UC Davis Aviation Noise and Emissions Symposium 2020

Community Group Meeting

SUNDAY MARCH 1, 2020

Agenda

- INTRO

Case Studies on Community Involvement

- Presentation:

Data Sources and Data Analysis Tools

Speakers:

Gene Reindel HMMH

Don Jackson The MONA Project

- Group Discussion

How to measure success, using risk management concepts as a framework
Moderator Jennifer Landesmann

Overview/Introduction of Data Sources

- Federal Aviation Administration
  - Flight track and aircraft identification data
    - National Offload Program (NOP) – no longer available in 2020
    - System Wide Information Management (SWIM)
  - Aircraft operations data
    - Historical: Air Traffic Activity System (ATADS)
    - Forecast: Terminal Area Forecast (TAF)
- Airport Noise and Operations Monitoring System
  - Flight tracks and aircraft identification data
  - Weather data
  - Complaint data
  - Noise measurement data
  - Public web portals

The Metroplex Overflight Noise Analysis Project (MONA)

- Principals:
  - Juan J. Alonso, Don Jackson, Tom Rindfleisch

- Objectives/Goals:
  - Provide objective **data**, **reports**, and **analyses** to **stakeholders** and **policy makers** to inform decision making
    - **Objective**, **factual**, **archival, real-time** measurements of SF Bay Area regional aircraft traffic and the resulting ground noise impact
    - **Public, web-accessible visualizations** and **analyses of data** to facilitate **understanding** of observations and to **monitor changes** and anomalies, utilizing our archived measurements and collected data.

Data Sources: What Do We Collect?

- Aircraft positions and flights, sources:
  - ADS-B receiver network (real-time), using FlightAware with MONA enhancements
  - FAA SWIM data feeds for flight metadata (work in progress)
  - FAA historical RADAR records (via FOIA filings)
- Sound level measurements, sources:
  - MONA Sound-Level Monitor (SLM) network (real-time)
- Other data sources:
  - FAA Coded Instrument Flight Procedures (CIFP): STAR/Approach/SID procedures, waypoints, airports, runways
  - FAA Registry:
    - Provides airframe, engine, and ownership
- All data/metrics are automatically transmitted to MONA servers, and ingested/archived into databases

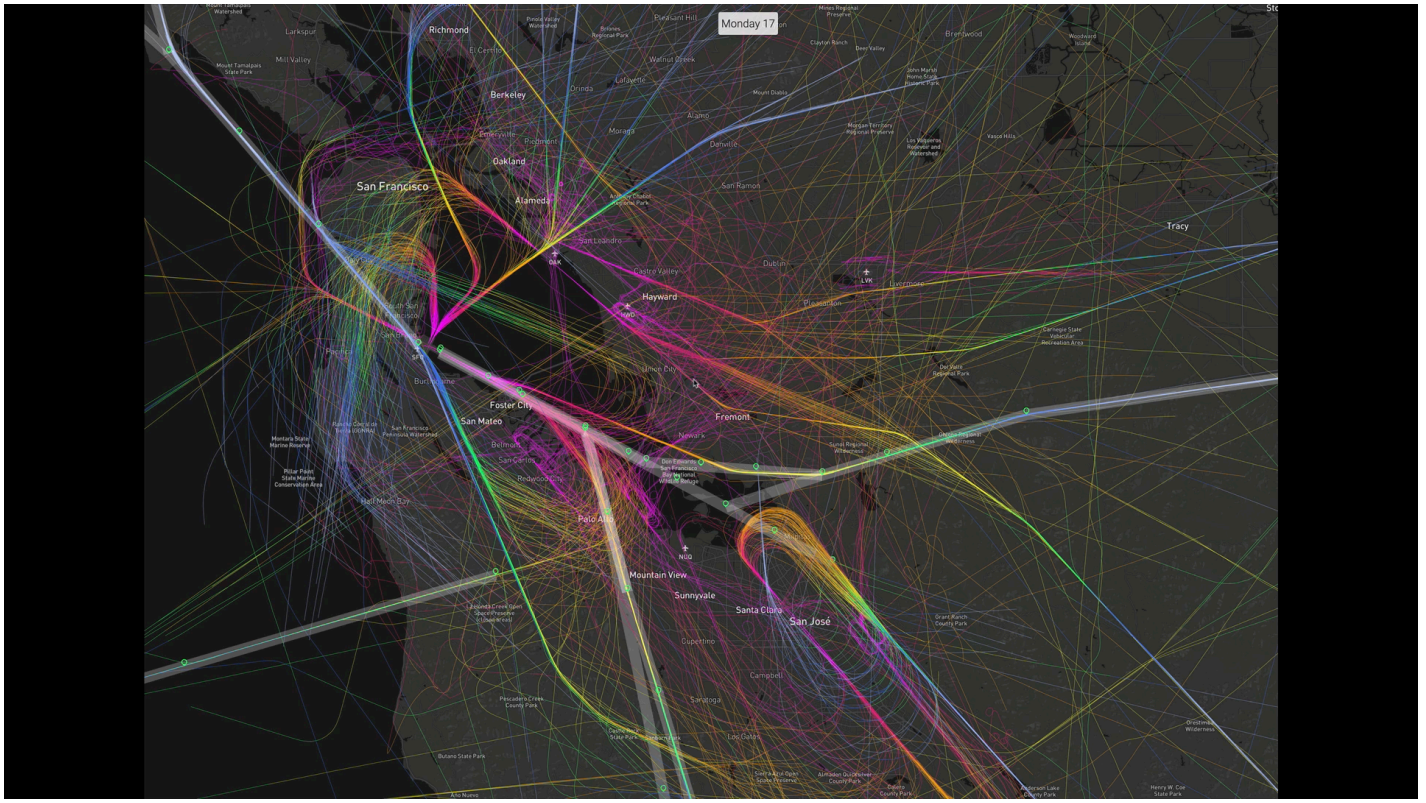
Example ADS-B and SLM Deployment

Co-located SLM Deployments: SFO and MONA

MONA Analysis and Reporting Tools

- Web application to visualize historic and real-time flight traffic/patterns
- Combine SLM measurements with aircraft position data to assign noise peaks with aircraft
- Automatically generate AEDT noise studies from actual flight tracks, and compare to measured sound levels (work in progress)

Visualization of Historic Flight Traffic/Patterns



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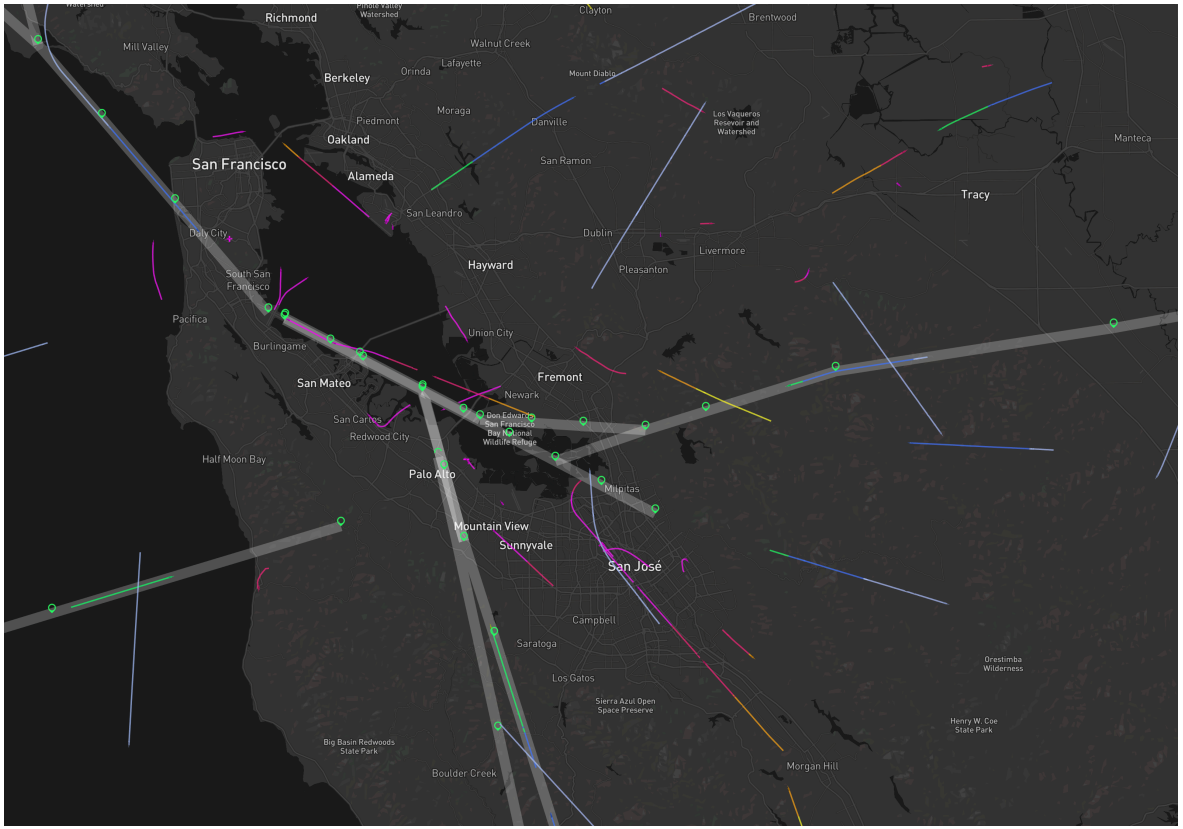
Real-Time Visualization of Aircraft Traffic



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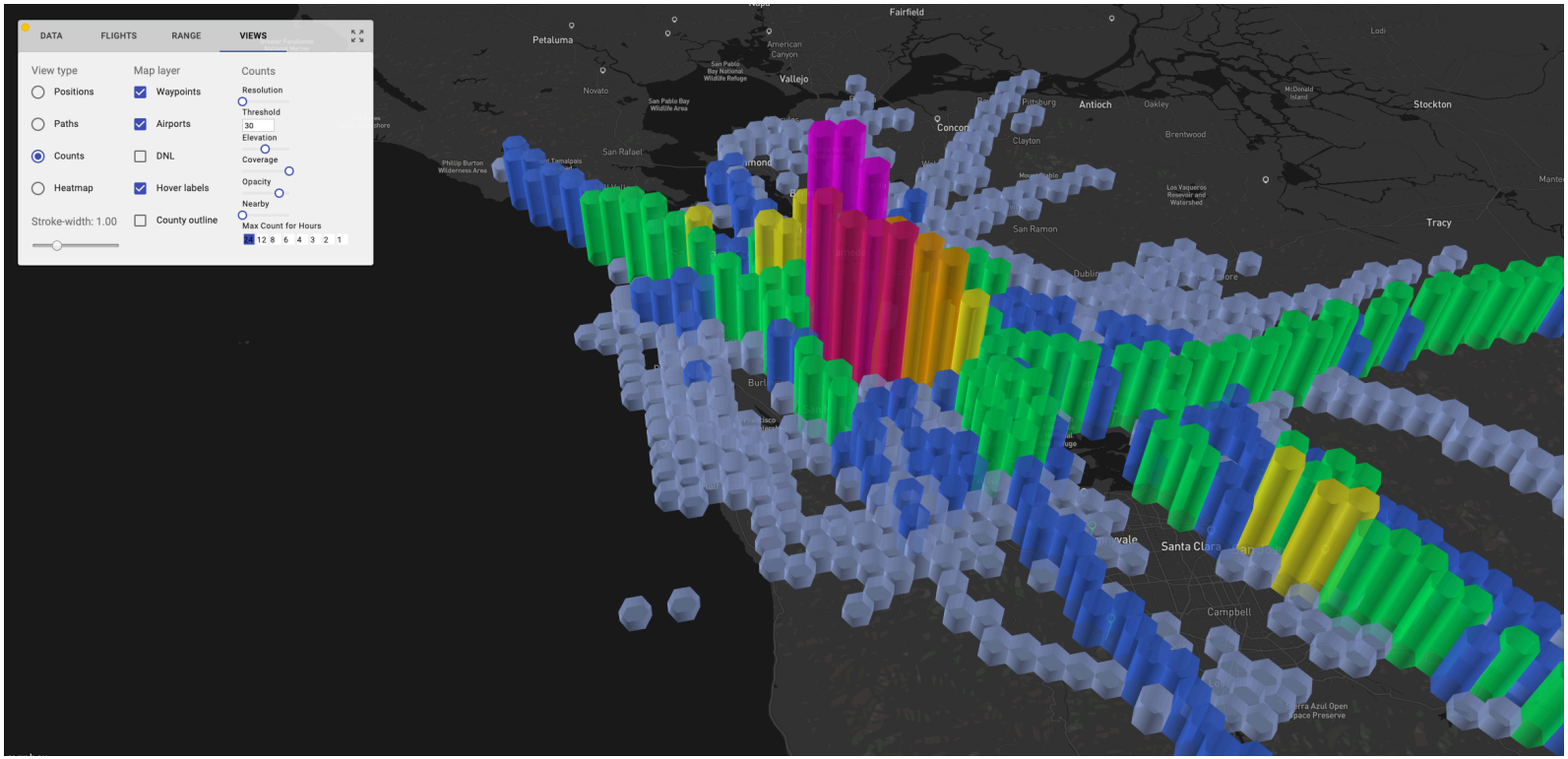
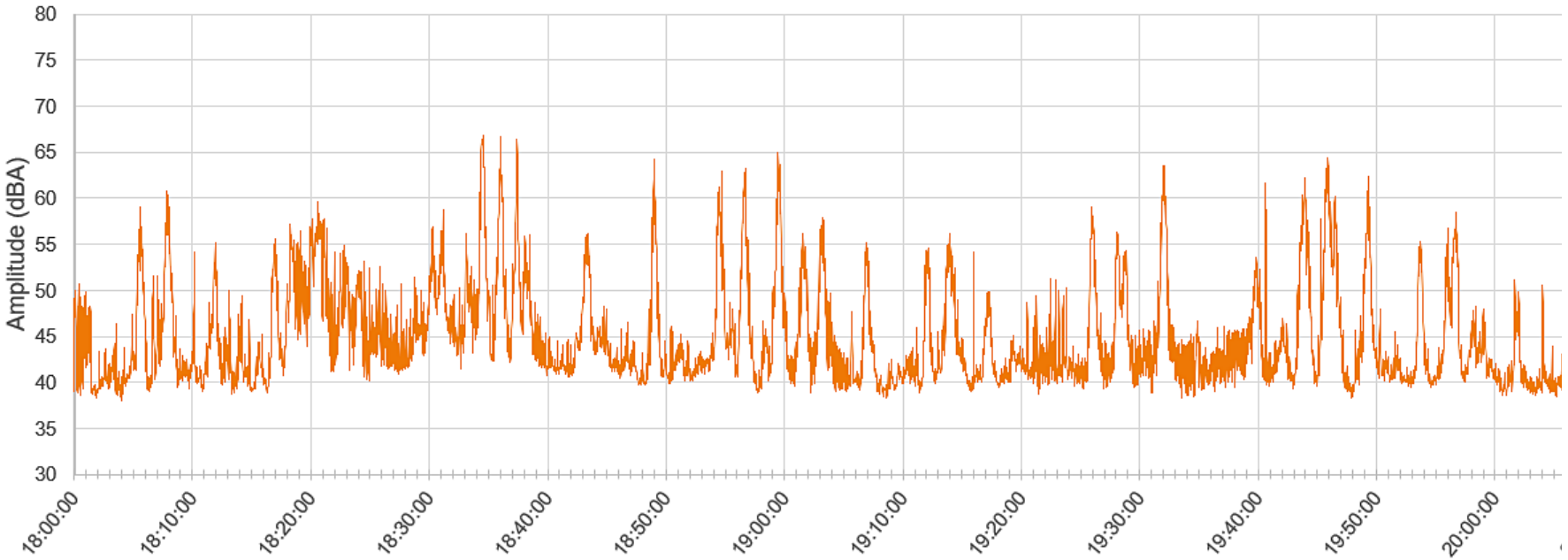
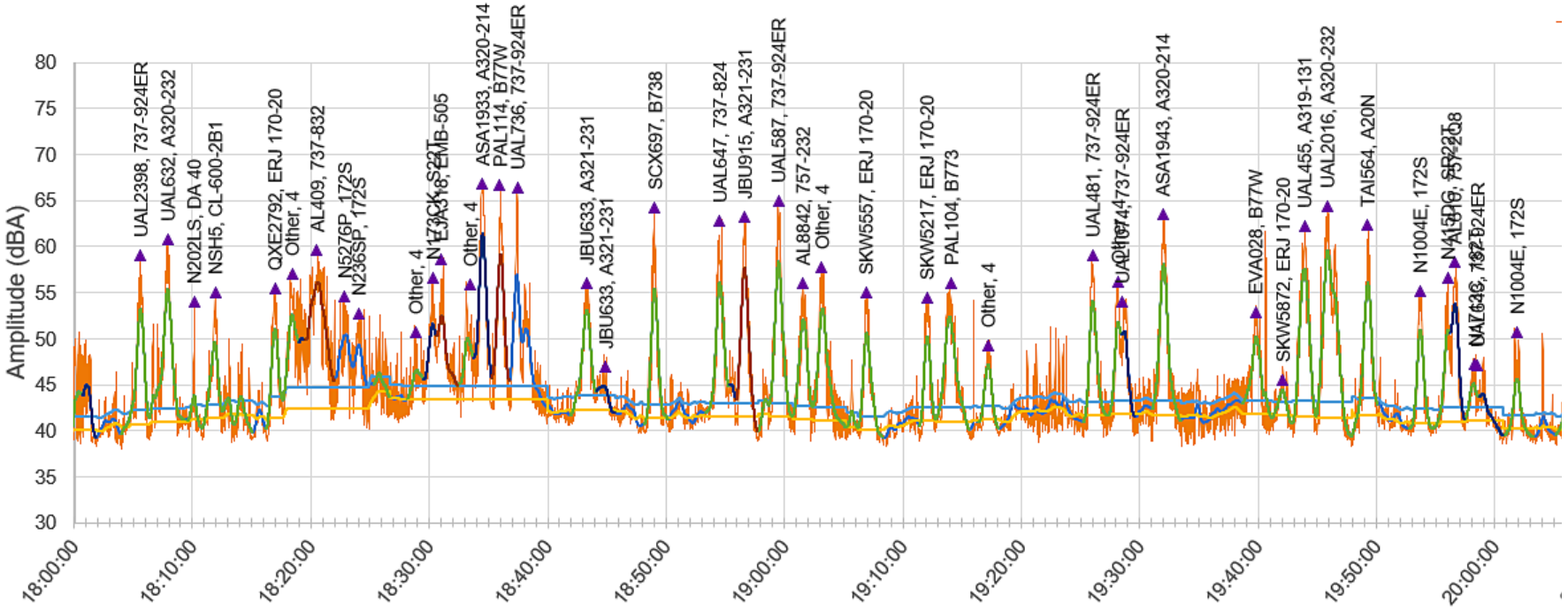
Aircraft Counts/Day Over Hexagonal Grid



Sound Profile Analysis: Raw Profile, 6/13/19



Processed Noise Profile, 6/13/19



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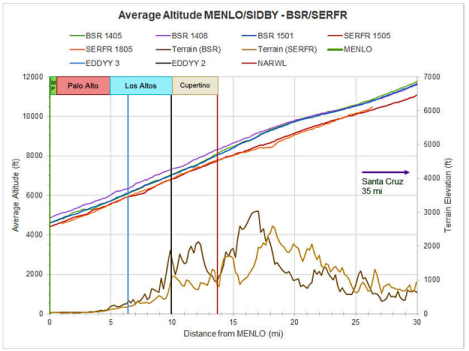
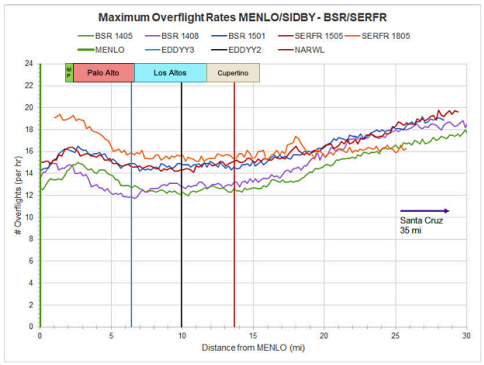
Example Analyses

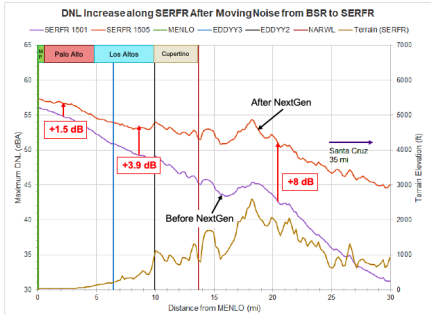
Average Altitudes along BSR/SERFR



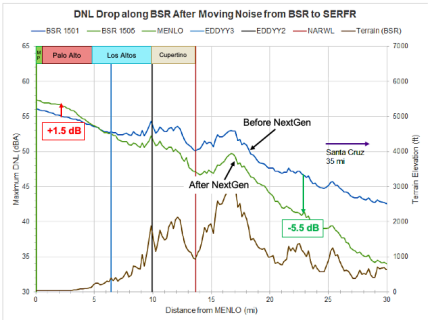
Average # Overflights/Hr along BSR/SERFR



DNL Increase on SERFR after BSR to SERFR



DNL Decrease on BSR after BSR to SERFR



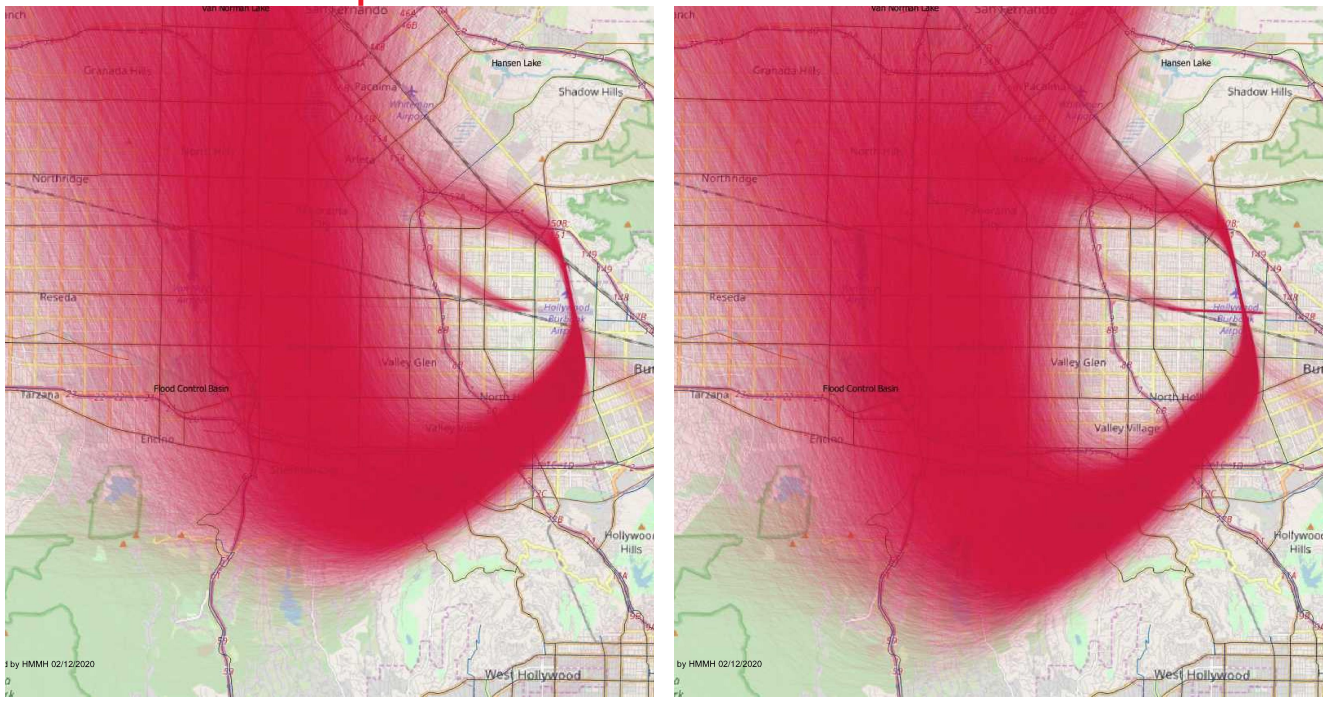
Data and Analysis Tools

- Visualization of flight tracks
- Flight track gates
- Flight track manipulation
- AEDT

Visualization of Flight Tracks

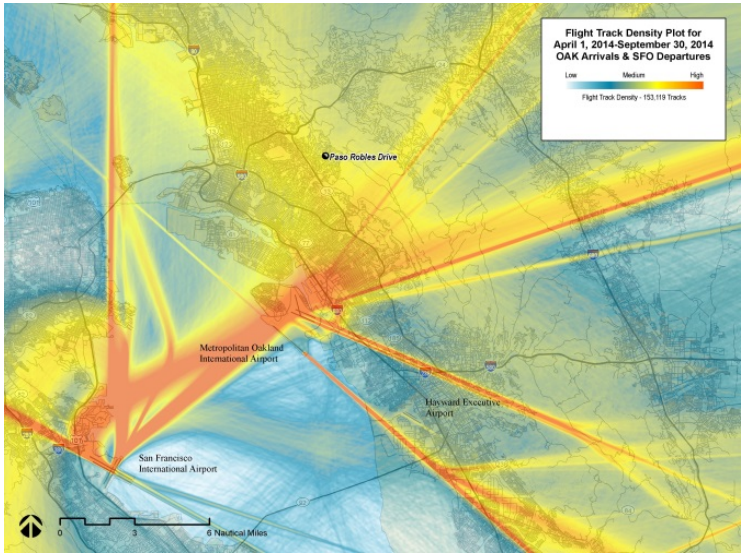
Full Year of Departure Flight Tracks Hollywood Burbank Airport

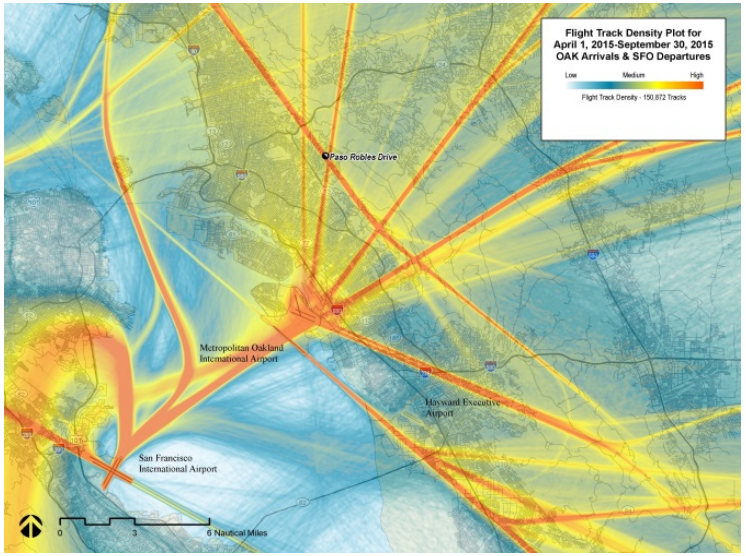
- 2007 on the left
- 2019 on the right



Flight Track Density Plots
SFO and OAK

- 2014 (Pre-Metroplex) on the left
- 2015 (Post-Metroplex) on the right

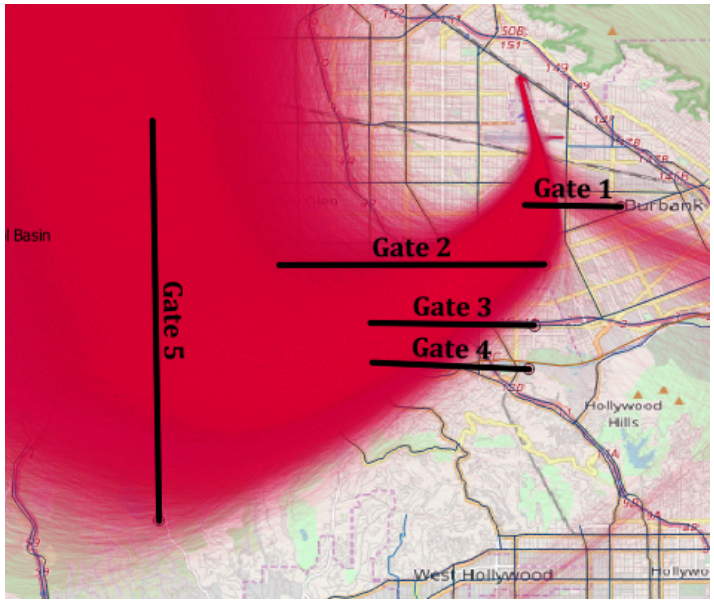




Flight Track Gates

Gate Analysis: Hollywood Burbank Airport Runway 15 Jet Departures

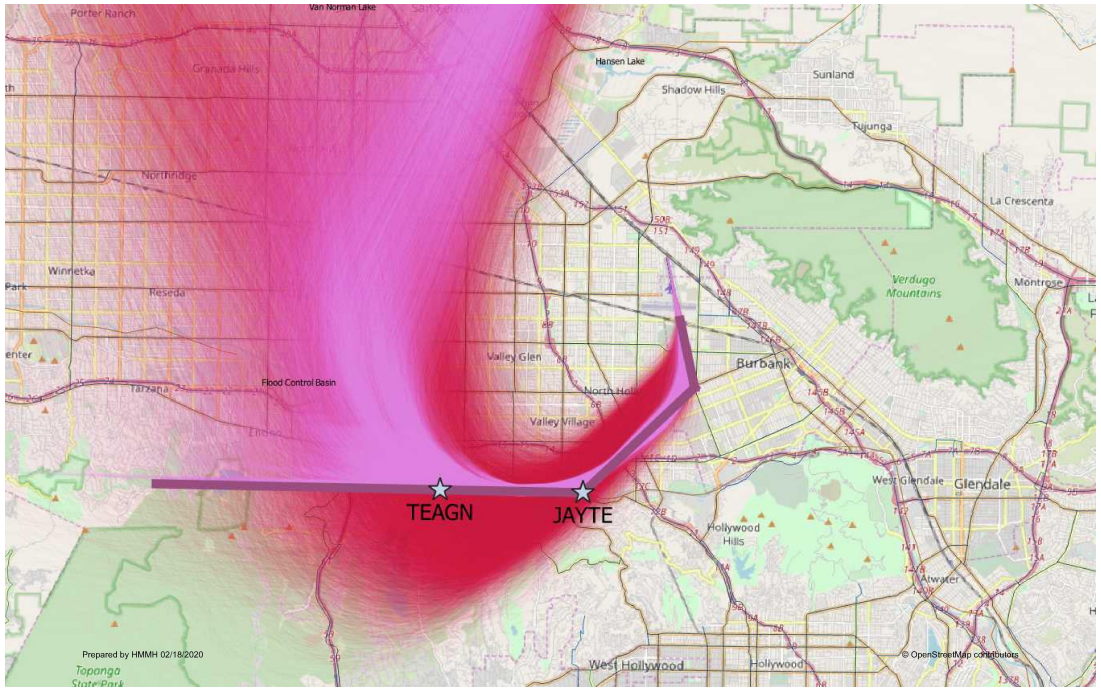
Gate	2007 Total Tracks	2007 Avg. Altitude (Ft. MSL)	2010 Total Tracks	2010 Avg. Altitude (Ft. MSL)	2015 Total Tracks	2015 Avg. Altitude (Ft. MSL)	2019 Total Tracks	2019 Avg. Altitude (Ft. MSL)
1	28,937	1,773	19,629	1,782	24,467	1,884	40,544	1,868
2	41,176	2,752	28,822	2,887	29,718	2,758	42,413	2,618
3	25,766	3,364	16,806	3,492	22,428	3,384	39,492	3,298
4	5,302	3,659	3,469	3,680	7,572	3,748	20,514	3,704
5	28,390	6,093	17,908	6,413	20,739	6,247	35,706	6,202



- Gate Placement:
  - Gate 1: Jeffries Ave/Luther Burbank Middle School (east/west)
  - Gate 2: W. Magnolia Blvd (east/west)
  - Gate 3: Highway 101 (east/west)
  - Gate 4: Ventura Blvd (east/west)
  - Gate 5: Van Nuys Blvd to Stone Canyon Reservoir (north/south)

Flight Track Manipulation

Flight Track Manipulation (Proposed RNAV) Hollywood Burbank Airport



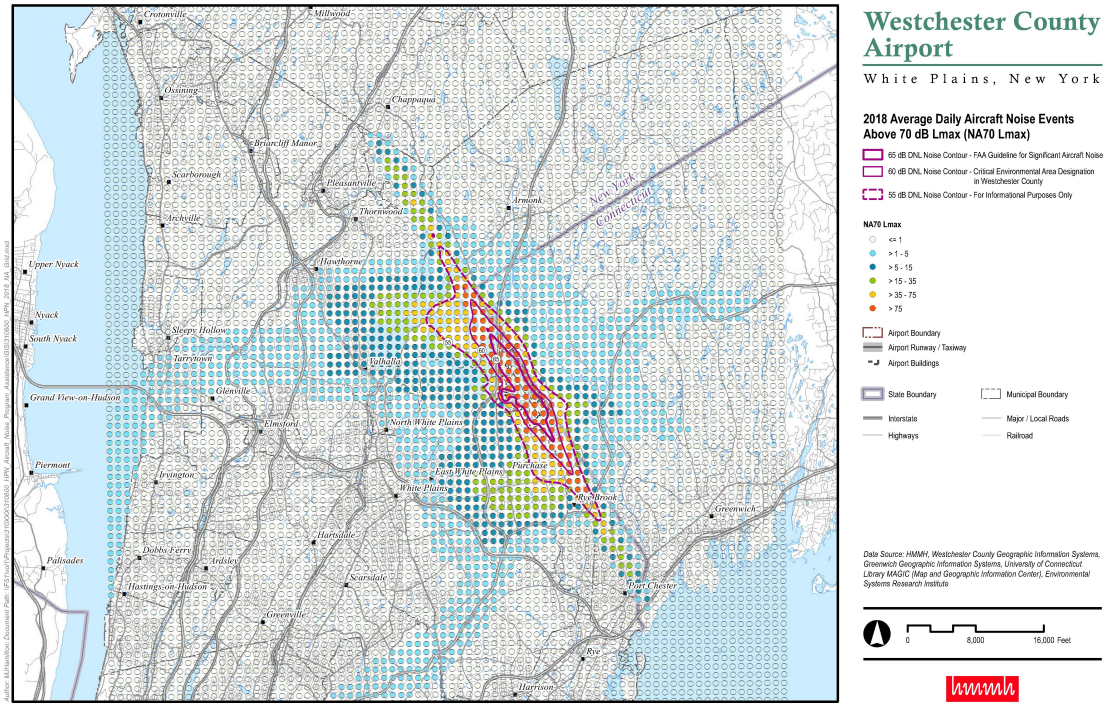
- Existing jet departure tracks from Runway 15 along with the FAA-proposed procedure from the October 2018 CatEx
- Showing approximation of aircraft flight tracks (purple) on the FAA's proposed procedure

AEDT

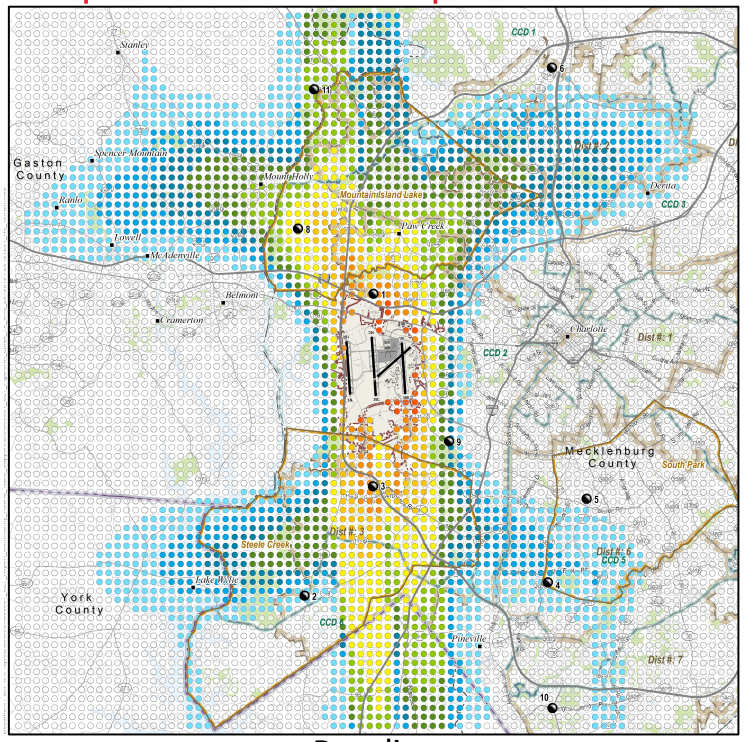
Federal Aviation Administration Aviation Environmental Design Tool (AEDT)

AEDT: Contours (DNL) and Grids (N70)

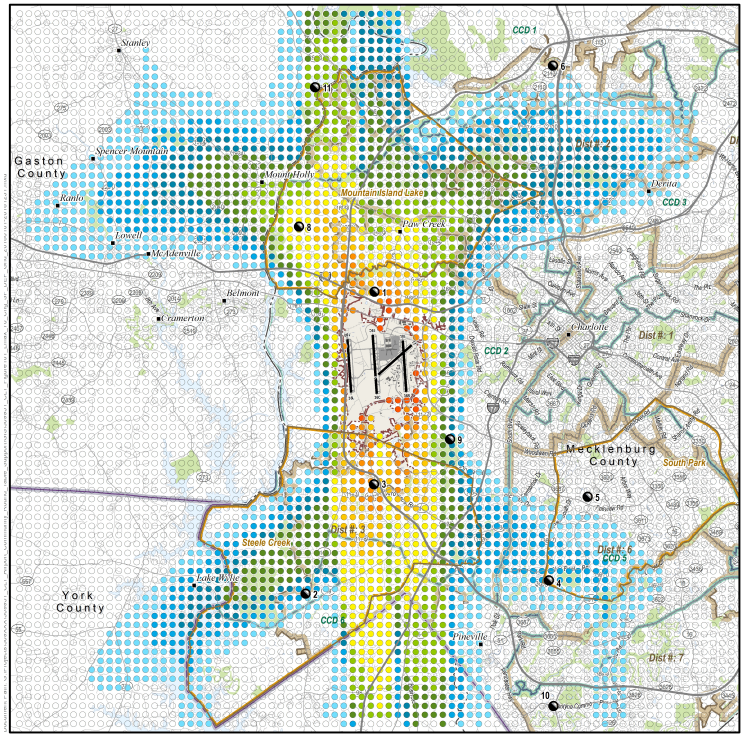
- Day-Night Average Sound Level (DNL) contours: 55, 60 and 65 dB
- Number of noise events above 70 dB
- Using a full year of flight track and aircraft identification data at Westchester County Airport (HPN)



Number of Noise Events Above 70 dB (N70) Analysis: 2018 Operations with Change in Initial Heading on South Flow Departures Compared to Baseline



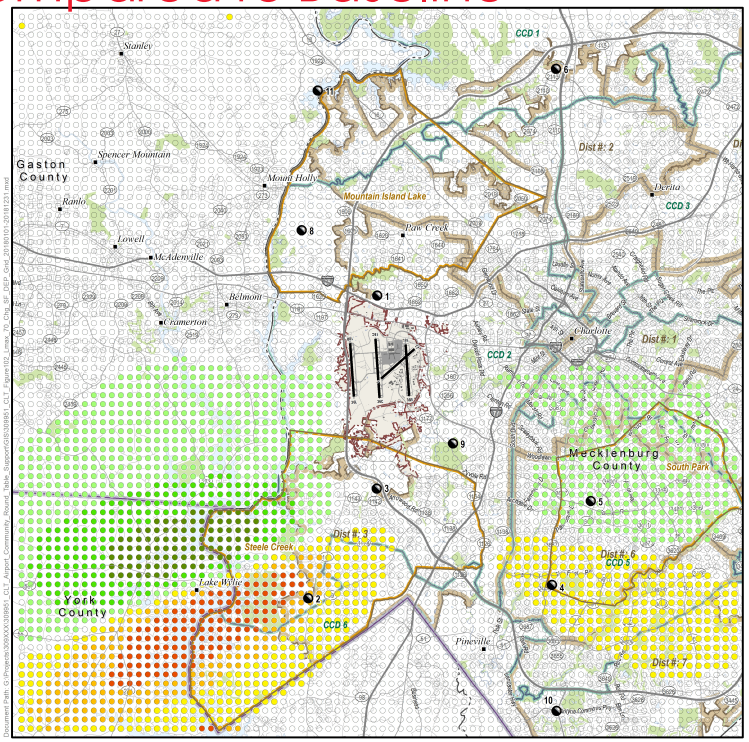
Baseline

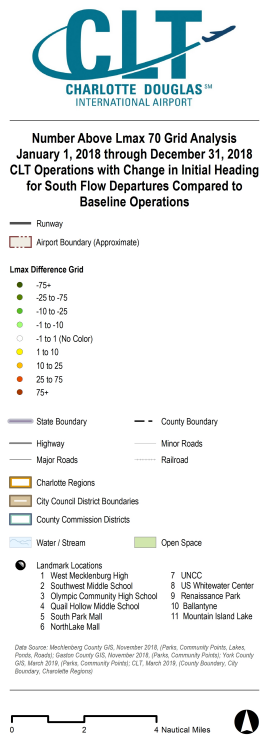


Modified

Number of Noise Events Above 70 dB (N70) Analysis: Difference – 2018 Operations with Change in Initial Heading on South Flow Departures Compared to Baseline

N70 Difference Interval (Events)	Count of Grid Points / % Change	Count of Population / % Change
Less than -75	0 / 0.0%	0 / 0.0%
-75 to -25	95 / 1.5%	2,659 / 0.4%
-25 to -10	194 / 3.1%	5,238 / 0.7%
-10 to -1	890 / 14.1%	104,091 / 14.1%
-1 to 1	4,285 / 68.0%	528,917 / 71.8%
1 to 10	531 / 8.4%	80,386 / 10.9%
10 to 25	176 / 2.8%	9,835 / 1.3%
25 to 75	130 / 2.1%	5,659 / 0.8%
Greater than 75	0 / 0.0%	0 / 0.0%
Total	6,301 / 100.0%	736,785 / 100.0%





- 1,179 Grid points (18.7%) / 111,988 people (15.2%) would experience fewer events above 70 dB Lmax with change in initial heading
- 837 Grid points (13.3%) / 95,880 people (13.0%) would experience more events above 70 dB Lmax with change in initial heading

Columbia University's Mailman School of Public Health

STUDY OF TNNIS FLIGHT PATH, QUEENS NY

A mathematical model conducted by a team from Columbia University Mailman School of Public Health compared the costs and quality-adjusted life years (QALYs) gained associated with reverting to pre-2012 flight patterns seen prior to the year-round use of TNNIS.

"**The Trade-Off between Optimizing Flight Patterns and Human Health: A Case Study of Aircraft Noise in Queens, NY, USA.**

Zafari Z[1,2], Jiao B[3], Will B[4], Li S[5], Muennig PA[6].

Discussion - How to measure success, A Risk Management Framework "TRAITS"

- TRACK
- REPORT
- ANTICIPATE
- INTERVENE
- TEST
- SHARE