

Centennial Airport Noise Monitoring System

Conceptual Design

Centennial Airport/Community Noise Roundtable
April 7, 2010

Presented by Gene Reindel and Robin Gardner

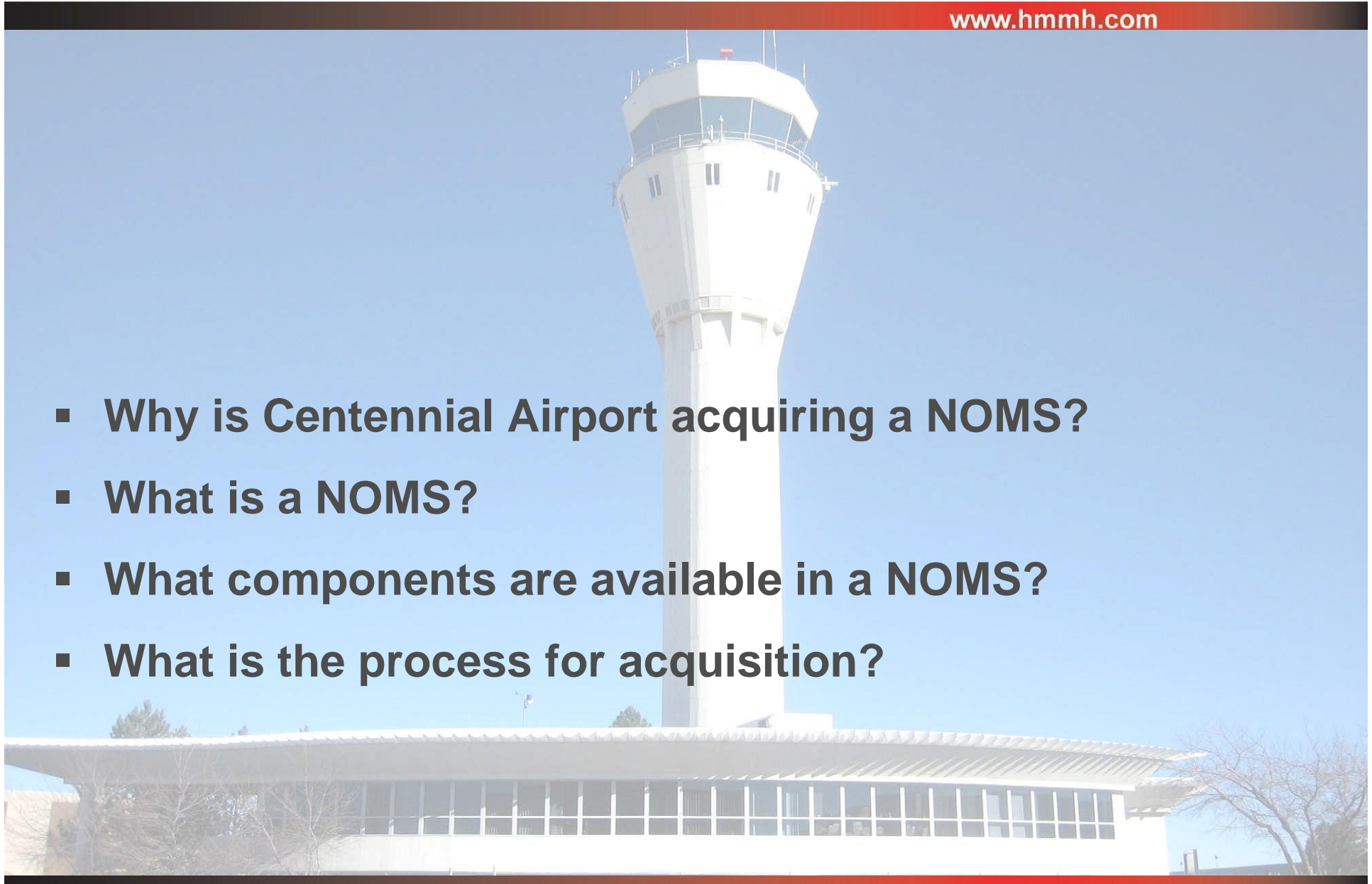


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Topics – Questions we will answer

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- **Why is Centennial Airport acquiring a NOMS?**
- **What is a NOMS?**
- **What components are available in a NOMS?**
- **What is the process for acquisition?**



Why is Centennial Airport Acquiring a NOMS?

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- **14 CFR Part 150 – Noise Compatibility Program stated goals:**
 - Monitor noise levels for comparison with INM predictions
 - Monitor compliance with noise abatement procedures
 - Provide data to assist in investigating and responding to noise complaints
 - Aid in the development of a “Fly Quiet Program”
 - Aid in the annual review of aircraft operations

Why is ACPAA Acquiring a NOMS?

Primary Objectives

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- **Monitor flight operations**
 - Traffic flows
 - Flight procedures
 - Runway use statistics
 - Operations counts & distribution over time
 - Fleet mix
- **Monitor weather conditions**
 - Runway use decisions
 - Aircraft flight characteristics
 - Noise propagation
 - Noise measurement accuracy
- **Monitor ATCT radio frequencies**
 - FAA operation of airspace
 - Aircraft identification
- **Evaluate Noise Exposure Maps**
- **Compare measured and modeled noise levels**
- **Document aircraft operations and noise exposure**

Why is ACPAA Acquiring a NOMS?

Secondary Objectives

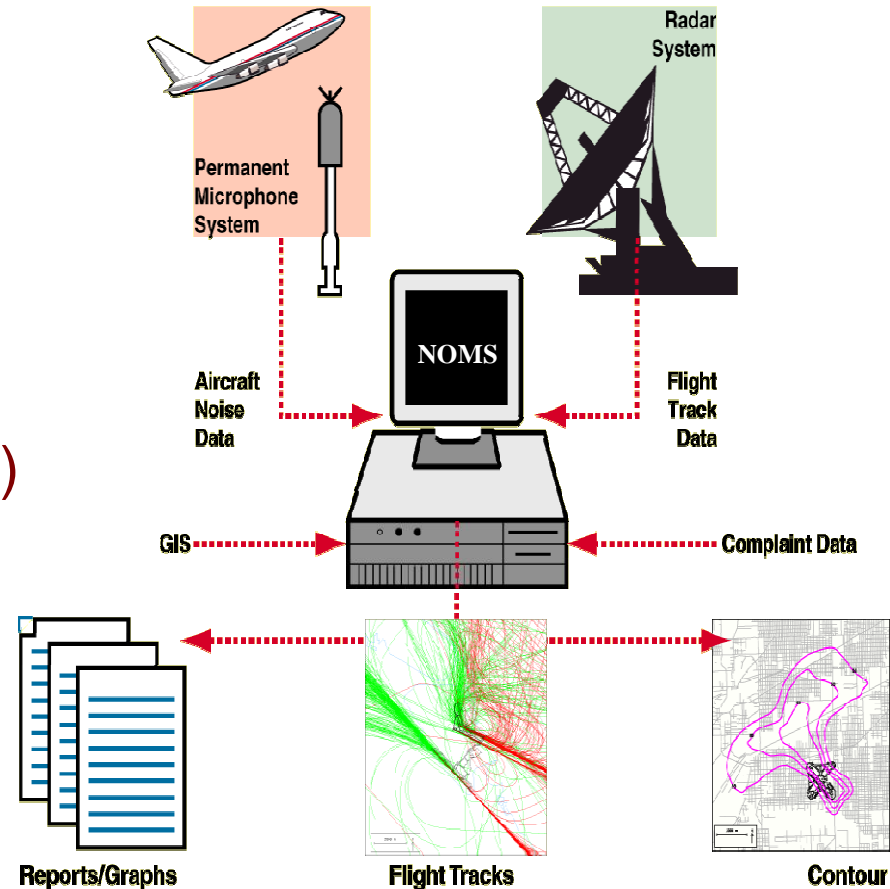
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- **Improve public communication**
 - Access to noise and operations data
 - Respond to community concerns
- **Monitor noise levels in communities**
- **Provide airspace use and analysis**
- **Share information with other ACPAA departments**

What is a NOMS?

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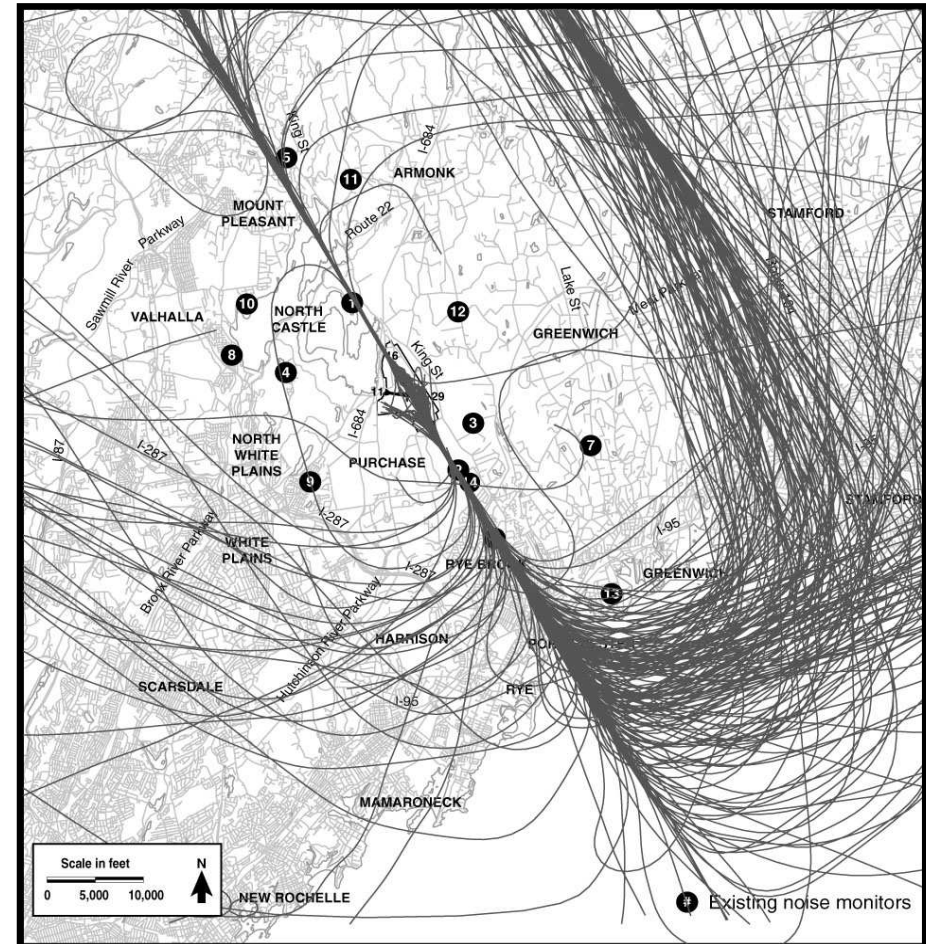
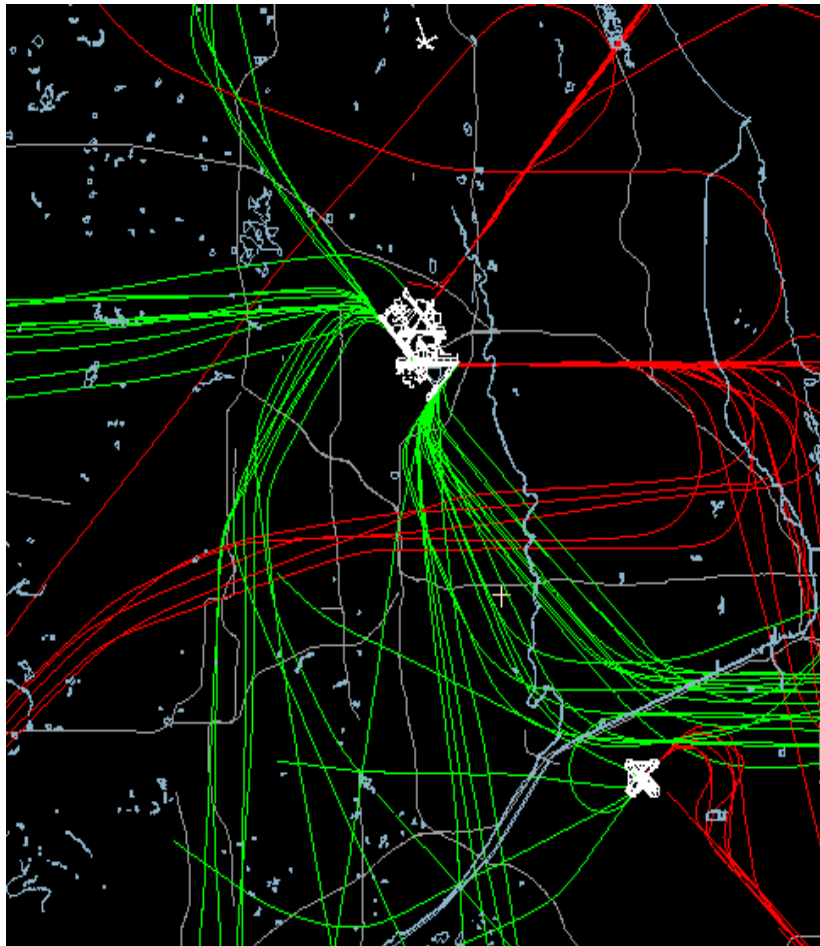
- **Input data**
 - Aircraft operations
 - Noise
 - Weather
 - Community concerns
- **Data processing**
 - Storage (integrated database)
 - Analysis (tools)
- **Output**
 - Reports
 - Data files
 - Public information



What is a NOMS? – Input Operations Monitoring “Flight Tracking”

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Generally the most valuable capability



Systems permit static plots and animated replay

What is a NOMS? – Input Noise Monitoring Options

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**Fixed monitors provide
trend data at the most
sensitive locations**



*Most systems include
both monitor types*



**Portable monitors provide
flexible, comprehensive
geographic coverage**

What is a NOMS? – Input Permanent Noise Monitoring

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■ Attributes

- Fixed locations - site selection critical
- Power, telephone lines, and poles

■ Benefits

- Consistent, comparable, long-term results
- Identifiable community locations
- Minimal operating labor

■ Drawbacks

- Limited geographic coverage
- Siting arrangements and fees
- Higher cost for installation and service



What is a NOMS? – Input Portable Noise Monitoring

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- **Attributes**
 - Self-contained monitor, data storage, power
 - Capabilities identical to permanent units

- **Benefits**
 - Unlimited monitoring locations
 - Measure on demand
 - Low purchase and service costs

- **Drawbacks**
 - Labor intensive
 - Data comparability
 - Security



What is a NOMS? – Output Reports

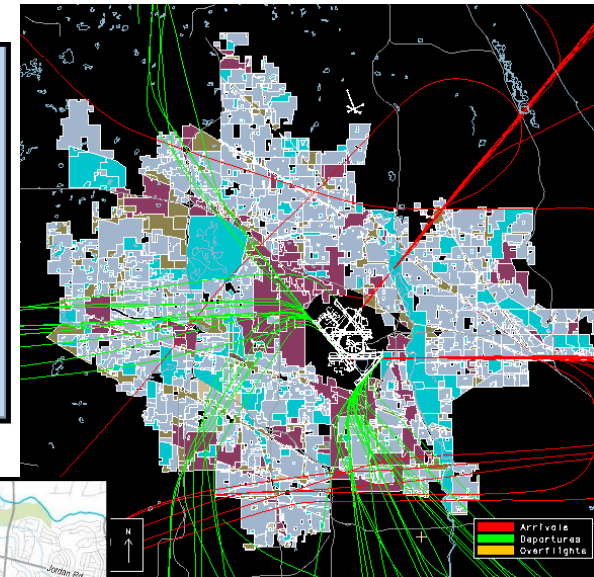
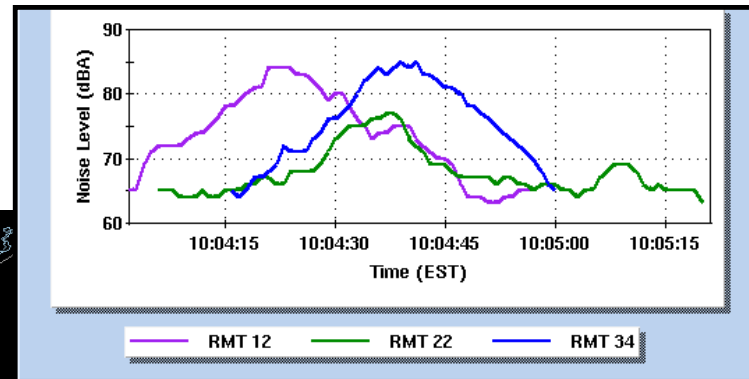
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- **The types and number of reports are limited only by the data in the system**
 - Daily, monthly, quarterly, and yearly DNLs
 - Single-event noise above pre-set threshold
 - Runway use by time of day
 - Landings by aircraft type
 - Flights in or out of corridors
 - Complaints (by location, time, cause, etc.)
 - Operations by hour, runway, etc.
 - And more...

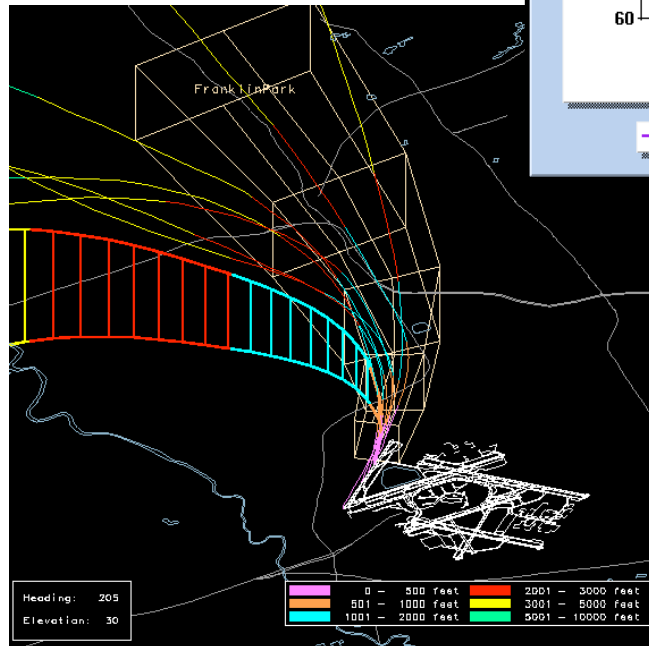
What is a NOMS? – Output Extensive Standard Features

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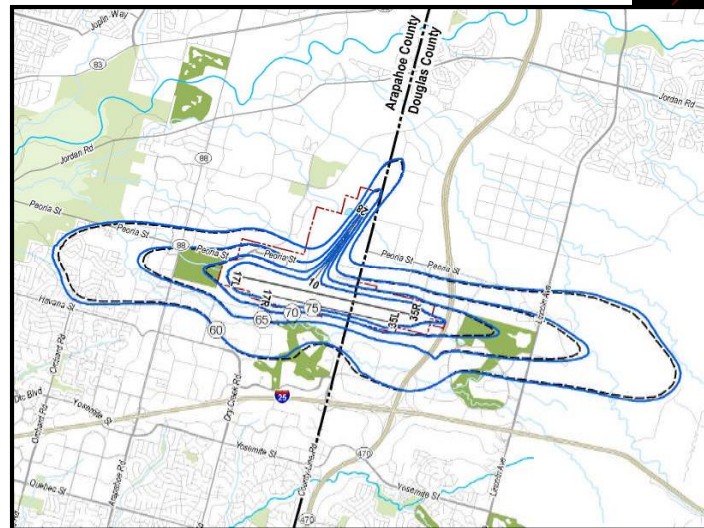
Event analysis



Mapping



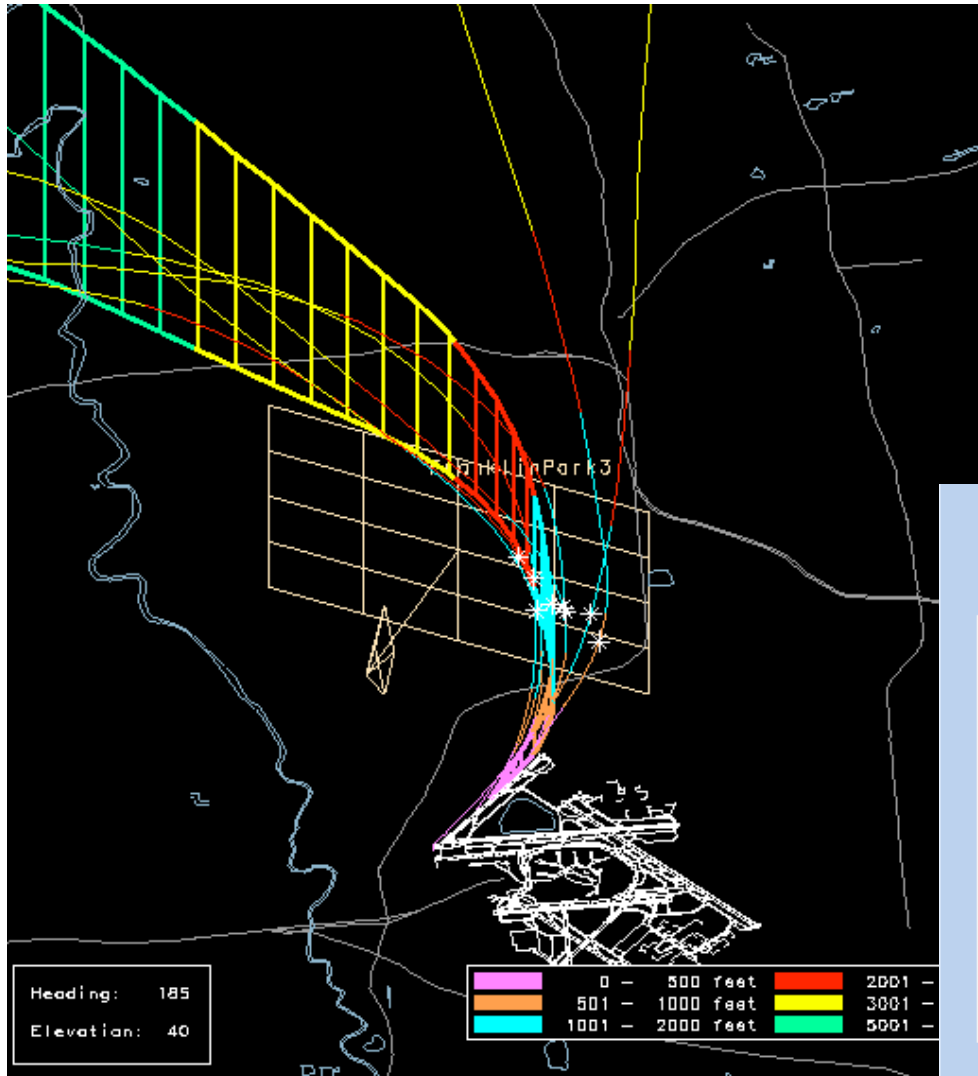
Profiles, gates, and corridors



Modeling support

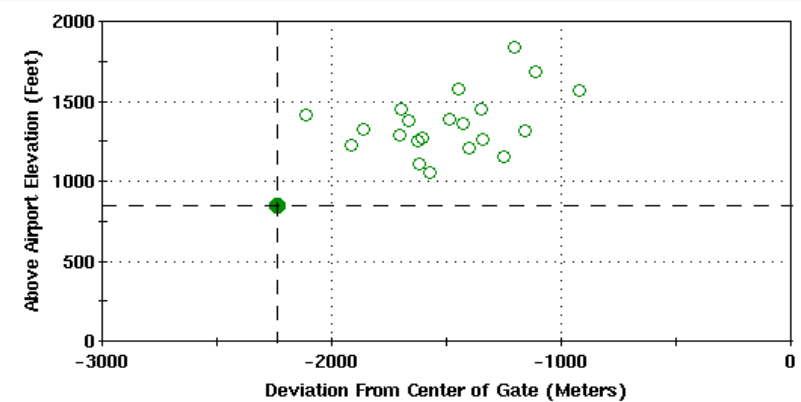
What is a NOMS? – Output Gate Analyses

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- Detect aircraft flying through an area
- Determine altitudes over communities
- Measure distances from a desired point

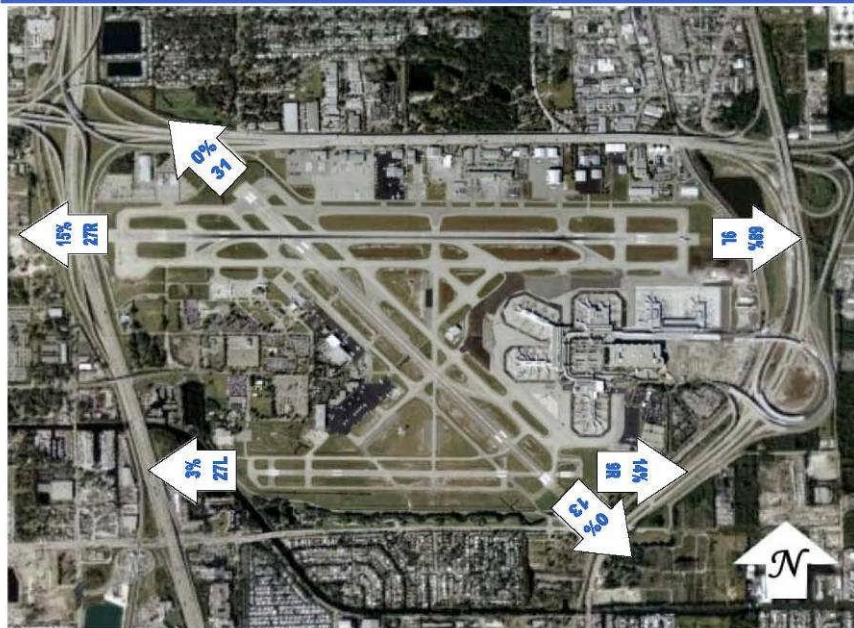
Chicago O'Hare Intl Airport
Penetration Gate Plot for Gate FranklinPark3
Wednesday, November 19, 1997 00:00 - 07:00
23 Tracks Crossed Gate: Left = 23 (100.0%), Right = 0 (0.0%)



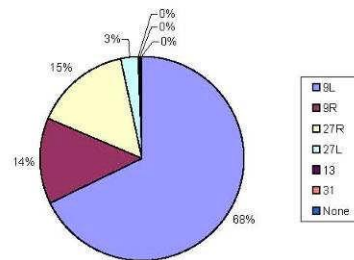
What is a NOMS? – Output Operations Summaries

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Runway Use Summary Report
Departure Runway Use for All Aircraft Types
Second Quarter 2006 (April 1 - June 30)

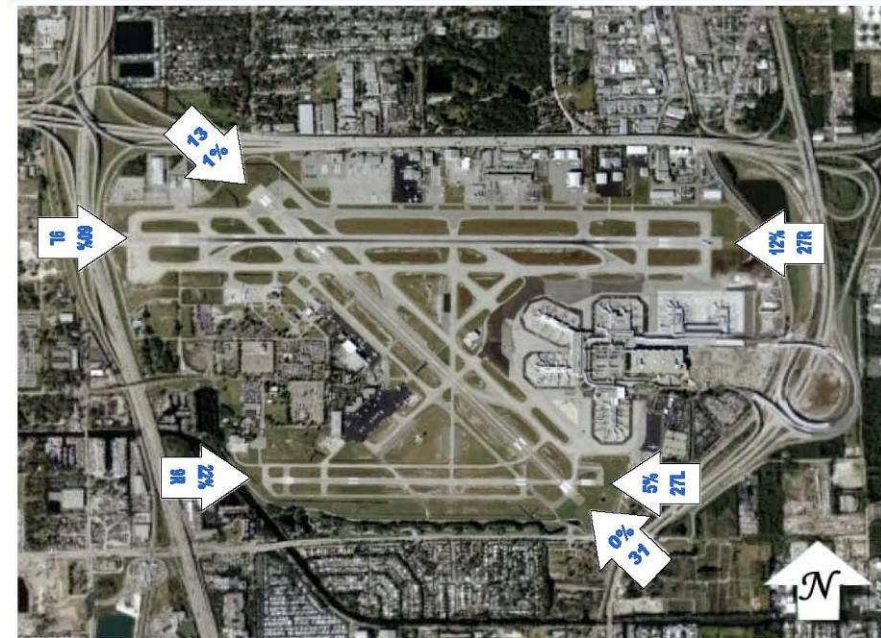


Runway	Departures
9L - North runway, east flow	26452
9R - South runway, east flow	5338
27R - North runway, west flow	5942
27L - South runway, west flow	1101
13 - Diagonal runway, south flow	136
31 - Diagonal runway, north flow	61
None identified	1

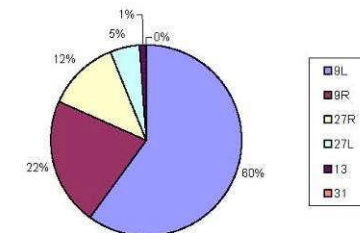


Partnership for Quieter Skies

Runway Use Summary Report
Arrival Runway Use for All Aircraft Types
Second Quarter 2006 (April 1 - June 30)



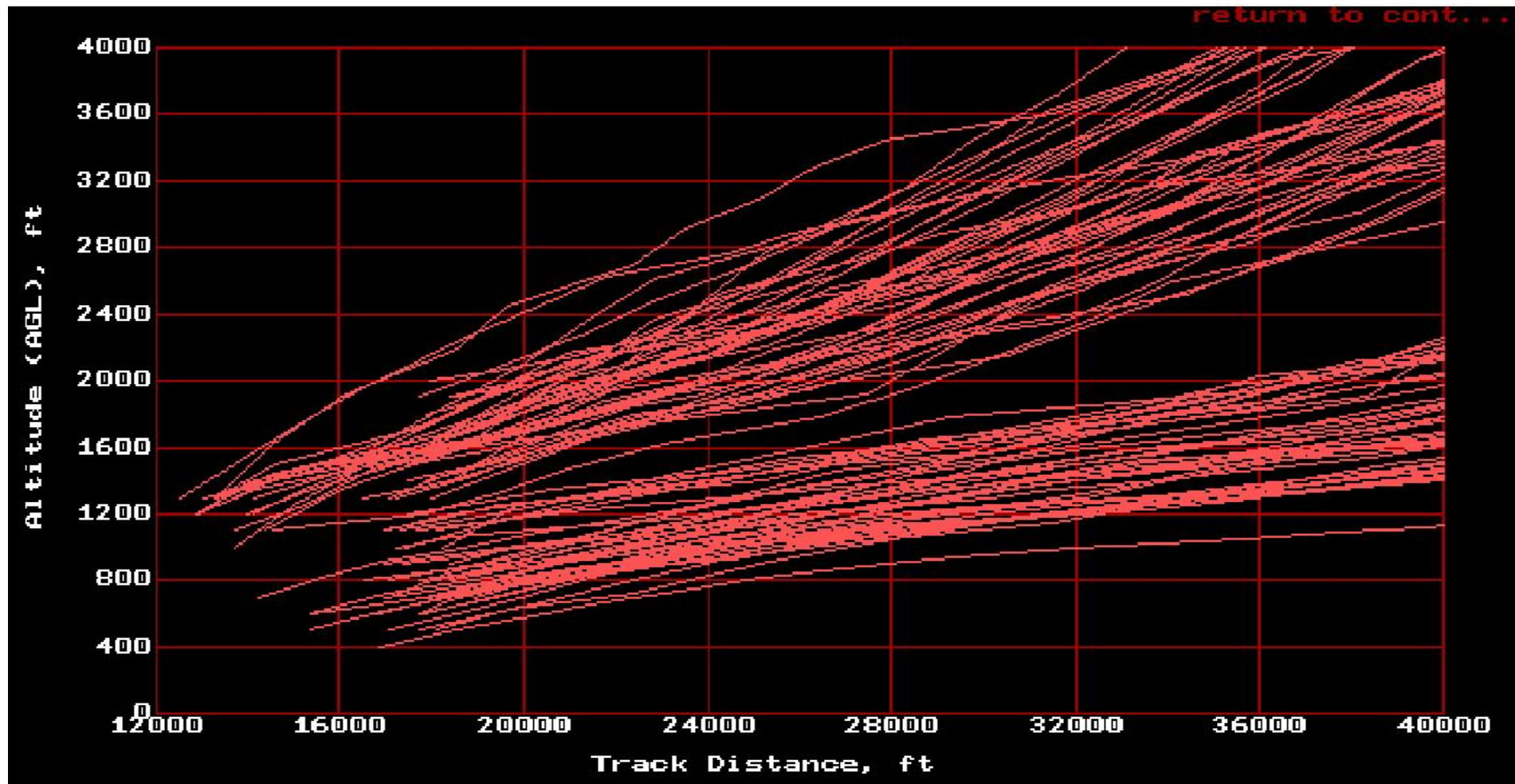
Runway	Arrivals
9L - North Runway, east flow	21596
9R - South Runway, east flow	7813
27R - North runway, west flow	4420
27L - South runway, west flow	1721
13 - Diagonal runway, south flow	420
31 - Diagonal runway, north flow	13



Partnership for Quieter Skies

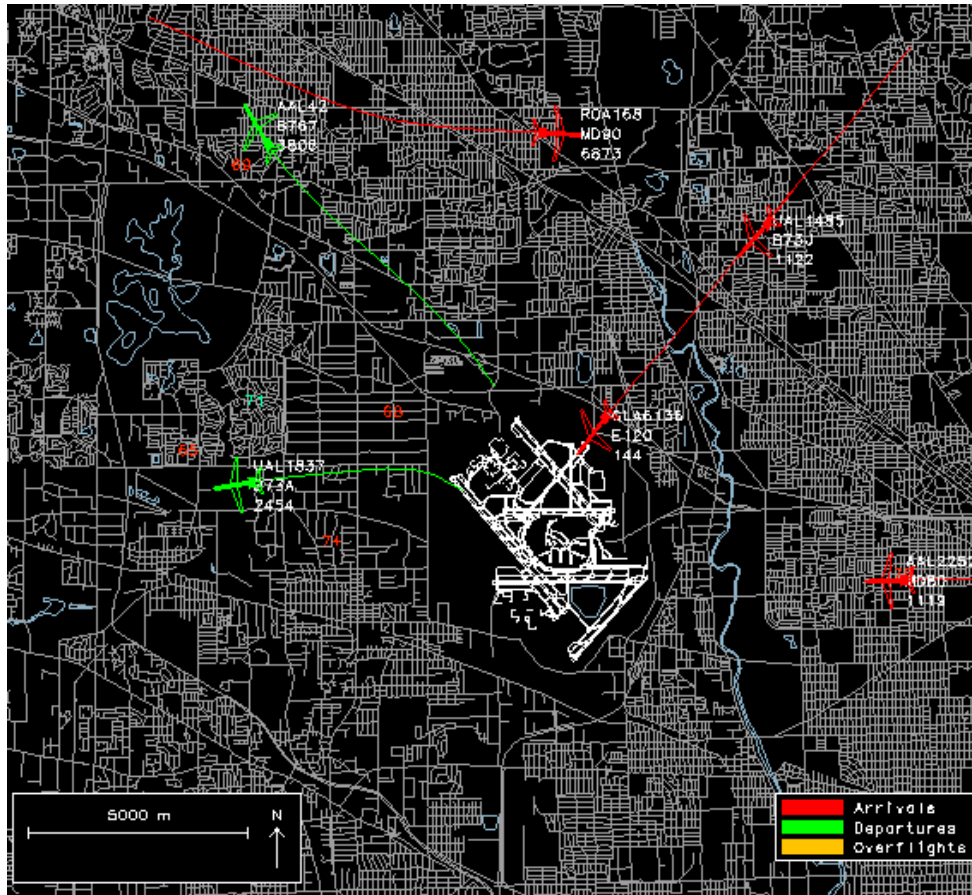
What is a NOMS? – Output Monitor Jet Noise Abatement Departure Profiles

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What is a NOMS? – Output Animated Replays

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- Analyze flights and noise levels
- View in 2D or 3D
- DVD controls
- Web options

Data Start Time:	11/19/97 09:50:00
Data End Time:	11/19/97 10:00:00
Replay Current Time:	11/19/97 09:59:03
Replay Elapsed Time:	00:09:03

Replay Speed (seconds of data / clock second):
1

Navigation buttons: Previous, Stop, Play, Next

Buttons: Load... Properties... Reset Dismiss

What is a NOMS? – Output Simplified/Automatic Noise Contour Preparation

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Tracks to Contours

Contour Type:

Contour Type:

Start Date (Month/Day/Year): End Date (Month/Day/Year):

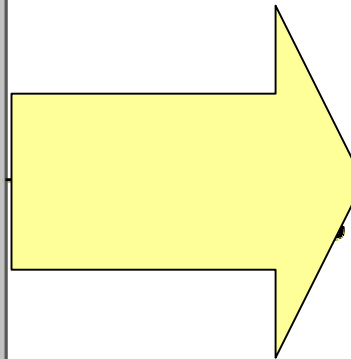
Description:

Noise Metric:

Noise Metric: Time of Day:

40%

Loading...



Flight Tracks
& Operations
Database

INM
Database

Noise
Model
Engine

Example of NOMS Conceptual Design

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Input

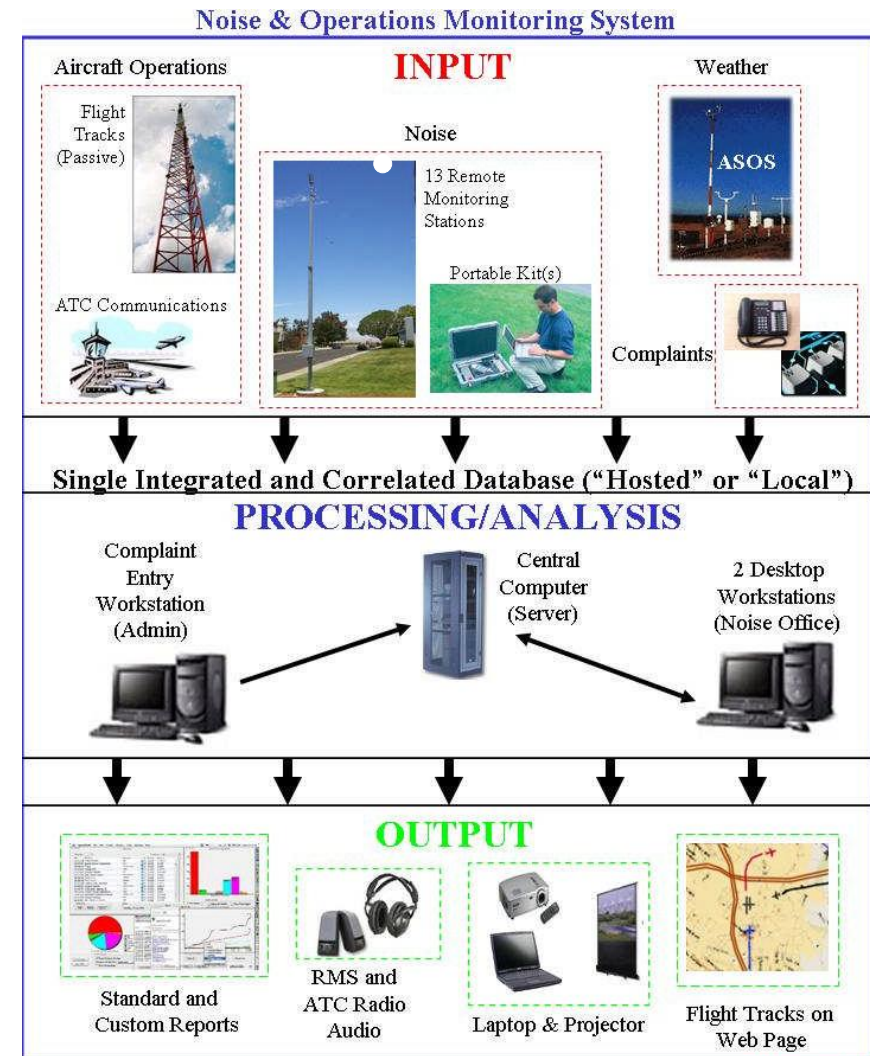
- Flight track source
- ATC radio monitoring
- Permanent noise monitors
- Portable noise monitors
- ASOS and wind data at RMS
- Complaints: phone & web

Processing

- One central computer
- Two workstation computers
- One data entry computer

Output

- Standard and custom reports
- RMS audio and ATC radio
- Laptop and projector
- Time-delayed flight tracks on the web



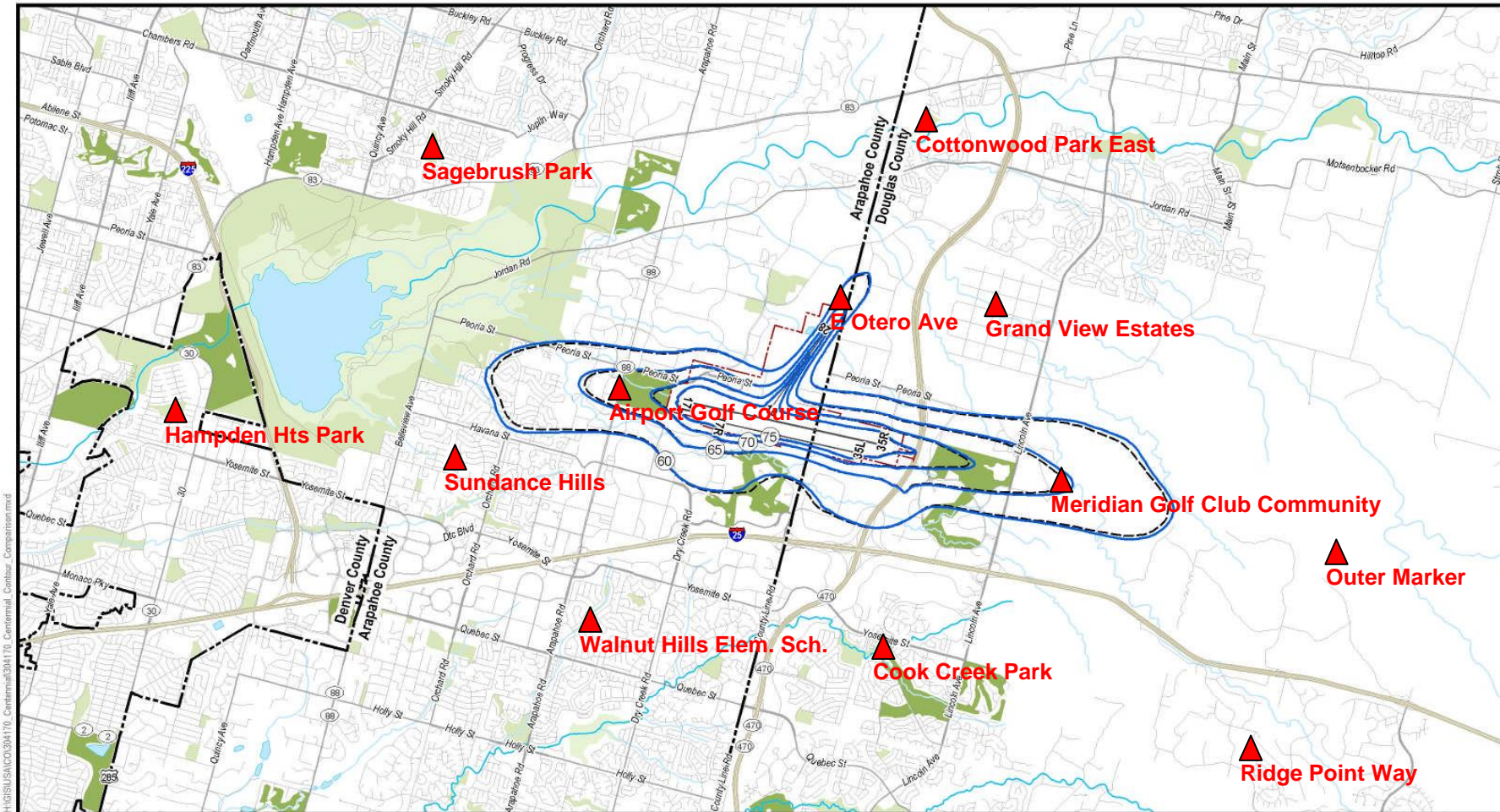
Prepared: October 2005

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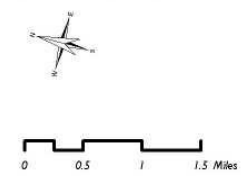
Centennial Airport NOMS Permanent Remote Monitoring Sites (12)



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HYGISUSA/C0304170_Centennial_Combour_Comparison.mxd



- Forecast 2012 DNL Contours
- Existing 2006 DNL Contours
- Parks and Open Space
- Golf Course
- ▲ Proposed Noise Monitor Sites

Proposed Noise Monitor Sites

Centennial Airport
Englewood, Colorado

Existing 2006 DNL Contour Compared to
Forecast 2012 DNL Contour

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Centennial Airport NOMS Acquisition Process



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- **Conceptual design** ←
- **Technical specification**
- **System procurement**
- **NOMS installation**
- **Acceptance testing**
- **System implementation**
 - Training, development of standard reports, etc.
- **Continuing support**
 - On-call vendor access
 - Upgrades to current software

Questions

Contact: Gene Reindel
HMMH Vice President
(916) 368-0707
ereindel@hmmh.com

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