Modeling Working Group Presentation

Overview of Grand Canyon Noise Analysis Results

Presented to: Third Meeting of the Grand Canyon Working Group Of the National Parks Overflights Advisory Group
By: FAA/NPS Technical Working Group
Date: January 31, 2006
Overview of Noise Analysis of Current Conditions

- INM Version 6.2
- 2004/2005 ambient data
- Noticeability/Detectability zones
- 2005 operational data
- Flight track data
- Output
- Results
Modeling Platform

“FICAN recommends INM 6.2 as the best practice modeling methodology currently available to evaluate aircraft noise in the national parks.” [FICAN (February 2005)]

- INM Version 6.2
  - Terrain shielding (line-of-sight blockage)
  - High-resolution terrain data (GridFloat and DEMs)
  - Expanded aircraft database (EC-130, PA-31)
  - New Metrics (Time Audible, Change in Exposure)
  - Contour boundary area percentage
  - Variable flight segment modeling
  - ETMS import modeling capability
2004/2005 Ambient Data

- 2004/2005 NPS measurements
- Mapping/measurements consistent with agreed NPS/FAA methodology
Noticeability/Detectability Zones

- Modeled as a 10 dB offset to the ambient data
- Used as a surrogate to mechanical noise (e.g., roadway, human activity)
2005 Operational Data

“August 8, 2005 is the Peak day”…”Peak day represents the highest daily number of all documented aircraft operations for the month of August 2005.”
[GCNP NPS Memorandum to FAA (November 2005)]

- Air tour and air tour related (August 8, 2005 mutually agreed to by NPS/FAA based on Elrod spreadsheet)
  - Commercial air tours
  - Grand Canyon west
  - Transportation, repositioning, maintenance and training
  - Over the edge
  - Bar 10

- Other (based on FAA/ETMS/PDARS)
  - General aviation
  - Military
  - Commercial high altitude overflights
# 2005 Operational Data

Operations by Aircraft Contribution, August 8, 2005

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Number of Operations*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air tour and air tour related</td>
<td>635</td>
</tr>
<tr>
<td>General Aviation (GA)</td>
<td>187</td>
</tr>
<tr>
<td>Military</td>
<td>11</td>
</tr>
<tr>
<td>Commercial</td>
<td>1214</td>
</tr>
</tbody>
</table>

* Daytime operations only (7 am to 7 pm)
Flight Track Data

- Create flight tracks and profiles
- Assign aircraft noise-power-distance data
- Populate with 2005 operational data
Flight Track Data

- General Aviation
- Military
- Commercial
Output

- Noise metrics
  - Time Audible
  - $L_{eq12}$
  - $L_{max}$
- Contours
- Location points
- Results by aircraft contribution

Example Time Audible Contour
Results

The goal is to achieve restoration of natural quiet. Natural quiet is obtained when "50 percent or more of the park is experiencing natural quiet (i.e., no aircraft audible) 75 to 100 percent of the day," each and every day. [NPS Report to Congress (July 1995)]

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>% of Park</th>
<th>% Restored</th>
<th>% Area Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Air Tour and Air Tour Related, GA, and Military</td>
<td>96.3</td>
<td>3.7</td>
<td>-1.6%, +3.1%</td>
</tr>
<tr>
<td>Total GA, Military, and Commercial</td>
<td>99.0</td>
<td>1.0</td>
<td>-0.4%, +1.4%</td>
</tr>
<tr>
<td>Commercial Air Tours</td>
<td>38.4</td>
<td>61.6</td>
<td>-2.5%, +2.2%</td>
</tr>
<tr>
<td>GC West</td>
<td>7.3</td>
<td>92.7</td>
<td>-0.4%, +0.5%</td>
</tr>
<tr>
<td>Transportation, Repositioning, etc.</td>
<td>10.3</td>
<td>89.7</td>
<td>-2.2%, +2.2%</td>
</tr>
<tr>
<td>Over the Edge</td>
<td>4.6</td>
<td>95.4</td>
<td>-2.2%, +2.2%</td>
</tr>
<tr>
<td>Bar 10</td>
<td>0.0</td>
<td>100.0</td>
<td>0%</td>
</tr>
<tr>
<td>Total Air Tour and Air Tour Related</td>
<td>46.1</td>
<td>53.9</td>
<td>-1.8%, +1.8%</td>
</tr>
<tr>
<td>General Aviation (GA)</td>
<td>69.7</td>
<td>30.3</td>
<td>-21.6%, +30.9%</td>
</tr>
<tr>
<td>Military</td>
<td>0.0</td>
<td>100.0</td>
<td>0%</td>
</tr>
<tr>
<td>Commercial</td>
<td>92.2</td>
<td>7.8</td>
<td>-1.8%, +4.4%</td>
</tr>
</tbody>
</table>

* Note: For additional discussion on contour uncertainty, please refer to pages 52-53 in the FICAN report, “Assessment of Tools for Modeling Aircraft Noise in the National Parks.” [FICAN (February 2005)]
Results

Total GA, Military, Air Tour and Air Tour Related
96.3% of the park (3.7% “Restored”)

Total GA, Military, Commercial
99.0% of the park (1.0% “Restored”)

Results

Commercial Air Tours
38.4% of the park (61.6% “Restored”)

GC West
7.3% of the park (92.7% “Restored”)

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January 31, 2006

Department of the Interior
Federal Aviation Administration
Results

Transportation, Repositioning, etc.
10.3% of the park (89.7% “Restored”)

Over the Edge
4.6% of the park (95.4% “Restored”)
Results

Bar 10
0.0% of the park (100% “Restored”)

Total Air Tours and Air Tour Related
46.1% of the park (53.9% “Restored”)
Results

General Aviation
69.7% of the park (30.3% “Restored”)

Military
0.0% of the park (100% “Restored”)
Results

Commercial
92.2% of the park (7.8% “Restored”)