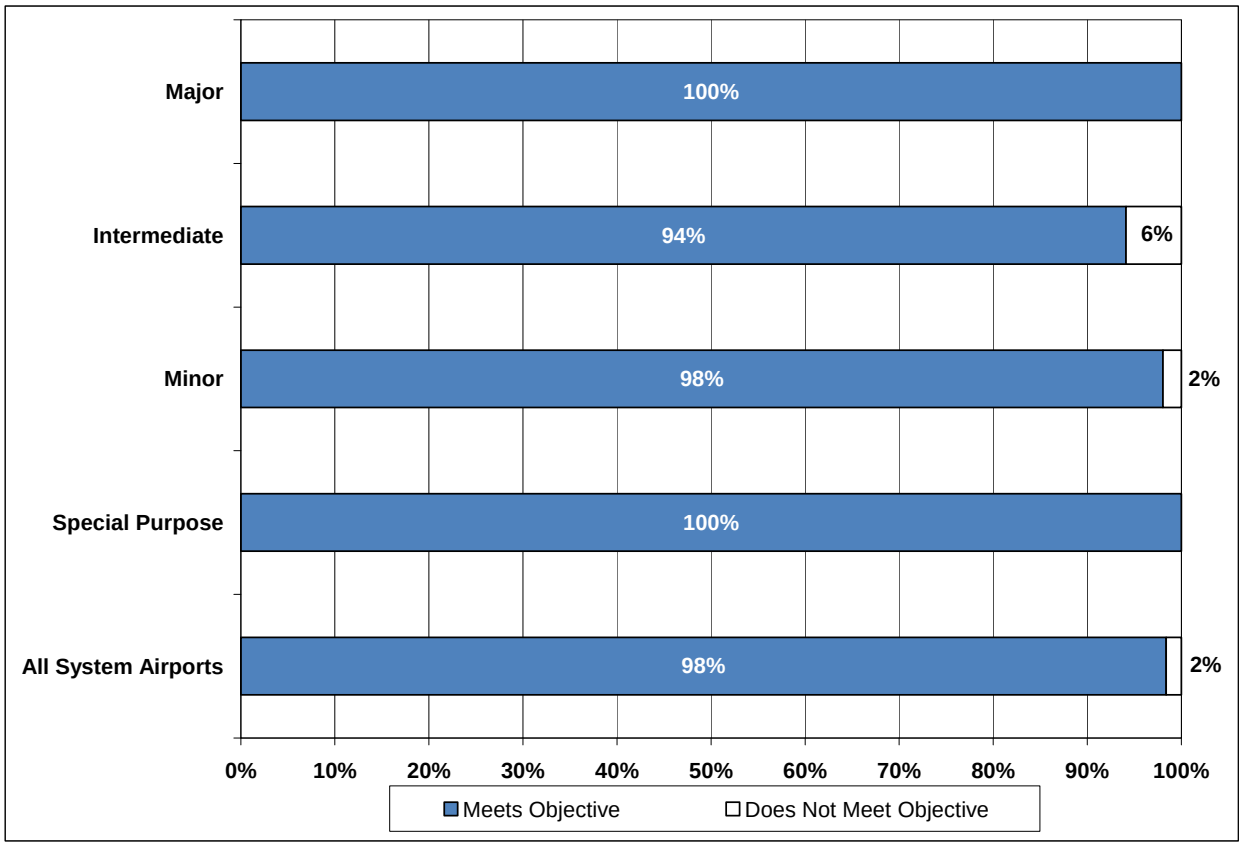
The system's Intermediate Airport, St. Paul Downtown, meets 94 percent of its proposed objectives. The only objective it failed to meet was the food service objective because of the lack of an airport restaurant.

The Minor Airports in the system meet 98 percent of their proposed objectives. Anoka County-Blaine, Flying Cloud, Airlake and Crystal Airport meet all of their objectives. Lake Elmo fails to meet only one of its proposed objectives, ground transportation, by lacking courtesy car service. South St. Paul Airport falls short of a single objective. It does not meet the approach lighting system objective, since it does not have any approach lights.

The Special Purpose Airports meet 100 percent of their proposed objectives.

Overall, the system airports meet 98 percent of their proposed objectives. This illustrates that the Twin Cities Regional Aviation System is a mature, well developed airport system made up of airports that areas are well suited for the current roles they have been assigned.

Exhibit 9-1: Summary of Airport Objectives



Source: Wilbur Smith Associates

Recommended Development Plan Costs

Facility needs and costs were first identified on an airport-by-airport basis and then compiled by system role and project type to develop a summary of system plan costs. In addition to these costs, the expense of capital projects planned for by each individual airport were tabulated to determine the overall capital cost of the system airports. Individual airport capital improvement costs are submitted to MnDOT for inclusion in the state's five-year CIP. The information presented in this chapter represents projects as of 2008 and include projects through 2030, where available since not all airports have submitted long term comprehensive plans. In addition, these costs are based on 2008 US dollars and have not been increased to reflect future inflation.

Costs are aggregated into the following categories for each airport and then summarized:

- Airfield Pavement and Lighting Projects,
- Visual/Navigational Aids,
- Facilities, and

- Other.

In the following sections, these costs are presented in tables and explained in the text. For each airport, the system improvement recommendations, if any, are explained, followed by the airport's overall capital improvement program cost.

Major Airport Funding Needs

Minneapolis-St. Paul International Airport (MSP) meets all of its recommended objectives thus no additional projects are recommended to meet its assigned system role. MSP's five-year capital improvement program, as provided by the Metropolitan Airport Commission, is presented in **Exhibit 9-2**. MSP has projects totaling almost $1.1 billion for its capital improvement program.

Exhibit 9-2: Major, Intermediate and Minor Airport's CIP
2008 - 2030

Capital Improvement Projects	Airport			
	MSP	St. Paul Downtown	Anoka County-Blaine	Flying Cloud
Airfield Pavement & Lighting				
Runways	$2,800,000	$0	$0	$1,500,000
Taxiways	$11,500,000	$0	$900,000	$0
Airfield Lighting	$1,800,000	$0	$0	$0
Pavement Maint & Rehab	$12,300,000	$4,800,000	$1,300,000	$2,000,000
Visual/Navigational Aids				
Approach Lighting	$0	$0	$0	$0
NAVAID/Radar	$5,000,000	$0	$0	$0
Automated Weather Reporting	$0	$0	$0	$0
Facilities				
Terminal Buildings	$725,185,000	$0	$0	$0
Car Parking	$119,550,000	$0	$0	$0
Aircraft Storage	$6,780,000	$0	$4,250,000	$2,100,000
Aircraft Parking	$0	$0	$0	$0
Other				
Fuel	$0	$0	$0	$0
Noise Mitigation	$65,700,000	$0	$0	$0
Utilities	$8,050,000	$1,300,000	$0	$0
Snow Removal Equipment	$0	$0	$0	$0
Other Improvements	$98,000,000	$1,800,000	$500,000	$0
Total Airfield	$28,400,000	$4,800,000	$2,200,000	$3,500,000
Total Navigational Aids	$5,000,000	$0	$0	$0
Total Facilities	$851,515,000	$0	$4,250,000	$2,100,000
Total Other	$171,750,000	$3,100,000	$500,000	$0
Total Costs for Airport	**$1,056,665,000**	**$7,900,000**	**$6,950,000**	**$5,600,000**

Source: MAC

Intermediate Airport Funding Needs

St. Paul Downtown Airport did not meet one objective, food service. Since a restaurant facility currently exists, but without an operator, no additional improvements are recommended for the airport to meet its assigned role. St. Paul Downtown's five-year capital improvement program is presented in Exhibit 9-2. St. Paul Downtown has costs of approximately $7.9 million for its capital improvement program.

Minor Airport Funding Needs

Anoka County-Blaine Airport meets all of its objectives, thus no additional improvements are recommended for the airport to meet its assigned role. Anoka County-Blaine Airport's five-year capital improvement program is presented in Exhibit 9-2. Anoka County-Blaine has total costs of almost $7 million for its capital improvement program.

Flying Cloud Airport extended its runway to 5,000 feet. The cost for extending the runway is estimated at approximately $1.5 million and comprises a significant portion of Flying Cloud's estimated $5.6 million CIP costs. Flying Cloud's five-year capital improvement program is presented in Exhibit 9-2.

Airlake Airport meets all of its objectives, thus no additional improvements are recommended for the airport to meet its assigned role. Airlake's 20-year capital improvement program is presented in **Exhibit 9-3**. Airlake has overall needs of $12.5 million for its capital improvement program.

Crystal Airport meets all of its objectives, thus no additional improvements are recommended for the airport to meet its assigned role. Crystal's 20-year capital improvement program is presented in Exhibit 9-3. Crystal has an estimated $2.6 million in costs for its capital improvement program.

Lake Elmo Airport did not meet one of its objectives, ground transportation services, but this is not a capital project, thus no additional improvements are recommended for the airport to meet its assigned role. Lake Elmo's 20-year capital improvement program is presented in Exhibit 9-3. Lake Elmo has overall needs of $7.7 million for its capital improvement program.

As stated previously in Chapter 6, South St. Paul lacks a lighting system to help identify the runway environment. The costs of such a system can vary considerably, thanks to a number of factors involved in determining the cost. For purposes of this study, it was estimated that South St. Paul could install a simple runway end identification lighting system for approximately $50,000. Obviously, a more sophisticated lighting system would cost more money. South St. Paul's five-year capital improvement program is presented in Exhibit 9-3. South St. Paul has short-term needs of $4.9 million for its capital improvement program.

Exhibit 9-3: Minor and Special Purpose Airport's CIP
2008 - 2030

Capital Improvement Projects	Airport				
	Airlake	Crystal	Lake Elmo	South St. Paul	Forest Lake
Airfield Pavement & Lighting					
Runways	$8,200,000	$1,000,000	$3,100,000	$0	$1,400,000
Taxiways	$0	$0	$1,200,000	$492,300	$1,200,000
Airfield Lighting	$0	$0	$0	$0	$180,000
Pavement Maint & Rehab	$600,000	$1,250,000	$600,000	$295,000	$0
Visual/Navigational Aids					
Approach Lighting	$0	$0	$0	$50,000	$50,000
NAVAID/Radar	$0	$0	$0	$0	$218,000
Automated Weather Reporting	$0	$0	$0	$0	$65,000
Facilities					
Terminal Buildings	$0	$0	$0	$0	$0
Aircraft Storage	$3,700,000	$0	$2,800,000	$1,585,000	$250,000
Aircraft Parking	$0	$0	$0	$720,000	$0
Other					
Fuel	$0	$0	$0	$80,000	$0
Utilities	$0	$0	$0	$0	$12,000
Snow Removal Equipment	$0	$0	$0	$200,000	$0
Other Improvements	$0	$300,000	$0	$1,483,700	$1,614,800
Total Airfield	$8,800,000	$2,250,000	$4,900,000	$787,300	$2,780,000
Total Navigational Aids	$0	$0	$0	$50,000	$333,000
Total Facilities	$3,700,000	$0	$2,800,000	$2,305,000	$250,000
Total Other	$0	$300,000	$0	$1,763,700	$1,626,800
Total Costs for Airport	**$12,500,000**	**$2,550,000**	**$7,700,000**	**$4,906,000**	**$4,989,800**

Source: MAC and MnDOT

Special Purpose Airport Funding Needs

Forest Lake Airport currently meets all of its objectives, thus no additional improvements are recommended for the airport to meet its assigned role. Forest Lake's five-year capital improvement program is presented in Exhibit 9-3. Forest Lake has project costs of almost $5 million for its capital improvement program. Should the role of Forest Lake be upgraded from Special Purpose Airport to Minor Airport as suggested in a previous chapter, its facility and service objectives would change. Many of the projects in Forest Lake's CIP address a number of these enhanced objectives (such as paving the runway, providing automated weather reporting equipment, and installing an approach lighting system), so completion of the airport's CIP would put it well along the path to being able to fulfill a Minor Airport role.

Both of the seaplane bases, Surfside Seaplane Base and Wipline Seaplane Base, meet all of their objectives, thus no additional improvements are recommended for either seaplane base. Furthermore,

neither seaplane base has any planned capital improvement projects on record, so there are no costs associated with either seaplane base.

Summary

Exhibit 9-4 summarizes the region's airport capital costs by project type and airport role. The Major Airport has the most costs, totaling nearly $1.1 billion. The Intermediate Airport has projects totaling approximately $7.9 million and the Minor airport costs involve $40.2 million. Special Purpose Airports identified capital costs of approximately $5 million, all associated with Forest Lake Airport. The grand total capital cost estimate through the year 2030 is $1.1 billion.

Exhibit 9-4: Estimated Cost of Recommended Regional System Improvements

Capital Improvement Projects	Major	Intermediate	Minor	Special Purpose	All Airports
Airfield Pavement & Lighting					
Runways	$2,800,000	$0	$13,800,000	$1,400,000	$18,000,000
Taxiways	$11,500,000	$0	$2,592,300	$1,200,000	$15,292,300
Airfield Lighting	$1,800,000	$0	$0	$180,000	$1,980,000
Pavement Maint & Rehab	$12,300,000	$4,800,000	$6,045,000	$0	$23,145,000
Visual/Navigational Aids					
Approach Lighting	$0	$0	$50,000	$50,000	$100,000
NAVAID/Radar	$5,000,000	$0	$0	$218,000	$5,218,000
Automated Weather Reporting	$0	$0	$0	$65,000	$65,000
Facilities					
Terminal Buildings	$725,185,000	$0	$0	$0	$725,185,000
Car Parking	$119,550,000	$0	$0	$0	$119,550,000
Aircraft Storage	$6,780,000	$0	$14,435,000	$250,000	$21,465,000
Aircraft Parking	$0	$0	$720,000	$0	$720,000
Other					
Fuel	$0	$0	$80,000	$0	$80,000
Noise Mitigation	$65,700,000	$0	$0	$0	$65,700,000
Utilities	$8,050,000	$1,300,000	$0	$12,000	$9,362,000
Snow Removal Equipment	$0	$0	$200,000	$0	$200,000
Other Improvements	$98,000,000	$1,800,000	$2,283,700	$1,614,800	$103,698,500
Total Airfield	$28,400,000	$4,800,000	$22,437,300	$2,780,000	$58,417,300
Total Navigational Aids	$5,000,000	$0	$50,000	$333,000	$5,383,000
Total Facilities	$851,515,000	$0	$15,155,000	$250,000	$866,920,000
Total Other	$171,750,000	$3,100,000	$2,563,700	$1,626,800	$179,040,500
Total Costs for Airport System	**$1,056,665,000**	**$7,900,000**	**$40,206,000**	**$4,989,800**	**$1,109,760,800**

Sources: MnDOT and MAC

Appendix

Development of Airport Roles and Classifications

The classification and composition of the Twin Cities Aviation System has undergone an evolution over the years in response to numerous factors, including changes in demand for air service, urban growth pressures, and policy restrictions. **Exhibit A-1** depicts several key reassessments of the region's aviation system and airport roles. The system's current classification is depicted under the Proposed MSP Expansion Option of the 1988 Major Airport Dual-Track Planning Strategy.

Exhibit A-1: System Reassessments - Airport Role/Classification

1968 MAC - Proposed New Commercial Reliever Airport to MSP	1978 Metro Council Update to the Region's 1972 System Plan	1988 Major Airport Dual-Track Planning Strategy	
		Proposed MSP Replacement Option	Proposed MSP Expansion Option
Airport Classification: **Air Transport** - Minneapolis - St. Paul - Ham Lake – New - St. Paul Downtown	Airport Classification: **Major Airport** - Minneapolis – St. Paul	Airport Classification: **Major Airport** - New – Dakota County - MSP (Closed)	Airport Classification: **Major Airport** - MSP International
General Utility - Anoka-Blaine - South St. Paul - Airlake Ind. (Pvt**.)**	**Intermediate** - St. Paul Downtown - Anoka Co.- Blaine	**Intermediate** - St. Paul Downtown - Anoka Co. – Blaine	**Intermediate** - St. Paul Downtown
Basic Utility - Belle Plaine (Pvt.) - Southport (Pvt.) - Crystal - Flying Cloud - Lake Elmo	**Minor** - South St. Paul - Crystal - Flying Cloud - Lake Elmo	**Minor** - South St. Paul - Crystal - Flying Cloud - Lake Elmo - Airlake (Public Acquisition)	**Minor** - Anoka Co – Blaine - South St. Paul - Crystal - Flying Cloud - Lake Elmo - Airlake
Landing Strip - Benson - Journey's End - Northport	**Special Purpose** - Benson (Removed) - Journey's End (Pvt.) - Northport (Pvt.) - Gateway Ind. (Pvt.) - Airlake Ind. (Pvt.) - Rice Lake SPB (Pvt.) - Southport (Closed) - Wipline SPB (Pvt.)	**Special Purpose** - Benson's (Sunsets 2035) -Forest Lake (Pvt.) - Northport (Closed) - Gateway (Closed - Rice Lake SPB (Pvt.) - Wipline SPB (Pvt.)	**Special Purpose** - Forest Lake (Pvt.) - Rice Lake SPB (Pvt.) - Wipline SPB (Pvt.)

Exhibit A-1: System Reassessments - Airport Role/Classification (cont.)

1968 MAC - Proposed New Commercial Reliever Airport to MSP	1978 Metro Council Update to the Region's 1972 System Plan	1988 Major Airport Dual-Track Planning Strategy	
		Proposed MSP Replacement Option	Proposed MSP Expansion Option
Airport Search Areas (8 – new general aviation airports)	**Airport Search Areas** -Search Area (A) - Search Area (B)	**Airport Search Areas** - Search Area (A) - Search Area (B) (Removed)	**Airport Search Areas** -Search Area (A)
Continued expansion over the time period of metro urban services area (MUSA) and metro systems to serve new geographical service areas, new clientel and increased service expectations/levels.			

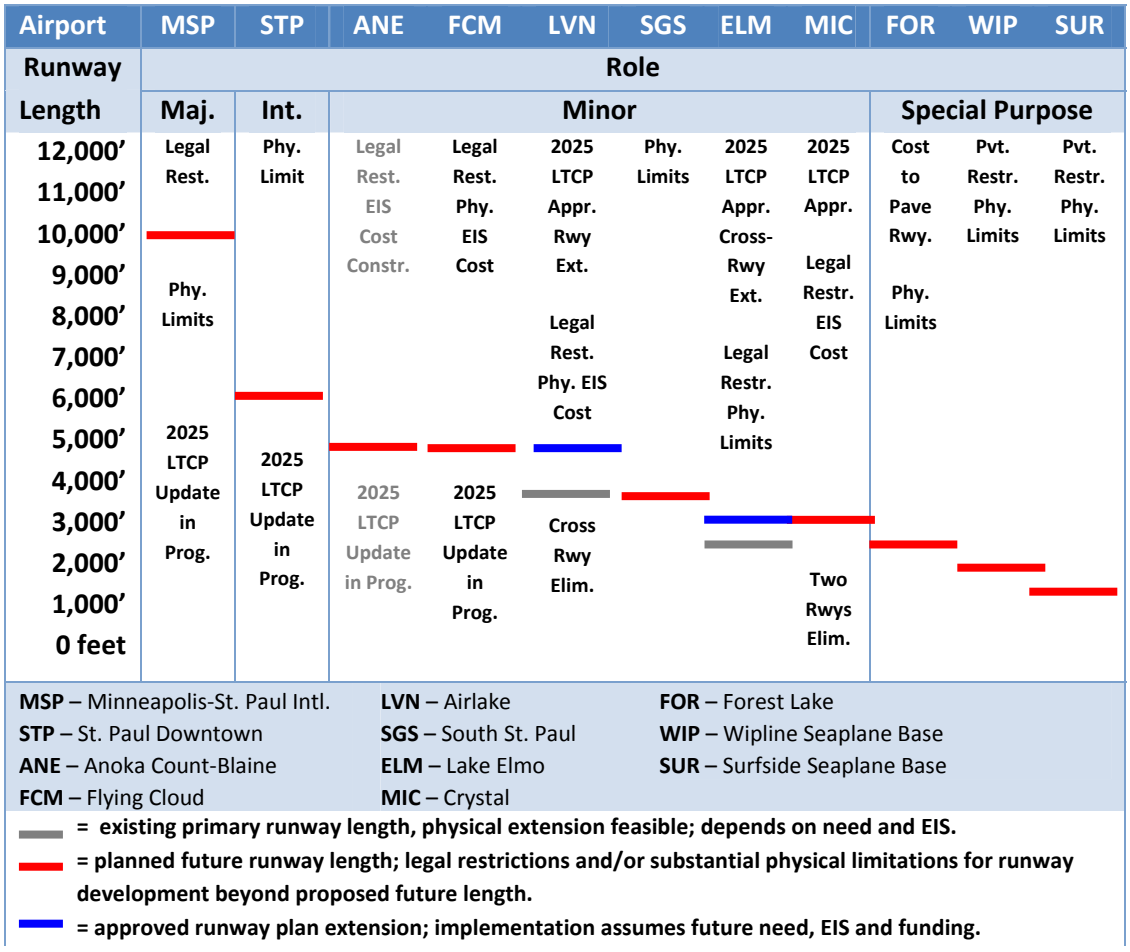
Source: Metropolitan Council

Airside Expansion Potential

The assessment of airport roles involves a number of elements. One of the technical items is an examination of airports general expansion potential for airside (e.g. runway/taxiways) development. An example is depicted in **Exhibit A-2** that gives a broad system comparison for airports in the region in relation to their general airside development capability based upon ranking by runway length. These runway lengths are approximate for comparison purposes. For more complete runway information, see Chapter 1.

As this exhibit indicates, the existing system airports have or are reaching the extent of their possible airside development due to physical limits and legal restraints. Several airports are removing runway capacity. Several airports have updated their long-term comprehensive plans (LTCP's) that identify some remaining airside expansion potential, but environmental and funding issues remain. The overall metro system has matured, with the focus on protection, preservation and selected enhancements. A key question is whether the current classification system provides enough definition to address the types of changes that the trends and forecasts, discussed earlier in Chapters 2 and 3, portend. The ability to evaluate system performance, devise appropriate future implementation strategies and priorities is shaped, in great part, on how an airport's role is determined.

Exhibit A-2: Generalized Airside Capability by Runway Ranking



MSP – Minneapolis-St. Paul Intl.
STP – St. Paul Downtown
ANE – Anoka Count-Blaine
FCM – Flying Cloud
LVN – Airlake
SGS – South St. Paul
ELM – Lake Elmo
MIC – Crystal
FOR – Forest Lake
WIP – Wipline Seaplane Base
SUR – Surfside Seaplane Base

= existing primary runway length, physical extension feasible; depends on need and EIS.

= planned future runway length; legal restrictions and/or substantial physical limitations for runway development beyond proposed future length.

= approved runway plan extension; implementation assumes future need, EIS and funding.

Source: Metropolitan Council