Mitigating Aviation Noise

Presented by:

Steve Alverson, ESA

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Presentation Outline

• Mitigating Aviation Noise
• Noise Abatement Options
  – Airfield Design
  – Operational
  – Restrict Operations
  – Management
• Noise Mitigation Options
  – Preventive
  – Remedial
Mitigating Aviation Noise

- Source
- Path
- Receiver

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- Reduce the source level
  - FAA is responsible for aircraft noise certification
  - Pilots may use reduced thrust
  - Ground crews can minimize APU use
  - Reduce or eliminate engine runups
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• Move the source or the receiver
  – Relocated runways, relocated taxiway, relocated run-up areas
  – Displaced takeoff or landing thresholds
  – Relocate noise sensitive uses
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- Remember: when moving aircraft away from residents, it takes a doubling of the distance to achieve a 6 dB reduction in the noise level.
- Except for direct overflight, slant range is more important than altitude.
Noise Abatement – Aircraft in Flight

• Example: Double the altitude
Noise Abatement – Aircraft in Flight

• Example: Double the slant range
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- Block the path – insertion loss
  - Barriers, berms, buildings
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• Maximum insertion loss is achieved when the source and receiver are close to the barrier
  – Highway noise barriers, ground run-up enclosures
PDX Ground Run-up Enclosure

- Port of Portland’s GRE utilizes insertion loss to reduce aircraft engine run-up noise
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NCP Measures That Are Required to Be Considered (14 CFR Part 150, Section B150.7)

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* Subject to further notice, review, and approval requirements in 14 CFR Part 161
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Major NCP Strategy Options

**Noise Abatement**
- Noise abatement flight tracks
- Preferential runway use
- Arrival/departure procedures
- Airport layout modifications
- Runup enclosures
- Use restrictions*
- Other actions proposed by stakeholders

**Land Use**
- Remedial Mitigation
  - Land acquisition
  - Sound insulation
  - Avigation easements
- Preventative Mitigation
  - Land use controls
  - Zoning
  - Building codes
  - Comprehensive plans
  - Real estate disclosures
- Other actions proposed by stakeholders

**Programmatic**
- Implementation tools
- Promotion, education, signage, etc.
- Monitoring
- Reporting
- NEM update
- NCP revision
- Other actions proposed by stakeholders

* Subject to further notice, review, and approval requirements in 14 CFR Part 161
Noise Abatement Options

• Noise abatement techniques can be applied to address:
  – Ground noise
  – Noise from aircraft in flight

• Techniques should be safe, cost effective, environmentally balanced, and capable of being implemented to be successful
Noise Abatement Options

• Standard evaluation criteria
  – Level of noise reduction
  – Effects on airfield capacity and aircraft delay
  – Effects on airspace/air traffic control procedures
  – Consistency with FAA safety and other standards
  – Other environmental effects (e.g., air quality)
  – Operational effects and costs
  – Financial feasibility
  – Consistency with policies adopted by Airport Proprietor
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Noise Abatement Options

- **Airfield Design**
  - Runway extensions, new runway construction
  - Decommission existing runways
  - Relocate runway thresholds

- **Operational**
  - Dispersing departure flight tracks
  - Advanced navigational technologies
  - Change departure flight profiles
  - Modify arrival flight profiles
  - Rotational runway use
  - Ground run-up facility
Noise Abatement Options

• Restrict operations*
  – Ground run-up restrictions
  – Curfews
  – Noise level restrictions
  – Noise budget
  – Limit number of operations

• Management
  – Pilot awareness program
  – Fly Quiet program
  – Noise sensitive areas noted in navigation charts

*Subject to ANCA and potentially 14 CFR Part 161
Noise Abatement Options

- Ground noise can come from several sources:
  - Aircraft taxiing on the airfield
  - Reverse thrust on landing roll out
  - Maintenance activities on the airfield
  - Ground equipment for aircraft servicing
  - Auxiliary power units
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Noise Abatement Options

- Noise abatement techniques to consider for addressing noise from taxiing aircraft:
  - Changes in runway location, length, or strength
  - Installation of high-speed exit taxiways
  - Terminal relocation
  - Noise barriers or berms
  - Establish preferential runway use
  - Establish restrictions on ground aircraft movement
  - Establish use restrictions (e.g., single-engine taxiing)
  - Tug to runway ends or into gates
Noise Abatement Options

- Noise abatement techniques to consider for addressing noise from ground support equipment:
  - Relocation of terminals or aircraft parking stands
  - Ground power plug-ins
  - Noise barriers
  - Establish limits on the use of ground equipment
  - Establish use restrictions
Noise Mitigation Options

• Remedial
  – Property acquisition
  – Redevelopment programs
  – Sound insulation
  – Avigation easements
  – Transaction assistance

• Preventive
  – Comprehensive planning
  – Growth management
  – Noise overlay zones
  – Property disclosure statements
Noise Mitigation Options

Property Acquisition

• This strategy is generally used for properties located within areas exposed to the highest noise levels (> 75 dB DNL)

• Properties are purchased and residents are relocated

• Some local communities dislike this practice because the purchase of the property removes it from the local tax roll

• However, the new compatible uses can be tax generating

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Noise Mitigation Options

Property Acquisition (cont.)

• Need to evaluate the potential for fragmentation or elimination of neighborhoods

• Only way airport operator can be assured of long-term protection for compatible land use

• This strategy can be very costly

• Public relations value of the program can be very positive or very negative
Noise Mitigation Options

Sound Insulation

• This strategy is generally used for properties located within noise levels between 65 DNL and 75 DNL

• Homes receive new doors, windows, sealing of leaks, and other treatments to bring the interior noise level in the home to 45 dBA

• The general condition, age, and home state of repair will determine degree of soundproofing needed
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Noise Mitigation Options

Sound Insulation (cont.)

• FAA also requires at least a 5-dB reduction in the exterior to interior sound level

• FAA Order 5100.38D requires that the home be both within the FAA-accepted 65 DNL contour and the interior noise level be greater than 45 dB DNL
Noise Mitigation Options

Sound Insulation (cont.)

• Avigation Easements are often secured in return for accepting the sound insulation package, the homeowner will not sue the airport over aircraft noise levels

• This strategy is generally favored by most airports due to lower cost and community acceptance when compared to acquisition, but can be costly
Noise Mitigation Options

Avigation Easements

- Airport operator pays the property owner a monetary sum in exchange an agreement that the property owner will not sue the airport for damages associated with aircraft noise
- Not a popular option with most airports because it does not change the incompatibility with aircraft noise levels
- FAA has stopped funding this option for the reason stated above
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Noise Compatibility Programs

• All measures must:
  – Reduce incompatible land use and prevent or reduce future incompatible land use
  – Ensure safety and efficiency
  – Be consistent with the powers and duties of the FAA
  – Be subject to revision if necessary
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Noise Compatibility Programs

• Noise restrictions or rules must:
  – Not unjustly discriminate
  – Not impose an undue burden on interstate commerce (requires balancing of interests)
  – Meet both local needs and national air transportation system needs
Noise Compatibility Programs

- May be subject to ANCA and 14 CFR Part 161
  - Curfews, noise limits, etc.
  - FAA does not approve noise rules and restrictions through 14 CFR Part 150

- Even if not subject to 14 CFR Part 161, must withstand rigorous scrutiny
  - Reduce existing land use incompatibility above DNL 65 dB
  - Be reasonable and not unjustly discriminatory
  - No undue burden on interstate commerce
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Noise Compatibility Programs

Difficulty of Obtaining FAA Approval

- Noise Restrictions
- Preferential Flight Tracks
- Sound Insulation
- Local Zoning

No approval needed  Often Approved  Balancing Interests  Opposed In Principle

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