Data Collection and Processing

- LAX NOMAD SYSTEM
- Data automatically transmitted and stored
- Noise data correlated with flight track data
- Tool to Query and Display Flight Track and Noise Data
- Oracle Database

LAX

- 25 Noise Monitoring Stations
- Weather Monitoring Stations
- Integrated Audio Recorder

FAA

ACES & ARTS Flight Track data in San Diego (7 nm and 30 nm radar coverage)
Origin of Radar Signal

- FAA ASR-9 radar at each airport (two sensors at LAX) sends out radar interrogations and detects radar returns from all aircraft.
- ASR-9 data is collected in real-time by the FAA ARTS computer.
- ASR-9 determines the range and bearing of the aircraft based on the radar return, and receives altitude (as sensed by the aircraft’s altimeter) and transponder code from the aircraft.
Origin of Flight Identification

- FAA central computers collect flight plan information filed by airlines/pilots, and package this in an interfacility message (IFM) sent to the ARTS computer.
- IFM contains assigned transponder code, aircraft identification, aircraft type, scheduled time of operation, and other information.
ARTS Merges Data Streams

- By matching transponder codes, the ARTS computer in San Diego merges the ASR-9 aircraft positional data with the IFM aircraft informational data.
- ARTS data is displayed for Air Traffic Control personnel in maintaining safe and efficient flight operations.
- ARTS data is sent, via LAN, to an ARTS Gateway computer that serves as an access to authorized outside agencies.
ARTS Gateway

• LAWA has a Memorandum of Agreement with the FAA to obtain the ARTS data.
• LAWA computers in San Diego interface directly with the FAA computers in real-time via the ARTS Gateway.
LAWA ARTS Collection

- LAWNA Noise Management Section’s ARTS Collection and Editing System (ACES) was designed and installed by Dimensions International, Inc.

- A Bulk Collection Subsystem (BCS) in San Diego extracts data directly from the ARTS Gateway and converts polar positional coordinates to Cartesian coordinates (typical for airport noise monitoring systems).
LAWA ARTS Transfer

• A Display and Editing Subsystem (DES) in San Diego
  – gathers data collected by the BCS every day,
  – retains the data for three days (MOA-required aging period),
  – removes certain operations (e.g., military), and
  – filters based on range and altitude.

• The DES calls the Playback Only System (POS) at LAX every night, and sends the releasable data files for three LAWA airports.
Sample Text

View of a POS Releasable File

- File includes these fields:
  - Date/Time,
  - Aircraft ID,
  - Transponder code,
  - East-west and north-south distances from radar (in nautical miles),
  - Altitude (in hundreds of feet), and
  - Aircraft type

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LAWA ARTS Loading

- LAWA’s Noise and Operations Monitoring and Analysis Display (NOMAD) software gathers the POS releasable data and loads the ARTS data into a searchable, viewable database.
- Separate LAWA computers are needed to manage “short-range” and “long-range” ARTS data due to the significant volume of data.
Los Angeles World Airports has twenty-five noise monitors installed around the airport.

The noise monitors measure noise 24 hours per day, 365 days per year.

Noise data is collected by the NOMAD system and is matched to FAA radar data to determine which aircraft made which noise.
Noise Data Collection

• NOMAD software contacts each noise monitor via modem, starting at midnight, to download previous day’s noise data.
• Site to site noise and ARTS flight track correlation performed.
• Data exported to Oracle Database for report generation.
NOMAD
(Noise and Operations Monitoring and Analysis Display)

- Access aircraft operations, noise and complaint information
- On-screen review of available data
- User-defined filters for flexibility in analyzing data
- Standardized graphical environment
- Runs on high-speed UNIX workstation and emulated on PC
Data Availability

- **Noise Data:** 6 months maximum on-line; older data stored on tape--reload if necessary

- **Flight Data:**
  - 7 nm data: 6 months maximum on-line; for older data, only header/ID data exported and stored on tape
  - 30 nm data: 3 months maximum on-line; for older data, only raw ARTS 3E files stored on tape
NOMAD Main Screen
NOMAD Noise Query

- Noise Query allows NOMAD users to search for noise events that meet different criteria:
  - date/time of event
  - all or specific noise monitoring stations
  - all noise data or specific range, duration
NOMAD Noise Detail

- Noise Detail allows NOMAD users to view detailed information for particular noise events, including associated flights.
NOMAD Track Query

• Track Query allows NOMAD users to search for flights that meet different criteria:
  – date/time of operation
  – departure/arrival/overflight
  – specific runway(s)
  – gate(s) penetrated
  – specific airline(s)
  – specific aircraft type(s)
NOMAD Track Detail

- Track Detail allows NOMAD users to view detailed information for particular flights, including altitude profile.
NOMAD Map Display
NOMAD Gate Query

- Use of two-dimensional gates allows NOMAD users to detect aircraft flying over particular neighborhoods and/or at a particular altitude.
NOMAD Reports

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Total number of penetrations: 3

Environmental Management Division
October 11, 2000
NOMAD “VCR” Tool

- VCR-style playback allows NMB to review all previous flight activity at any specific time of day.
Conclusion