A Presentation to StART

Background Information on Airport Noise Monitoring Systems

Presented Vincent Mestre, P.E.
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History of Systems & Best Practices

- First systems developed in late 1960s and early 1970s
  - Seattle first system dates to early 1970s
  - Hydrophones were used as microphones
  - Seattle has updated systems about every 20 years corresponding to technology improvements

- International Standards & Best Practice Guidelines
  - IEC 61672 (Sound Level Meters and Microphones)
  - IEC 60942 (Sound Level Calibrators)
  - SAE ARP 4721 (Monitoring Noise in the Vicinity of Airports)
  - ISO 20906 (Unattended Noise Monitoring of Aircraft Sound In the Vicinity of Airports)
Goals

- Monitor noise levels generated from aircraft operations
- Compare with noise policy guidelines
- Documentation for community/governmental groups
- Justify mitigation measures
- Minimize noise impact on nearby communities
Use of the Data

- Link Noise Events to Specific Flights
- Validate Noise Modeling
- Flight Track Analysis
- Evaluate Noise Abatement Alternatives
- Respond to Community Complaints/Concerns
  - Includes processed raw data by request
Capture Flight Tracks and Overflight Noise
Aircraft Noise Monitors
Major System Components

- Analysis and Reporting Software
- Computer Systems
- Geographic Information System
- Remote Noise Monitors
- Portable Noise Monitors
- Flight Track Acquisition System (Radar Data)
- Complaint Logging System
- Meteorology Data Acquisition
- Air Traffic Control Radio Recorder
NOISE MONITORING EQUIPMENT

- Directional Characteristics
- Microphone Height
- Time Averaging Characteristics
- Clock
- Resolution of Reported Noise Levels
- Threshold Sound Level
- Linear Operating Range
- Transmission of Data
- System Calibration
- Environmental Characteristics
- Back-up Electrical Power
- Remote Site Data Back-up
- Remote Monitoring Station Supplies and Maintenance
- Signal Output
Site Selection - Technical Considerations

- Ambient Noise
- Reflective surfaces
- Shielding by terrain or structures
- Utilities (solar and cellular possible)
- Access
- Long Term Easement
- Electromagnetic Radiation
- Vandalism Potential
Technical Reporting

Airline Fly Quiet Summary
San Francisco International Airport
Period: 4Q/Quarter 2011

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Source: SFO Noise Abatement Office
ANMS Operations

- Flight Track Analysis
ANMS Operation

- Noise Complaint Handling
Noise Modeling
Noise Measurement vs Noise Modeling

- Historically easy to measure aircraft noise
  - Older noisier aircraft stood out from community noise
  - Newer quieter aircraft make measuring aircraft noise more difficult
    - “Signal to Noise Ratio”
  - Easier to measure aircraft noise near the airport, especially under the flight track
  - Farther from the airport it transitions to a point where the best estimate of aircraft noise may be using a computer aircraft noise model
    - “Virtual Noise Monitor”
    - The issue comes down to the inability to detect when an aircraft noise event and car, truck, motorcycle, bus, etc. occurs simultaneously.
  - Noise monitors don’t hear, they only measure sound level
Questions?