

Introduction

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This Working Paper, Working Paper Two, presents the forecast of aviation activity at General Mitchell International Airport. This working paper is the second in a series to be prepared for the General Mitchell International Airport FAR Part 150 Study. It must be remembered that the FAR Part 150 Study is a five-year planning study, with the future year being the fifth year after the date of submittal of the document. This Working Paper is intended for review and comment by the Committee, and should be considered a draft chapter of the final report.

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Forecast of Aviation Activity

Introduction

The forecasting of aviation activity in terms of future aircraft operations at General Mitchell International Airport serves as a significant basis for analyzing existing aircraft noise levels and identifying future noise levels associated with aircraft activity. Forecasting, by its very nature, is not exact; however, it does establish some general parameters for evaluating existing and potential aircraft-generated noise effects as well as for airport development needs.

Background

In preparing a Federal Aviation Regulations (FAR) Part 150 Noise Compatibility Plan, one of the key products is the preparation of the Noise Exposure Maps (NEM's). The Noise Exposure Maps identify the existing and future noise exposure (5 years into the future from the date of submission of the NEM's), and are prepared using the Federal Aviation Administration's Integrated Noise Model (INM). To prepare a noise contour for a particular year, the INM requires information concerning the number of aircraft operations, the types of aircraft (fleet mix), and the time of day that the activity occurs. **The Terminal Area Forecast (TAF) prepared by the FAA for fiscal year 2003 serves as the basis for future aircraft activity level (*operations*) projections that will be used in the FAR Part 150 Noise Compatibility Planning Study. The ongoing General Mitchell International Airport Master Plan Update Study (hereafter referred to as the MKE Master Plan) serves as the basis for detailed *aircraft type* trends as well as passenger forecasts. No new forecasts were developed for this Study.**

While a FAR Part 150 Noise Study is required to examine noise conditions only 5 years into the future, the longer range forecasts prepared by the FAA are summarized in this paper for information purposes.

In assessing aviation traffic and demand, the following terms are used:

- *Enplaned Passengers*: passengers boarding aircraft that will be departing an airport. Enplanements are approximately half of total passengers;
- *Origin-Destination Passengers*: passengers that either begin or end their trip in the Milwaukee area;
- *Total Passengers*: the sum of enplanements and deplanements; and
- *Operation or Aircraft Operation*: either an aircraft arrival or aircraft departure from an airport. In the case of aircraft training activity, both an arrival and a departure are counted as having occurred.

Aviation demand forecasting is often incorrectly perceived of as a science, with all of the variables being predictable and known. However, as previously mentioned, precise forecasting for specific future years, particularly more than 10 years in the future, is very difficult. Aviation demand has been particularly difficult to forecast, due to the volatility of the industry beginning with deregulation in the late 1970's, through airline consolidations of the 1980's, airline financial difficulties of the early 1990's, and again in the late 2001 through 2003 period when this text was being prepared.

Future Activity Levels

Table B1 describes the total annual enplaned passengers, which are expected to grow by approximately 111 percent by the year 2021, which represents the end of the MKE Master Plan 20-year planning period.

Passenger Forecast

The MKE Master Plan consultant prepared detailed projections for the years 2006, 2011 and 2021. The primary source of data was from MKE records. Other sources used were Official Airline Guide (OAG) schedule data, U.S. Department of Transportation (DOT) data on origin/destination traffic and activity by carrier, Federal Aviation Administration annual forecasts, and Woods & Poole Economics data on historical and forecast county level socio-economic parameters.

Table B1
**SUMMARY OF RECENT HISTORIC AND ANNUAL
 PASSENGER FORECASTS**

General Mitchell International Airport Noise Study Update

| Year | Total Enplaned Passengers | Percent Growth Over 2000 |
|-------------------|--|-------------------------------------|
| 2000 | 3,039,962 | --- |
| 2001 | 2,811,954 | -7.50% |
| 2002 | 2,815,984 | -7.37% |
| 2006 | 3,658,480 | 20.35% |
| 2009 ¹ | 4,123,895 | 35.66% |
| 2011 | 4,434,172 | 45.86% |
| 2021 | 6,427,713 | 111.44% |

Source: General Mitchell International Airport/PB Aviation Inc.

¹ 2009 forecast represents a linear interpolation between the 2006 and 2011 forecast.

Passenger projections were made using regression analysis relating the volume of travel at the Airport to socioeconomic factors in the surrounding region and the cost of air travel at MKE. In formulating the relationships among these factors, several different measures were used to represent the demand for air travel, the cost of air travel, and the socio-economic activity in the surrounding area. Air travel demand was represented as total enplaned passengers, and as origin/destination (O&D) passengers. The cost of air travel was represented by airline yield at the Airport. Airline yield is the revenue collected by the airline for carrying one paying passenger one mile. Variables were also included in the analysis to reflect the start-up of service by Midwest Express in 1984, and to account for the impact of the Gulf War.

The socioeconomic factors that were analyzed included population, personal income, per capita income, and employment. The counties analyzed included the seven counties comprising the area covered by the Southeastern Wisconsin Regional Planning Commission (Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington and Waukesha), and three neighboring counties in Illinois (Lake, McHenry and Winnebago). In developing the statistical relationships among these variables, both linear and logarithmic formulations were considered. Linear formulations imply that the absolute growth in traffic is related to the absolute growth in the other variables. Logarithmic formulations imply that the rates of traffic growth are related to the rates of growth in the other variables. The equation chosen for use in the MKE Master Plan forecast was selected for its statistical

goodness of fit to the historical data, and for its reasonableness in the implied relationships.

Over the last ten years, passenger activity at MKE has grown at an average annual rate of 3.3 percent, compared with 3.5 percent for the nation as a whole. Immediately after deregulation in 1978, MKE traffic declined. It rebounded significantly when Midwest Express began service in June of 1984. From 1984 through 2001 traffic grew at an average annual growth rate of 4.7 percent, largely on the basis of Midwest's activity. Over that same period traffic in the U.S. grew just under 3 percent annually.

Passenger activity is projected to increase at an average annual growth rate of 4.2 percent through the year 2021. Passenger average annual growth is expected to increase the greatest through 2006 at 5.4 percent and then continue at approximately 3.8 percent for the remaining forecast period.

Air Cargo and Mail

Freight and mail at MKE have exhibited strong growth over the last few decades. The activity is domestic, as international cargo is usually flown out of Chicago on international flights. Changes to the security environment after September 11, 2001 have had an impact on cargo volume at MKE, as at most airports in the country. However, several carriers at the Airport indicated during the preparation of the MKE Master Plan that there is still a strong interest by both all-cargo and passenger carriers to pursue freight and mail as valuable business enterprises for the airlines.

Mail volume reached its peak at MKE in 1991 when it spiked upward for a two-year period. It has been trending down since 1997. Overall in the U.S., the FAA is forecasting a 23.8 percent decline in domestic air mail RTMs in fiscal year 2002 versus 2001, and a further decline of 5.0 percent in 2003. This is on top of a 15.2 percent decline in 2001 versus 2000. Historically, most of the mail at MKE, 88 percent, has been carried by passenger carriers. However, recent security measures allow passenger carriers to carry only first class mail, with all mail over 16 ounces going on all-cargo carriers. Thus, the percentage of mail going to passenger carriers has been reduced to 25 percent, which has been the experience at MKE in recent months.

Aircraft Operations

Total operations are forecast to increase 1.7 percent annually from 2003 through 2009. Commuter operations are the largest contributor to this growth. These operations are forecast to increase from 36.9 percent of total operations in 2001 to 38.6 percent in 2021. While passenger operations show strong growth through 2006, as they rebound from reduced activity in 2001, cargo and general aviation operations

do not exhibit this strong rebound. Cargo growth is slow over that period as carriers work to improve the pounds per departure carried to get it to late 1990s levels.

General aviation is forecast to continue its decline through 2006, and rebounds somewhat thereafter.

Based on the annual total passengers, total annual aircraft operations were also forecast. These figures are reflected in Table B2.

Table B2
SUMMARY OF RECENT HISTORIC AND ANNUAL AIRCRAFT OPERATION FORECASTS
General Mitchell International Airport Noise Study Update

| Year | Total Operations | Percent Growth Over 2000 | Average Annual Daily Operations |
|------|------------------|--------------------------|---------------------------------|
| 2000 | 221,885 | --- | 608 |
| 2001 | 211,512 | -4.67% | 579 |
| 2002 | 216,179 | -2.57% | 592 |
| 2003 | 211,418 | -4.72% | 579 |
| 2009 | 234,466 | 5.67% | 642 |
| 2014 | 253,566 | 14.3% | 695 |
| 2019 | 272,666 | 22.9% | 747 |

Source: General Mitchell International Airport.
 FAA 2003 Terminal Area Forecast

Air Carrier

Departures on major carriers have declined since 1996, while commuter departures have grown at an average rate of 6.2 percent annually. This reflects the transition of the major carriers to service on regional jets provided by their respective partners. American has transitioned entirely to American Eagle service at MKE. Continental has shifted service to Continental Express, United has shifted to United Express, and ATA provides service to Chicago using Chicago Express. Midwest Airlines continues to expand both major carrier service and service on Midwest Connect.

Passenger operations, including major carriers, commuters, and charters, are forecast to grow approximately 1.3 percent annually from 2003 through 2009.

Cargo

Operations by all-cargo aircraft were forecast using freight volume as a base, and projecting all-cargo share of the total volume and all-cargo pounds per operation based upon historical relationships. All-cargo operations increased at 5.1 percent annually from 1996 through 2001. Over this same time period, the volume carried per operation declined 5.8 percent per year. In projecting cargo operations, the average pounds per operation experienced over the last six years was used as the projected pounds per operation. It is believed that cargo carriers will seek improvements to efficiency following the declines in cargo activity in 2001 and continuing into 2002. Therefore, it was assumed that poundage carried per operation would revert to the higher levels carried in the late 1990s. This volume was estimated to be 11,536 pounds per operation. Cargo operations are forecast to grow very slowly in the 2001 through 2006 time frame as the carriers use existing capacity more efficiently. After 2006, when pounds per departure have reached the 11,536 level, cargo operations are forecast to begin to grow again at 3.0 and 3.6 percent annually throughout the forecast period.

Unscheduled Air Taxi

Records submitted by operators at the Airport and those maintained by the tower on operations have different definitions of category of operation. For example, a large cargo operator such as Federal Express could be included in the Air Carrier category by the tower, and in the Cargo category by the Airport. A small cargo carrier would be classified as Air Taxi by the tower, but as Cargo by the Airport. The tower classifies the operations of Skyway as Air Taxi, but the commuter operations of American Eagle are classified as Air Carrier. In order to account for all of the operations reported by the tower, it is necessary to estimate a number of "Other Air Taxi" operations. These operations are estimated to have accounted for 5.7 percent of total operations over the last few years. Therefore, the sum of previously estimated operations is increased by this amount to insure that all operations are taken into account. These operations are assumed to have a fleet mix distribution similar to general aviation operations.

General Aviation

General aviation operations at MKE have been trending downward since 1990. Throughout the U.S. this activity declined through the 1980s and into the early 1990s as product liability costs discouraged manufactures from building new aircraft. The forecast assumes that the general aviation operations decline at MKE will level off at 0.08 percent of the U.S. activity throughout the forecast period. This results in a level of activity that does not rebound to the 2000 level by the end of the 2021 forecast period. Activity declines through 2006 as the share continues down from

0.09 percent in 2001 to 0.08 percent. After 2006, there is slight growth, 1.2 percent annually through 2011, and 0.9 percent per year through 2021.

Military

Operations have fluctuated, declining 1996 through 1998, increasing slightly, then declining significantly from 1999 to 2000, and growing again in 2001. Military operations are forecast to be the average annual operations experienced 1996 through 2000. It was felt that 2001 may be an aberration due to activities surrounding September 11. Historically, all of the military operations have been itinerant operations. The military activity tends to be dominated by based aircraft such as the C-130 and the KC-135.

Summary

Table B3 depicts the recent historic and forecast approximate level of use by general aircraft types that are projected to use General Mitchell International Airport. Total operations are forecast in the MKE Master Plan to increase at 1.7 percent annually 2003 through 2009. Regional jets and commuter operations are the largest contributor to this growth. While passenger operations show strong growth through 2009, as they rebound from reduced activity in 2001, cargo and general aviation operations do not exhibit this strong rebound. Cargo growth is slow over that period as carriers work to improve the pounds per departure carried to get it to late 1990s levels. General aviation continues its decline through 2006, and rebounds somewhat thereafter.

Table B3
SUMMARY OF OPERATIONS BY AIRCRAFT CATEGORY, Recent Historic and Forecast
General Mitchell International Airport Noise Study Update

| Aircraft Category | 2003 | 2009 |
|--|----------------|----------------|
| <i>Passenger Air Carrier and Air Cargo</i> | <i>168,708</i> | <i>182,786</i> |
| Wide Body Jets | 1,632 | 1,179 |
| Narrow Body Jets | 63,895 | 49,803 |
| Regional Jets | 61,881 | 77,544 |
| Commuter Prop | 41,300 | 54,260 |
| <i>General Aviation and Small Air Taxi</i> | <i>38,080</i> | <i>47,171</i> |
| Corporate Jets | 14,050 | 13,575 |
| Single & Multi-Engine Prop | 24,030 | 33,596 |
| <i>Military</i> | <i>4,630</i> | <i>4,509</i> |
| Tankers | 1,805 | 1,690 |
| Transports | 2,825 | 2,819 |
| Total Operations | 211,418 | 234,466 |

Source: General Mitchell International Airport
 FAA 2003 Terminal Area Forecast
 BridgeNet International

Fleet Mix Forecast

An updated fleet mix forecast is presented in the Noise Analysis Chapter. The fleet mix is determined based on the actual type of aircraft flying currently at the airport derived from radar data and airport/airline records. The fleet mix is projected for the future based on trends in the industry and discussions with airport users. This information has been translated into specific aircraft types for use in the FAA's Integrated Noise Model and is presented in the next Chapter.