Noise Compatibility Planning Study
Dane County Regional Airport

Public Open House
Airport Facility Overview

**MSN**
- Covers 3,500 acres and serves over 2.2 million commercial passengers each year
- Fixed-Base Operator Wisconsin Aviation is located on the east side of the airport

**115th Fighter Wing of the Wisconsin Air National Guard (ANG)**
- Chosen to host the F-35A mission and receive a new fleet of F-35A Lightning II aircraft beginning in Spring of 2023

**Wisconsin Army National Guard (ARNG) 64th Troop Command**
- Operates UH-60 Black Hawk helicopters at Truax Field
Airport History

City of Madison purchases airport land in 1927.

Airfield operation transferred to US Army Air Corps, was renamed Truax Field, and was expanded. Following WWII, the airfield was returned to the city and the Wisconsin Air National Guard base was established in the 1940s.

Madison Municipal Airport's first airplane manufacturing plant opened in the 1930s, making it Madison's first passenger airport.

1950s and 60s: Commercial service expanded and terminal was relocated and expanded.

1970s and 80s: Madison Municipal Airport transitioned to the Dane County Regional Airport, became self-sustaining, and tripled in size.


2000s and 10s: Renovated terminal and focused on environmental and airfield improvements.

Today: Airport functions as a joint-use military and civilian facility and terminal modernization continues.

Source: https://www.msnairport.com/about/facilities_maps/history
# Roles and Responsibilities

## Part 150 Study

### Airport
- Project sponsor
- Certification that documentation is true and accurate
- Recommend measures to address incompatible land use

### Consultant Team
- Overall project management, documentation, and outreach
- Aircraft noise analysis and abatement planning
- Noise compatibility analysis and planning
- Aviation forecast and airfield analysis

### FAA
- Certification that the documentation meets federal regulations and guidelines
- Approval of Airport-recommended measures

### Technical Advisory Committee
- Review study inputs, assumptions, analyses, documentation, etc.
- Input, advice, and guidance related to NEM and NCP development

### Public
- Provide input on study during comment period
- Review public draft documents
Part 150 Overview: Major Elements

• FAA created in response to Federal Aviation Safety and Noise Abatement Act of 1979 (ASNA)
• Codified under Title 14 of the Code of Federal Regulations Part 150
  • Formal *citation* is “14 CFR Part 150,” informal is “Part 150”
• Two primary elements
  • Noise Exposure Map (NEM)
  • Noise Compatibility Program (NCP)
  • Detailed FAA guidance available at [www.faa.gov/airports/environmental/airport_noise/](http://www.faa.gov/airports/environmental/airport_noise/)
• Consultation required with:
  • All local, state, and federal entities with control over land use within DNL 65+ dB
  • FAA regional officials, regular aeronautical users of the airport
  • All parties interested in review of and comment on the draft
• Opportunity must be offered for a final public hearing on the NCP
• MSN will exceed all consultation requirements
  • Improved stakeholder relations is typically one of the most valuable study results
Part 150 Overview: Study Process

Develop Study Protocol
- Finalize methodology
- Establish Technical Advisory Committee
- Develop project schedule and milestones

Verification
- Existing Noise Exposure Maps, planning, and environmental documents
- Noise complaint data
- GIS and land use data
- Flight track, operations, and noise data
- FAA activity forecasts

Develop NEMs
- Develop noise contours for existing and 5-year forecast conditions
- Review land use data & policies
- Noise impact evaluation for DNL 65-75 dBA
- Identify incompatible land uses and review existing NCP
- Prepare maps in accordance with 14 CFR Part 150

Develop NCP
- Consider noise abatement strategies
- Consider land use strategies
- Consider programmatic strategies
- Update NCP in accordance with 14 CFR Part 150

Stakeholder Engagement and Public Outreach
Technical Advisory Committee • Public Meetings/Hearings • Public Website Materials and Newsletters
Part 150 Overview: Noise Exposure Map

- FAA “accepts” NEM as compliant with Part 150 standards
- NEM must include detailed description of
  - Airport layout, aircraft operations, and other inputs to noise model
  - Aircraft noise exposure in terms of Day-Night Average Sound Level (DNL)
  - Land uses within DNL 65+ decibel (dB) contours
  - Noise / land use compatibility statistics within DNL 65+ dB contours
- NEM must address two calendar years
  - Year of submission (2022)
  - Forecast (at least five years from year of submission; 2027)
  - FAA reviews forecasts for consistency with Terminal Area Forecast (TAF)
Noise Terminology

- Maximum Noise Level ($L_{\text{max}}$)
- Sound Exposure Level (SEL)
- Equivalent Sound Level ($L_{\text{eq}}$)
- Day-Night Average Sound Level (DNL)

![Graph showing noise levels over time with L_{\text{max}}, L_{\text{eq}}, SEL, and DNL values.]
Noise Terminology

• The decibel is a complex logarithmic quantity based on sound pressure
• A-weighted decibels correlate well with how we hear
• Noise levels can be expressed many ways depending on their purpose, including but not limited to:
  • Instantaneous maximum noise levels (Lmax)
  • Single event dose (SEL)
  • Long-duration exposure (DNL)
• FAA requires use of DNL in a Part 150 study
• FAA Part 150 land use compatibility guidelines:
  • All land use is compatible with aircraft noise less than DNL 65 dB
  • Land use compatibility assessments use 5-dB contour bands
    • 65 to 70 dB
    • 70 to 75 dB
    • Greater than 75 dB
Enplanement Forecast Methods Comparison

- Terminal Area Forecast
- Airport Data
- Trend Forecast
- Regression

FAA Fiscal Year (October 1 - September 30)
Total Aircraft Operations Forecast Comparison

- Terminal Area Forecast
- Airport Records
- Trend Forecast

FAA Fiscal Year (October 1 - September 30)
# 2021 FAA Terminal Area Forecast (TAF) for MSN

## Enplanements

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Enplanements</th>
<th>ITINERANT</th>
<th>LOCAL</th>
<th>Total Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Air Carrier</td>
<td>Air Taxi</td>
<td>General Aviation</td>
</tr>
<tr>
<td>2019</td>
<td>1,142,812</td>
<td>24,284</td>
<td>11,655</td>
<td>28,689</td>
</tr>
<tr>
<td>2021</td>
<td>551,317</td>
<td>17,728</td>
<td>6,747</td>
<td>29,916</td>
</tr>
<tr>
<td>2027</td>
<td>1,211,674</td>
<td>33,841</td>
<td>6,935</td>
<td>31,797</td>
</tr>
<tr>
<td>2032</td>
<td>1,352,756</td>
<td>37,150</td>
<td>6,941</td>
<td>32,773</td>
</tr>
<tr>
<td>2037</td>
<td>1,491,362</td>
<td>40,079</td>
<td>7,362</td>
<td>33,778</td>
</tr>
<tr>
<td>2042</td>
<td>1,626,176</td>
<td>43,877</td>
<td>7,781</td>
<td>34,814</td>
</tr>
</tbody>
</table>

## Compound Annual Growth Rate (CAGR)

| '21-'41 | 5.56% | 4.64% | 0.72% | 0.76% | 0.00% | 2.19% | 0.05% | 0.00% | 0.05% | 1.79% |

Source: 2021 FAA Terminal Area Forecast (TAF)
Detailed Forecast Data

- Base fleet mix developed from flight track and aircraft identification data
- Fleet mix then assigned to Air Carrier, Air Taxi, General Aviation and Military
- Base fleet mix then scaled to the 2022 and 2027 Forecast levels for each category
- Military operations augmented with information from 115th Fighter Wing and Army Guard

### Aircraft Operations Forecast by Aircraft Category

<table>
<thead>
<tr>
<th>Aircraft Operation Category</th>
<th>2019</th>
<th>2022</th>
<th>2027</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Carrier</td>
<td>24,284</td>
<td>20,306</td>
<td>35,714</td>
</tr>
<tr>
<td>Air Taxi</td>
<td>11,655</td>
<td>7,395</td>
<td>6,757</td>
</tr>
<tr>
<td>General Aviation</td>
<td>41,157</td>
<td>47,735</td>
<td>48,825</td>
</tr>
<tr>
<td>Military (Total)</td>
<td>4,989</td>
<td>6,047</td>
<td>7,418</td>
</tr>
<tr>
<td>ANG F-16C</td>
<td>-</td>
<td>3,081</td>
<td>-</td>
</tr>
<tr>
<td>ANG F-35A</td>
<td>-</td>
<td>-</td>
<td>4,252</td>
</tr>
<tr>
<td>Total Operations</td>
<td>82,085</td>
<td>81,483</td>
<td>98,741</td>
</tr>
</tbody>
</table>

2019 Source: Dane County Regional Airport
2021 Source: FAA OpsNet
2027 Sources: FAA Terminal Area Forecast (TAF)
Note: Calendar year operations were used for 2021 as they are the most recent 12 months of available data.
Noise Modeling Process
For Commercial and General Aviation Operations

• Base Year – 2021
  • Obtained, processed and analyzed 12 months of flight track and aircraft identification data
  • Developed modeled flight tracks
  • Determined day-night aircraft operations, fleet mix and runway use

• Existing and Forecast Conditions – 2022 & 2027
  • Confirmation of the FAA’s Terminal Area Forecast (TAF)
  • Scaled base year operations and updated aircraft fleet to 2022 and 2027 TAF
  • No changes to flight tracks, runway use
Noise Model Physical Input Requirements

- Airport layout
  - Runway configuration (including displaced landing or takeoff thresholds)
- Flight tracks
- Airport elevation
  - Terrain data were obtained from the United States Geological Survey National Elevation Dataset
- Airport weather (30-year average)
  - Temperature
  - Station pressure
  - Relative humidity
  - Dew point
  - Wind speed
- Aircraft operations data
  - Runway use rates
  - Flight track use rates
  - Numbers flight operations for each aircraft type by day and night
Arrival Track Density

Figure: Arrival Track Density Plot

Source: County of Dane, Wisconsin; City of Madison, Wisconsin; Wisconsin Department of Natural Resources; ESRI, Inc.
Arrival Runway Use

- All Arrivals
- Day Arrivals
- Night Arrivals
Departure Runway Use

- **All Departures**
- **Day Departures**
- **Night Departures**
Noise Modeling Process
For Military Aviation Operations

• Base Year for Air National Guard (ANG) – 2021
  • ANG provided numbers of annual flight F-16C operations
  • ANG reviewed and updated F-16C model input data from the F-35A EIS for use in the Existing NEM

• Existing and Forecast Conditions – 2022 & 2027
  • Army National Guard reviewed and updated UH-60 model input data from the EIS for use in the Exiting and Forecast NEMs
  • ANG F-16C 2021 pre-drawdown operations data used for Existing NEM
  • ANG forecast 2027 annual operations for the F-35A are based on historical average annual operations for the F-16C
  • ANG reviewed and updated F-35A model input data from the EIS for use in the Forecast NEM
  • No changes to flight tracks runway use between Existing and Forecast
Model Tracks: NOISEMAP Inputs

Military Fixed-wing Arrivals
Model Tracks: NOISEMAP Inputs

Dane County Regional Airport
Madison, Wisconsin

Figure 5.6:
NOISEMAP Modeled Fixed-wing Departure Flight Tracks

1. Modeled Military Departure Tracks (13)

- Airport Boundary
- FlightTrack Analysis Boundary
- Runway / Taxiway
- Helicopter Pad
- Buildings
- Major / Minor Roads
- Railroad
- Madison Municipal Boundary
- Open Land
- Recreation / Open Space
- Woodlands
- Lake / Pond

Source: County of Dane, Wisconsin; City of Madison, Wisconsin; Wisconsin Department of Natural Resources; ESRI, Inc.

1 Nautical Mile

Military Fixed-wing Departures
Model Tracks: NOISEMAP Inputs

Military Fixed-wing Circuits
Military Jet Runway Use

Arrivals

Departures

Circuits

Departure Scrambles
Military Turboprop Runway Use

Arrivals

Departures

Circuits
# Land Use Assessment for Existing and Forecast Conditions

<table>
<thead>
<tr>
<th>Baseline 2022 Combined 65 – 75 DNL Contours</th>
<th>Population Census 2020</th>
<th>Housing Units</th>
<th>Area (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>65-70 DNL</td>
<td>503</td>
<td>225</td>
<td>1,070.54</td>
</tr>
<tr>
<td>70-75 DNL</td>
<td>12</td>
<td>3</td>
<td>534.13</td>
</tr>
<tr>
<td>&gt;75 DNL</td>
<td>0</td>
<td>0</td>
<td>626.02</td>
</tr>
<tr>
<td>Total</td>
<td>515</td>
<td>228</td>
<td>2,230.69</td>
</tr>
</tbody>
</table>

**Noise Sensitive Receptor**

- Madison Area Technical College

<table>
<thead>
<tr>
<th>Forecast 2027 Combined 65 – 75 DNL Contours</th>
<th>Population Census 2020</th>
<th>Housing Units</th>
<th>Area (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>65-70 DNL</td>
<td>2,424</td>
<td>1227</td>
<td>1,823.31</td>
</tr>
<tr>
<td>70-75 DNL</td>
<td>57</td>
<td>23</td>
<td>935.53</td>
</tr>
<tr>
<td>&gt;75 DNL</td>
<td>0</td>
<td>0</td>
<td>917.30</td>
</tr>
<tr>
<td>Total</td>
<td>2,481</td>
<td>1,250</td>
<td>3,676.14</td>
</tr>
</tbody>
</table>

**Noise Sensitive Receptors**

- Madison Area Technical College, Claudi’s Kids Inc Day Care Center, and Ridgeway Church
## Proposed Schedule

<table>
<thead>
<tr>
<th>Meeting / Activity</th>
<th>Anticipated Purpose</th>
<th>Anticipated Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kick-Off Meeting with MSN and the Part 150 Team</td>
<td>Define organizational and procedural matters and public outreach, review and refine scope and schedule details.</td>
<td>January 20, 2022</td>
</tr>
<tr>
<td>1st Public Open House</td>
<td>Introduction to Part 150, set expectations, discuss stakeholder roles, identify issues of concern</td>
<td>April 26, 2022</td>
</tr>
<tr>
<td>NEM Public Comment Period, 2nd Public Open House</td>
<td>NEM thirty-day public comment period and second Public Open House</td>
<td>November-December 2022</td>
</tr>
<tr>
<td>MSN to Submit Final NEM to FAA</td>
<td>MSN submits final updated NEM to FAA for review and approval. Respond to FAA questions as needed.</td>
<td>December 2022</td>
</tr>
<tr>
<td>NCP Public Comment Period, 3rd Public Open House and NCP Hearing</td>
<td>NCP thirty-day public comment period and third Public Open House and NCP Hearing.</td>
<td>4th Quarter 2023</td>
</tr>
<tr>
<td>MSN to Submit Final NCP to FAA</td>
<td>MSN submits final updated NCP to FAA for review and approval. Respond to FAA questions as needed.</td>
<td>1st Quarter 2024</td>
</tr>
</tbody>
</table>
MSN Part 150 Study Website and Project Contacts

- Website: https://www.msnairport.com/about/ecomentality/Part-150-Study
- Project email address: part150study@msnairport.com
- Tim Middleton – HMMH Project Manager, Contact: tmiddleton@hmmh.com
- Michael Riechers – MSN Director of Marketing and Communications, Contact: Riechers.Michael@msnairport.com
Public Comment Opportunities

- Public comments can be submitted throughout the comment period (November 14, 2022-December 10, 2022)
  - In writing at the public open house
  - Through the project email address (part150study@msnairport.com)
- The draft NEM is available for public review at the following locations:
  - On the MSN website: https://www.msnairport.com/about/ecomentality/Part-150-Study
  - At the MSN administrative office: 4000 International Lane, Madison, WI 53704, during normal business hours
  - At the Lakeview Branch of the Madison Public Library: 2845 N. Sherman Ave., Madison, WI 53704