Aviation Noise Working Group
Facilitator's Meeting Summary

March 9, 2020; 5:30 pm – 7:30 pm
ZOOM VIDEOCONFERENCE

Attendee	Interest Represented
Steve Osterdahl	Alaska Airlines
Chris Schaffer	FAA
Marco Milanese	Port of Seattle
Vince Mestre	L&B
Scott Ingham	Delta Air Lines
Jennifer Kester	SeaTac
Stan Shepherd	Port of Seattle
Justin Biassou	FAA
Scott Kennedy	Alaska Airlines
Mark Hoppen	Normandy Park

Additional Participants: Brad Nicholas, HMMH
Facilitator: Phyllis Shulman, Civic Alchemy
Note Taker: Amanda Murphy, Amanda Gray Consulting

Meeting Objectives:

To provide an update on and provide input on the Ground Noise Analysis. To discuss the Terminal Flight Data Manager program. To review and discuss additional analysis completed as part of the Noise Abatement Departure Profiles Study. To provide a briefing on the Aviation Noise and Emissions Symposium.

Meeting Summary

Update on Ground Noise Analysis
Brad Nicholas, HMMH

Nicholas provided an update on the Ground Noise Analysis work to date. The update included:

- Completed collection and analysis of flight and run-up statistics
- Created air carrier survey
- Identified initial sites for ground noise monitoring
- Created draft noise monitoring protocol
- Identified and trained staff for data collection
- Began internal planning for analysis methods to identify mitigation options

Nicholas reviewed the three monitoring program goals, program methodology, potential sources of noise, and proposed noise monitoring sites.

Goals:

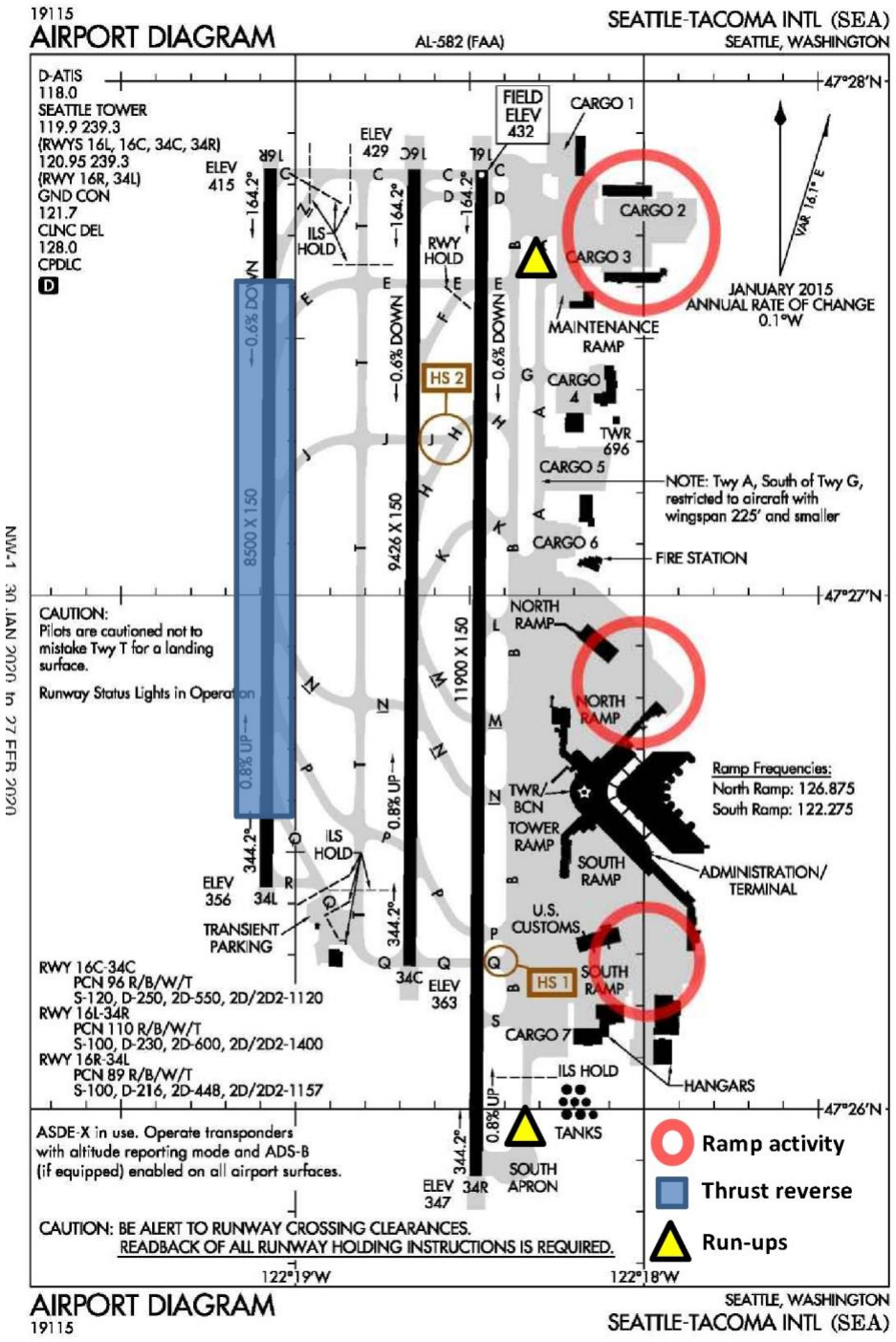
- Provide temporary noise monitoring east and west of airport to obtain data not captured by the permanent monitors.
- Identify aircraft types that may cause unusual ground-based noise.
- Capture noise levels from various operating scenarios including north flow, south flow, taxiway noise, ground run-ups and any other sources identified.

Monitoring Program Methodology:

- Measure at approximately five sites over five days
- Collect time histories recordings and observer logs (including airfield observations)
- Analyze results to determine frequency of various aircraft activities and their typical noise levels in noise sensitive locations
- Includes the capability to go back and listen to recordings and check the source
- Direct observations will be utilized along with statistics for identifying noise sources

Ground Noise Monitoring Sources: (see diagram below)

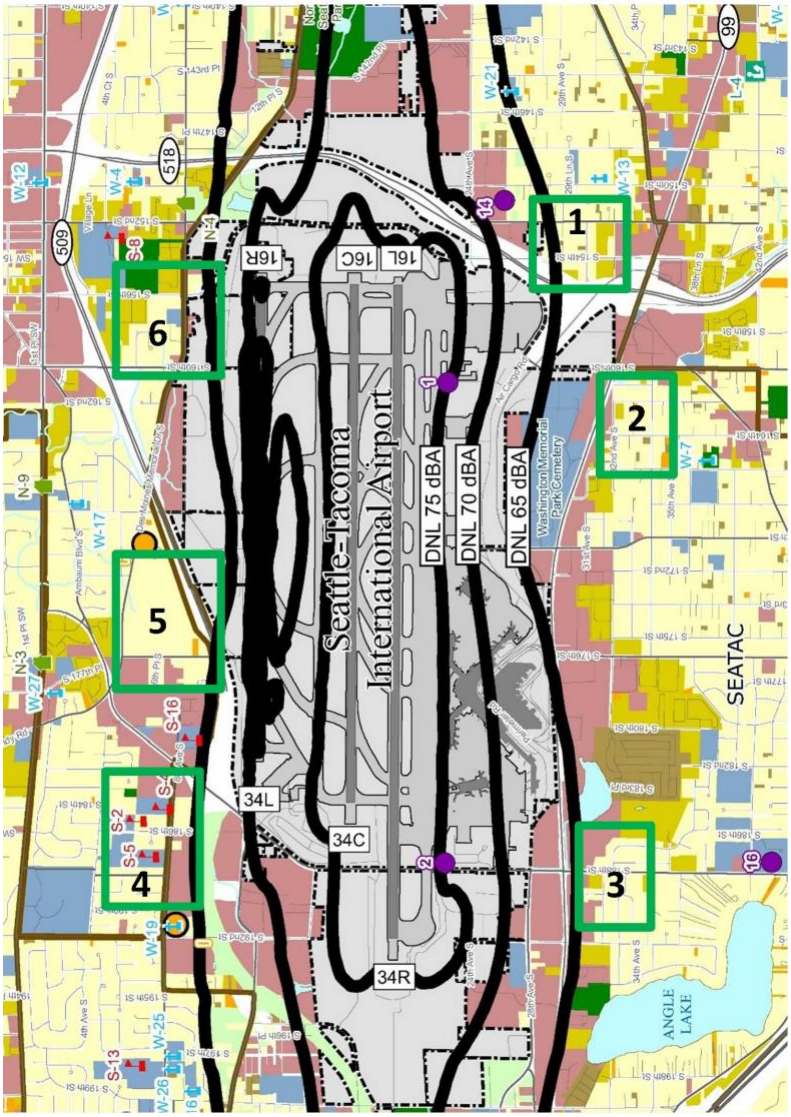
- Aircraft taxiing/idling
- Auxiliary Power Units (APUs)
- Ground service equipment
- Reverse thrust
- Engine maintenance run-ups


19115
AIRPORT DIAGRAM
SEATTLE-TACOMA INTL (SEA)
SEATTLE, WASHINGTON
AL-582 (FAA)
D-ATIS
118.0
SEATTLE TOWER
119.9 239.3
(RWYS 16L, 16C, 34C, 34R)
120.95 239.3
(RWY 16R, 34L)
GND CON
121.7
CLNC DEL
128.0
CPDLC
FIELD ELEV 432
47°28'N
47°27'N
47°26'N
122°19'W
122°18'W
CARGO 1
CARGO 2
CARGO 3
MAINTENANCE RAMP
CARGO 4
TWR 696
CARGO 5
CARGO 6
FIRE STATION
NOTE: Twy A, South of Twy G, restricted to aircraft with wingspan 225' and smaller
JANUARY 2015
ANNUAL RATE OF CHANGE
0.1°W
VAR 16.1° E
ELEV 429
ELEV 415
16R
16L
ILS HOLD
RWY HOLD
164.2°
0.6% DOWN
HS 2
8500 X 150
9426 X 150
11900 X 150
CAUTION:
Pilots are cautioned not to mistake Twy T for a landing surface.
Runway Status Lights in Operation
0.8% UP
344.2°
ELEV 356
34L
TRANSIENT PARKING
34C
ELEV 363
NORTH RAMP
TWR/ BCN
TOWER RAMP
SOUTH RAMP
ADMINISTRATION/ TERMINAL
Ramp Frequencies:
North Ramp: 126.875
South Ramp: 122.275
U.S. CUSTOMS
HS 1
CARGO 7
HANGARS
ILS HOLD
TANKS
SOUTH APRON
ELEV 347
34R
RWY 16C-34C
PCN 96 R/B/W/T
S-120, D-250, 2D-550, 2D/2D2-1120
RWY 16L-34R
PCN 110 R/B/W/T
S-100, D-230, 2D-600, 2D/2D2-1400
RWY 16R-34L
PCN 89 R/B/W/T
S-100, D-216, 2D-448, 2D/2D2-1157
ASDE-X in use. Operate transponders with altitude reporting mode and ADS-B (if equipped) enabled on all airport surfaces.
CAUTION: BE ALERT TO RUNWAY CROSSING CLEARANCES.
READBACK OF ALL RUNWAY HOLDING INSTRUCTIONS IS REQUIRED.
Ramp activity
Thrust reverse
Run-ups
NW-1, 30 JAN 2020 to 27 FEB 2020
NW-1, 30 JAN 2020 to 27 FEB 2020
AIRPORT DIAGRAM
19115
SEATTLE, WASHINGTON
SEATTLE-TACOMA INTL (SEA)

Ground Noise Monitoring Sites:

- Main areas that experience noticeable aircraft ground noise
    - Close to ground operations
    - Where there is minimal shielding from buildings of ground operations
    - Low physical shielding from other noise sources
    - Within areas of residential land use

- Represent diversity of noise exposure
    - Areas that represent the geographic range of exposed communities
    - Experience the range of different ground noise sources



Ground Noise Study Next Steps will Include:

- Ground noise data research
    - Finalize operator survey including contact list, deploy survey, analyze results
    - Review ground run-up engine testing logs
- Noise Monitoring
    - Finalize schedule and sites
    - Conduct monitoring
    - Analyze results
- Identify Mitigation Options
    - Begin modeling set-up
    - Receive input from StART

Working Group participants asked a number of questions. Based on these questions, Nicholas provided some additional information including:

- Two consulting staff will be on site for the five days of monitoring moving between sites.
- Consultants will engage Port staff to identify airfield noise sources.
- Anticipated start is the first week of April (although that will be delayed due to COVID-19).

Terminal Flight Data Manager Overview

Justin Biassou, FAA Community Engagement Officer

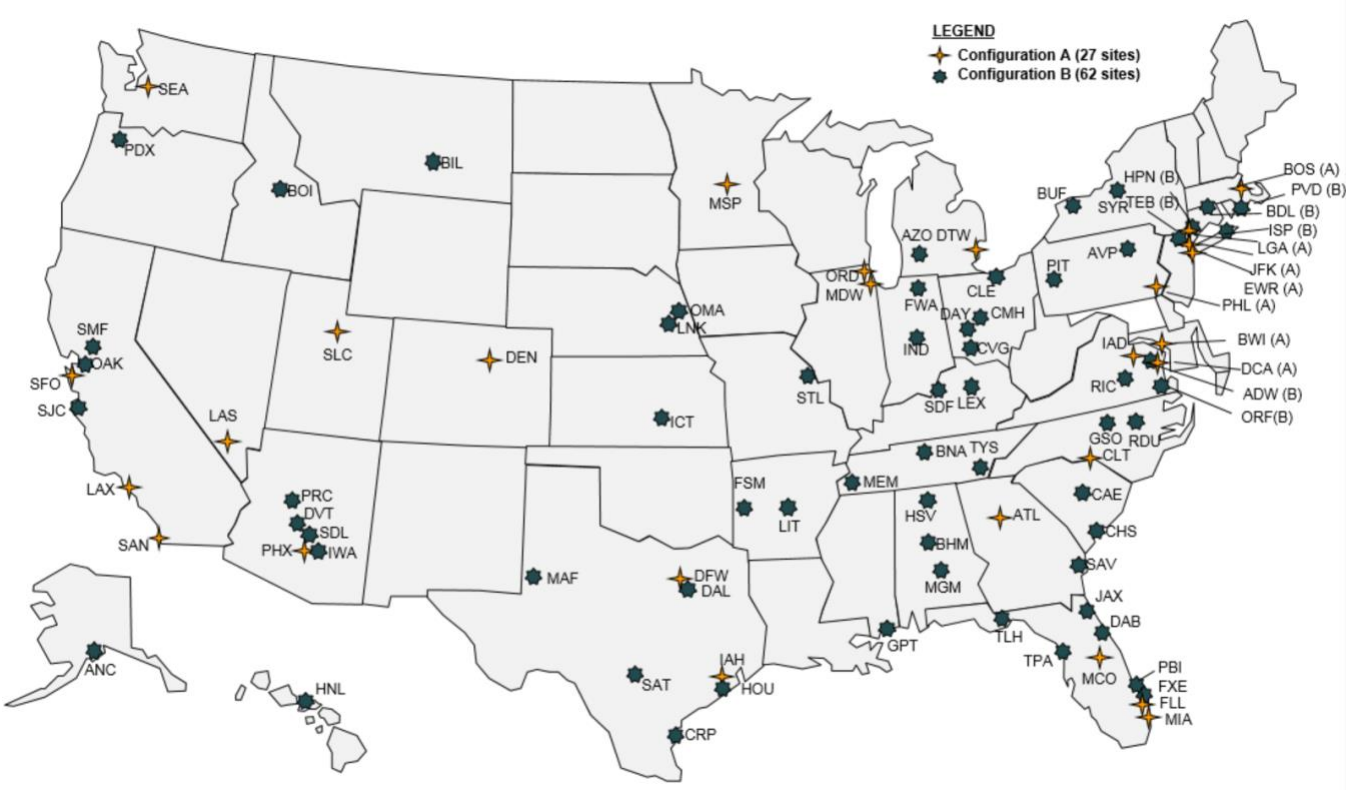
Biassou presented an overview of the Terminal Flight Data Manager (TFDM), which is part of the NextGen modernization of the National Airspace System. This newly developed system for surface management of aircraft is focused on increasing efficiency given limited ground space at airports. Biassou shared a video which explained the basics of TFDM. He explained that TFDM allows for arrivals and departures staging, manages surface traffic flow, provides stakeholders a shared awareness of flights on the ground, exchanges data electronically, and provides an updated picture of traffic volume.

The potential benefits will include:

- Improved predictability
    - Improves departure schedule prediction
    - Maximizes airport efficiency
    - Reduces taxi-time delays
- Collaborative decisions
    - Provides a departure scheduler and surface metering capability
- Environmentally friendly
    - Reduces taxi times
    - Reduced delays and missed connections
    - Reduced emissions and noise pollution due to less flights awaiting gates
    - Fuel savings
- System modernization
    - Electronic flight strips
- Improved safety
    - Reduced operational safety risk by increasing controllers heads up time

Deployment is scheduled in two phases, Configuration A (27 sites) and Configuration B (62 sites). Configuration A is for large, high density airports. SEA is considered a Configuration A airport. The TFDM will be fully operational in 2023 at SEA instead of the original date of 2025 due to the current surface limitations. Full functionality includes:

- Improved electronic flight data (EFD) exchange and electronic flight strips in towers
- Surface surveillance data integration
- Full decision support tools (DSTs), including surface scheduling/metering
- Traffic flow management (TFM) data exchange and integration



Working Group participants asked a number of questions. Based on these questions, Biassou provided some additional information including:

- Will look into what type of environmental review the TFDM went through
- At the time of the meeting, there were no potential roadblocks to meeting the 2023 schedule for implementation
- Airports in Phoenix and Cleveland will be implementing this system in the next few months
- TFDM will be implemented in a number of airports prior to SEA

<u>Additional Analysis - Noise Abatement Departure Profiles Study</u>
Vince Mestre, Consultant

Mestre provided information on the additional analysis requested for the Noise Abatement Departure Profiles (NADP) Study. A key issue is at what point is there a noticeable difference in sound, perceived by

listeners, if sound is increased? Mestre reviewed numerous sound studies which all conclude that up to a 3dBA increase in sound level for a single event is barely noticeable to the human ear. Sound levels need to raise by 5dBA or more before most listeners report a noticeable change. This is important information to consider when evaluating the trade off between noise reduction benefits of a distance NADP for neighborhoods further away from the airport and possible small increases in noise for a limited number of households north and south of the airport.

Mestre reviewed the results of analyzing noise for the Boeing 777 Close-In vs. the Distant NADP for Runway 16L and Runway 34R. He analyzed the data through a series of zoomed in grid points to determine if there are noise differences within the SEL 90 dBA contours for a Distant NADP vs a Close-In NADP (grid analysis data by ESA). Based on the analysis the conclusions included:

- There were no areas where noise increased more than 2 dB

Runway 16L:

- There were limited areas where the utilization of a Distant NADP for a Boeing 777-300ER increased noise between 1-2 dB
- No increases would be perceptible by a human

Runway 34R

- Change in noise level is less than 1 dB
- No increases would be perceptible by a human

Overall, Mestre stated that the analysis concludes that pursuing a distant NADP would be beneficial as it would reduce noise in neighborhoods further from the airport without making noise worse in close-in communities. The next steps would be for the Port to have additional discussions with StART and the airlines. Mestre stated that he recommends proceeding with the airlines to operationalize a pure distant NADP. Working Group participants emphasized the need for effective community outreach that includes demonstrating the difference in sound utilizing audio so that people can experience what the difference sounds like.

<u>Aviation Noise and Emissions Symposium Debrief</u>
Jennifer Kester, Planning Manager, City of SeaTac

Kester gave an overview of her experience at the Aviation Noise and Emissions Symposium in San Diego in early March. She explained that the conference was 60% about noise and the rest was topics related to emissions. There were a lot of community members in attendance. There was a diversity of attendees from the FAA, airlines, trade, academia, consultants, and European agencies. Kester shared some of her key take-aways which included:

- StART is young compared to other comparable groups that have been operating for a longer time
- Where there is robust outreach and a roundtable for discussion that includes the communities, FAA, airlines, and the airport operator, better outcomes can be achieved by working together
- Stress and physiological and psychological reactions to sound also determine how annoyed people get from aviation noise
- Studies show that the more trust that people have in the process and by being involved in the process, the less annoyed they feel

- It is important to get communities involved and build trust with cities that are impacted by an airport
- It is important to continue to develop sustainable aviation fuels and low carbon ground equipment
- Recommended that more cities from Puget Sound area attend next year

It was suggested to have a presentation on aviation biofuels at a future StART Working Group meeting.

Future Meeting Date/Times:

Next Meeting: May 11, 2020, 5:30pm - 7:30pm, Tentative Location: SEA International Conference Center, Room 4A Conference Room