Aircraft Noise Control
and the
Role of Federal Research

Presentation by
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to
NASA's Environmental Compatibility Research Workshop II
May 19-21, 1998, Cleveland, OH
Aircraft Noise Control

 Fetish Aircraft Noise Certification

• FAR part 36
• ICAO Annex 16, Volume I

 Fetish Airport Land Use Compatibility

• FAR part 150
International Practices

**FAR part 36**
- Noise standards and certification procedures
- Appendix C – transport and jet powered airplanes (“Stage 3”)
- Appendix G – propeller-driven small airplanes
- Appendix H -- helicopters
- Appendix J – alternative procedure for helicopters weighing not more than 6000 lbs.

**ICAO Annex 16, Vol. I**
- Standards and recommended practices
- Chapter 3 – subsonic jet and large propeller-driven aeroplanes
- Chapter 10 – propeller-driven light aeroplanes
- Chapter 8 -- helicopters
- Chapter 11 – helicopters not exceeding 2730 kg
Aircraft Noise Certification

Committee on Aviation Environmental Protection (CAEP)

ICAO Council

CAEP

CAEP Steering Group

FESG

WG1 Aircraft Noise

WG2 Airports

WG3 Engine Emissions

WG4 Emissions - Operations
FAR part 150

¬ Aviation Safety and Noise Abatement Act of 1979

¬ Single system for measuring noise -- **DNL**

¬ Noise exposure maps -- **DNL 65,70,75 contours**

¬ FAA approved methodology -- **INM (or HNM)**

¬ Noise compatibility program -- **flight procedures, land acquisition, soundproofing, ...**
Aircraft Noise Impact

Airport Land Use Compatibility

% Highly Annoyed

Severe Exposure

Significant

Moderate

DNL (dB)
History of DNL

  • DNL is best descriptor and outdoor level of 55 dB is requisite to protect public health and welfare

➔ FICUN (Guidelines for Considering Noise in Land Use Planning and Control, 1980)
  • With consideration to cost and feasibility factors, DNL 65 dB and higher is incompatible with residential land use.

➔ FICON (Federal Agency Review of Selected Airport Noise Analysis Issues, 1992)
  • Reaffirmed DNL with appropriate use of supplemental metrics.
## Noise Metric of Choice

<table>
<thead>
<tr>
<th>Effect</th>
<th>DNL</th>
<th>AL</th>
<th>SEL</th>
<th>EPNL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loudness</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Human annoyance response</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
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<tr>
<td>Duration</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Speech interference</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
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<tr>
<td>Sleep disturbance</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>Community annoyance</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public health and welfare</td>
<td>✓</td>
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FAA’s Environmental R&D Mission

Provide strong leadership in mitigating aviation’s adverse impact on the public consistent with an effective aviation system.

Apply R&D funds to the:
- advancement of abatement technology,
- identification of appropriate environmental standards, and;
- development of environmental assessment computer models.

Promulgate these environmental standards through the agency’s statutory authority:
- Aircraft Noise Abatement Act of 1968
- Noise Control Act of 1972
- Airport Safety and Noise Abatement Act of 1979
### Role of Federal Research

#### “Regulatory Research”

<table>
<thead>
<tr>
<th>Act</th>
<th>Control and Abatement</th>
<th>Technology Assessment</th>
<th>Airport Noise Exposure Modeling</th>
<th>Compatibility Criteria</th>
<th>Environmental Analysis Tools (Models)</th>
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<tbody>
<tr>
<td>Aircraft Noise Abatement Act of 1968</td>
<td>control and abatement</td>
<td>Measurement test procedures</td>
<td>Technology assessment</td>
<td>Airport noise exposure modeling</td>
<td>Compatibility criteria</td>
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<tr>
<td>Noise Control Act of 1972</td>
<td>technologically feasible and economically reasonable</td>
<td>14 CFR part 36</td>
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<td>14 CFR part 36</td>
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<tr>
<td>National Environmental Policy Act of 1969</td>
<td>environmental consequences of Federal actions</td>
<td>40 CFR parts 1500-08</td>
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</table>
## Partnerships

*Unified Regulatory-R&D Approach to Source Control*

<table>
<thead>
<tr>
<th>End Product</th>
<th>Subsonic Jet</th>
<th>Light Prop</th>
<th>Helicopter</th>
<th>Tiltrotor</th>
<th>HSCT</th>
</tr>
</thead>
</table>

Active projects
Role of Federal Research

Customer and Stakeholder Involvement

✈ International Civil Aviation Organization (ICAO)
  • Committee on Aviation Environmental Protection (CAEP)

✈ Aviation Regulatory Advisory Committee (ARAC)
  • FAR/JAR Harmonization

✈ Federal Interagency Committee on Aviation Noise (FICAN)
  • DOD, DOI/NPS, DOT/OST, EPA, HHS/CDC, HUD, and NASA
  • Public forums

✈ Society of Automotive Engineers (SAE)
  • Aircraft Noise (A-21)
  • Engine Emissions (E-31)

✈ R,E&D Advisory Committee and Subcommittee
Role of Federal Research

Building FAA’s Environmental Roadmap

- Limited resources
- Mission-critical investments
- Stakeholder imprint
- Unified regulatory-R&D approach
- “Three-legged stool” (source reduction, abatement procedures, and land use planning)
- “Win-win” between a safe, efficient aviation system and protection of public health and welfare