2003 ANNUAL REPORT TO THE LEGISLATURE

METROPOLITAN AIRPORTS COMMISSION

March 2004

2003 REPORT TO THE LEGISLATURE

Metropolitan Airports Commission

INTRODUCTION

In 1989, the Minnesota Legislature adopted the Metropolitan Airport Planning Act. This legislation required the Metropolitan Airports Commission (MAC) and the Metropolitan Council (MC) to complete a comprehensive and coordinated program to plan for major airport development in the Twin Cities. The planning activities were designed to compare the option of future expansion of Minneapolis-Saint Paul International Airport (MSP) with the option of building a new airport.

The analysis was completed in 1996, and the MAC and MC formally submitted their recommendations to the Legislature on March 18, 1996. On April 2, 1996, legislation was passed by both the House and Senate, and subsequently signed by Governor Carlson, stopping further study of a new airport and directing the MAC to implement the MSP 2010 Long Term Comprehensive Plan.

The 1996 legislation requires the MAC to prepare an annual report to the Legislature by February 15th of each year that describes recent airport activity, current and anticipated capacity and delay for the airfield and terminal, and technological developments that could improve airport efficiency. Activity trends are compared to the 1993 MAC forecasts. The report also compares MSP trends with Detroit Metropolitan Wayne County Airport (DTW) trends.

The 2003 Annual Report to the Legislature is divided into five sections:

- Description of MSP and DTW facilities.
- Comparison of MSP and DTW activity.
- Comparison of 1993 MAC forecasts with actual activity.
- Current airfield capacity and average length of delay statistics.
- Technological developments affecting aviation and their effect on airport operations and capacity.

DESCRIPTION OF AIRPORT FACILITIES

This section compares the facilities of MSP and DTW. **Table 1** summarizes the major airport components and identifies when new facilities are expected to be in place.

Minneapolis-St. Paul International Airport

Figure 1 shows the general airport layout for MSP. The airfield consists of two parallel runways and one crosswind runway that intersects both parallel runways. Runway 12L-30R is 8,200 feet long; Runway 12R-30L is 10,000 feet long; and Runway 4-22 is 11,006 feet long. A deicing pad was constructed at Runway 12L in 1998 with the capacity to accommodate six jets and two regional aircraft. During the reconstruction of the southeastern portion of Runway 12R-30L, a new parallel taxiway was constructed south of the runway, and a deicing pad capable of handling six jet aircraft was constructed at Runway 30L in 1999. A deicing pad for Runway 30R was constructed in 2001 and can accommodate 3 narrowbody and 2 regional aircraft. In addition, an Engineered Materials Arresting System (EMAS) was installed on the approach end of Runway 30L to enhance safety. In 2003 a new deicing pad was added to Runway 12R and can accommodate 3 Widebody, 3 narrowbody and 2 regional aircraft. Construction on the new Runway 17-35 began on March 15, 1999, with an anticipated completion date of late 2005. In 2003 the north end of the runway was paved bringing the project one step closer to completion. The remaining southern portion is scheduled for completion in 2004/2005. Two cargo aprons (50 acres of concrete) were constructed in 2000. FedEx opened their new sort facility in 2002, and UPS completed construction of their new facility in 2003. An airline maintenance apron was constructed in 2001 and Mesaba Airlines completed construction of their new facility in 2003. A new public roadway system is open, providing access to the west side of the airport for relocated and future tenants. One Light Rail Transit station directly East of the Humphrey terminal was completed in 2003 and another station at the Lindbergh terminal is to be completed in 2004, with initiation of service in December 2004.

The Lindbergh Terminal is located between the two parallel runways, east of the crosswind runway. The terminal is laid out with single-loaded and double-loaded concourses that provide 117 gate positions in 2003. A concourse tram along Concourse C will begin operation in 2004.

Table 1

2003 REPORT TO THE LEGISLATURE

Comparison of Existing Airport Facilities

Airport Component	MSP	DTW
Runways		
Main	2 Parallel	4 Parallel
Crosswind	1 (1)	2
Total	3 (1)	6
Longest (ft.)	11,006 (2)	12,001
Terminal Facilities		
Square Feet (millions)	2.4	3.0
Total Gates	127 (3)	139
Lindbergh Terminal	87	McNamara 97 (6)
Humphrey Terminal	10 (4)	Smith/Berry 38/4
Northwest Gates	68 (3)	97 (7)
Regional Positions (50 seats or less)	30	32
Auto Parking Spaces	21,465 (5)	24,500 (8)

Notes:

(1) New North/South runway will open in late 2005.

(2) Runway 4-22 has environmental approval to be extended to 12,000 feet.

(3) Seven new Northwest gates opened in Lindbergh during 2002/2003.

(4) Space exists for the construction of 8 to 10 more gates in the future.

(5) The Humphrey garage provided 4,674 public parking spaces by the end of 2003, and when completed a second facility will add another 4,526 public and employee spaces.

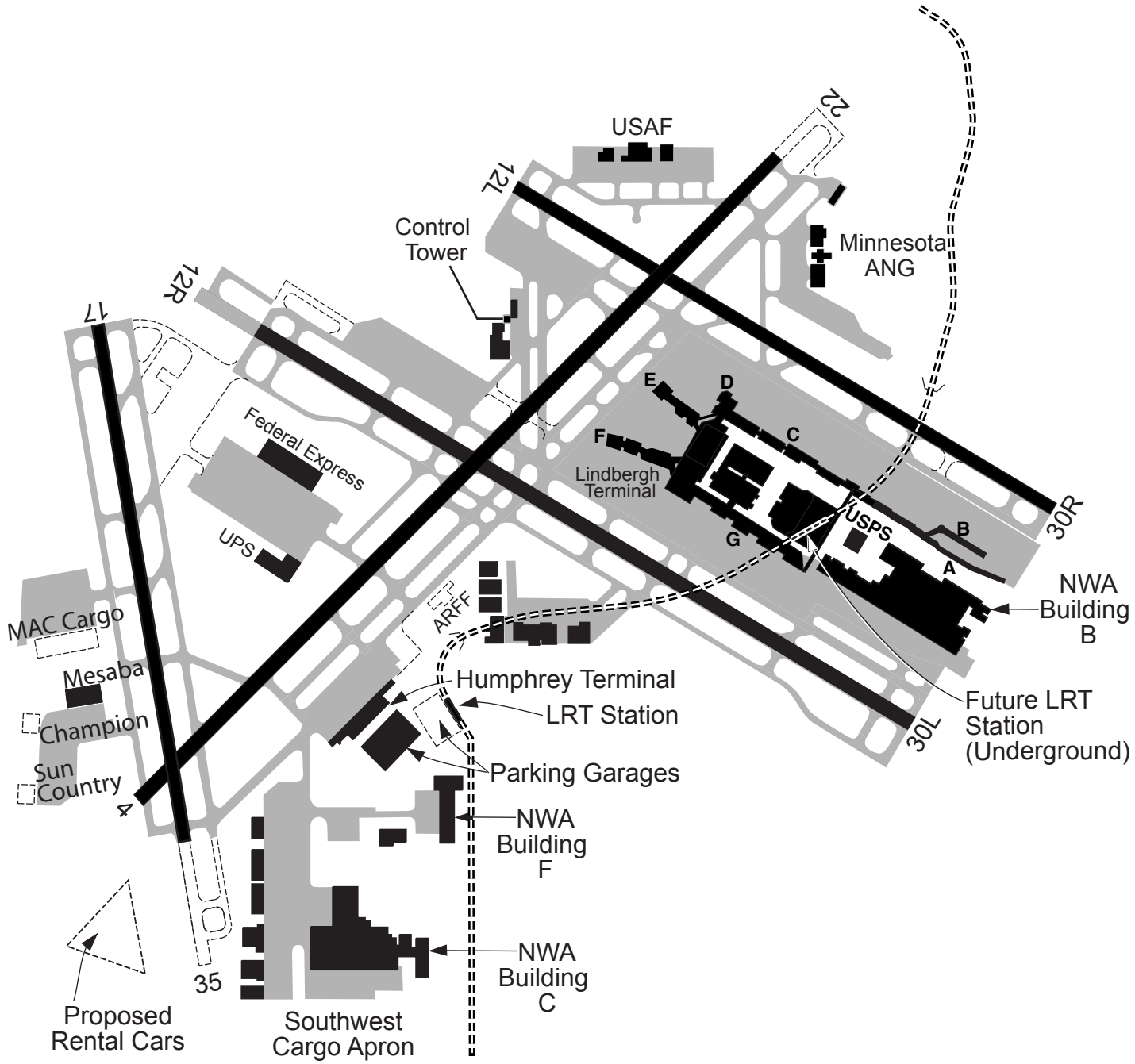
(6) In 2004/2005, 23 more gates will be added.

(7) Northwest has 97 gates at the new mid-field terminal, including 25 commuter gates.

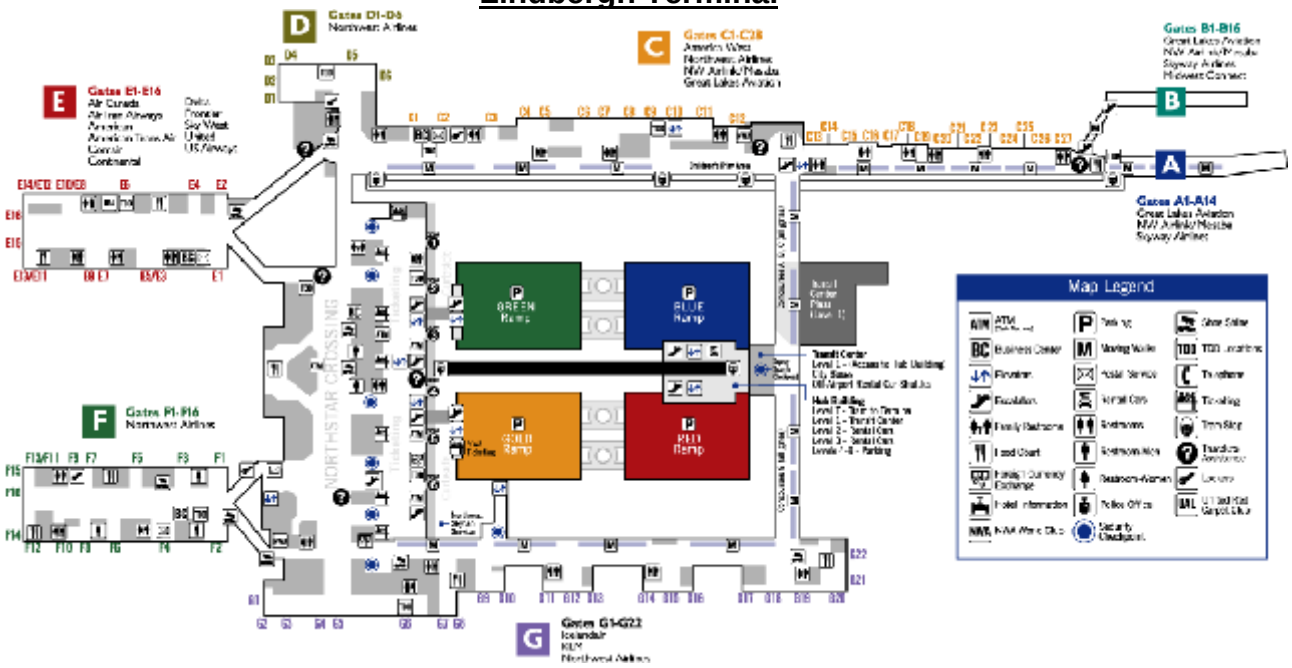
(8) New terminal construction included an 11,500-space parking deck in 2002.

Source: HNTB analysis.

Minneapolis-St. Paul International Airport Layout — Figure 1

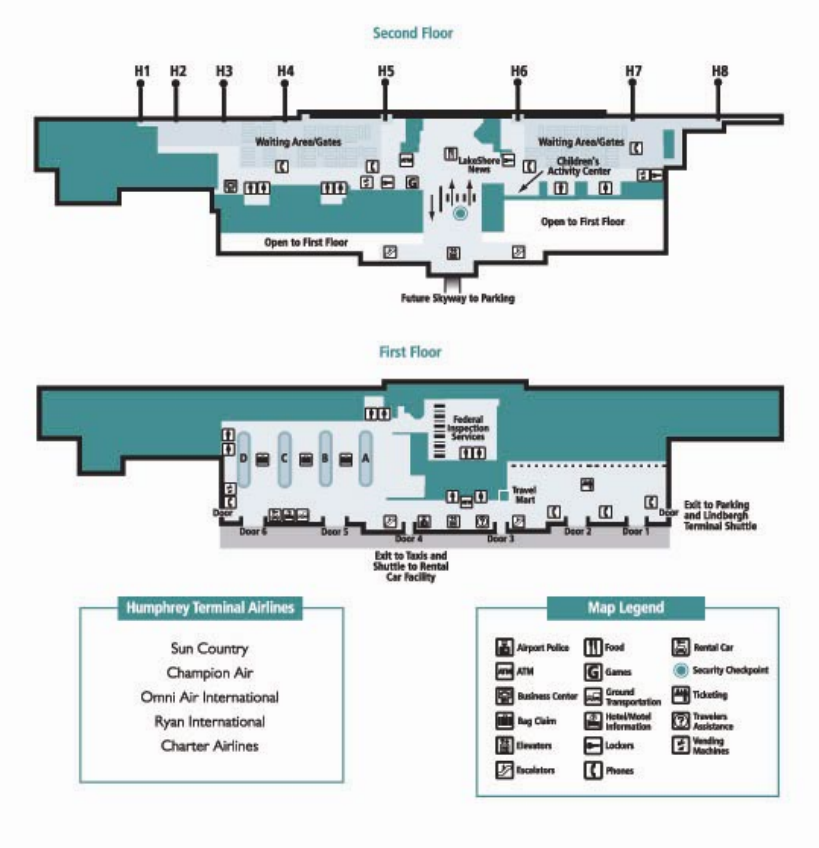


Lindbergh Terminal



The Humphrey Terminal opened in 2001 as part of the MSP 2010 Airport Expansion Plan, and provides 10 gates used by charter airlines and Sun County airlines. In the future, space exists for an additional 8 to 10 gates to be constructed at the Humphrey Terminal. The Humphrey parking garage gained another 365 stalls in May of 2003 which brings the total to 4,674 spaces provided to the public. This completes the first phase of a 9,200-space parking facility for both employees and the public. Construction of the second garage (4,526 spaces) would occur in the future as demand warrants.

Humphrey Terminal



General Aviation (GA) services are provided south of Runway 12R-30L. In 2001, Signature Aviation opened two new maintenance hangars to replace facilities that were removed to allow for construction of the Runway 12L deicing pad. The second hangar is operated by Gulfstream Aviation. Signature also opened a new FBO Terminal in 2002. Cargo operations and most airline maintenance are concentrated south of Runway 4-22. U.S. Air Force Reserve and Minnesota Air National Guard facilities are located north of the airfield.

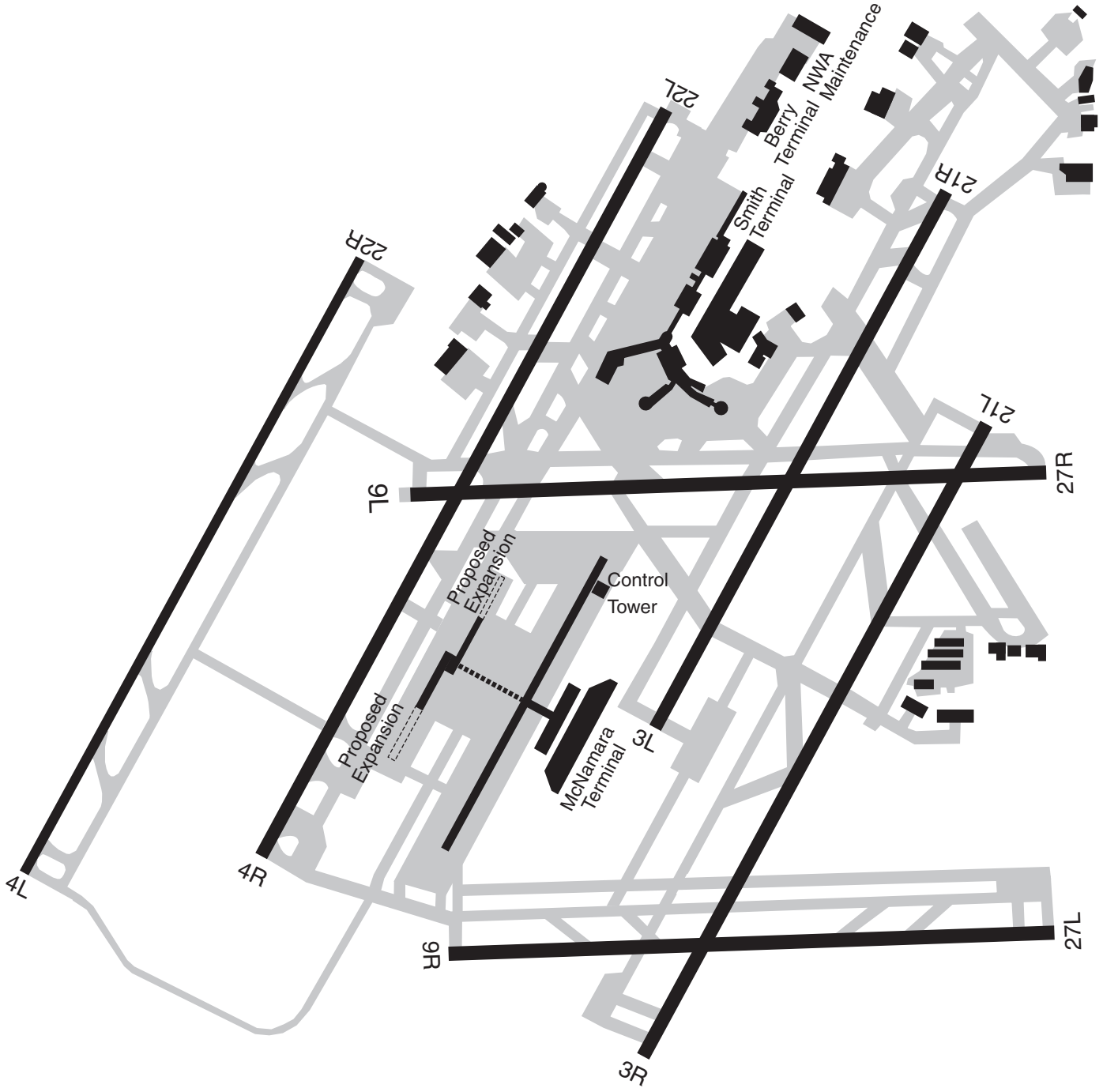
Detroit Metropolitan Wayne County Airport

Figure 2 shows the general airport layout for DTW. The airport has six runways: four main parallel runways oriented on a northeast-southwest heading and two crosswind runways oriented on an east-west heading. Runway 4R-22L is 12,001 feet long, Runway 4L-22R is 10,000 feet long, Runway 3L-21R is 8,500 feet long, Runway 3R-21L is 10,000 feet long, Runway 9L-27R is 8,700 feet long, and Runway 9R-27L is 8,500 feet long. Runway 4L-22R is a new runway that was commissioned on December 11, 2001.

There are three passenger terminals located north of Runway 9L-27R, between Runways 4R-22L and 3L-21R. Two double-loaded concourses provides 97 gates at the McNamara Terminal. The M. Berry International Terminal provides an additional four

N

Detroit Metropolitan Wayne County Airport Layout — Figure 2



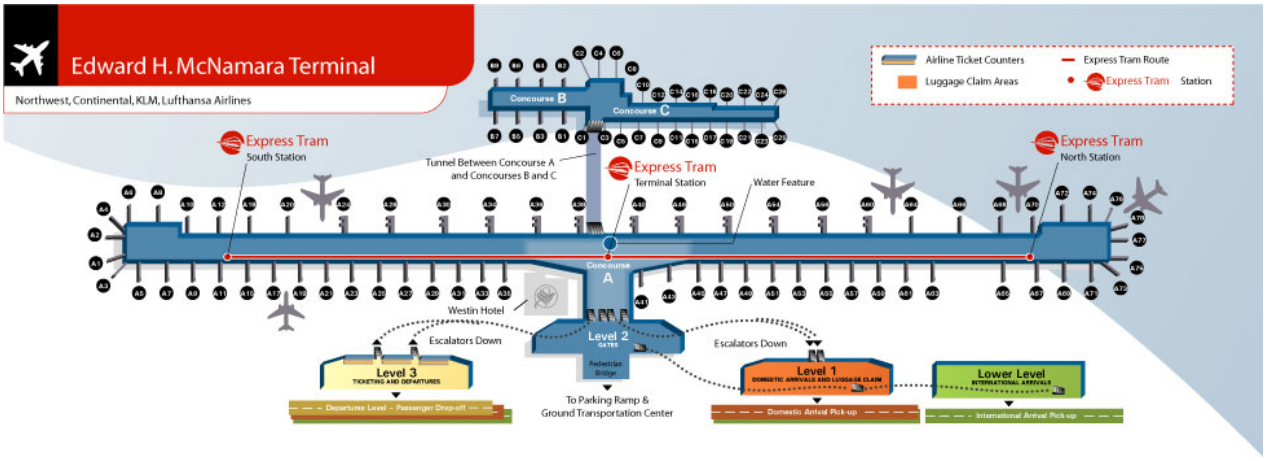
0 1 2 3 4 5

SCALE IN THOUSANDS OF FEET

gates for charters and the L. C. Smith Terminal provides 38 gates for other scheduled airlines. General Aviation services are provided on the east side of the airport.

In February 2002, Northwest Airlines and Wayne County completed the $1.2 billion McNamara Terminal Project which features overhead trams to transport passengers between gate connections, 97 airline gates, and an 11,500-space parking deck. In 2002 John Dingell Drive was opened providing a second main entrance to the airport , with a six lane, four mile long road connecting I-275 traffic to the new McNamara terminal.

McNamara Terminal



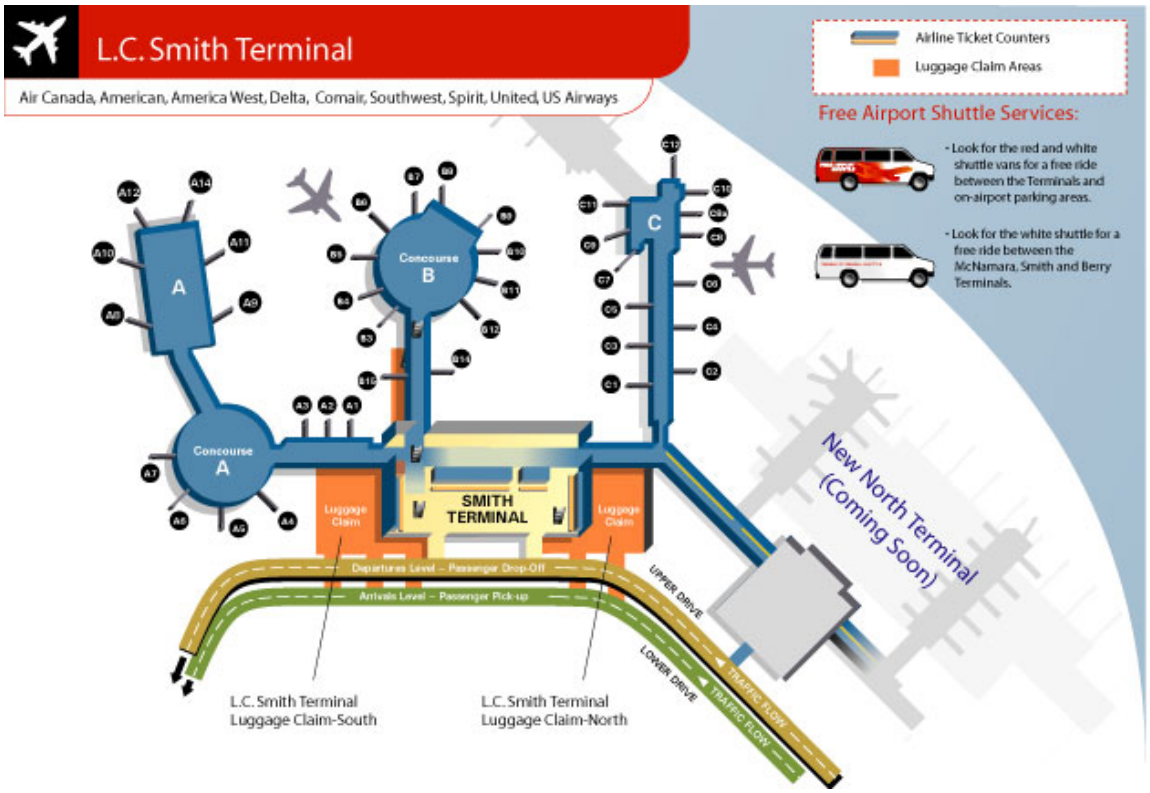
Moving walkways link gates for added passenger convenience. An expandable remote boarding area, for commuter and other domestic aircraft connect to the main terminal by means of an underground tunnel equipped with a moving walkway. The new terminal opened on February 24, 2002, and currently houses Northwest, KLM, Continental, and Lufthansa flight operations.

This Midfield Terminal Project, approximately 2 million square feet in size, is comprised of a passenger terminal and three concourses. Concourse A has 64 jet aircraft gates and a passenger tunnel connecting it to Concourse B, while Concourse B has eight jet gates and Concourse C has 25 commuter aircraft gates. The terminal project also included an energy plant, a three-level roadway system, 180 acres of apron, taxiways, and support facilities. A Westin Hotel attached to the Midfield Terminal opened in December 2002 and provides over 400 guest rooms.

Westin Hotel

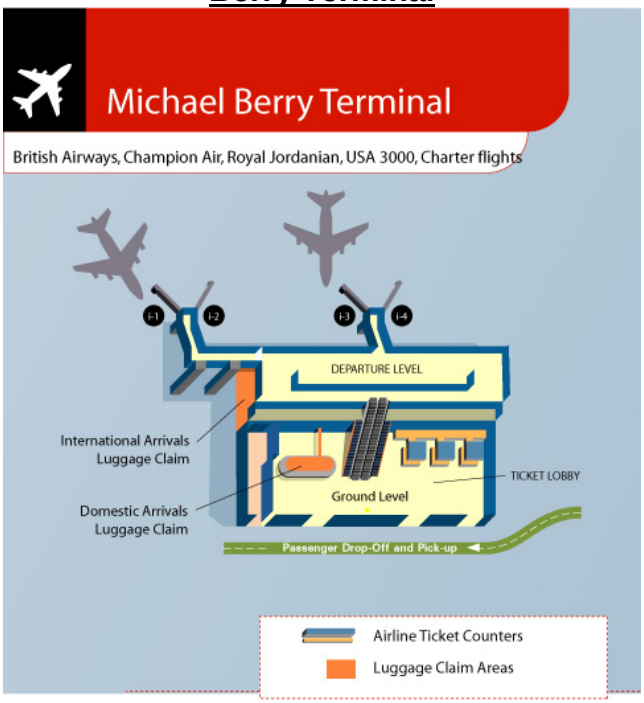
Towards the end of 2002, a $175 million plan to expand the B and C concourses at the Midfield Terminal was placed on hold, due to unfavorable economic conditions and the slowdown in air travel. The project to expand the concourse by 23 gates, 16 jet and 7 commuter, was reinstated in 2003 and is scheduled to be completed after 2006.
In 2002, NWA demolished Concourses D, E, F, and G along with half of Concourse C at the Smith Terminal.

Smith Terminal



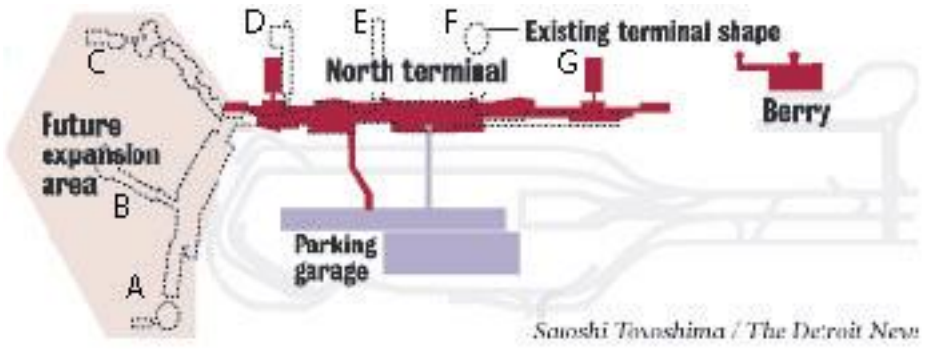
In 2003, Northwest Airlines completed construction on a $31 million hangar, the last piece of DTW's six-year, $1.6 billion expansion program. The 128,100 square-foot hangar is located north of the Berry Terminal, and is designed to simultaneously accommodate one 757-200 and two 747-400s.

Berry Terminal



Wayne County plans to demolish concourses A, B and C at the Smith Terminal and replace them with a new North Terminal consisting of 29 new gates for other airlines. Airport officials still plan to renovate the Davey Terminal, which is expected to open in 2007 at a cost of $428 million.

Future North Terminal



AIRPORT ACTIVITY AND SERVICE TRENDS

This section presents an overview of passenger and aircraft activity at MSP and DTW, and compares air service at the two airports. It should be noted that the Northwest Airlines (NWA) Pilots Labor Strike, during August and September 1998, affected activity levels during 1998. If the strike had not occurred, the activity levels for 1998 would likely have exceeded 500,000 aircraft operations at MSP. NWA's schedule returned to pre-strike levels around October 1998.

Sun Country Airlines, which is based at MSP, initiated scheduled passenger service on June 1, 1999. By the end of 2000, Sun Country had flown 1,437,496 total passengers, or 4.3 percent of MSP's passenger traffic, to or from the Airport. Due to severe financial pressures, the airline ceased operations December 7, 2001. Sun Country resumed charter operations to several destinations in mid-2002 with new investors and reinstated scheduled service on February 27th, 2002 to Orlando and Pensacola. Sun Country added more destinations in March of 2002, and as of December,2003 they serve 21 destinations.

The events of September 11, 2001 had significant financial and operational impacts on MSP. Decreased numbers of air travelers reduced both year-end revenues and passenger facility charges by $10 to $12 million in 2001. In 2002, these revenues increased only marginally. Due to reduced demand and the loss of parking spaces near the terminal, as mandated by the FAA's 300-foot rule, revenue from parking declined by 65 percent in 2001 and early 2002. However, all general and short term parking areas (1,626 spaces) at the Lindbergh Terminal that were off limits under the 300-foot rule were re-opened in April 2002. In May, the 480-space valet garage at the Lindbergh Terminal was also re-opened.

Funding for construction in 2002 was reduced by $295 million, from $371 million to $76 million. Again in 2003 the construction budget was reduced, down to $86.9 million. Projects previously scheduled for 2003 at MSP that were deferred include: the new fire and rescue station; expansion of the Lindbergh Terminal for concessions; a second parking deck structure at the Humphrey Terminal; miscellaneous projects related to Runway 17-35 land acquisition, noise mitigation and landside rehabilitations.

Impacts on DTW included the addition of four new passenger screening lanes in the new mid-field McNamara Terminal, raising the total number to sixteen. Parking at the new mid-field terminal was affected by September 11, 2001. Level 10 of the garage was closed and full inspection at each entry point was instituted. The $175 million plan to demolish and expand Concourse B and C at the new Midfield Terminal was deferred. In 2004, the concourse project was reinstated and will be constructed in 2005/2006.

Airport security at MSP and DTW has been enhanced in response to Transportation Security Administration (TSA) regulations following September 11, 2001. Starting in 2002, TSA security personnel and local police monitored passenger-screening checkpoints, and screeners used new explosive detection machines (CTX-5000) and

trace detection units to scan all pieces of checked luggage. Only ticketed passengers with boarding passes and photo identification are allowed beyond security checkpoints at MSP and DTW with some exceptions, such as public attendance at commission meetings. MSP has applied to TSA for a Letter of Intent to construct an in-line bag screening system.

The FAA expects domestic flights to return to pre-September 11, 2001 passenger levels by 2006.

Domestic Originations/Destinations

Figure 3 compares historical domestic passenger originations/destinations (O&D) at MSP and DTW. O&D passengers are those who begin or end their trip at the airport (versus passengers who are connecting at the airport en route to another destination). O&D passenger demand is primarily driven by local socioeconomic factors. Following is a summary of recent O&D activity at MSP and DTW. Domestic O&D data for 2003 are estimated based on passenger activity in the first three quarters of 2003.

- Between 1990 and 2003, domestic O&D passengers at MSP rose from 9.5 million to 14.6 million, an increase of 53.6 percent. This increase represents an annual compounded growth rate of 3.4 percent.

- At DTW, between 1990 and 2003, domestic O&D passengers rose from 12.1 million to 15.1 million, an increase of 24.7 percent. This increase represents an annual compounded growth rate of 1.7 percent.

- It is estimated that the number of domestic O&D passengers increased 1.4 percent at MSP, from 14.4 million in 2002 to 14.6 million in 2003, and 1.3 percent at DTW, from 14.9 million in 2002 to 15.1 million in 2003.

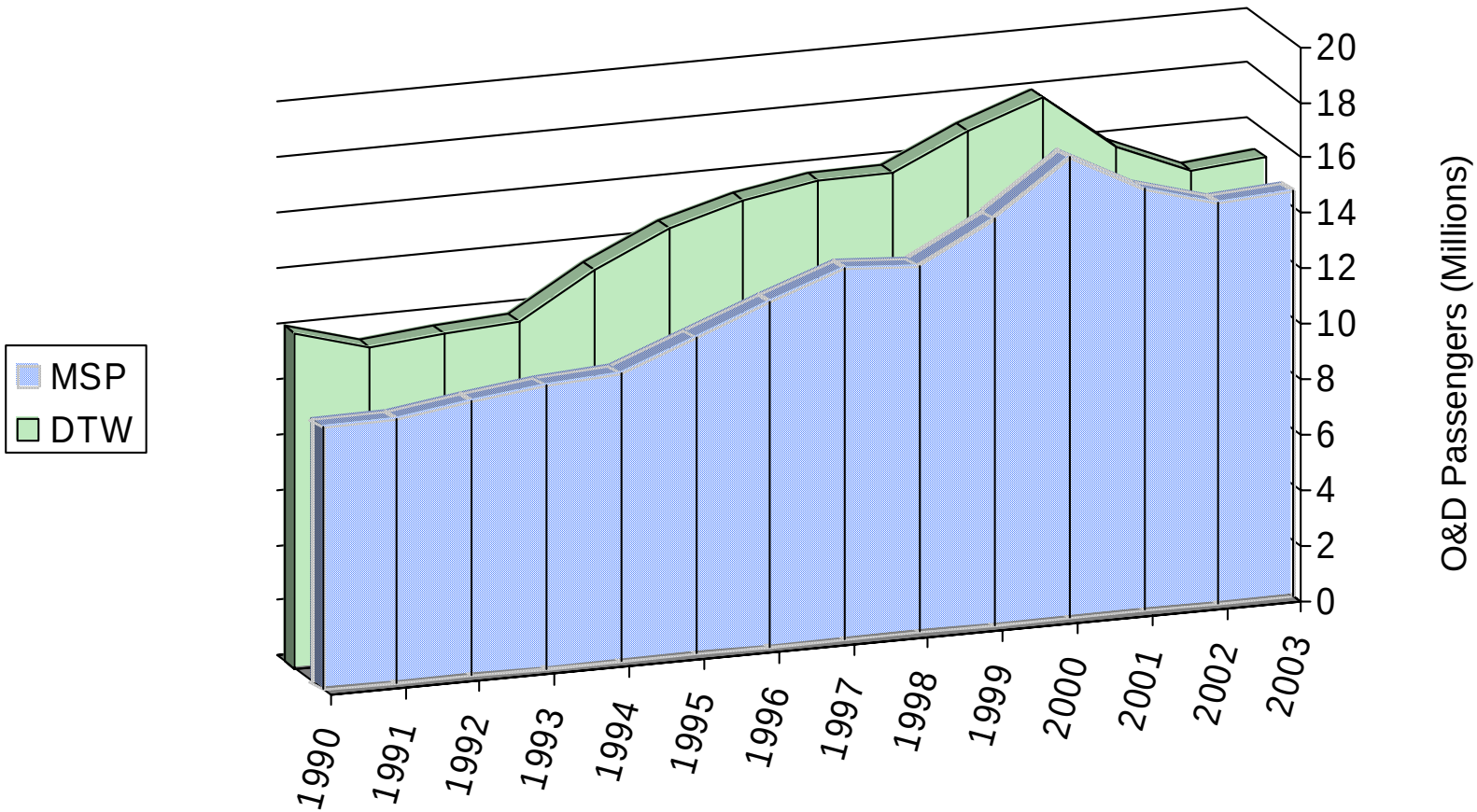
Domestic Connections

- Between 1990 and 2003, the total estimated number of domestic connecting passengers at MSP, as a percentage of total passengers, increased from 48 percent to 52.8 percent. Data for 2003 include both air carrier and regional carrier passengers.

- During the same period, the percentage of domestic connecting passengers at DTW increased from 43 percent to 50.3 percent. Like MSP, the 2003 data for DTW includes both air carrier and regional carrier passengers.

- Connecting passengers at MSP and DTW in 2003 are both estimated from the first three quarters of 2003.

Figure 3
Annual Passenger Originations/Destinations* Totals 1990-2003



*2003 O&D passengers estimated from first three quarters of 2003.
Sources: U.S. DOT; HNTB analysis.

Total Annual Passengers

Total annual passengers are shown in **Figure 4**. Total passengers include O&D and connecting passengers.

- Between 1990 and 2003, total annual passengers grew by more than 13.1 million passengers at MSP and approximately 10.6 million passengers at DTW, with MSP reaching 32.3 million total passengers and DTW reaching 32.4 million total passengers in 2003. This represents an annual compounded growth rate of 4.1 percent for MSP and 3.1 percent for DTW.

- A decline in total annual passenger numbers occurred in 2001 at MSP and DTW, due to the events of September 11th. MSP numbers dropped 8.3 percent from levels reported for the year 2000, while Detroit's overall passenger count decreased 9.2 percent compared to 2000 levels.

- In 2003, both MSP and DTW experienced increases in total annual passengers. MSP numbers increased from 31.5 million to 32.3 million passengers, an increase of 2.5 percent. Total passengers at DTW increased from 32.2 million to 32.4 million, an increase of 0.6 percent.

Aircraft Operations

Annual aircraft operations are presented in **Figure 5**.

- In the early 1990s, MSP and DTW had similar levels of operations (approximately 390,000 annually); by the mid-1990s, operations at DTW had increased more rapidly than at MSP.

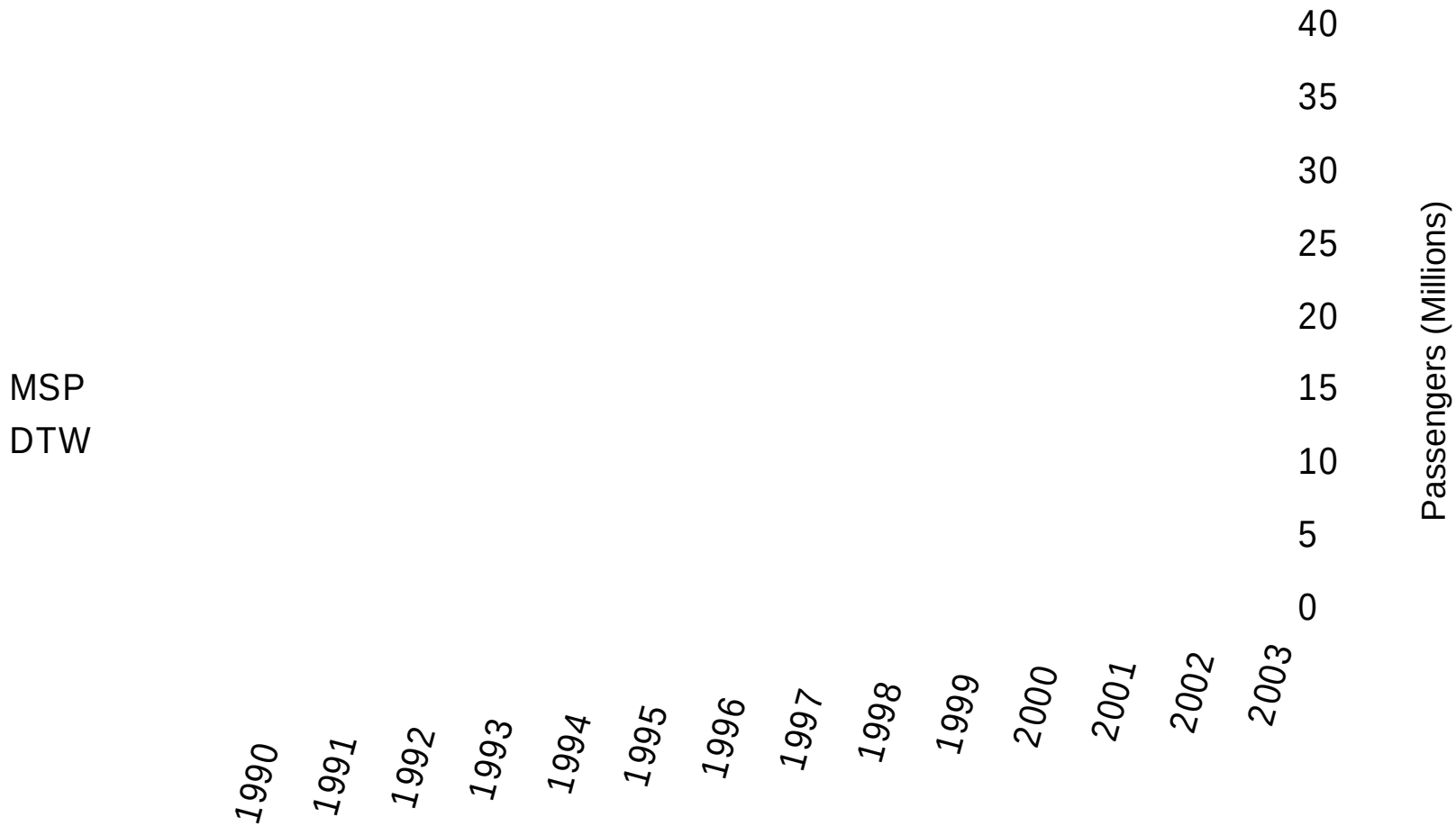
- Total annual operations in 2000 at MSP and DTW were up 36 percent and 43 percent since 1990, respectively.

- Total annual operations at MSP and DTW declined during 2001 after the events of September 11th. At the end of 2001, total operations at MSP were 501,522 (3.9 percent decline) and at DTW 522,132 (5.9 percent decline).

- In 2003 operations increased over 2002 by .9 percent to 512,350. At DTW, in 2003 total annual operations decreased below 2002 operations by 1.3 percent to 488,543 operations.

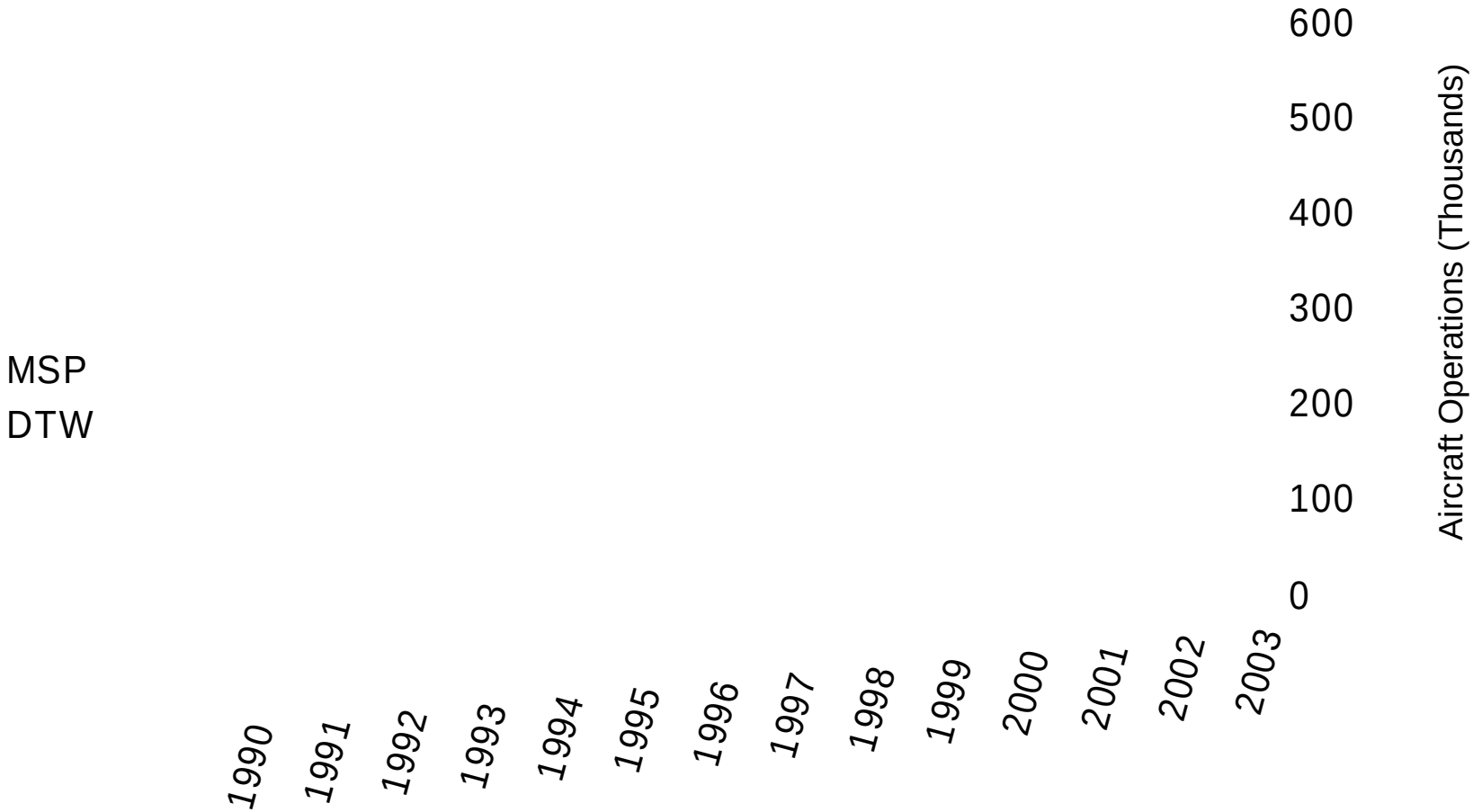
- Due to the effects of September 11th, Northwest scheduled air carrier operations decreased at both MSP and DTW in 2001. At MSP, operations experienced a 3.6 percent decrease; while at DTW they decreased by 4.5 percent. During 2002, the lingering effects of September 11th coupled with the economic downturn also affected Northwest scheduled air carrier operations at both MSP and DTW. At MSP, Northwest operations increased, by 1.5 percent, and at DTW, Northwest operations

Figure 4
Total Annual Revenue Passengers
1990-2003



Sources: Metropolitan Airports Commission, Wayne County, Airports Council International; HNTB analysis.

Figure 5
Annual Aircraft Operations
1990-2003



Sources: Metropolitan Airports Commission, Wayne County, Airports Council International; HNTB analysis.

decreased by 2.7 percent. In 2003, Northwest operations at MSP decreased 1.3 percent and at DTW Northwest operations decreased by 4.1 percent.

Nonstop Markets

Figure 6 shows the number of nonstop domestic and international (including Canada) markets served by MSP and DTW in 2003. The domestic markets include those receiving an annual average of at least five weekly nonstop flights. The international markets include those receiving an annual average of at least one weekly nonstop flight. Some of these markets are served only seasonally.

- MSP offered 119 nonstop markets—105 domestic and 14 international (nine of these international markets were in Canada). This is the same number of markets MSP offered in 2002.

- DTW offered 116 nonstop markets—97 domestic and 19 international (eight of these international markets were in Canada). This is an increase of 2.7 percent from the number of markets DTW offered in 2002.

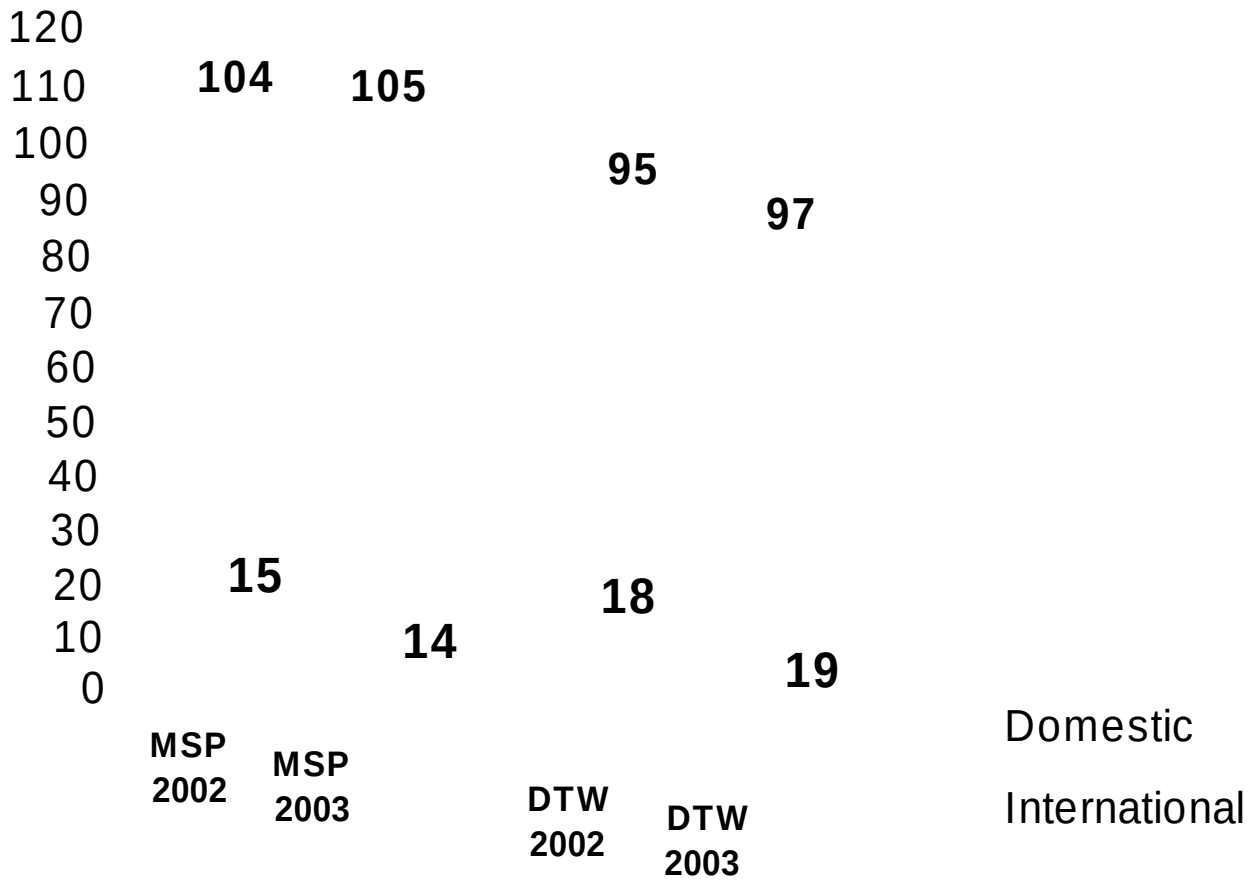
Figure 7 shows how these flights are served, either by air carrier service (jet aircraft), regional service (regional jet or turboprop aircraft), or a combination of air carrier and regional carrier service. For the purposes of this report, a "regional jet aircraft" is defined as a jet aircraft with 85 or fewer seats (i.e., Avro Regional Jet, Canadair Regional Jet, and Embraer Regional Jet).

- 48.7 percent of MSP markets are served exclusively by air carrier jets. Regional carrier service accounts for 29.4 percent of MSP markets, with 14.3 percent being served by regional jets and 15.1 percent being served by turboprop aircraft. 21.9 percent of MSP markets are served by a combination of air carrier and regional service.

- 46.6 percent of DTW markets are served exclusively by air carrier jets. Regional carrier service accounts for 33.6 percent of DTW markets, with 24.1 percent being served by regional jets and 9.5 percent being served by turboprop aircraft. 19.8 percent of DTW markets are served by a combination of air carrier and regional service.

Figure 8 and **Table 2** compare MSP to other major metropolitan areas in terms of the number of nonstop markets served by each airport per population of the Metropolitan Statistical Area. As shown, few metropolitan areas of any size have more cities served by nonstop flights than MSP.

Figure 6
Number of Nonstop Markets
2002 and 2003



Sources: Official Airline Guide via BACK Aviation Solutions, 2003; HNTB analysis.

Figure 7
2003 Nonstop Markets by Type of Service

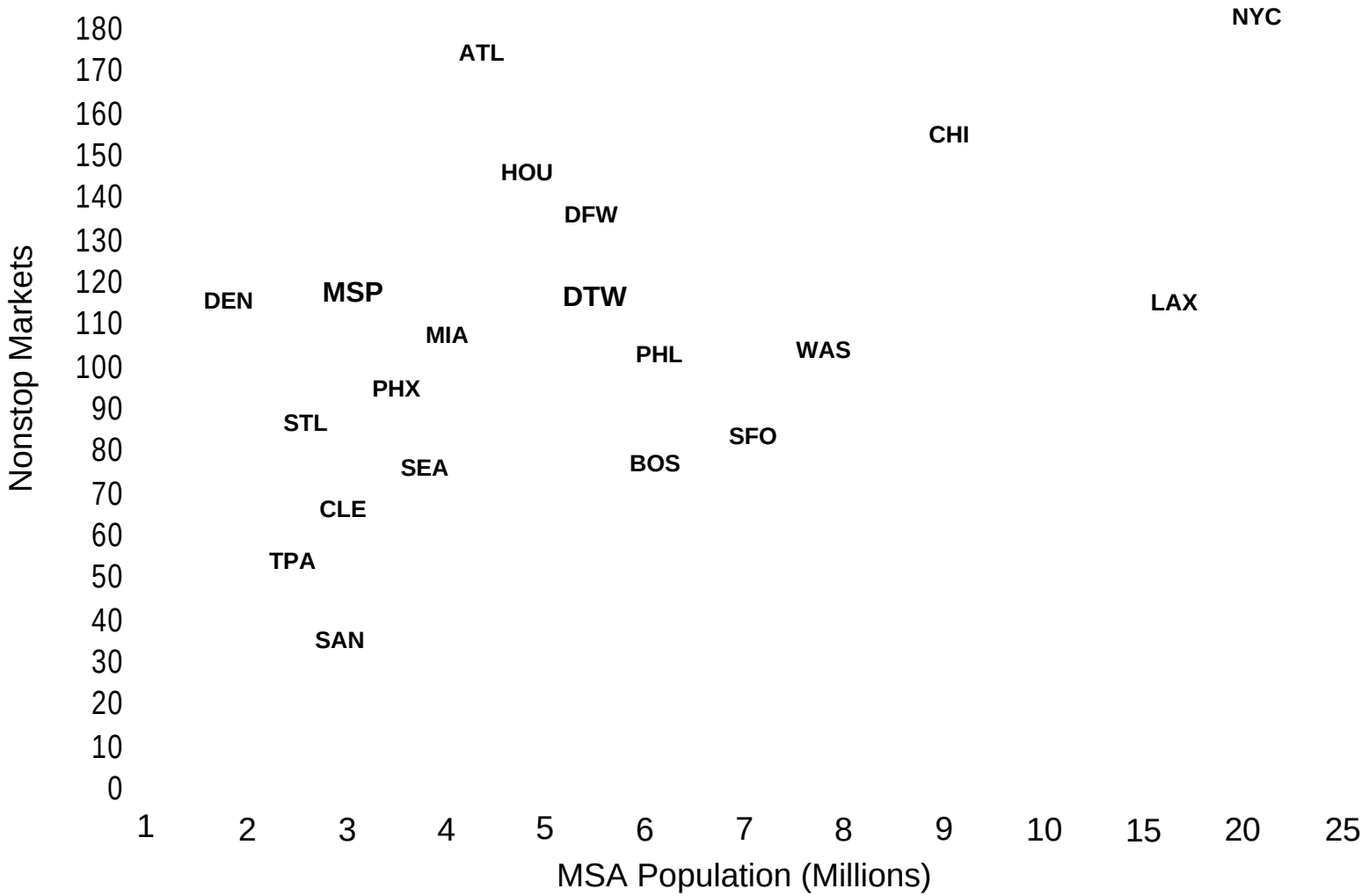
Air Carrier Service = Jet Aircraft
Regional Carrier Service -
Regional Jet = Regional Jet Aircraft
Turboprop = Turboprop Aircraft
Combo = Combination of Air Carrier & Regional Carrier Service

M S P
119 Nonstop Markets

D T W
116 Nonstop Markets

Sources: Official Airline Guide via BACK Aviation Solutions, 2003; HNTB analysis.
Note: Regional jets are defined as a jet aircraft having 85 or fewer seats.

Figure 8
Population vs. Nonstop Service
2003



Sources: Bureau of Economic Analysis 2001, Data Published for May 2003; Official Airline Guide via BACK Aviation Solutions, 2003; HNTB analysis.

Table 2

2003 REPORT TO THE LEGISLATURE

Nonstop Markets by Metropolitan Area

Metropolitan Area [1]	Population [2] (Millions)	Nonstop Markets [3] [4]	Markets/Pop. (Million) Ratio
New York	21.3	181	8.5
Los Angeles	16.7	116	6.9
Chicago	9.3	156	16.8
Washington-Baltimore	7.8	105	13.5
San Francisco-Oakland	7.1	83	11.6
Philadelphia	6.2	103	16.6
Boston	6.1	77	12.6
Detroit	**5.5**	**116**	**21.1**
Dallas-Fort Worth	5.4	136	25.1
Houston	4.8	146	30.4
Atlanta	4.3	174	40.7
Miami-Fort Lauderdale	4.0	108	27.2
Seattle-Tacoma	3.6	76	21.0
Phoenix	3.4	95	28.0
Minneapolis-St. Paul	**3.0**	**119**	**39.3**
Cleveland	2.9	68	23.1
San Diego	2.9	36	12.5
Denver	2.7	116	43.5
St. Louis	2.6	87	33.2
Tampa-St. Petersburg	2.4	54	22.1

Notes:

[1] Twenty largest metropolitan areas in the US with the greatest number of non-stop markets, excluding San Juan, PR.

[2] Bureau of Economic Analysis, MSA CA1-3-Population for 2001, Data published for May 2003.

[3] Multiple Airports serving the same metro area are counted as on nonstop market (i.e. Chicago Midway and Chicago O'Hare are considered one nonstop market).

[4] Nonstop markets include all domestic nonstop markets to which the originating airport had an average of at least five weekly nonstop flights and all international markets to which the originating airport had at least one weekly nonstop flight between Jan 2003 and Dec 2003.

Sources: Bureau Economic Analysis, 2003 Official Airline Guide via BACK Aviation solutions

COMPARISON OF 1993 MAC FORECAST WITH ACTUAL ACTIVITY

As required by the Metropolitan Planning Act of 1989, the Dual Track forecasts were revised in 1993, using 1992 as a base year. To ensure that the revised forecasts were optimal from both predictive and planning standpoints, forecast workshops were convened in 1992 and 1993 by the MAC and the MC. The Expert Panel Session on Forecast Methodologies, held on October 29, 1992, focused on the most appropriate forecasting techniques given recent aviation trends and the character of aviation demand at MSP. The Expert Panel Session on Aviation Assumptions was held on November 18, 1992, and addressed ongoing trends in the aviation industry with regard to fares, aircraft equipment, and airline service practices. The Socioeconomics Expert Panel Session was convened on November 19, 1992, to assess the most likely trends in area population, employment, and income that ultimately drive demand for aviation services. The final Expert Panel Session was held on May 27, 1993, to review the work accomplished to date and to develop a consensus on the final assumptions, methodologies, and scenarios to be used in the updated forecasts.

The forecasts were developed with the understanding that the assumptions used were likely to vary over the forecast period, and that the variation could be material. The likely range of possibilities resulting from these variations was tested by constructing alternative scenarios in conjunction with the expert panels. These scenarios were developed separately and in combination. In this manner, a range of possible variations from the base case forecasts was developed.

The scenarios took into account factors affecting economic growth, including fuel prices, low-cost carriers, airfares, airline hubbing ratio, regional carrier penetration into air carrier markets, and changes in the structure of air travel demand. The highest scenario was defined by the following assumptions:

- Higher than projected economic growth.
- A continuation of the high level of connecting activity at MSP by Northwest.
- High international travel demand resulting from an increasingly globalized economy.

The most conservative scenario was defined by the following assumptions:

- Lower than projected economic growth.
- A reduction in connecting activity by Northwest airlines to the minimum level allowed by the hub covenant contained in the Northwest loan agreement.
- A greater transfer of routes from air carriers to regional carriers.

A comparison of the enplanement, passenger origination, and aircraft operations forecasts with actual 1993-2003 activity follows. It should be noted that there are often substantial year-to-year fluctuations in activity levels around a long-term average. It is important to distinguish between these short-term fluctuations and long-term trends when evaluating a forecast.

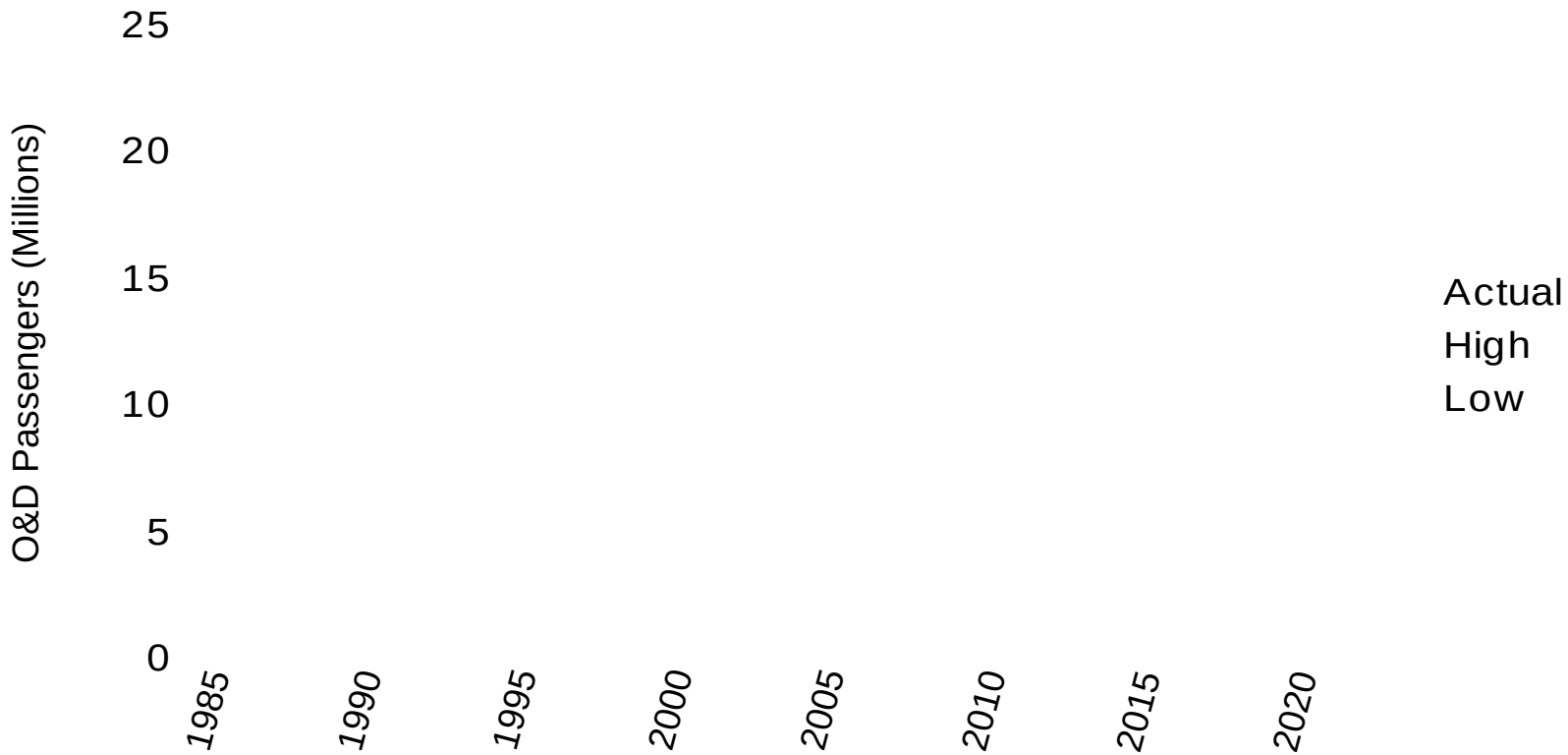
Figures 9-11 show O&D, total passengers, and annual aircraft operations, respectively.

- Actual passenger originations were slightly below the high forecast level in 1993 and 1994, but increased to above the high forecast level through 2000 (Figure 9). The growth in 1996 was due, in large part, to the passenger ticket tax lapse that stimulated passenger demand by lowering effective ticket prices. Northwest continued to reduce real fares during 1997. This, combined with a strong economy, caused originations to grow. Passenger originations and destinations in 1998 were reduced because of the loss of service resulting from the Northwest strike in August and September. O&D totals were also down in 1999 due to the strike, but rebounded midway through the year to pre-strike levels. At the end of 2001, O&D numbers decreased 8.4 percent from a high of 16.6 million after passengers abstained from air travel in response to the events of September 11th. In 2002, due to the lingering effects of September 11, 2001 and the economic downturn, O&D passenger numbers continued their decline. By the end of the year, they were down 5.3 percent from 2001, to 14.4 million. The FAA expects domestic flights to return to pre-September 11, 2001 levels by 2006. 2003 O&D passengers increased 2.1 percent over the year 2002 level to 14.7 million. The 2003 O&D level is 13.4 percent below the high forecast.

- As shown in Figure 10, MSP total passenger activity closely paralleled the base case forecast in 1993, but enplanement growth accelerated between 1994 and 1995 and approached the high forecast in 1996. In 1999 and 2000, total passengers exceeded the high forecast. Much of the passenger growth at MSP during the last six years was the result of one-time factors. These include Northwest's airline hub consolidation that involved reducing operations at other airports to concentrate connections at the two major hubs (MSP and DTW in 1992 and 1993), the liberalization of Canadian markets which opened up MSP as a hub for cross-border traffic beginning in 1995, and the lapse of the passenger ticket tax during most of 1996, which reduced effective fares to travelers and thereby increased demand. Also, airlines have developed much more sophisticated reservation systems in recent years, allowing them to generate more revenue by filling otherwise empty seats with passengers flying on discount fares. The passenger growth rate in 1998 decreased from that of previous years because of the loss of service resulting from the Northwest strike in August and September. Discount fares helped Northwest regain lost passengers volumes in 1999. A decline in the number of total revenue passengers occurred after September 11, 2001, with MSP experiencing an 8.3 percent decrease from 2000 levels. In 2002, MSP experienced another decline in total revenue passengers, due to the aftereffects of September 11th coupled with the sluggish economy. Passenger levels decreased 2.2 percent from 2001. In 2003 passenger levels began increasing, 2.5 percent over 2002. The 2003 passenger level is 10 percent below the high forecast.

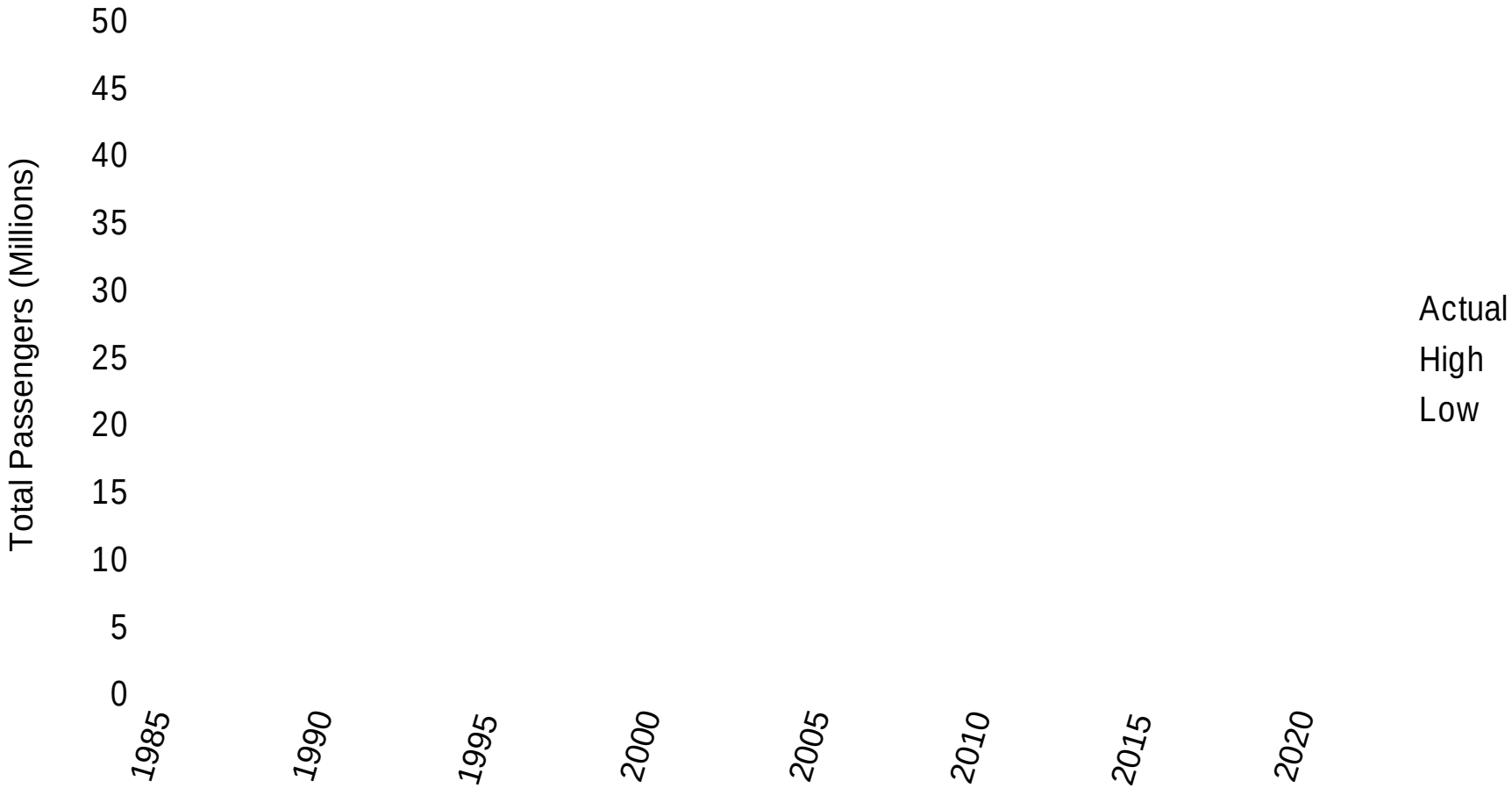
- Figure 11 compares total aircraft operations (as counted by the MSP Air Traffic Control Tower) with the base case, high, and low forecasts. There was an initial burst of aircraft operations in 1993 and 1994 as a result of significant build-up of regional carrier flights by Northwest Airlink. Since that time, the factors that have stimulated passenger traffic, such as the strong economy, Northwest's hub

Figure 9
Minneapolis-St. Paul International Airport
Forecast vs. Actual 2003 Passenger Originations/Destinations



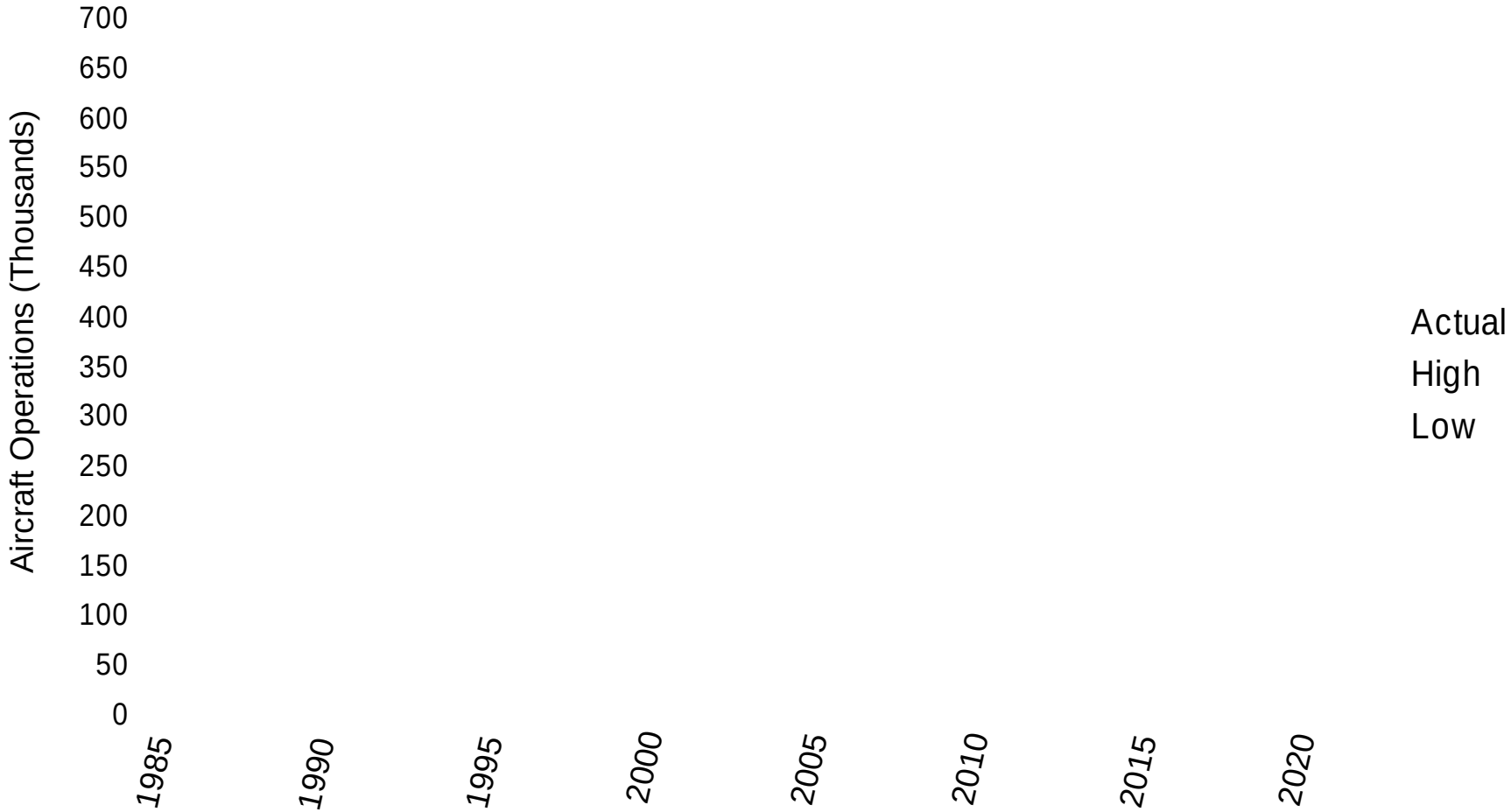
Sources: MSP Base and Combination 2 Forecasts; U.S. DOT; HNTB analysis.
Note: O&D Passenger estimates are based on the first three quarters of 2003.

Figure 10
Minneapolis-St. Paul International Airport
Forecast vs. Actual 2003 Total Revenue Passengers



Sources: MSP Base and Combination 2 Forecasts; Metropolitan Airports Commission; Airports Council International; HNTB analysis.

Figure 11
Minneapolis-St. Paul International Airport
Forecast vs. Actual 2003 Total Aircraft Operations



Sources: MSP Base and Combination 2 Forecasts; Metropolitan Airports Commission, FAA; HNTB analysis.

consolidation, the liberalization of Canadian markets, and the lapse of the passenger ticket tax, have served to maintain a high number of aircraft operations. Numbers of total aircraft operations decreased in 1998 due to the Northwest strike in August and September. As stated previously, the Northwest schedule rebounded to pre-strike levels in October 1998. After September 11, 2001, air carriers reduced aircraft operations at MSP nearly 20 percent in response to low passenger demand. As a result, MSP aircraft operations in 2001 decreased by 3.9 percent from 2000 levels. The economic downturn and lingering effects of September 11th have also affected the growth rate of total aircraft operations at MSP in 2002. Operations in 2002 actually increased by 1.2 percent over the total number of aircraft operations in 2001. In 2003 operations continued to increase over 2002 by a smaller margin of 0.9 percent. The 2003 operations level is 9.3 percent below the high forecast.

AIRPORT CAPACITY AND DELAY

This section describes the airfield capacity of MSP and DTW. Aircraft delay analysis is also summarized.

Airfield Capacity

Airfield capacity is typically described in terms of annual capacity and hourly capacity under good weather and poor weather conditions. **Table 3** compares existing and future capacity for MSP and DTW.

Table 3

2003 REPORT TO THE LEGISLATURE

Comparison of Capacity and Delay

	MSP		DTW	
Airfield Capacity	**Existing**	**2010**	**Existing**	**2010**
Airfield Capacity				
Hourly				
Good Weather	115-120	154-159	179-182	188-191
Poor Weather	112	147	159-161	168-170
Annual	480,000[(1)]	640,000[(1)]	700,000[(2)]	700,000[(2)]

Notes:

[(1)] 1993 MSP Capacity Enhancement Plan (FAA).

[(2)] Annual capacity level derived from the addition of the new fourth runway in Dec. 2001, Runway 4L-22R. Estimated based on FAA AC150/5060-5 and professional judgment.

Source: FAA Benchmark Report, 2001.

MSP

- As shown in Table 3, existing hourly capacity at MSP is about 115-120 operations in good weather and 112 operations in poor weather. With the addition of the north-south runway, hourly capacity is expected to increase by 29 percent to 148-153 operations in good weather and by 26 percent to 141 in poor weather. Specific conditions that define poor weather include the airport's most commonly used instrument configuration, where operations are conducted below visual approach minima (i.e. instrument approaches).

- By 2010 Minneapolis-St. Paul's hourly capacity will increase by a total of 34 percent to 154-159 operations in good weather and by a total of 31 percent to 147 operations in adverse weather. Improvements in technology and procedures paired with the addition of the new runway will support higher capacity levels.

- According to the FAA's 1993 Capacity Enhancement Plan for MSP, annual capacity at MSP is currently about 480,000 operations assuming a 4-minute average delay per aircraft and use of the Precision Runway Monitor (PRM). With the north-south runway in place, annual capacity would increase to 580,000 operations assuming the same 4-minute average delay level. At slightly higher levels of delay, capacity could reach 640,000 operations, as indicated in the Dual Track Airport Planning Process, Report to the Legislature.

- Over the next decade (2003-2013), demand at MSP is projected to grow by 30.1 percent according to the FAA Terminal Area Forecast. However, further increases in delay are not expected with the opening of Runway 17-35 in late 2005.

DTW

- The addition of Runway 4L-22R in 2001 has raised the existing hourly capacity at DTW to 179-182 operations in good weather and 159-161 operations in poor weather.

- Annual capacity at DTW is now about 700,000 operations. The new runway significantly increased annual capacity.

- Detroit's capacity over the next decade (2003-2013) will keep pace with the airport's demand, which is expected to grow by 36 percent. Arrival and departure demand levels remain similar such that the current capacity adequately meets the demand.

- Flight delays of more than 15 minutes constitute less than 2 percent of Detroit's total operations.

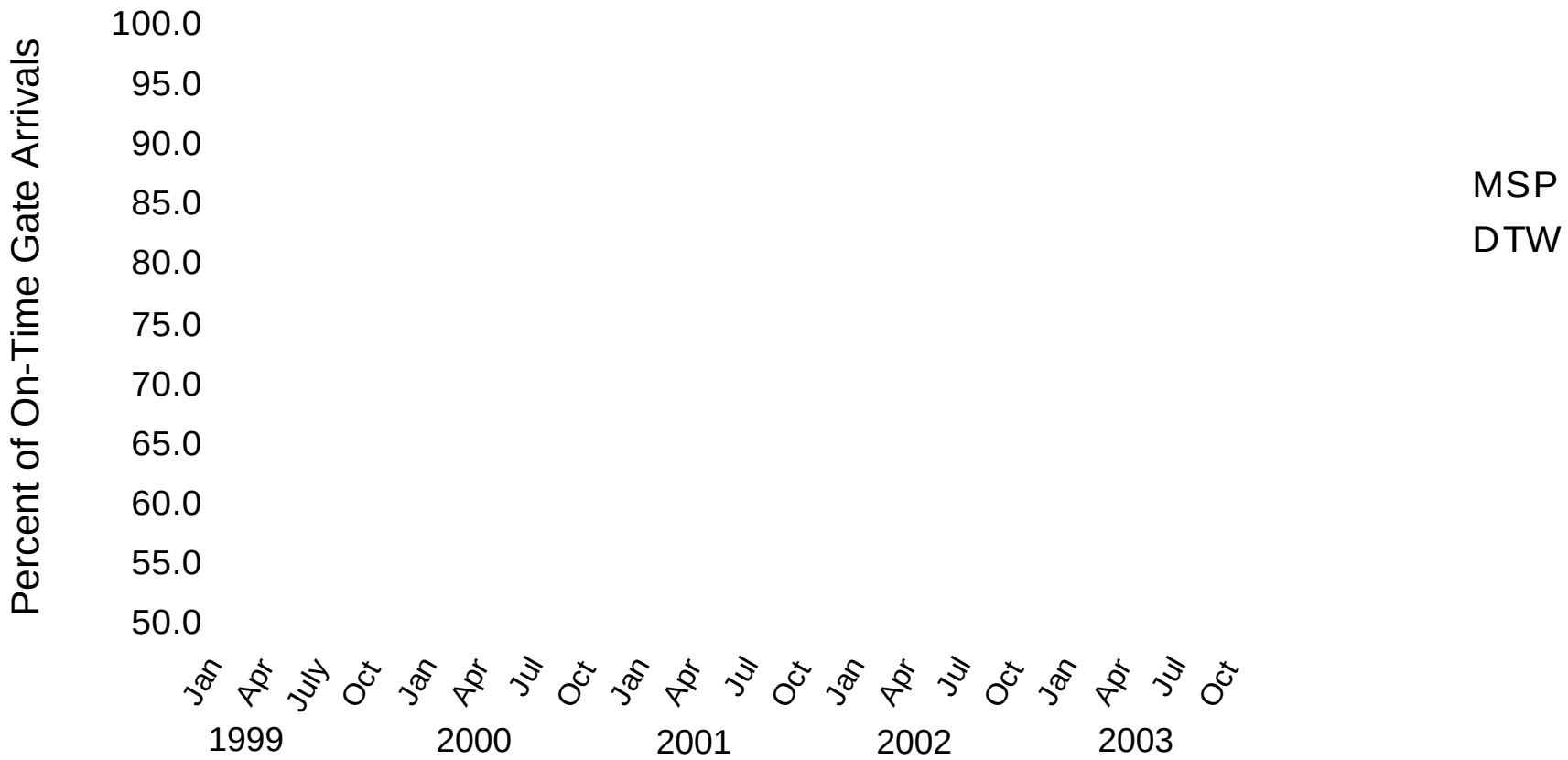
- By 2010, the addition of Runway 4L-22R paired with technological and procedural improvements are expected to increase Detroit's capacity by a total of 31 percent to between 188-191 operations in good weather and by 24 percent to between 168-170 operations in poor weather.

Airfield Delay

Delay can be measured in several ways. The FAA (OPSNET database) counts flights that were delayed by 15 minutes or more. In CY 2003, the FAA identified 7,333 flights at MSP which were delayed at least 15 minutes, an decrease of 16.0 percent from 2002 (8,733 delayed flights). At DTW, 4,842 delayed flights were identified, a decrease of 24.7 percent from 2002 (6,430 delayed flights), illustrating the benefits of new runway capacity. These delays can be caused by numerous factors, including mechanical problems, lack of crew, and weather below minimums, and are not limited to capacity constraints.

Figure 12 shows the on-time gate arrival performance for domestic air carrier flights at MSP and DTW, based on the delay data extracted from the Federal Aviation

Figure 12
On-Time Gate Arrivals
1999-2003



Sources: Aviation System Performance Metrics (ASPM) database, FAA-APO, HNTB analysis.

Administration's Aviation System Performance Metrics (ASPM) database. The data series includes only those flights which were delayed at least 15 minutes from their scheduled times. Within this data set, aircraft must be airborne in order for them to be considered "delayed," therefore, cancelled and/or diverted flights are not considered "late" in this system. Scheduled times typically include some "cushion" for delay. As with FAA-reported statistics, delays can be caused by numerous factors and are not limited to capacity constraints.

MSP's average monthly on-time gate arrival percentage fluctuated greatly between 1998 and 2003. It decreased from 83 percent in December 1998 to a period low of nearly 73 percent in January 1999. A noticeable decline in performance occurred again in November 2000 when on-time percentages dropped from 80 percent to 70 percent. In November 1999, the performance experienced a high of 91 percent. In 2003 monthly on-time gate arrival percentages fluctuated from a low of 76 percent to a high of 88 percent, averaging 84 percent for the year. During the same period from 1998 to 2003, Detroit's monthly on-time gate arrival percentage followed much the same pattern as MSP, with a few exceptions. In terms of the average yearly on-time percentage, DTW increased from 79 percent in 1998 to 86 percent in 2001. In 2003, monthly on-time gate arrival percentages for DTW fluctuated from a low of 80 percent to a high of 91 percent, for a yearly average of 87 percent.

For previous editions of this report, delay was estimated by using the Consolidated Operations and Delay Analysis System (CODAS) and the DOT Airline Service Quality Performance (ASQP) database to compare optimal versus actual taxi and flight times, and calculate the average airport delay for MSP and DTW. Airport-attributable delay can be estimated by comparing actual air and taxi times of flights with unconstrained times. The Federal Aviation Administration's Aviation System Performance Metrics (ASPM) database was used for this report. The ASPM uses ASQP database information and compares optimal versus actual taxi and flight times. The FAA has replaced CODAS with this new program providing delay information to industry professionals and government agencies. Creation of the ASPM database provides a more comprehensive analysis of airport delay and capacity. The FAA also uses the results to create performance benchmarks for airports, based on facility enhancements that occur each year.

Each of the current delay reporting systems used by the various agencies and groups was designed for a specific and different purpose, based on an independent data source or methodology and reports delay differently. As a result, the measures of delay are difficult to compare with each other. No existing delay measurement system provides a comprehensive measure of the performance of the air traffic control (ATC) system. The ASPM has been designed to remedy this deficiency.

The Aviation System Performance Metrics program was created by the FAA's Office of Aviation Policy and Plans to provide estimates of aircraft delay by airport. APO's main objective was to develop a clear and well-supported methodology to calculate aircraft delays that will be accepted by both government and industry as valid, accurate and reliable. Because the acceptance of the ASPM delay estimates is the key to its

usefulness, APO coordinated the development of ASPM with other FAA organizations and major air carriers and continues to do so.

The ASPM information shows that, for 2003, average delay was calculated to be approximately 6.85 minutes per operation at MSP, and 5.40 minutes per operation at DTW. By comparison, MSP averaged 6.85 minutes of delay and DTW averaged 6.56 minutes of delay in 2002. ASPM also provides airport rankings by average delay. As shown in **Table 4**, MSP ranked sixth in the nation in 2003, in terms of highest average delay versus DTW's 2003 ranking of eleventh.

Table 4

2003 REPORT TO THE LEGISLATURE

Top Fifteen Large Hub Airports with Highest Average Total Delay per Operation [(1)]

Rank	Airport	2003 Total Minutes Per Operation	2002 Total Minutes Per Operation	*2001 Total Minutes Per Operation*	*2002 Rank*	*2001 Rank*	Change from 2002 to 2003
1	EWR	9.17	7.55	9.37	2	2	1.62
2	PHL	8.78	7.95	8.81	1	3	0.83
3	LGA	8.66	7.18	9.39	3	1	1.48
4	ATL	7.25	6.05	5.91	9	11	1.20
5	ORD	7.16	6.09	6.48	8	7	1.07
6	**MSP**	**6.85**	**6.85**	**6.87**	**4**	**5**	**0.00**
7	JFK	6.08	5.56	6.24	10	8	0.52
8	DFW	5.75	6.35	6.80	7	6	*-0.60*
9	MDW	5.58	4.11	3.36	13	15	*1.48*
10	STL	5.41	6.85	5.99	5	10	-1.44
11	**DTW**	**5.40**	**6.56**	**6.95**	**6**	**4**	**-1.16**
12	MIA	5.34	4.86	4.85	11	13	0.48
13	BOS	5.24	4.79	6.09	12	9	0.45
14	LAX	4.17	3.99	5.12	14	12	0.19
15	LAS	3.88	3.61	3.37	15	14	0.27

Notes: [(1)] Taxi-in, Taxi-out, and Airborne delay included.

Source: Aviation System Performance Metrics (ASPM) - Office of Aviation Policy and Plans, FAA 2001.

TECHNOLOGICAL / CAPACITY ENHANCEMENTS

The FAA continuously investigates potential capacity-enhancing development/ technology in an effort to increase airport efficiency and reduce delay. When an advancement is identified, efforts are made to implement the technology at the busiest airports. This section describes these efforts as they apply to MSP and DTW.

MSP

- In 1993, the FAA published the *Minneapolis-Saint Paul International Airport Capacity Enhancement Plan*. The purpose of the plan was to identify potential cost-effective projects which would appreciably increase airport capacity. The plan was followed by the 1996 *Airport Capacity Enhancement Terminal Airspace Study*, which identified potential methods of improving airspace capacity.

- Airport Surface Detection Equipment (ASDE-3) was installed at MSP in 1996. It allows controllers to "see" aircraft movements on the ground during poor visibility, which increases safety and efficiency.

- Capacity improvements at Minneapolis-St. Paul will be aided by the use of Flight Management System/Area Navigation Routes (FMS/RNAV). The equipment will provide a more consistent flow of aircraft to the departure runway.

- A Precision Runway Monitor (PRM) was installed in 1997 and has been commissioned. The PRM permits simultaneous landings on the parallel runways in poor weather down to CAT I minimums. Due to airline and air traffic control coordination issues, the PRM was removed from service in mid-2002. It is expected to return to service in 2003 once the issues are resolved.

- MAC installed a differential Global Positioning System (GPS) unit at MSP. It has been certified as a Special CAT I installation. The GPS approach allows flight management approaches that reduce fuel consumption and controller workload. Ultimately, curved approaches and precision missed approach may be provided to reduce noise impacts and to lower landing minimums. This will result in a small increase in airport capacity.

- In an effort to increase the operational efficiency and capacity of MSP during inclement weather, MAC has implemented additional CAT II and CAT III capabilities at the airport.

- Future increases in MSP capacity levels will depend on the introduction of new aircraft avionics. An enhanced tool called Automatic Dependent Surveillance-Broadcast/Cockpit Display of Traffic Information (ADS-B/CDTI), with a Local Area Augmentation System (LAAS) identifies the location of other aircraft and displays their position in the cockpit. This technology allows pilots to maintain the desired

separation more precisely; however, it requires aircraft to be properly equipped to use this device.

- Alternative airspace improvements were studied in the *Airport Capacity Enhancement Terminal Airspace Study*. The report found that the existing airspace around MSP can be reconfigured to accommodate the proposed north-south runway. In addition, airspace efficiency can be improved either by adding a new jet arrival fix or a new parallel jet arrival stream.

- Within the next decade air traffic controllers will begin using the Passive Final Approach Spacing Tool (pFAST). It assists controllers with sequencing aircraft and creates a better flow of traffic into the terminal area.

- The new north-south runway is under construction and, when complete in late 2005, will provide significant airfield capacity.

DTW

- The new 97-gate mid-field complex for Northwest and international flights was completed in February 2002. It is being expanded by 23 additional gates with completion scheduled for 2004. The terminal is designed with ten gates designated for jumbo aircraft. These gates will have two jet bridges apiece in order to take advantage of the multiple doors of larger aircraft. Also in 2002, the Smith Terminal was reconfigured to provide 29 gates for other airlines.

- A fourth parallel runway commissioned as Runway 4L-22R opened on December 11, 2001. It was the only runway in America to open in 2001. The addition of this runway makes simultaneous arrivals and departures possible.

- Use of Automatic Dependent Surveillance-Broadcast (ADS-B) and Cockpit Display of Traffic Information (CDTI) with Local Area Augmentation Systems (LAAS) will help increase Detroit's future capacity levels. These instruments allow pilots to maintain a more precise taxiing separation as cockpit displays indicate the location of other aircraft. Integration of the new technology will require aircraft to be properly equipped to use these devices.

- Capacity improvements will be brought about with the implementation of Flight Management Systems (FMS) and Area Navigation (RNAV) routes. This new technology will provide a more consistent flow of aircraft to the runway.

Comparison of Precision Instrument Approaches

In addition to how an airport's runways are separated and configured, airfield capacity can be greatly affected by how the runways are equipped for inclement weather. A comparison of the number and type of precision instrument approaches at MSP and DTW is summarized in **Table 5**.

A feasibility study was conducted to determine which runways at MSP would be likely candidates for CAT II/III landings and low-visibility departures based on existing ground equipment, dimensional criteria, aircraft equipment, and operational procedures. The analysis determined that the most feasible runways at MSP for this capability are Runway 12R, Runway 12L, and Runway 35. The schedule for implementing these upgrades is as follows:

Runway	Approach	Year
12L	CAT IIIb	Completed (2003)
12R	CAT IIIb	Completed (2003)
35	CAT IIIb	2005

Table 5

2003 REPORT TO LEGISLATURE

Comparison of Precision Instrument Approaches

MSP	**CAT I**	**CAT II**	**CAT III**
Runways:	30R	30L	12R - 2003
	4		12L – 2003
	12L		35 - 2005
	12R		

DTW	**CAT I**	**CAT II**	**CAT III**
Runways:	21L		4R
	22L		4L
	22R		3R
	27L		
	27R		

Notes: The term *decision height* is defined as the height at which a decision must be made during a precision approach to either continue the landing maneuver or execute a missed approach.

Precision approaches are categorized based on decision height and the horizontal visibility that a pilot has along the runway. Visibility values are expressed in statute miles, or in terms of *runway visual range (RVR)*, if RVR measuring equipment is installed at an airport.

The different classes of precision instrument approaches are:

i. Category I (CAT I) – provides approaches to a decision height down to 200 feet and a basic visibility of ¾ statute miles or as low as 1,800 feet RVR.

ii. Category II (CAT II) – provides approaches to a decision height down to 100 feet and an RVR down to 1,200 feet.

iii. Category IIIA (CAT IIIA) – provides approaches without a decision height (down to the ground) and an RVR down to 700 feet.

iv. Category IIIB (CAT IIIB) – provides approaches without a decision height and an RVR down to 150 feet.

v. Category IIIC (CAT IIIC) – provides approaches without a decision height and RVR. This will permit landings in "0/0 conditions," that is, weather conditions with no ceiling and visibility as during periods of heavy fog.

Source: December 2003 U.S. Terminal Procedures, NOAA.