



# Meeting Packet

## Regular Meeting

Meeting No. 313  
**Wednesday, June 6, 2018 - 7:00 p.m.**

David Chetcuti Community Room – Millbrae City Hall  
450 Popular Avenue – Millbrae, CA 94030

Note: To arrange an accommodation under the Americans with Disabilities Act to participate in this public meeting, please call (650) 363-1853 at least 2 days before the meeting date.

### AGENDA

#### **1. Call to Order / Roll Call / Declaration of a Quorum Present**

*ACTION*

Elizabeth Lewis, Roundtable Chairperson / James A. Castaneda, AICP, Roundtable Coordinator

#### **2. Public Comments on Items NOT on the Agenda**

*INFORMATION*

Speakers are limited to two minutes. Roundtable members cannot discuss or take action on any matter raised under this item

### CONSENT AGENDA ITEMS

All items on the Consent Agenda are approved/accepted in one motion. A Roundtable Representative can make a request, prior to action on the Consent Agenda, to transfer a Consent Agenda item to the Regular Agenda. Any items on the Regular Agenda may be transferred on the Consent Agenda in a similar manner.

#### **3. Review of Roundtable Meeting Overview for April 4, 2018**

*ACTION*

1. April 4, 2018 Meeting Overview pg. 13

#### **4. Airport Director's Reports for March & April 2018, Fly Quiet Report Q1 2018**

*ACTION*

1. March 2018 Airport Director's Report pg. 17
2. April 2018 Airport Director's Report pg. 23
3. Fly Quiet Report for Q1 2018 pg. 29

### REGULAR AGENDA

#### **9. SFO Updates**

*INFORMATION*

Ivar Satero, Director – San Francisco International Airport

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REGULAR AGENDA (continued)

**6. Presentation on Second Chance and Replacement Noise Insulation Program**

*INFORMATION*

Doug Yakel, Public Information Officer – San Francisco International Airport

**7. Status/Update, FAA Initiative Phase 2 – Technical Working Group follow-up, next steps, and upcoming meeting dates**

*INFORMATION*

Gene Reindel, Roundtable Technical Consultant

- 1. Summary Memorandum pg. 43

**8. Upcoming 3-Year Strategic Plan and 2018-2019 Work Plan meeting, Member Appointment to Work Plan Subcommittee**

*INFORMATION*

James Castañeda, Roundtable Coordinator

OTHER MATTERS

**9. Aviation Noise News and Updates**

*INFORMATION*

Gene Reindel, Roundtable Technical Consultant

**10. Member Communications / Announcements**

*INFORMATION*

Roundtable Members and Staff

**11. Adjourn**

*ACTION*

Elizabeth Lewis, Roundtable Chairperson

Correspondences / Additional Reports

- 1. Letter to FAA, representative to attend Roundtable meetings, dated April 27, 2018 pg. 57
- 2. Letter to FAA, Follow up to April 27, 2018 letter, dated May 25, 2018 pg. 60
- 3. Portola Valley Q1 2018 Monitoring Report pg. 61
- 4. Woodside Q1 2018 Monitoring Report pg. 65
- 5. Brisbane Q1 2018 Monitoring Report pg. 69
- 6. Burlingame Portable Noise Monitoring Report pg. 75

Additional Resources

- 1. Welcome pg. 3
- 2. About the Roundtable pg. 4
- 3. Roundtable Member Roster pg. 6
- 4. Glossary of Acoustic & Air Traffic Control Terms pg. 7



# Welcome

The Airport/Community Roundtable is a voluntary committee that provides a public forum to address community noise issues related to aircraft operations at San Francisco International Airport. The Roundtable encourages orderly public participation and has established the following procedure to help you, if you wish to present comments to the committee at this meeting.

- You must fill out a Speaker Slip and give it to the Roundtable Coordinator at the front of the room, as soon as possible, if you wish to speak on any Roundtable Agenda item at this meeting.
- To speak on more than one Agenda item, you must fill out a Speaker Slip for each item.
- The Roundtable Chairperson will call your name; please come forward to present your comments.

The Roundtable may receive several speaker requests on more than one Agenda item; therefore, each speaker is limited to two (2) minutes to present his/her comments on any Agenda item unless given more time by the Roundtable Chairperson. The Roundtable meetings are recorded. Copies of the audio file can be made available to the public upon request. Please contact the Roundtable Coordinator for any request.

Roundtable Meetings are accessible to people with disabilities. Individuals who need special assistance or a disability-related modification or accommodation to participate in this meeting, or who have a disability and wish to request an alternative format for the Agenda, Meeting Notice, Meeting Packet, or other writings that may be distributed at the meeting, should contact the Roundtable Coordinator at least two (2) working days before the meeting at the phone or e-mail listed below. Notification in advance of the meeting will enable Roundtable staff to make reasonable arrangements to ensure accessibility to this meeting.

## **AIRPORT/COMMUNITY ROUNDTABLE OFFICERS & STAFF**

### Chairperson:

ELIZABETH LEWIS  
Representative, Town of Atherton  
elewis@ci.atherton.ca.us

### Vice-Chairperson:

RICARDO ORTIZ  
Representative, City of BURLINGAME  
rortiz@burlingame.org

### Roundtable Coordinator:

JAMES A. CASTAÑEDA, AICP  
County of San Mateo  
Planning & Building Department  
jcastaneda@sforoundtable.org



# About the Roundtable

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The Airport/Community Roundtable was established in May 1981, by a Memorandum of Understanding (MOU), to address noise impacts related to aircraft operations at San Francisco International Airport (SFO). The Airport is owned and operated by the City and County of San Francisco, but it is located entirely within San Mateo County. This voluntary committee consists of 22 appointed and elected officials from the City and County of San Francisco, the County of San Mateo, and several cities in San Mateo County (see attached Membership Roster). It provides a forum for the public to address local elected officials, Airport management, FAA staff, and airline representatives, regarding aircraft noise issues. The committee monitors a performance-based aircraft noise mitigation program, as implemented by Airport staff, interprets community concerns, and attempts to achieve additional noise mitigation through a cooperative sharing of authority brought forth by the airline industry, the FAA, Airport management, and local government officials. The Roundtable adopts an annual Work Program to address key issues. In 2017, the Roundtable is scheduled to meet on the first Wednesday of the following months: February, April, June, August, October and December. Regular Meetings are held on the first Wednesday of the designated month at 7:00 p.m. at the **David Chetcuti Community Room at Millbrae City Hall, 450 Poplar Avenue, Millbrae, California** unless noted. Special Meetings and workshops are held as needed. The members of the public are encouraged to attend the meetings and workshops to express their concerns and learn about airport/aircraft noise and operations. For more information about the Roundtable, please contact Roundtable staff at (650) 363-1853.

## POLICY STATEMENT

The Airport/Community Roundtable reaffirms and memorializes its longstanding policy regarding the “shifting” of aircraft-generated noise, related to aircraft operations at San Francisco International Airport, as follows:

**“The Airport/Community Roundtable members, as a group, when considering and taking actions to mitigate noise, will not knowingly or deliberately support, encourage, or adopt actions, rules, regulations or policies, that result in the “shifting” of aircraft noise from one community to another, when related to aircraft operations at San Francisco International Airport.”**

*(Source: Roundtable Resolution No. 93-01)*

## FEDERAL PREEMPTION, RE: AIRCRAFT FLIGHT PATTERNS

The authority to regulate flight patterns of aircraft is vested exclusively in the Federal Aviation Administration (FAA). Federal law provides that:

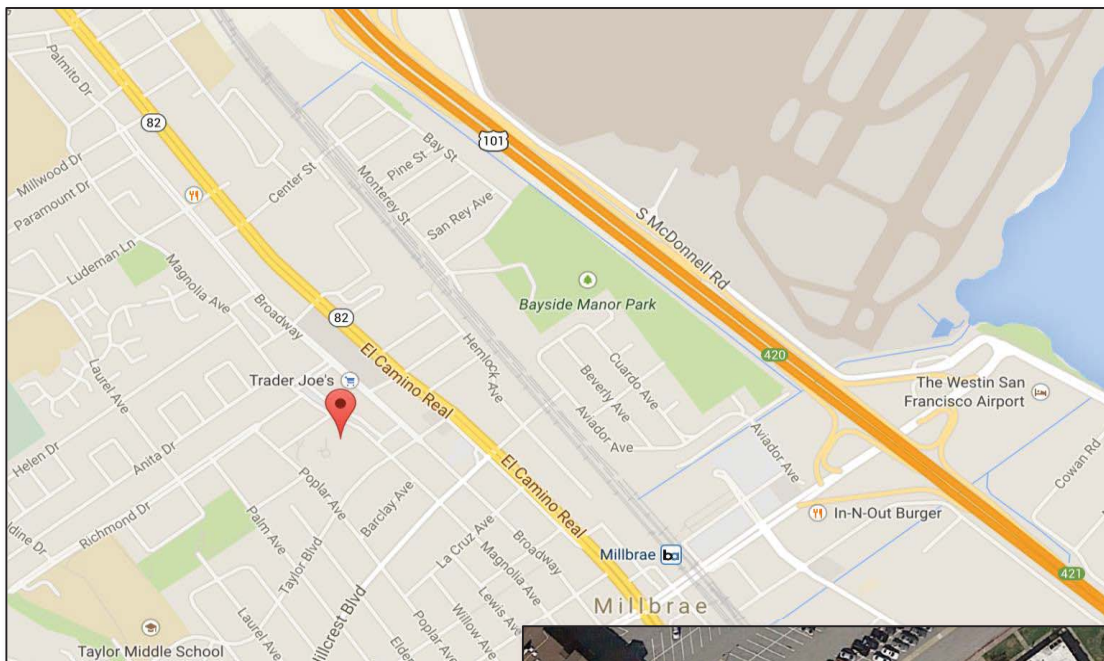
“No state or political subdivision thereof and no interstate agency or other political agency of two or more states shall enact or enforce any law, rule, regulation, standard, or other provision having the force and effect of law, relating to rates, routes, or services of any air carrier having authority under subchapter IV of this chapter to provide air transportation.”

*(Source: 49 U.S.C. A. Section 1302(a)(1)).*

# Meeting Location

**David Chetcuti Community Room  
450 Poplar Avenue - Millbrae, CA 94030**

Access through Millbrae Library parking lot on Poplar Avenue







# Member Roster

June 2018

**CITY AND COUNTY OF SAN FRANCISCO  
BOARD OF SUPERVISORS**

Ahsha Safai, Supervisor

**CITY AND COUNTY OF SAN FRANCISCO MAYOR'S  
OFFICE**

David Takashima, (Appointed)

**CITY AND COUNTY OF SAN FRANCISCO AIRPORT  
COMMISSION REPRESENTATIVE**

Ivar Satero, Airport Director (Appointed)

Alternate: Doug Yakel, Public Information Officer

**COUNTY OF SAN MATEO  
BOARD OF SUPERVISORS**

Dave Pine, Supervisor

Alternate: Don Horsley, Supervisor

**CITY/COUNTY ASSOCIATION OF GOVERNMENTS  
AIRPORT LAND USE COMMITTEE (ALUC)**

Adam Kelly, ALUC Chairperson (Appointed)

**TOWN OF ATHERTON**

Elizabeth Lewis, Mayor

Alternate: Bill Widmer, Council Member

**CITY OF BELMONT**

Douglas Kim, Council Member

Alternate: Eric Reed, Council Member

**CITY OF BRISBANE**

Terry O'Connell, Council Member

Alternate: Madison Davis, Council Member

**CITY OF BURLINGAME**

Ricardo Ortiz, Council Member

**CITY OF DALY CITY**

Glenn Sylvester, Mayor

**CITY OF FOSTER CITY**

Sam Hindi, Council Member

**CITY OF HALF MOON BAY**

Harvey Rarback, Council Member

**TOWN OF HILLSBOROUGH**

Alvin Royse, Council Member

Alternate: Shawn Christianson, Council Member

**CITY OF MENLO PARK**

Peter Ohtaki, Council Member

**CITY OF MILLBRAE**

Anne Oliva, Council Member

Alternate: Ann Schneider, Council Member

**CITY OF PACIFICA**

Sue Digre, Council Member

Alternate: John Keener, Mayor

**TOWN OF PORTOLA VALLEY**

Ann Wengert, Council Member

Alternate: Maryann Derwin, Council Member

**CITY OF REDWOOD CITY**

Janet Borgens, Council Member

**CITY OF SAN BRUNO**

Marty Medina, Council Member

Alternate: Rico Medina, Council Member

**CITY OF SAN CARLOS**

Ron Collins: Council Member

Alternate: Matt Grocott, Council Member

**CITY OF SAN MATEO**

Diane Papan, Council Member

**CITY OF SOUTH SAN FRANCISCO**

Mark Addiego, Council Member

Alternate: Pradeep Gupta, Council Member

**TOWN OF WOODSIDE**

Chris Shaw, Council Member

Alternate: Deborah Gordon, Council Member

ROUNDTABLE ADVISORY MEMBERS

**AIRLINES/FLIGHT OPERATIONS**

Captain James Abell, United Airlines

Glenn Morse, United Airlines

**FEDERAL AVIATION ADMINISTRATION**

Thann McLeod, NORCAL TRACON

Tony DiBernardo, FAA Sierra-Pacific District

**ROUNDTABLE STAFF**

James A. Castañeda, AICP, Roundtable Coordinator

Gene Reindel, Technical Consultant (HMMH)

Justin Cook, Technical Consultant (HMMH)

Adam Scholten, Technical Consultant (HMMH)

**SAN FRANCISCO INTERNATIONAL AIRPORT  
NOISE ABATEMENT STAFF**

Bert Ganoung, Noise Abatement Manager

David Ong, Noise Abatement Systems Manager

Nastasja von Contra, Senior Noise Abatement Specialist

Anthony Carpeneti, Noise Abatement Specialist

Joyce Satow, Administration Secretary

## Aircraft Noise Abatement Office

# Glossary of common Acoustic and Air Traffic Control

## terms

### A

**ADS-B - Automatic Dependent Surveillance – Broadcast**

– ADS-B uses ground based antennas and in-aircraft displays to alert pilots to the position of other aircraft relative to their flight path. ADS-B is a key element of NextGen.

**Air Carrier** - A commercial airline with published schedules operating at least five round trips per week.

**Air Taxi** – An aircraft certificated for commercial service available for hire on demand.

**ALP - Airport Layout Plan** – The official, FAA approved map of an airport's facilities.

**ALS – Approach Lighting System** - Radiating light beams guiding pilots to the extended centerline of the runway on final approach and landing.

**Ambient Noise Level** – The existing background noise level characteristic of an environment.

**Approach Lights** – High intensity lights located along the approach path at the end of an instrument runway. Approach lights aid the pilot as he transitions from instrument flight conditions to visual conditions at the end of an instrument approach.

**APU - Auxiliary Power Unit** – A self-contained generator in an aircraft that produces power for ground operations of the electrical and ventilation systems and for starting the engines.

**Arrival** – The act of landing at an airport.

**Arrival Procedure** - A series of directions on a published approach plate or from air traffic control personnel, using fixes and procedures, to guide an aircraft from the en route environment to an airport for landing.

**Arrival Stream** – A flow of aircraft that are following similar arrival procedures.

**ARTCC – Air Route Traffic Control Center** - A facility providing air traffic control to aircraft on an IFR flight plan within controlled airspace and principally during the enroute phase of flight.

**ATC - Air Traffic Control** - The control of aircraft traffic, in the vicinity of airports from control towers, and in the airways between airports from control centers.

**ATCT – Air Traffic Control Tower** - A central operations tower in the terminal air traffic control system with an associated IFR room if radar equipped, using air/ground communications and/or radar, visual signaling and other devices to provide safe, expeditious movement of air traffic.

**Avionics** – Airborne navigation, communications, and data display equipment required for operation under specific air traffic control procedures.

**Altitude MSL** – Aircraft altitude measured in feet above mean sea level.

### B

**Backblast** - Low frequency noise and high velocity air generated by jet engines on takeoff.

**Base Leg** – A flight path at right angles to the landing runway. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline.

### C

**Center** – See ARTCC.

**CNEL** – Community Noise Equivalent Level - A noise metric required by the California Airport Noise Standards for use by airport proprietors to measure aircraft noise levels. CNEL includes an additional weighting for each event occurring during the evening (7:00 PM – 9:59 PM) and nighttime (10 pm – 6:59 am) periods to account for increased sensitivity to noise during these periods. Evening events are treated as though there were three and nighttime events are treated as though there were ten. This results in a 4.77 and 10 decibel penalty

penalty for operations occurring in the evening and nighttime periods, respectively.

**CNEL Contour** - The "map" of noise exposure around an airport as expressed using the CNEL metric. A CNEL contour is computed using the FAA-approved Integrated Noise Model (INM), which calculates the aircraft noise exposure near an airport.

**Commuter Airline** – Operator of small aircraft (maximum size of 30 seats) performing scheduled (maximum size of 30 seats) performing service between two or more points.

## D

**Decibel (dB)** - In sound, decibels measure a scale from the threshold of human hearing, 0 dB, upward towards the threshold of pain, about 120-140 dB. Because decibels are such a small measure, they are computed logarithmically and cannot be added arithmetically. An increase of ten dB is perceived by human ears as a doubling of noise.

**dBA** - A-weighted decibels adjust sound pressure towards the frequency range of human hearing.

**dBC** - C-weighted decibels adjust sound pressure towards the low frequency end of the spectrum. Although less consistent with human hearing than A-weighting, dBC can be used to consider the impacts of certain low frequency operations.

**Decision Height** – The height at which a decision must be made during an instrument approach either to continue the approach or to execute a missed approach.

**Departure** – The act of an aircraft taking off from an airport.

**Departure Procedure** – A published IFR departure procedure describing specific criteria for climb, routing, and communications for a specific runway at an airport.

**Displaced Threshold** - A threshold that is located at a point on the runway other than the physical beginning. Aircraft can begin departure roll before the threshold, but cannot land before it.

**DME - Distance Measuring Equipment** - Equipment (airborne and ground) used to measure, in nautical miles, a slant range distance of an aircraft from the DME navigational aid.

**DNL - Day/Night Average Sound Level** - The daily average noise metric in which that noise occurring between 10:00 p.m. and 7:00 a.m. is penalized by 10 dB. DNL is often expressed as the annual-average noise level.

**DNL Contour** - The "map" of noise exposure around an airport as expressed using the DNL metric. A DNL contour is computed using the FAA-approved Integrated Noise Model (INM), which calculates the aircraft noise exposure near an airport.

**Downwind Leg** – A flight path parallel to the landing runway in the direction opposite the landing direction.

**Duration** - The length of time in seconds that a noise event lasts. Duration is usually measured in time above a specific noise threshold.

## E

**En route** – The portion of a flight between departure and arrival terminal areas.

**Exceedance**— Whenever an aircraft overflight produces a noise level higher than the maximum decibel value established for a particular monitoring site, the noise threshold is surpassed and a noise exceedance occurs. An exceedance may take place during approach, takeoff, or possibly during departure ground roll before lifting off.

## F

**FAA** - The Federal Aviation Administration is the agency responsible for aircraft safety, movement and controls. FAA also administers grants for noise mitigation projects and approves certain aviation studies including FAR Part 150 studies, Environmental Assessments, Environmental Impact Statements, and Airport Layout Plans.

**FAR – Federal Aviation Regulations** are the rules and regulations, which govern the operation of aircraft, airways, and airmen.

**FAR Part 36** – A Federal Aviation Regulation defining maximum noise emissions for aircraft.

**FAR Part 91** – A Federal Aviation Regulation governing the phase out of Stage 1 and 2 aircraft as defined under FAR Part 36.

**FAR Part 150** – A Federal Aviation Regulation governing noise and land use compatibility studies and programs.

**FAR Part 161** – A Federal Aviation Regulation governing aircraft noise and access restrictions.

**Fix** – A geographical position determined by visual references to the surface, by reference to one or more NavAids, or by other navigational methods.

**Fleet Mix** – The mix or differing aircraft types operated at a particular airport or by an airline.

**Flight Plan** – Specific information related to the intended flight of an aircraft. A flight plan is filed with a Flight Service Station or Air Traffic Control facility.



**FMS – Flight Management System** - a specialized computer system in an aircraft that automates a number of in-flight tasks, which reduces flight crew workload and improves the precision of the procedures being flown.

## G

**GA - General Aviation** – Civil aviation excluding air carriers, commercial operators and military aircraft.

**GAP Departure** – An aircraft departure via Runways 28 at San Francisco International Airport to the west over San Bruno, South San Francisco, Daly City, and Pacifica.

**Glide Slope** – Generally a 3-degree angle of approach to a runway established by means of airborne instruments during instrument approaches, or visual ground aids for the visual portion of an instrument approach and landing.

**GPS - Global Positioning System** – A satellite based radio positioning, navigation, and time-transfer system.

**GPU - Ground Power Unit** – A source of power, generally from the terminals, for aircraft to use while their engines are off to power the electrical and ventilation systems on the aircraft.

**Ground Effect** – The excess attenuation attributed to absorption or reflection of noise by manmade or natural features on the ground surface.

**Ground Track** – is the path an aircraft would follow on the ground if its airborne flight path were plotted on the ground the terrain.

## H

**High Speed Exit Taxiway** – A taxiway designed and provided with lighting or marking to define the path of aircraft traveling at high speed from the runway center to a point on the center of the taxiway.

## I

**IDP - Instrument Departure Procedure** - An aeronautical chart designed to expedite clearance delivery and to facilitate transition between takeoff and en route operations. IDPs were formerly known as SIDs or Standard Instrument Departure Procedures.

**IFR - Instrument Flight Rules** -Rules and regulations established by the FAA to govern flight under conditions in which flight by visual reference is not safe.

**ILS - Instrument Landing System** – A precision instrument approach system which normally consists of a localizer, glide slope, outer marker, middle marker, and approach lights.

**IMC – Instrument Meteorological Conditions** - Weather conditions expressed in terms of visibility, distance from clouds, and cloud ceilings during which all aircraft are required to operate using instrument flight rules.

**Instrument Approach** – A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

## J

## K

**Knots** – A measure of speed used in aerial navigation. One knot is equal to one nautical mile per hour (100 knots = 115 miles per hour).

## L

**Load Factor** – The percentage of seats occupied in an aircraft.

**Lmax** – The peak noise level reached by a single aircraft event.

**Localizer** – A navigational aid that consists of a directional pattern of radio waves modulated by two signals which, when receding with equal intensity, are displayed by compatible airborne equipment as an “on-course” indication, and when received in unequal intensity are displayed as an “off-course” indication.

**LDA – Localizer Type Directional Aid** – A facility of comparable utility and accuracy to a localizer, but not part of a complete ILS and not aligned with the runway.

## M

**Middle Marker** - A beacon that defines a point along the glide slope of an ILS, normally located at or near the point of decision height.

**Missed Approach Procedure** – A procedure used to redirect a landing aircraft back around to attempt another landing. This may be due to visual contact not established at authorized minimums or instructions from air traffic control, or for other reasons.

## N

**NAS – National Airspace System** - The common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information, manpower and material.

**Nautical Mile** – A measure of distance used in air and sea navigation. One nautical mile is equal to the length of one minute of latitude along the earth's equator. The nautical mile was officially set as 6076.115 feet. (100 nautical miles = 115 statute miles)

**Navaid** – Navigational Aid.

**NCT – Northern California TRACON** – The air traffic control facility that guides aircraft into and out of San Francisco Bay Area airspace.

**NDB – Non-Directional Beacon** - Signal that can be read by pilots of aircraft with direction finding equipment. Used to determine bearing and can “home” in or track to or from the desired point.

**NEM – Noise Exposure Map** – A FAR Part 150 requirement prepared by airports to depict noise contours. NEMs also take into account potential land use changes around airports.

**NextGen** – The Next Generation of the national air transportation system. NextGen represents the movement from ground-based navigation aids to satellite-based navigation.

**NMS** – See RMS

**Noise Contour** – See CNEL and DNL Contour.

**Non-Precision Approach Procedure** – A standard instrument approach procedure in which no electronic glide slope is provided.

## O

**Offset ILS – Offset Parallel Runways** – Staggered runways having centerlines that are parallel.

**Operation** – A take-off, departure or overflight of an aircraft. Every flight requires at least two operations, a take-off and landing.

**Outer Marker** – An ILS navigation facility in the terminal area navigation system located four to seven miles from the runways edge on the extended centerline indicating the beginning of final approach.

**Overflight** – Aircraft whose flights originate or terminate outside the metropolitan area that transit the airspace without landing.

## P

**PASSUR System** – Passive Surveillance Receiver - A system capable of collecting and plotting radar tracks of individual aircraft in flight by passively receiving transponder signals.

**PAPI – Precision Approach Path Indicator** - An airport lighting facility in the terminal area used under VFR conditions. It is a single row of two to four lights, radiating high intensity red or white beams to indicate whether the pilot is above or below the required runway approach path.

**PBN –Performance Based Navigation** - Area navigation based on performance requirements for aircraft operating along an IFR route, on an instrument approach procedure or in a designated airspace.

**Preferential Runways** - The most desirable runways from a noise abatement perspective to be assigned whenever safety, weather, and operational efficiency permits.

**Precision Approach Procedure** – A standard instrument approach procedure in which an electronic glide slope is provided, such as an ILS. GPS precision approaches may be provided in the future.

**PRM – Precision Runway Monitoring** – A system of high-resolution monitors for air traffic controllers to use in landing aircraft on parallel runways separated by less than 4,300’.

## Q

## R

**Radar Vectoring** – Navigational guidance where air traffic controller issues a compass heading to a pilot.

**Reliever Airport** – An airport for general aviation and other aircraft that would otherwise use a larger and busier air carrier airport.

**RMS – Remote Monitoring Site** - A microphone placed in a community and recorded at San Francisco International Airport's Noise Monitoring Center. A network of 29 RMS's generate data used in preparation of the airport's Noise Exposure Map.

**RNAV – Area Navigation** - A method of IFR navigation that allows an aircraft to choose any course within a network of navigation beacons, rather than navigating directly to and from the beacons. This can conserve flight distance, reduce congestion, and allow flights into airports without beacons.

**RNP – Required Navigation Performance** - A type of performance-based navigation (PBN) that allows an aircraft to fly a specific path between two 3- dimensionally defined points in space. RNAV and RNP systems are fundamentally similar. The key difference between them is the requirement for on-board performance monitoring and alerting. A navigation specification that includes a requirement for on-board navigation performance monitoring and alerting is referred to as an RNP specification. One not having such a requirement is referred to as an RNAV specification.

**Run-up** – A procedure used to test aircraft engines after maintenance to ensure safe operation prior to returning the aircraft to service. The power settings tested range from idle to full power and may vary in duration.

**Run-up Locations** - Specified areas on the airfield where scheduled run-ups may occur. These locations are sited, so as to produce minimum noise impact in surrounding neighborhoods.

**Runway** – A long strip of land or water used by aircraft to land on or to take off from.

## S

**Sequencing Process** – Procedure in which air traffic is merged into a single flow, and/or in which adequate separation is maintained between aircraft.

**Shoreline Departure** – Departure via Runways 28 that utilizes a right turn toward San Francisco Bay as soon as feasible. The Shoreline Departure is considered a noise abatement departure procedure.

**SENEL – Single Event Noise Exposure Level** - The noise exposure level of a single aircraft event measured over the time between the initial and final points when the noise level exceeds a predetermined threshold. It is important to distinguish single event noise levels from cumulative noise levels such as CNEL. Single event noise level numbers are generally higher than CNEL numbers, because CNEL represents an average noise level over a period of time, usually a year.

**Single Event** – Noise generated by a single aircraft over-flight.

### SOIA – Simultaneous Offset Instrument Approach

Is an approach system permitting simultaneous Instrument Landing System approaches to airports having staggered but parallel runways. SOIA combines Offset ILS and regular ILS definitions.

**STAR – Standard Terminal Arrival Route** is a published IFR arrival procedure describing specific criteria for descent, routing, and communications for a specific runway at an airport.

## T

**Taxiway** – A paved strip that connects runways and terminals providing the ability to move aircraft so they will not interfere with takeoffs or landings.

**Terminal Airspace** - The air space that is controlled by a TRACON.

**Terminal Area** – A general term used to describe airspace in which approach control service or airport traffic control service is provided.

**Threshold** – Specified boundary.

**TRACON -Terminal Radar Approach Control** – is an FAA air traffic control service to aircraft arriving and departing or transiting airspace controlled by the facility. TRACONS control IFR and participating VFR flights. TRACONS control the airspace from Center down to the ATCT.

## U

## V

**Vector** – A heading issued to a pilot to provide navigational guidance by radar. Vectors are assigned verbally by FAA air traffic controllers.

**VFR – Visual Flight Rules** are rules governing procedures for conducting flight under visual meteorological conditions, or weather conditions with a ceiling of 1,000 feet above ground level and visibility of three miles or greater. It is the pilot's responsibility to maintain visual separation, not the air traffic controller's, under VFR.

**Visual Approach** – Wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of an air traffic facility and having an air traffic control authorization, may proceed to destination airport under VFR.

**VASI – Visual Approach Slope Indicator** - An airport lighting facility in the terminal area navigation system used primarily under VFR conditions. It provides vertical visual guidance to aircraft during approach and landing, by radiating a pattern of high intensity red and white focused light beams, which indicate to the pilot that he/she is above, on, or below the glide path.

**VMC – Visual Meteorological Conditions** - weather conditions equal to or greater than those specified for aircraft operations under Visual Flight Rules (VFR).

**VOR - Very High Frequency Omni-directional Range** – A ground based electronic navigation aid transmitting navigation signals for 360 degrees oriented from magnetic north. VOR is the historic basis for navigation in the national airspace system.

## W

## X

## Y

# how to reach us

**SFO Aircraft Noise Abatement Office mailing address is:  
P.O. Box 8097, San Francisco, CA 94128**

<b>Phone:</b>	<b>650.821.5100</b>
<b>Fax:</b>	<b>650.821.5112</b>
<b>Noise Complaint Line:</b>	<b>650.821.4736</b>
<b>Toll Free Noise Complaint Line:</b>	<b>877.206.8290</b>
<b>Noise Complaint E-mail:</b>	<b><a href="mailto:sfo.noise@flysfo.com">sfo.noise@flysfo.com</a></b>
<b>Airport Web Page:</b>	<b><a href="http://www.flysfo.com">www.flysfo.com</a></b>
<b>Noise Abatement Web Page:</b>	<b><a href="http://www.flysfo.com/community-environment/noise-abatement">http://www.flysfo.com/community-environment/noise-abatement</a></b>
<b>Roundtable Web Page:</b>	<b><a href="http://www.sforoundtable.org">www.sforoundtable.org</a></b>

## **SFO Airport/Community Roundtable**

Meeting No. 312 Action Minutes

Wednesday, April 4, 2018

### **1. Call to Order / Roll Call / Declaration of a Quorum Present**

Roundtable Chairperson, Elizabeth Lewis, called the Regular Meeting of the SFO Airport / Community Roundtable to order, at approximately 7:00 p.m., in the David Chetcuti Community Room at the Millbrae City Hall. James A. Castañeda, AICP, Roundtable Coordinator, called the roll. A quorum (at least 12 Regular Members) was present as follows:

#### REGULAR MEMBERS PRESENT

Doug Takel – City and County of San Francisco Airport Commission  
Don Horsley – County of San Mateo Board of Supervisors  
Carlo Ford - C/CAG Airport Land Use Committee (ALUC)  
Elizabeth Lewis – Town of Atherton  
Doug Kim – City of Belmont  
Terry O’Connell – City of Brisbane  
Ricardo Ortiz – City of Burlingame  
Ann Schneider – City of Millbrae  
Sue Digre – City of Pacifica  
Janet Borgens – City of Redwood City  
Ron Collins – City of San Carlos  
Diane Papen – City of San Mateo

#### REGULAR MEMBERS ABSENT

City and County of San Francisco Board of Supervisors  
City and County of San Francisco Mayor’s Office  
City of Daly City  
City of Foster City  
City of Half Moon Bay  
Town of Hillsborough  
City of Menlo Park  
Town of Portola Valley  
City of San Bruno  
City of South San Francisco  
Town of Woodside

#### ROUNDTABLE STAFF

James A. Castañeda, AICP – Roundtable Coordinator  
Gene Reindel – Roundtable Consultant (HMMH)

#### SAN FRANCISCO INTERNATIONAL AIRPORT STAFF

David Ong, Noise Abatement Systems Manager  
Nastasja von Contra, Senior Noise Abatement Specialist  
Anthony Carpeneti, Noise Abatement Specialist



## 2. Jon C. Long Fly Quiet Awards for 2015-2016 and 2017

Chairperson Elizabeth Lewis and Noise Abatement Systems Manager David Ong presented the 2015-2016 and 2017 Jon C. Long Fly Quiet Awards.

## 3. Public Comments on Items NOT on the Agenda

A total of four members of the public spoke during public comments:

Charlie Wambeke  
Doreen Gotelli  
Elizabeth Lopez  
Carolyn Kincaid

## 4. Review of Roundtable Meeting Overview for December 6, 2017 and February 7, 2018

## 5. Airport Director's Reports for January & February 2018

ACTION: Terry O'Connel **MOVED** approval of the meeting overview for December 6, 2017 and February 7, 2018, Airport Director's Reports for January and February 2018. The motion was seconded by Janet Borgens and **CARRIED**, unanimously.

## 6. SFO Updates

Doug Yakel, SFO Public Information Officer for San Francisco International Airport, provided an update as to the operations at SFO, including the forthcoming installation of a Ground Based Augmentation System (GBAS).

## 7. Report and Recommendation from Work Program Subcommittee of Roundtable FY2017-2018 Budget

ACTION: Ann Schinder **MOVED** approval of Roundtable FY2017-2018 budget. The motion was seconded by Ricardo Ortiz and **CARRIED**, unanimously.

## 8. Status/Update, FAA Initiative Phase 2 / Technical Working Group Meeting Follow-up

Roundtable Technical Consultant Gene Reindel provided an overview of the Technical Working Group meeting that occurred on March 8, 2018.

## 9. Update from the Roundtable's Legislative Subcommittee Meeting

Redwood City representative Janet Borgens provided an update and overview of the March 20, 2018 Legislative Subcommittee meeting. Pacifica representative Sue Digre provided additional comments.

### **10. Discussion, Health Effects of Aircraft Noise on People**

Mary Ellen Eagan, president of HMMH, presented on the effects of aircraft noise on people, and the various research that's been conducted on the matter.

### **11. Follow-up, Expand Roundtable membership to include 2 additional members; one representative from each Santa Clara County and Santa Cruz County**

Roundtable Chairperson Elizabeth Lewis introduced Gary Waldeck, Councilmember from Los Altos Hills and member of the Cities Association of Santa Clara County to discuss the current status of the Roundtable creation efforts in the south bay.

### **12. Upcoming 3-Year Strategic Plan and 2018-2019 Work Plan development, Member Appointment to Work Program Subcommittee**

Roundtable Coordinator James Castañeda announced forthcoming efforts to develop the Roundtable's 3-year strategic plan and 2018-2019 work plan.

### **13. Aviation Noise News and Updates**

Roundtable Technical Consultant Gene Reindel provided a brief recap of relevant aviation noise news to the Roundtable.

### **14. Member Communications / Announcements**

None.

### **15. Adjourn**

Chairperson Lewis adjourned the meeting at 9:03 p.m.

*Roundtable action minutes are considered draft until approved by the Roundtable at a regular meeting. A video recording of this meeting is available on the Roundtable's website.*

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# Airport Director's Report

Presented at the June 6, 2018  
Airport Community Roundtable Meeting

Aircraft Noise Abatement Office  
March 2018



San Francisco  
International  
Airport

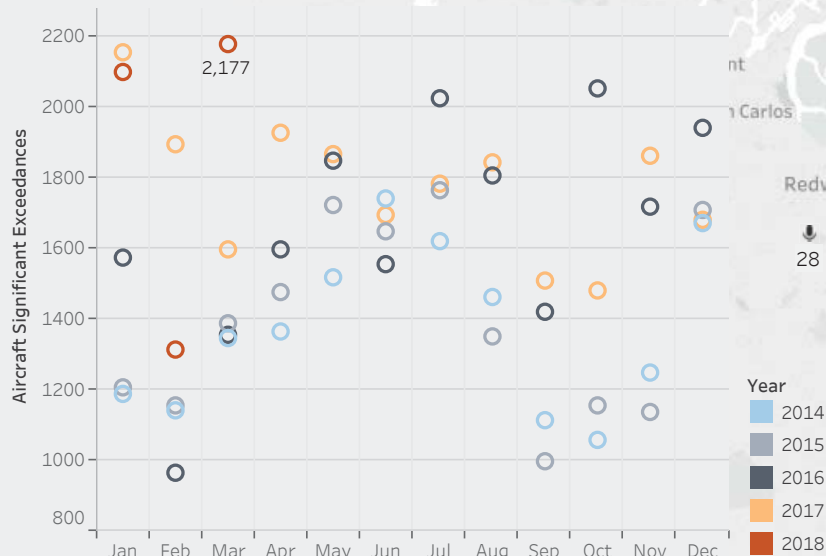
The map shows 29 aircraft noise monitoring locations that keep track of noise levels in the communities around the airport. Image centered on SFO airport shows quarterly aircraft noise levels (dBA) exposure. The green zone marks 65dBA Community Noise Exposure Level (CNEL). The CNEL metric is used to assess and regulate aircraft noise exposure in communities surrounding the airport.

Site	City	Noise Events (AVG Day)	Aircraft			City
			CNEL (dBA)	SEL (dBA)	LMax (dBA)	
1	San Bruno	229	73	93	78	68
3	SSF	86	56	81	68	64
4	SSF	154	68	90	78	61
5	San Bruno	173	66	88	75	64
6	SSF	149	66	89	76	59
7	Brisbane	32	53	81	71	59
8	Millbrae	338	67	85	69	68
9	Millbrae	47	53	82	71	60
10	Burlingame	26	51	83	71	59
11	Burlingame	28	55	84	72	59
12	Foster City	349	63	82	71	60
13	Hillsborough	7	56	98	73	68
14	SSF	142	61	84	72	60
15	SSF	144	58	81	69	59
16	SSF	130	60	84	72	59
17	SSF	146	61	84	71	60
18	Daly City	139	65	88	75	60
19	Pacifica	120	62	86	74	59
20	Daly City	34	49	79	68	60
21	San Francisco	10	40	77	66	57
22	San Bruno	190	61	83	71	65
23	San Francisco	81	54	80	69	63
24	San Francisco	24	45	78	68	61
25	San Francisco	31	44	77	63	58
26	San Francisco	8	41	78	67	59
27	San Francisco	10	42	79	67	59
28	Redwood City	9	43	81	67	67
29	San Mateo	39	53	82	70	60

Above table shows Aircraft and Community monthly CNEL average for each noise monitoring location. In addition daily average aircraft counts are presented with the average sound exposure level (SEL) and maximum level (LMax).

The graph below shows aircraft noise events that produced a noise level higher than the maximum allowable decibel value established for a particular monitoring site.

Significant Exceedances



Note: Site 2 is currently not operational.

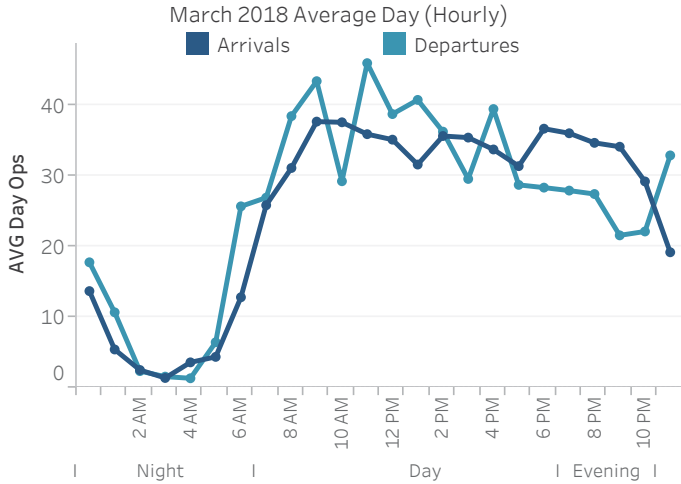
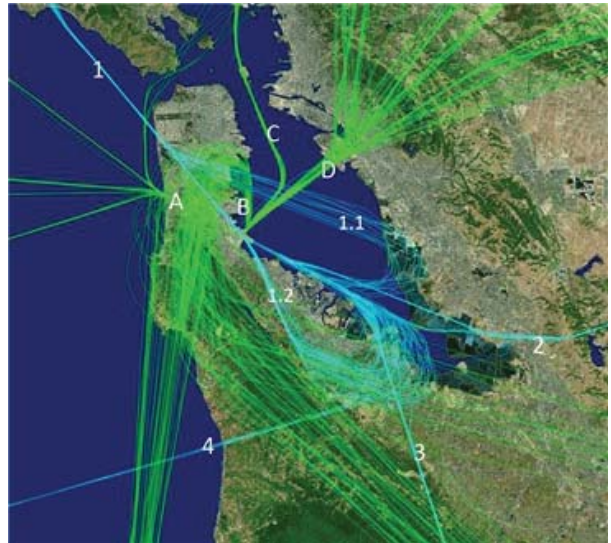


# Monthly Operations Summary

March 2018

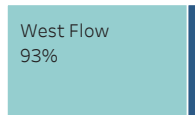
37,865	1,221	38,232	3.6%
Monthly Operations	Average Daily Operations	12 Month AVG	YOY Growth

Major Arrival and Departure Route Pattern (West Flow)



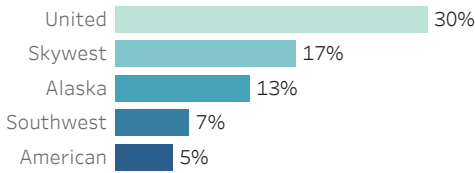
Arrivals		Departures	
1. BDEGA	25%	A. GAP	25%
2. DYAMD	40%	B. SSTIK	28%
3. SERFR	30%	C. NIITE	9%
4. OCEANIC	6%	D. TRUKN RWY 01	35%
		D. TRUKN RWY 28	4%

Top Destinations		
Los Angeles	Seattle	Portland
8%	5%	4%



Down the Bay vs Peninsula	
1.1 BDEGA East	25%
1.2 BDEGA West	75%

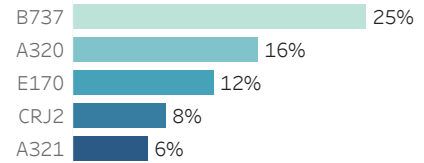
## Airlines with the Most Operations



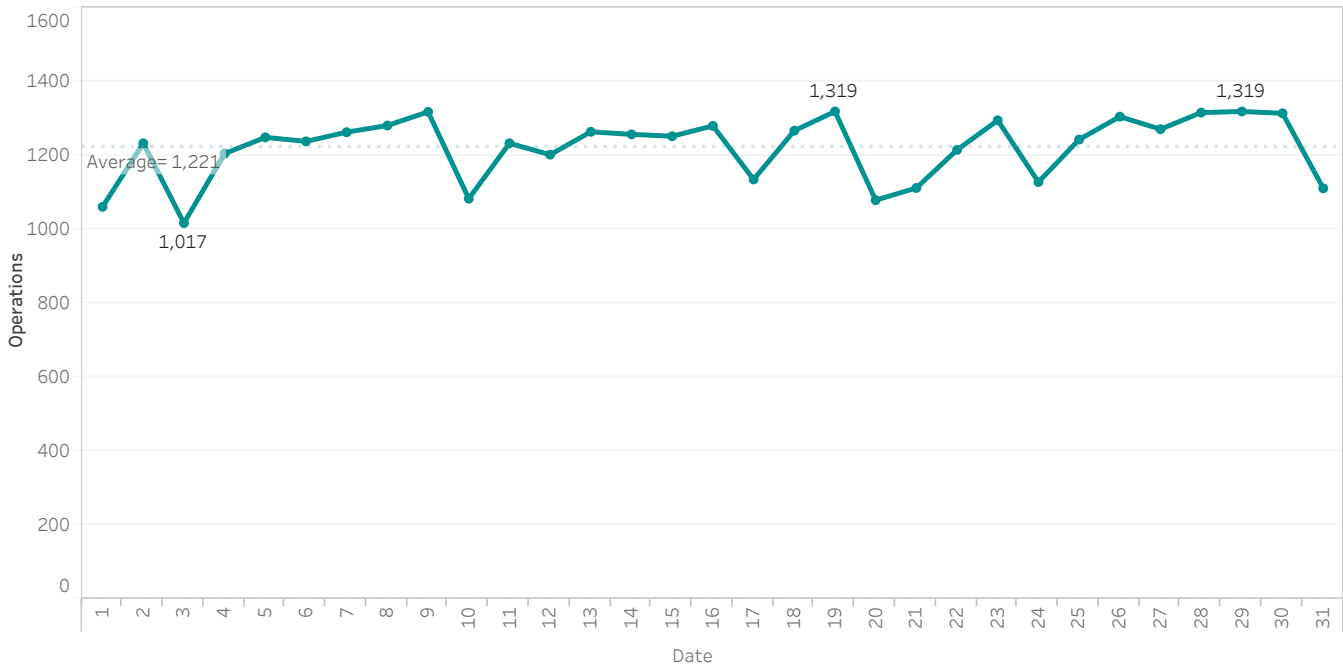
## Business Jets / Helicopters / GA 6%



## Most Utilized Aircraft Types



## Daily Aircraft Operations



# Runway Usage and Nighttime Operations

Monthly runway usage is shown for arrivals and departures, further categorized by all hours and nighttime hours. Graph at the bottom of the page shows hourly nighttime operations for each day. Power Runup locations are depicted on the airport map with airline nighttime power runup counts shown below. (Percent [%] rounded to nearest whole number)

### Runway Utilization (all hours)

	Arrivals	Departures
01 L/R		68% 12,362
10 L/R		6% 1,071
19 L/R	7% 1,173	1% 175
28 L/R	93% 16,397	25% 4,532

### Late Night Preferential Runway Use (1 am - 6 am)

	Departures
10 L/R	19% 117
01 L/R	47% 292
28 L/R	33% 201
19 L/R	1% 5

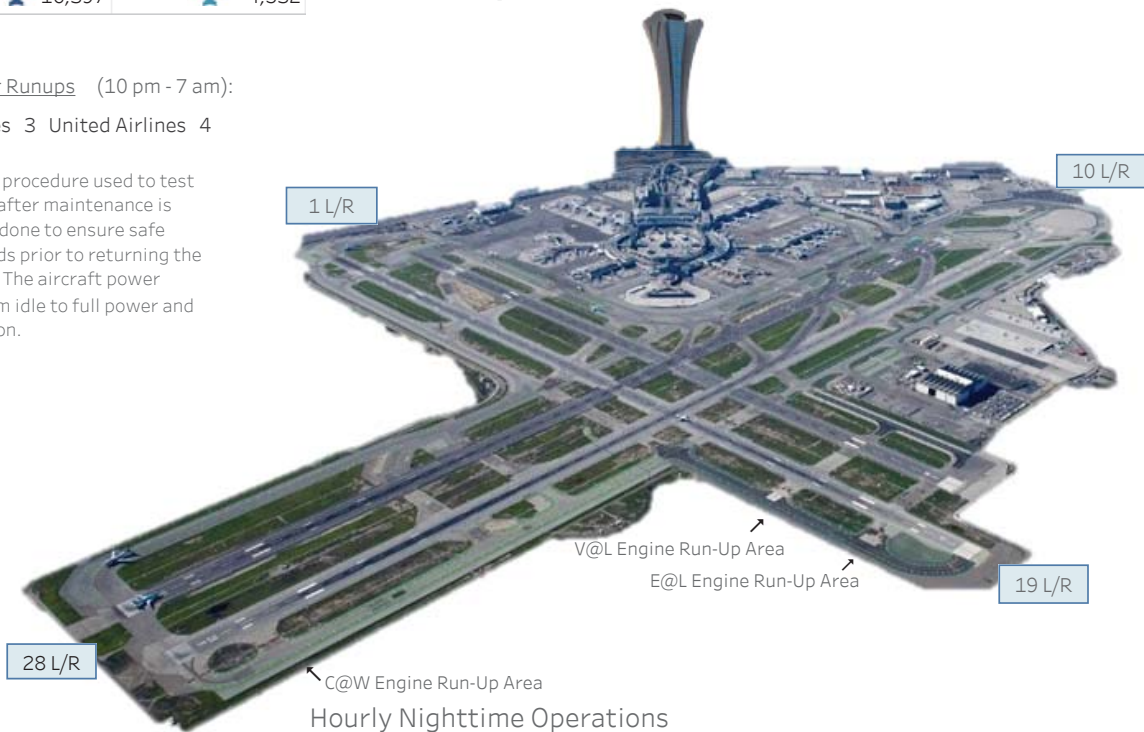
### 28 L vs R

Arrivals	
28L	28R
46%	54%
Night (10 pm - 7 am)	
34%	66%

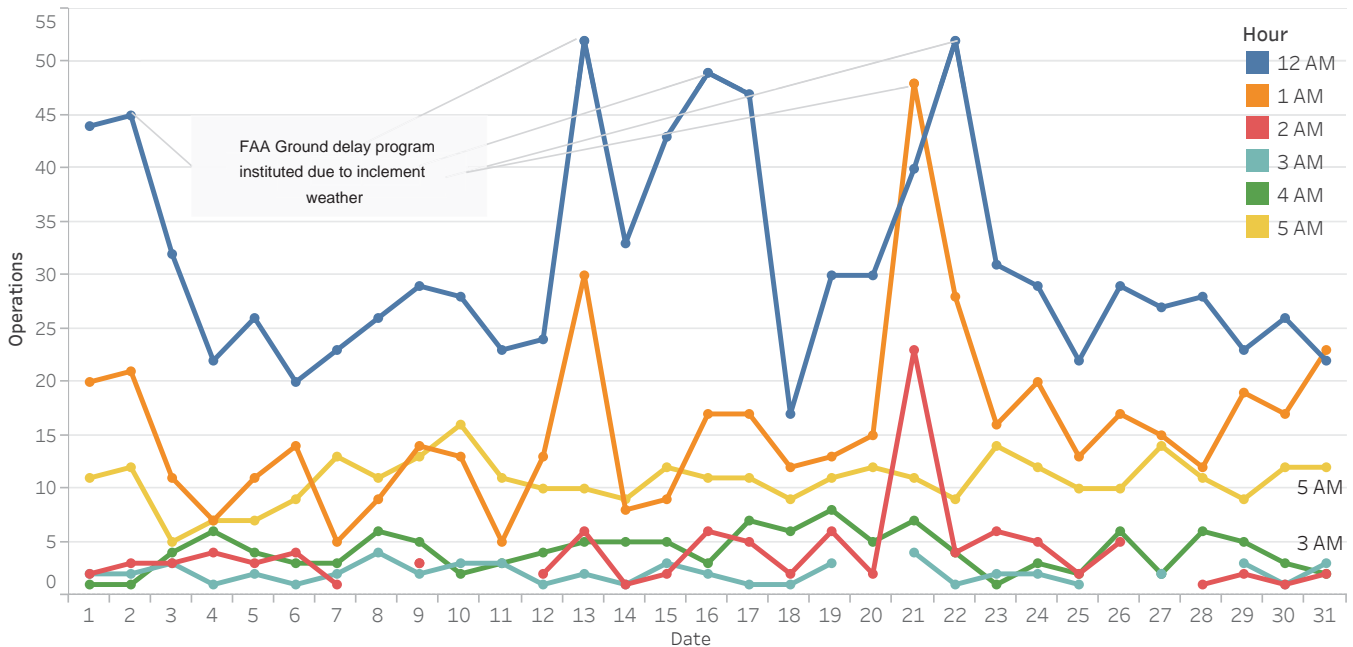
### Nighttime Power Runups (10 pm - 7 am):

American Airlines 3 United Airlines 4

A power runup is a procedure used to test an aircraft engine after maintenance is completed. This is done to ensure safe operating standards prior to returning the aircraft to service. The aircraft power settings range from idle to full power and may vary in duration.



### Hourly Nighttime Operations



# Noise Reports



March 2018

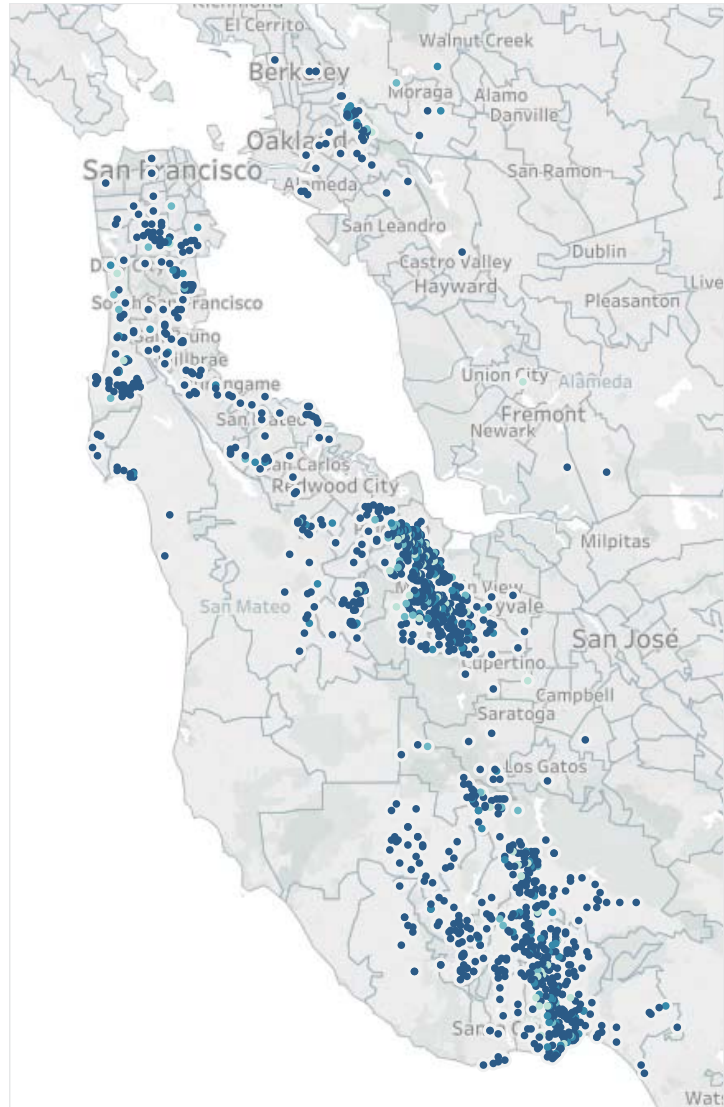
Noise Reporters / Noise Reports

	Noise Reporters	Noise Reports
Atherton	8	853
Belmont	7	879
Brisbane	30	3,669
Burlingame	11	620
Daly City	10	2,484
El Granada	4	201
Foster City	8	278
Half Moon Bay	10	399
Menlo Park	29	2,595
Millbrae	6	52
Pacifica	61	6,480
Portola Valley	40	7,497
Redwood City	16	1,832
San Bruno	10	350
San Carlos	3	15
San Francisco	44	4,986
San Mateo	14	866
South San Francisco	13	436
Woodside	13	1,234
Alameda	3	33
Albany	1	1
Aptos	16	1,044
Ben Lomond	22	687
Berkeley	5	66
Bonny Doon	4	189
Boulder Creek	28	1,582
Brookdale	2	16
Capitola	26	3,460
Carmel	2	112
Castro Valley	1	10
Cupertino	3	1,081
East Palo Alto	2	27
Felton	40	1,558
Fremont	2	25
La Selva Beach	1	34
Lafayette	1	442
Los Altos	186	28,338
Los Altos Hills	35	9,153
Los Gatos	153	22,822
Moraga	3	390
Morgan Hill	2	345
Mount Hermon	1	2
Mountain View	67	7,170
Oakland	42	9,391
Orinda	1	643
Palo Alto	244	57,528
Piedmont	1	5
San Jose	1	92
Santa Clara	1	37
Santa Cruz	159	24,142
Saratoga	9	846
Scotts Valley	95	13,259
Soquel	100	9,420
Sunnyvale	13	1,077
Watsonville	1	175
<b>Total</b>	<b>1,610</b>	<b>230,928</b>

Roundtable Communities

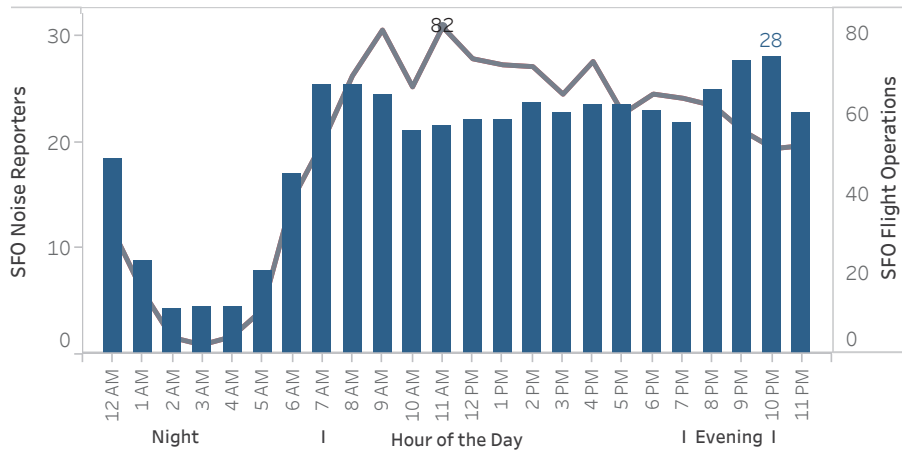
Other Communities

## Noise Reporters Location Map



- 1,569 Noise Reporters (12 month AVG)
- 220,500 Noise Reports (12 Month AVG)
- 148 New Reporters
- Felton New Reporters Top City
- 88 miles Furthest Report
- 6 Reports per SFO Operation
- B737, A320, E170 Top Aircraft Type
- CMP382\*, JBU736, KAL213\* Top Flight Number \*Night

Hourly Noise Reporters vs. Flight Operations (AVG Day)



Our software vendor's address validation relies on USPS-provided ZIP code look up table and USPS-specified default city values. Source: SFO Intl Airport Noise Monitoring System

99% of noise reports correlate to a flight origin/destination airport:

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# Airport Director's Report

Presented at the June 6, 2018  
Airport Community Roundtable Meeting

Aircraft Noise Abatement Office  
April 2018

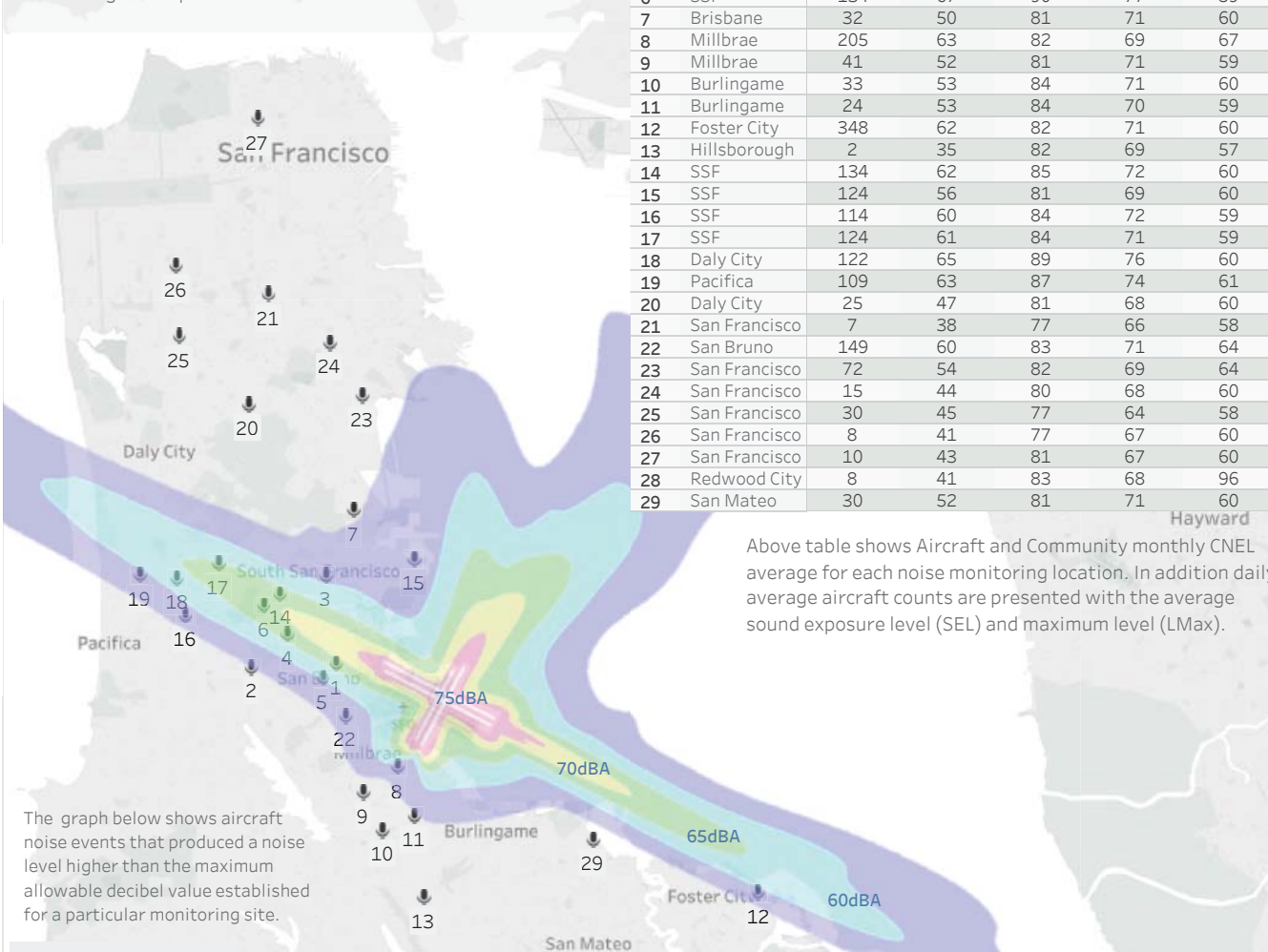


San Francisco  
International  
Airport



The map shows 29 aircraft noise monitoring locations that keep track of noise levels in the communities around the airport. Image centered on SFO airport shows quarterly aircraft noise levels (dBA) exposure. The green zone marks 65dBA Community Noise Exposure Level (CNEL). The CNEL metric is used to assess and regulate aircraft noise exposure in communities surrounding the airport.

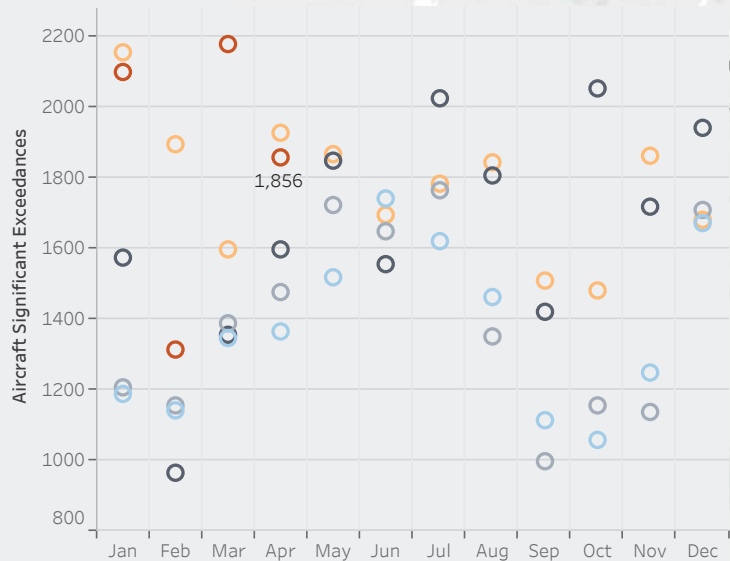
Site	City	Noise Events (AVG Day)	Aircraft			City CNEL (dBA)
			CNEL (dBA)	SEL (dBA)	LMax (dBA)	
1	San Bruno	181	73	94	80	68
3	SSF	97	56	82	69	62
4	SSF	142	69	92	79	60
5	San Bruno	152	66	88	76	63
6	SSF	134	67	90	77	59
7	Brisbane	32	50	81	71	60
8	Millbrae	205	63	82	69	67
9	Millbrae	41	52	81	71	59
10	Burlingame	33	53	84	71	60
11	Burlingame	24	53	84	70	59
12	Foster City	348	62	82	71	60
13	Hillsborough	2	35	82	69	57
14	SSF	134	62	85	72	60
15	SSF	124	56	81	69	60
16	SSF	114	60	84	72	59
17	SSF	124	61	84	71	59
18	Daly City	122	65	89	76	60
19	Pacifica	109	63	87	74	61
20	Daly City	25	47	81	68	60
21	San Francisco	7	38	77	66	58
22	San Bruno	149	60	83	71	64
23	San Francisco	72	54	82	69	64
24	San Francisco	15	44	80	68	60
25	San Francisco	30	45	77	64	58
26	San Francisco	8	41	77	67	60
27	San Francisco	10	43	81	67	60
28	Redwood City	8	41	83	68	96
29	San Mateo	30	52	81	71	60



Above table shows Aircraft and Community monthly CNEL average for each noise monitoring location. In addition daily average aircraft counts are presented with the average sound exposure level (SEL) and maximum level (LMax).

The graph below shows aircraft noise events that produced a noise level higher than the maximum allowable decibel value established for a particular monitoring site.

Significant Exceedances



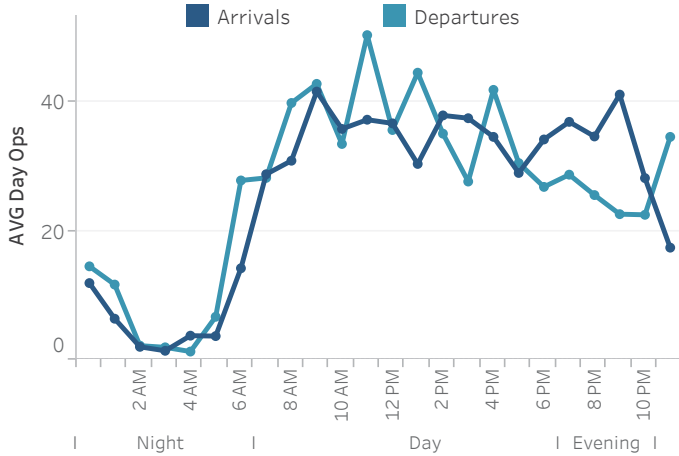
Note: Site 2 is currently not operational.

# Monthly Operations Summary

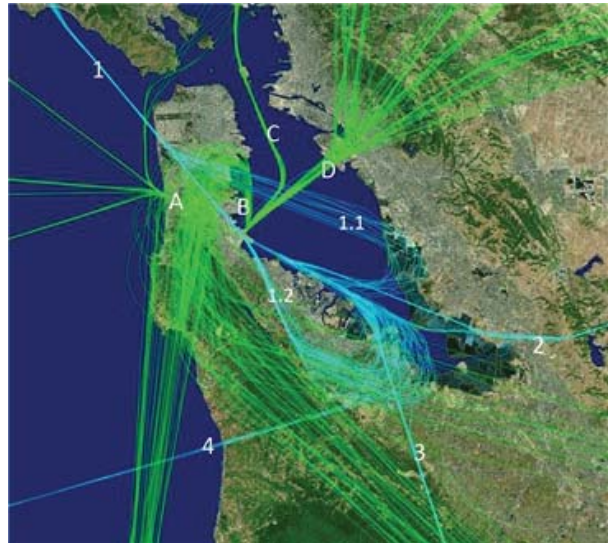
April 2018

37,522	1,251	38,232	8.3%
Monthly Operations	Average Daily Operations	12 Month AVG	YOY Growth

April 2018 Average Day (Hourly)



Major Arrival and Departure Route Pattern (West Flow)



Arrivals

1. BDEGA	25%
2. DYAMD	40%
3. SERFR	30%
4. OCEANIC	5%

Departures

A. GAP	20%
B. SSTIK	31%
C. NIITE	9%
D. TRUKN RWY 01	38%
D. TRUKN RWY 28	3%

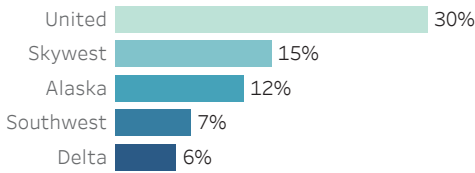
Los Angeles	Seattle	Portland
8%	5%	4%

West Flow  
97%

Down the Bay vs Peninsula

1.1 BDEGA East	30%
1.2 BDEGA West	70%

## Airlines with the Most Operations



Business Jets / Helicopters / GA 16%



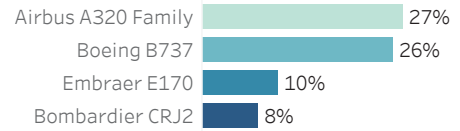
Narrowbody Jets 70%



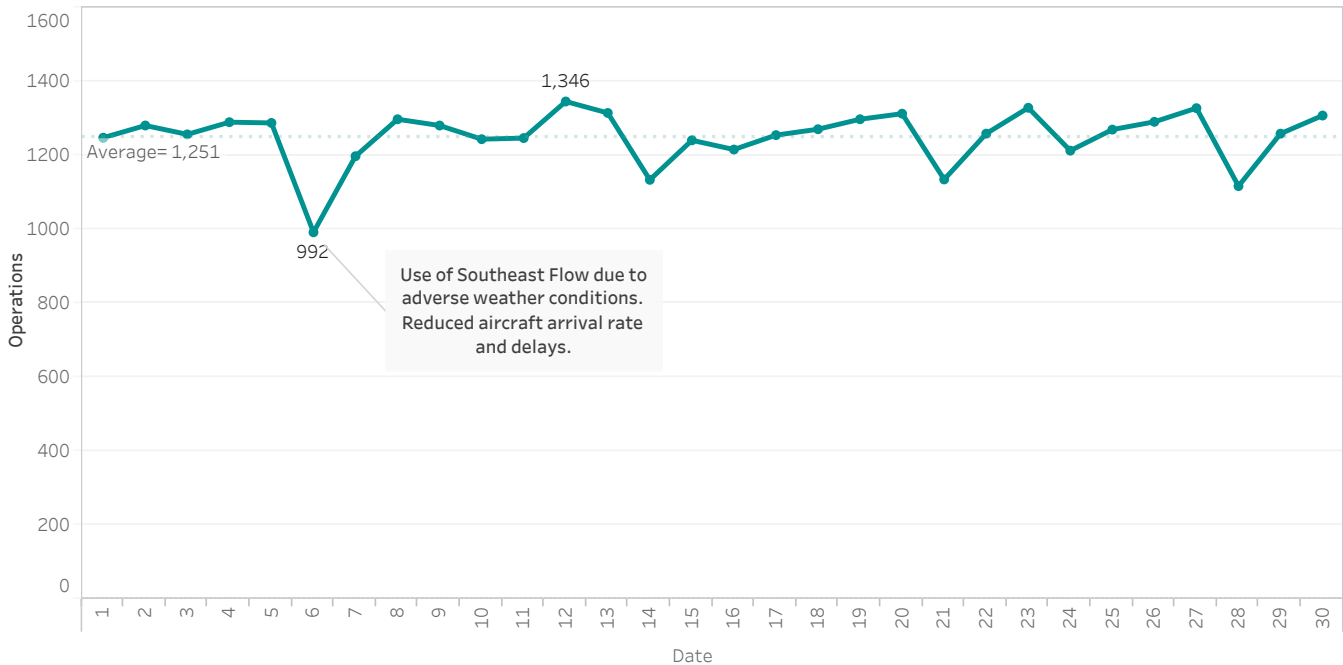
Widebody Jets 14%



## Most Utilized Aircraft Types



## Daily Aircraft Operations



# Runway Usage and Nighttime Operations

Monthly runway usage is shown for arrivals and departures, further categorized by all hours and nighttime hours. Graph at the bottom of the page shows hourly nighttime operations for each day. Power Runup locations are depicted on the airport map with airline nighttime power runup counts shown below. (Percent [%] rounded to nearest whole number)

## Runway Utilization (all hours)

	Arrivals	Departures
01 L/R		78% 13,871
10 L/R	0% 1	3% 532
19 L/R	3% 502	
28 L/R	97% 16,720	19% 3,485

## Late Night Preferential Runway Use (1 am - 6 am)

	Departures
10 L/R	8% 51
01 L/R	48% 301
28 L/R	44% 276

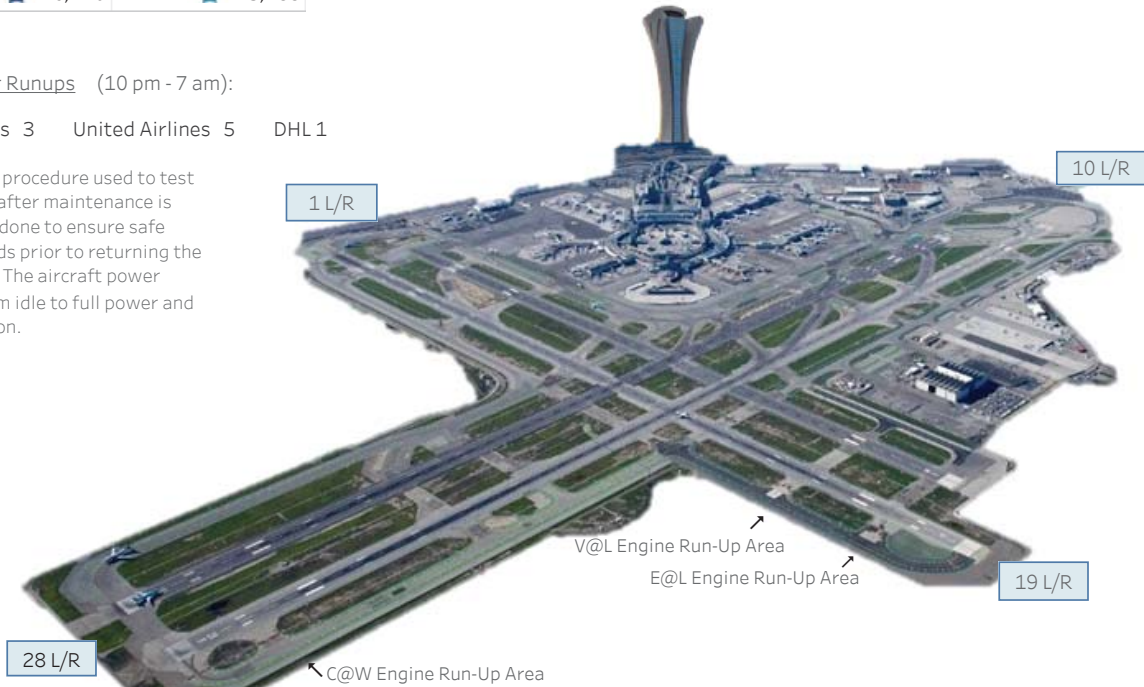
## 28 L vs R

Arrivals	
28L	28R
45%	55%
Night (10 pm - 7 am)	
23%	77%

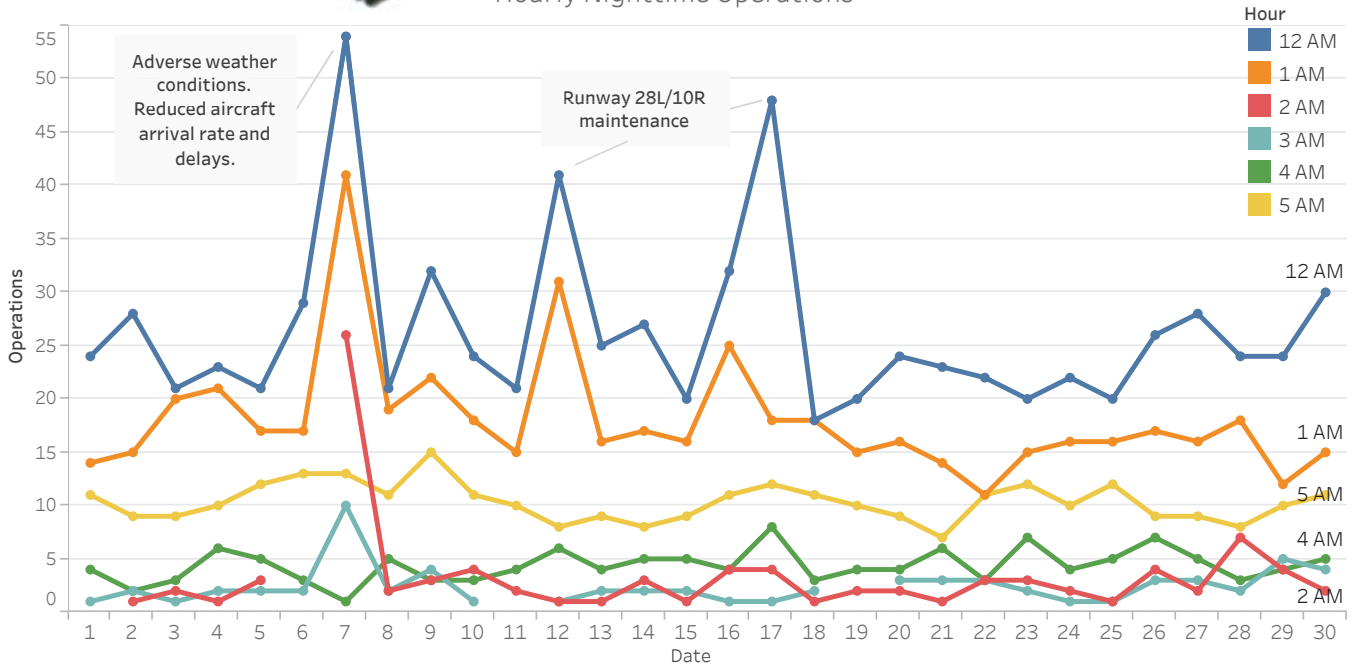
## Nighttime Power Runups (10 pm - 7 am):

American Airlines 3    United Airlines 5    DHL 1

A power runup is a procedure used to test an aircraft engine after maintenance is completed. This is done to ensure safe operating standards prior to returning the aircraft to service. The aircraft power settings range from idle to full power and may vary in duration.



## Hourly Nighttime Operations



# Noise Reports

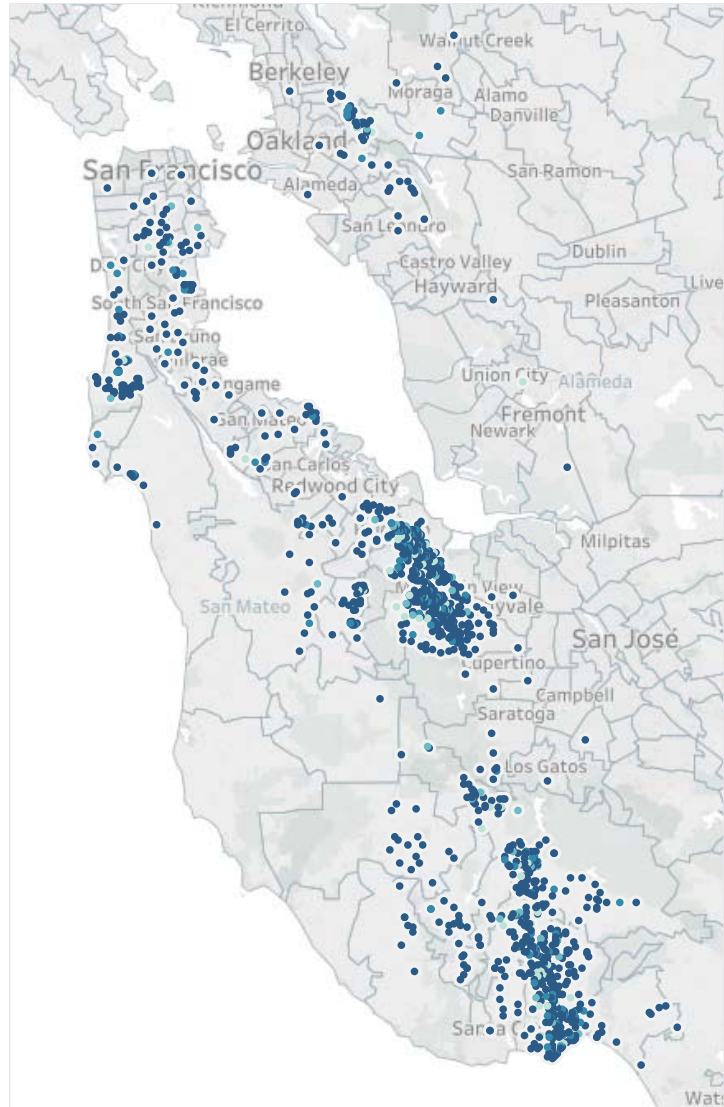


April 2018

Noise Reporters / Noise Reports

	Noise Reporters	Noise Reports
Atherton	7	707
Belmont	5	749
Brisbane	30	3,897
Burlingame	9	211
Daly City	8	1,255
El Granada	3	222
Foster City	11	603
Half Moon Bay	8	1,000
Hillsborough	1	2
Menlo Park	24	2,069
Millbrae	3	3
Pacifica	61	7,194
Portola Valley	39	7,702
Redwood City	18	1,465
San Bruno	6	492
San Carlos	2	64
San Francisco	41	5,474
San Mateo	9	1,160
South San Francisco	8	97
Woodside	12	1,637
Alameda	1	13
Aptos	15	1,005
Ben Lomond	13	445
Berkeley	6	49
Bonny Doon	4	104
Boulder Creek	17	805
Brookdale	1	3
Capitola	23	4,060
Carmel	4	366
Cupertino	3	165
East Palo Alto	2	68
Felton	21	892
Fremont	1	28
Hayward	1	1
Lafayette	2	144
Los Altos	180	28,287
Los Altos Hills	32	8,961
Los Gatos	154	28,141
Moraga	2	594
Morgan Hill	2	643
Mountain View	60	5,285
Oakland	48	8,498
Orinda	1	192
Palo Alto	239	57,205
Richmond	1	1
San Jose	1	24
San Leandro	1	188
Santa Clara	1	15
Santa Cruz	159	25,475
Saratoga	9	944
Scotts Valley	92	15,159
Soquel	97	9,857
Sunnyvale	11	205
Watsonville	1	222
<b>Total</b>	<b>1,510</b>	<b>234,047</b>

## Noise Reporters Location Map

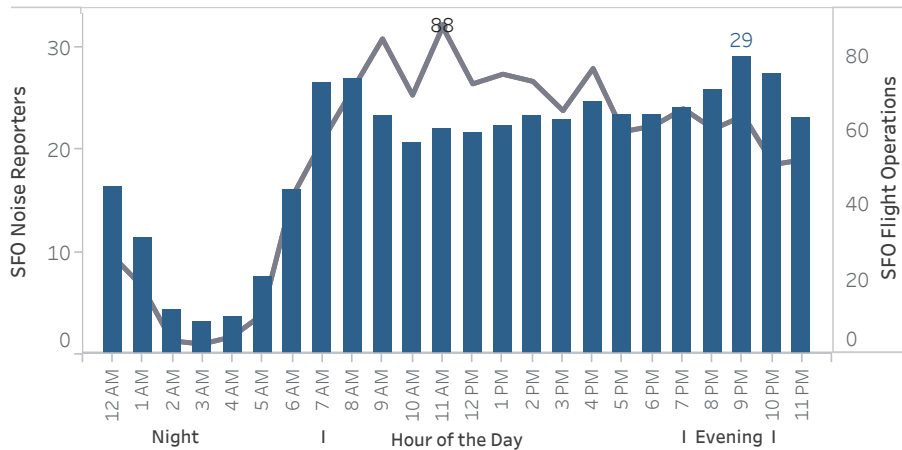


- 1,551 Noise Reporters (12 month AVG)
- 218,962 Noise Reports (12 Month AVG)
- 52 New Reporters
- Oakland New Reporters Top City
- 88 miles Furthest Report
- 6 Reports per SFO Operation
- B737 A320 E75L Top Aircraft Type
- CMP382 \* KAL213 JBU736 \* Top Flight Number \*Night

Roundtable Communities

Other Communities

Hourly Noise Reporters vs. Flight Operations (AVG Day)



Our software vendor's address validation relies on USPS-provided ZIP code look up table and USPS-specified default city values. Source: SFO Intl Airport Noise Monitoring System

99% of noise reports correlate to a flight origin/destination airport:

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# Fly Quiet Report

Presented at the June 6, 2018  
Airport Community Roundtable Meeting

Aircraft Noise Abatement Office  
First Quarter 2018



San Francisco  
International  
Airport

**Meeting 313 - Jun 6, 2018**  
**Packet Page 29**

# Fly Quiet Program

San Francisco International Airport's Fly Quiet Program is an Airport Community Roundtable initiative implemented by the Aircraft Noise Abatement Office. Its purpose is to encourage individual airlines to operate as quietly as possible at SFO. The program promotes a participatory approach in complying with noise abatement procedures and objectives by grading an airline's performance and by making the scores available to the public via newsletters, publications, and public meetings.

Fly Quiet offers a dynamic venue for implementing new noise abatement initiatives by praising and publicizing active participation rather than a system that admonishes violations from essentially voluntary procedures.

## Program Goals

The overall goal of the Fly Quiet Program is to influence airlines to operate as quietly as possible in the San Francisco Bay Area. A successful Fly Quiet Program can be expected to reduce both single event and total noise levels around the airport.

## Program Reports

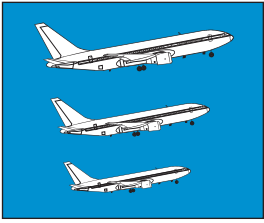
Fly Quiet reports communicate results in a clear, understandable format on a scale of 0-10, zero being poor and ten being good. This allows for an easy comparison between airlines over time. Individual airline scores are computed and reports are generated each quarter. These quantitative scores allow airline management and flight personnel to measure exactly how they stand compared to other operators and how their proactive involvement can positively reduce noise in the Bay Area.

## Program Elements

Currently the Fly Quiet Program rates jets and regional jets on six elements: the overall noise quality of each airline's fleet operating at SFO, an evaluation of single overflight noise level exceedences, a measure of how well each airline complies with the preferred nighttime noise abatement runways, assessment of airline performance to the Gap and Shoreline Departures, and over the bay approaches to runways 28L and 28R.



# SFO's Fly Quiet Ratings



## Fleet Noise Quality

The Fly Quiet Program Fleet Noise Quality Rating evaluates the noise contribution of each airline's fleet as it actually operates at SFO. Airlines generally own a variety of aircraft types and schedule them according to both operational and marketing considerations. Fly Quiet assigns a higher rating or grade to airlines operating quieter, new generation aircraft, while airlines operating older, louder technology aircraft would rate lower. The goal of this measurement is to fairly compare airlines—not just by the fleet they own, but by the frequency that they schedule and fly particular aircraft into SFO.



## Noise Exceedance

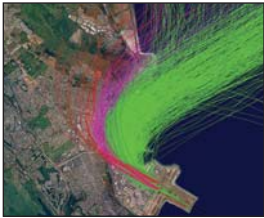
Eliminating high-level noise events is a long-standing goal of the Airport and the Airport Community Roundtable. As a result the Airport has established single event maximum noise level limits at each noise-monitoring site. These thresholds were set to identify aircraft producing noise levels higher than are typical for the majority of the operations.

Whenever an aircraft overflight produces a noise level higher than the maximum decibel value established for a particular monitoring site, the noise threshold is surpassed and a noise exceedance occurs. An exceedance may take place during approach, takeoff, or possibly during departure ground roll before lifting off. Noise exceedances are logged by the exact operation along with the aircraft type and airline name.



## Nighttime Preferential Runway Use

SFO's Nighttime Preferential Runway Use program was developed in 1988. Although the program cannot be used 100% of the time because of winds, weather, and other operational factors, the Airport, the Community Roundtable, the FAA, and the Airlines have all worked together to maximize its use when conditions permit. The program is voluntary; compliance is at the discretion of the pilot in command. The main focus of this program is to maximize flights over water and minimize flights over land and populated areas between 1:00 a.m. and 6:00 a.m. Fortunately, because airport activity levels are lower late at night, it is feasible to use over-water departure procedures more frequently than would be possible during the day. Reducing nighttime noise—especially sleep disturbance—is a key goal of SFO's aircraft noise abatement program.



## Shoreline Departure Quality

Aircraft departing SFO using Runways 28L and 28R are also considered by the Fly Quiet grading system whenever they use the Shoreline Departure Procedure. This predominately VFR (visual flight rules) departure steers aircraft to the northeast shortly after takeoff in an attempt to keep aircraft and aircraft noise away from the residential communities located to the northwest of SFO. By keeping aircraft east of Highway 101 the majority of the overflights will be experienced by industrial and business parks instead of residential areas.

In order to evaluate each airline's performance when flying a Shoreline Departure, a corridor was established using Interstate 101 (green colored flight tracks) as a reference point. The corridor runs north along 101, beginning approximately one-mile north-northwest of the end of Runways 28L and 28R and continuing up into the City of Brisbane. Departures west of 101 are scored marginal or poor depending on their location.



## Gap Departure Quality

Aircraft departing SFO using Runways 28L and 28R frequently depart straight out using a procedure known as the Gap Departure. This procedure directs air traffic to fly a route that takes them over the area northwest of the airport over the cities of South San Francisco, San Bruno, Daly City, and Pacifica. In an attempt to mitigate noise in this specific area, the Gap Departure Quality Rating has been included as a category in the Fly Quiet Program.

Since "higher is quieter", aircraft altitudes are recorded along the departure route. Scores are assigned at specified points or gates set approximately one mile apart, with the higher aircraft receiving higher scores.



## Foster City Arrival Quality

The Arrival Quality Rating is the latest addition to the Fly Quiet Program. In an effort to further reduce nighttime noise in neighboring communities, this rating is designed to maximize over-bay approaches to Runways 28 between 11:00 p.m. and 6:00 a.m. Airlines arriving to Runways 28 during these hours are assessed based on which approach flight path was used. Over-the-bay approaches are rated good (green colored flight tracks), versus over-the-communities which are rated poor.
















Airline Fly Quiet Summary Report - 1st Quarter 2018

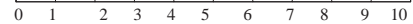
January 1 to March 31, 2018

Airline		Fleet Noise Quality	Noise Exceedance	Nighttime Runway Use	Departures Shoreline	Arrivals Gap Foster City	Final Score	Airline Fly Quiet Rating			
AIR CHINA	CCA	10.00	10.00	-	-	7.86	-	9.29			
Horizon Air	QXE	10.00	9.98	-	-	7.09	-	9.02			
Lufthansa	DLH	9.08	9.59	10.00	-	6.33	-	8.75			
HONGKONG AIRLINES 香港航空	CRK	9.50	10.00	-	-	5.63	-	8.38			
ANA	ANA	7.15	9.97	-	-	7.40	-	8.17			
Emirates	UAE	10.00	9.97	-	-	3.91	-	7.96			
Scandinavian Airlines	SAS	8.17	10.00	-	-	5.66	-	7.94			
JAPAN AIRLINES	JAL	7.15	9.94	-	-	6.26	-	7.79			
AIRFRANCE	AFR	7.08	10.00	-	10.00	4.02	-	7.78			
SkyWest	SKW	10.00	9.95	5.00	9.04	6.91	5.04	7.66			
Compass Airlines	CPZ	10.00	9.87	3.56	9.69	7.23	5.15	7.58			
AIR NEW ZEALAND	ANZ	7.01	9.85	-	-	5.82	-	7.56			
BRITISH AIRWAYS	BAW	5.51	9.60	10.00	-	4.90	-	7.50			
DELTA	DAL	6.02	9.82	5.71	7.86	7.59	7.06	7.34			
AIR CANADA	ACA	5.74	9.73	-	8.31	5.74	6.67	7.24			
SWISS	SWR	7.15	9.97	-	-	4.51	-	7.21			
KLM Royal Dutch Airlines	KLM	8.92	10.00	-	0.50	8.50	-	6.98			
中國東方航空 CHINA EASTERN	CES	6.24	10.00	-	-	4.67	-	6.97			
interJet	AIJ	4.85	9.53	6.67	-	8.75	5.00	6.96			
wow	WOW	4.22	10.00	-	5.00	8.41	-	6.91			
Southwest	SWA	5.82	9.83	4.07	9.56	5.99	6.15	6.90			
中國南方航空 CHINA SOUTHERN AIRLINES	CSN	7.15	8.49	-	-	4.91	-	6.85			
volaris	VOI	4.94	9.54	3.33	-	10.00	5.50	6.66			
virgin atlantic	VIR	9.14	9.98	-	0.00	7.52	-	6.66			
FRONTIER AIRLINES	FFT	5.64	9.73	4.01	8.75	3.93	7.57	6.60			
								6.57	<b>SFO AVERAGE</b>		
TURKISH AIRLINES	THY	7.15	10.00	-	-	2.56	-	6.57			
Aer Lingus	EIN	4.05	9.86	-	-	5.73	-	6.55			
FedEx	FDX	3.84	9.16	-	8.75	5.50	5.38	6.53			
sun country airlines	SCX	5.82	9.85	3.33	9.17	4.46	6.15	6.46			
jetBlue	JBU	4.77	9.78	4.67	7.79	5.65	6.12	6.46			
American Airlines	AAL	4.94	9.80	5.00	8.85	3.25	6.70	6.42			
UNITED	UAL	6.05	9.74	3.96	7.59	5.22	5.36	6.32			
Alaska	ASA	5.08	9.82	3.44	9.03	4.56	5.54	6.24			
Allegiant	AJT	4.87	8.13	-	-	5.83	5.00	5.96			
Avianca	TAI	4.95	8.51	3.76	-	7.68	4.85	5.95			
america	VRD	5.03	9.78	4.44	7.94	3.07	5.26	5.92			
QANTAS	QFA	3.43	8.13	-	-	6.06	-	5.87			
NCA Nippon Cargo Airlines	NCA	8.96	8.55	0.00	-	7.00	4.71	5.84			

**Airline Fly Quiet Summary Report - 1st Quarter 2018**



























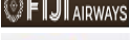


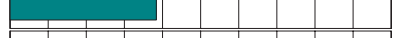



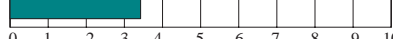
January 1 to March 31, 2018

Airline		Fleet Noise Quality	Noise Exceedance	Nighttime Runway Use	Departures Shoreline Gap	Arrivals Foster City	Final Score	Airline Fly Quiet Rating
 GTI		4.37	8.68	2.22	7.00	7.78	5.00	5.84
 AMX		5.82	8.89	4.15	-	5.65	4.31	5.76
 CPA		7.87	8.39	0.96	-	5.90	5.00	5.63
 FJI		4.05	7.00	-	-	5.69	-	5.58
 HAL		4.05	9.10	3.33	-	6.25	5.00	5.55
 AIC		7.15	8.16	0.00	-	7.23	5.00	5.51
 CAL		6.30	8.08	1.85	-	6.24	5.00	5.49
 SIA		8.32	7.90	1.36	-	4.30	-	5.47
 KAL		7.82	6.93	1.60	-	5.39	4.57	5.26
 EVA		7.14	7.59	1.43	-	4.42	5.00	5.12
 AAR		6.84	5.95	1.90	-	5.96	4.49	5.03
 CMP		5.82	8.96	1.29	6.25	2.99	4.04	4.89
 PAL		7.28	5.41	1.43	-	3.71	-	4.46
 CKS		3.43	0.00	1.67	1.67	4.00	3.33	2.35
<b>SFO Average</b>		<b>6.57</b>	<b>8.99</b>	<b>3.47</b>	<b>7.14</b>	<b>5.80</b>	<b>5.31</b>	<b>6.57</b>

























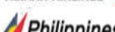



Airline	San Francisco		Fleet Noise Quality Rating	
	Nationwide	Average Daily Jet Operations		
	Fleet Noise Quality Rating	Score		
AIR CHINA CCA	3.46	1	10.00	
Emirates UAE	7.89	1	10.00	
Horizon Air QXE	10.00	4	10.00	
SkyWest SKW	10.00	108	10.00	
Compass Airlines CPZ	10.00	14	10.00	
HONGKONG AIRLINES CRK	0.00	0	9.50	
virgin atlantic VIR	5.84	2	9.14	
Lufthansa DLH	6.09	2	9.08	
NCA NCA	3.90	1	8.96	
KLM KLM	4.67	1	8.92	
SINGAPORE AIRLINES SIA	5.93	2	8.32	
SAS Scandinavian Airlines SAS	4.96	1	8.17	
CATHAY PACIFIC CPA	4.18	3	7.87	
KOREAN AIR KAL	4.05	3	7.82	
Philippines PAL	5.09	1	7.28	
VIETNAM AIRLINES AIC	4.77	1	7.15	
ANA ANA	5.43	1	7.15	
中国南方航空 CSN	5.64	1	7.15	
JAPAN AIRLINES JAL	4.20	1	7.15	
SWISS SWR	5.17	1	7.15	
TURKISH AIRLINES THY	6.80	1	7.15	
EVA AIR EVA	5.05	3	7.14	
AIRFRANCE AFR	5.49	1	7.08	
AIR NEW ZEALAND ANZ	4.00	1	7.01	
ASIANA AIRLINES AAR	3.93	2	6.84	
			6.57	<b>SFO AVERAGE</b>
CHINA AIRLINES CAL	3.62	2	6.30	
中国东方航空 CHINA EASTERN CES	4.63	1	6.24	
UNITED UAL	5.83	171	6.05	
DELTA DAL	4.92	24	6.02	
AEROMEXICO AMX	5.54	3	5.82	
Copa Airlines CMP	6.46	2	5.82	
sun country airlines SCX	5.82	1	5.82	
Southwest SWA	5.70	43	5.82	
AIR CANADA ACA	6.75	10	5.74	
FRONTIER AIRLINES FFT	6.41	4	5.64	

Airline	San Francisco		Fleet Noise Quality Rating	
	Nationwide Fleet Noise Quality Rating	Average Daily Jet Operations		Score
 BRITISH AIRWAYS BAW	4.34	2	5.51	
 Alaska ASA	5.10	72	5.08	
 america VRD	5.31	7	5.03	
 Avianca TAI	5.18	2	4.95	
 volaris VOI	0.00	1	4.94	
 American Airlines AAL	3.94	34	4.94	
 Allegiant AJT	0.05	0	4.87	
 interjet AIJ	0.00	0	4.85	
 jetBlue JBU	6.13	16	4.77	
 ATLAS AIR GTI	0.93	2	4.37	
 wow WOW	0.00	0	4.22	
 Aer Lingus EIN	4.05	1	4.05	
 HAWAIIAN AIRLINES HAL	6.21	2	4.05	
 FIJI AIRWAYS FJI	0.00	0	4.05	
 FedEx FDX	2.80	1	3.84	
 KALITTA AIR CKS	0.60	0	3.43	
 QANTAS QFA	3.47	1	3.43	
<b>AVERAGE</b>	<b>4.62</b>	<b>11</b>	<b>6.57</b>	

Noise Exceedance Rating Report - 1st Quarter 2018

January 1 to March 31, 2018

Airline	Noise Exceedances				Noise Exceedance Quality Rating
	Total Noise Exceedances	Total Quarterly Operations	Exceedances per 1000 Operations	Score	
AIRFRANCE / AFR	0	182	0	10.00	
AIR CHINA / CCA	0	180	0	10.00	
中国东方航空 / CHINA EASTERN / CES	0	254	0	10.00	
HONGKONG AIRLINES / 香港航空 / CRK	0	8	0	10.00	
KLM / Royal Dutch Airlines / KLM	0	180	0	10.00	
Scandinavian Airlines / SAS	0	178	0	10.00	
TURKISH AIRLINES / THY	0	181	0	10.00	
WOW / WOW	0	78	0	10.00	
virgin atlantic / VIR	1	302	3	9.98	
Horizon Air / QXE	3	766	4	9.98	
ANA / ANA	1	180	6	9.97	
SWISS / SWR	1	180	6	9.97	
Emirates / UAE	1	180	6	9.97	
SkyWest / SKW	178	19,364	9	9.95	
JAPAN AIRLINES / JAL	2	180	11	9.94	
Compass Airlines / CPZ	67	2,488	27	9.87	
Aer Lingus / EIN	4	144	28	9.86	
AIR NEW ZEALAND / ANZ	5	172	29	9.85	
sun country airlines / SCX	6	195	31	9.85	
Southwest / SWA	267	7,738	35	9.83	
Alaska / ASA	456	12,904	35	9.82	
DELTA / DAL	158	4,404	36	9.82	
American Airlines / AAL	250	6,107	41	9.80	
america / VRD	53	1,223	43	9.78	
jetBlue / JBU	129	2,873	45	9.78	
UNITED / UAL	1,593	30,804	52	9.74	
AIR CANADA / ACA	94	1,768	53	9.73	
FRONTIER AIRLINES / FFT	39	719	54	9.73	
BRITISH AIRWAYS / BAW	29	361	80	9.60	
Lufthansa / DLH	29	358	81	9.59	
volaris / VOI	17	185	92	9.54	
Interjet / AIJ	3	32	94	9.53	
FedEx / FDX	34	202	168	9.16	
HAWAIIAN AIRLINES / HAL	65	362	180	9.10	
				8.99	SFO AVERAGE
Copa Airlines / CMP	82	396	207	8.96	
AEROMEXICO / AMX	121	546	222	8.89	
ATLAS AIR / GTI	72	273	264	8.68	

Airline	Noise Exceedances				Noise Exceedance Quality Rating
	Total Noise Exceedances	Total Quarterly Operations	Exceedances per 1000 Operations	Score	
 NCA	33	114	289	8.55	
 TAI	94	315	298	8.51	
 CSN	52	172	302	8.49	
 CPA	159	495	321	8.39	
 AIC	59	160	369	8.16	
 AJT	3	8	375	8.13	
 QFA	60	160	375	8.13	
 CAL	146	381	383	8.08	
 SIA	151	360	419	7.90	
 EVA	223	463	482	7.59	
 FJI	24	40	600	7.00	
 KAL	316	514	615	6.93	
 AAR	259	320	809	5.95	
 PAL	188	205	917	5.41	
 CKS	30	15	2000	0.00	
<b>TOTAL</b>	<b>5,557</b>	<b>100,369</b>			
<b>SFO AVERAGE</b>			<b>202</b>	<b>8.99</b>	

Nighttime Preferential Runway Use - 1st Quarter 2018


















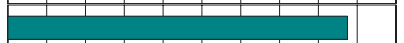









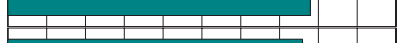
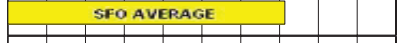







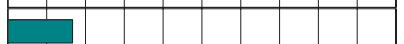




January 1 to March 31, 2018

Airline	Nighttime Departures ( 1:00 am to 6:00 am )						Nighttime Runway Use Rating
	Total	10L/R	28L/R Shoreline	01L/R	28L/R Straight	Score	
BRITISH AIRWAYS BAW	1	100%	0%	0%	0%	10.00	
Lufthansa DLH	1	100%	0%	0%	0%	10.00	
Interjet AIJ	2	50%	0%	50%	0%	6.67	
DELTA DAL	14	36%	0%	64%	0%	5.71	
American Airlines AAL	32	22%	13%	59%	6%	5.00	
SkyWest SKW	8	25%	0%	75%	0%	5.00	
jetBlue JBU	25	20%	8%	64%	8%	4.67	
america VRD	3	0%	33%	67%	0%	4.44	
AEROMEXICO AMX	41	15%	0%	80%	5%	4.15	
Southwest SWA	72	13%	0%	85%	3%	4.07	
FRONTIER FFT	84	8%	6%	83%	2%	4.01	
UNITED UAL	374	10%	4%	82%	5%	3.96	
Avianca TAI	47	11%	0%	81%	9%	3.76	
Compass Airlines CPZ	87	5%	0%	93%	2%	3.56	
							<b>SFO AVERAGE</b>
							3.47
Alaska ASA	98	2%	0%	97%	1%	3.44	
HAWAIIAN AIRLINES HAL	1	0%	0%	100%	0%	3.33	
sun country airlines SCX	3	0%	0%	100%	0%	3.33	
volaris VOI	24	4%	0%	88%	8%	3.33	
ATLAS AIR GTI	3	0%	0%	67%	33%	2.22	
ASIANA AIRLINES AAR	42	19%	0%	0%	81%	1.90	
CHINA AIRLINES CAL	27	19%	0%	0%	81%	1.85	
KALITTA AIR CKS	4	0%	25%	0%	75%	1.67	
KOREAN AIR KAL	81	16%	0%	0%	84%	1.60	
EVA AIR EVA	42	14%	0%	0%	86%	1.43	
Philippines PAL	7	14%	0%	0%	86%	1.43	
SINGAPORE AIRLINES SIA	22	14%	0%	0%	86%	1.36	
Copa Airlines CMP	49	10%	4%	0%	86%	1.29	
CATHAY PACIFIC CPA	52	10%	0%	0%	90%	0.96	
NCA NCA	2	0%	0%	0%	100%	0.00	
<b>TOTAL</b>	<b>1,251</b>						
<b>SFO AVERAGE</b>		<b>18%</b>	<b>3%</b>	<b>44%</b>	<b>35%</b>	<b>3.47</b>	


































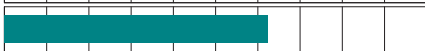













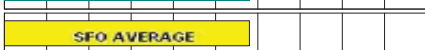






















Shoreline Departure Rating - 1st Quarter 2018

January 1 to March 31, 2018

Airline	Shoreline Departures					Shoreline Departure Rating
	Total	Successful	Marginal	Poor	Score	
 AFR	1	100%	0%	0%	10.00	
 CPZ	16	94%	6%	0%	9.69	
 SWA	68	91%	9%	0%	9.56	
 SCX	6	83%	17%	0%	9.17	
 SKW	171	85%	11%	4%	9.04	
 ASA	222	81%	18%	0%	9.03	
 AAL	135	78%	21%	1%	8.85	
 FDX	8	75%	25%	0%	8.75	
 FFT	16	75%	25%	0%	8.75	
 ACA	62	71%	24%	5%	8.31	
 VRD	17	59%	41%	0%	7.94	
 DAL	145	62%	33%	5%	7.86	
 JBU	68	56%	44%	0%	7.79	
 UAL	523	61%	29%	9%	7.59	
					7.14	
 GTI	10	40%	60%	0%	7.00	
 CMP	4	25%	75%	0%	6.25	
 WOW	1	0%	100%	0%	5.00	
 CKS	3	0%	33%	67%	1.67	
 KLM	10	0%	10%	90%	0.50	
 VIR	1	0%	0%	100%	0.00	
<b>TOTAL</b>	<b>1,487</b>					
<b>SFO AVERAGE</b>		<b>57%</b>	<b>29%</b>	<b>14%</b>	<b>7.14</b>	




































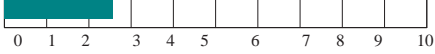
Gap Departure Climb Rating - 1st Quarter 2018

January 1 to March 31, 2018

Airline	Gap Departures		Gap Departure Quality Rating
	Total	Score	
 VOI	6	10.00	
 AIJ	1	8.75	
 KLM	5	8.50	
 WOW	11	8.41	
 CCA	88	7.86	
 GTI	27	7.78	
 TAI	7	7.68	
 DAL	101	7.59	
 VIR	54	7.52	
 ANA	88	7.40	
 CPZ	122	7.23	
 AIC	78	7.23	
 QXE	40	7.09	
 NCA	55	7.00	
 SKW	884	6.91	
 DLH	175	6.33	
 JAL	86	6.26	
 HAL	13	6.25	
 CAL	184	6.24	
 QFA	78	6.06	
 SWA	369	5.99	
 AAR	149	5.96	
 CPA	238	5.90	
 AJT	3	5.83	
 ANZ	84	5.82	
			<b>SFO AVERAGE</b>
 ACA	51	5.74	
 EIN	70	5.73	
 FJI	20	5.69	
 SAS	87	5.66	
 AMX	23	5.65	
 JBU	73	5.65	
 CRK	4	5.63	
 FDX	10	5.50	
 KAL	241	5.39	












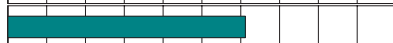







































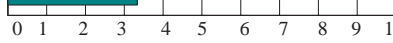






Gap Departure Climb Rating - 1st Quarter 2018

January 1 to March 31, 2018

Airline	Gap Departures		Gap Departure Quality Rating
	Total	Score	
 UAL	3551	5.22	
 CSN	82	4.91	
 BAW	144	4.90	
 CES	124	4.67	
 ASA	663	4.56	
 SWR	87	4.51	
 SCX	7	4.46	
 EVA	221	4.42	
 SIA	174	4.30	
 AFR	69	4.02	
 CKS	5	4.00	
 FFT	14	3.93	
 UAE	88	3.91	
 PAL	100	3.71	
 AAL	398	3.25	
 VRD	68	3.07	
 CMP	185	2.99	
 THY	88	2.56	
<b>TOTAL</b>	<b>9593</b>		
<b>SFO Average</b>		<b>5.80</b>	

Foster City Arrival Rating - 1st Quarter 2018

January 1 to March 31, 2018

Airline	Foster City Arrivals					Foster City Arrival Rating
	Total	Successful	Marginal	Poor	Score	
 FFT	74	51%	49%	0%	7.57	
 DAL	194	42%	57%	1%	7.06	
 AAL	324	36%	61%	2%	6.70	
 ACA	87	36%	62%	2%	6.67	
 SCX	13	31%	62%	8%	6.15	
 SWA	244	26%	71%	3%	6.15	
 JBU	210	22%	78%	0%	6.12	
 ASA	472	13%	85%	2%	5.54	
 VOI	10	10%	90%	0%	5.50	
 FDX	39	8%	92%	0%	5.38	
 UAL	961	14%	79%	7%	5.36	
					5.31	<b>SFO AVERAGE</b>
 VRD	39	5%	95%	0%	5.26	
 CPZ	100	3%	97%	0%	5.15	
 SKW	132	5%	90%	5%	5.04	
 AIC	28	0%	100%	0%	5.00	
 AIJ	1	0%	100%	0%	5.00	
 AJT	3	0%	100%	0%	5.00	
 CAL	2	0%	100%	0%	5.00	
 CPA	1	0%	100%	0%	5.00	
 EVA	3	0%	100%	0%	5.00	
 GTI	61	3%	93%	3%	5.00	
 HAL	3	0%	100%	0%	5.00	
 TAI	66	2%	94%	5%	4.85	
 NCA	17	6%	82%	12%	4.71	
 KAL	69	3%	86%	12%	4.57	
 AAR	39	0%	90%	10%	4.49	
 AMX	29	3%	79%	17%	4.31	
 CMP	52	0%	81%	19%	4.04	
 CKS	3	0%	67%	33%	3.33	
<b>TOTAL</b>	<b>3,276</b>					
<b>SFO AVERAGE</b>		<b>11%</b>	<b>84%</b>	<b>5%</b>	<b>5.31</b>	



May 21, 2018

TO: Roundtable Members and Interested Parties

FROM: Justin W. Cook – INCE, LEED GA  
Roundtable Technical Consultant - HMMH

SUBJECT: Summary of the 4<sup>th</sup> Technical Working Group (TWG) Meeting on Thursday, May 3, 2018

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The 1<sup>st</sup> Technical Working Group (TWG) meeting was held August 15, 2017 and focused on reviewing the Federal Aviation Administration's (FAA) Phase 2 Initiative Document<sup>1</sup> and compared the Roundtable's recommendations to the FAA responses that were dated November 2016.

The purpose of 2<sup>nd</sup> and 3<sup>rd</sup> TWG meetings was to review and analyze the FAA's Update on Phase 2 Initiative Document<sup>2</sup> to: 1) determine how the Roundtable should go about monitoring those measures the FAA will implement and 2) determine if there are any opportunities to work with the FAA on items they found not feasible.

The FAA Update on Phase 2 Initiative Document was released in November 2017 and is an update to the interim Phase 2 Initiative Document released in July 2017. The update provides details on 203 items, which consists of the original 104 recommendations and their associated sub-recommendations.

Below is the agenda for the 4<sup>th</sup> TWG meeting held on Thursday, May 3, 2018. It is expected that future TWG meetings will follow a similar agenda until the TWG has completed their review and analysis of all FAA responses.

1. Introductions, Brief Overview of the Framework for the Review/Analysis Process
2. Begin Review/Analysis of Topic 3 - Near Bay Daytime Operations (RWY 28 Arrivals Only)
3. Review/Analysis of Topic 4 – Near Bay Daytime Operations (RWY 28 Departures Only)  
*\*Time Permitting*
4. Review/Analysis of Topic 5 – Near Bay Daytime Operations (RWY 10 Departures Only)  
*\*Time Permitting*
5. Summarize Action Items
6. Discuss and Announce Next Technical Working Group Meeting Dates
7. Public Comments on Items NOT on the Agenda
8. Adjourn

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<sup>1</sup> FAA Initiative to Address Noise Concerns of Santa Cruz/Santa Clara/San Mateo/San Francisco Counties, Phase Two, Compiled at the Requests of Representatives Farr (Panetta), Eshoo and Speier, July 2017

<sup>2</sup> FAA Initiative to Address Noise Concerns of Santa Cruz/Santa Clara/San Mateo/San Francisco Counties, Update on Phase Two, Compiled at the Requests of Representatives Farr (Panetta), Eshoo and Speier, November 2017



The following section provides a summary of the 4<sup>th</sup> TWG discussions for Topic 3, “Near Bay Daytime Operations – Runway 28 Arrivals Only.”

## Near Bay Daytime Operations – Runway 28 Arrivals Only

This section provides brief descriptions of the recommended measures, the FAA responses provided to date and the recommendations resulting from the TWG review grouped into the three areas: recommendations the FAA has or will address, recommendations requiring further analysis/information for the FAA to address and recommendations the FAA determined they would not address.

### Recommendations the FAA Has or Will Address

The following recommended measures include those that the FAA either has or will address through changes to their ongoing implementation of the Northern California Metroplex:

#### 1. BDEGA

**FAA’s Update on Phase 2 Initiative Document Reference:** Page 23 – Item 1, Page 23 – Item 4, Page 34 – Item 1, Page 35 – Item 7, Page 36 – Item 11, Page 36 – Item 12

**Summary of Recommendations:** Return to historical use of the BDEGA East downwind prior to May 2010. Use all available opportunities to assign arrivals from the north and oceanic flight plans to an east downwind “down the Bay”. Compare current BDEGA arrival to previous Golden Gate arrival. Research reasons for continued increased use of BDEGA west from May 2010 to present.

**Summary of FAA Responses:** The FAA concurs with the recommendation to utilize the BDEGA “East Leg” to the extent operationally feasible; however, a return to “pre-May 2010 levels” is unlikely without a decrease in operations. The BDEGA East Leg shares a final for SFO’s Runway 28R with the DYAMD arrival, which contains the greatest share of SFO’s arrivals. DYAMD arrival aircraft are constrained by SJC airspace to the South and OAK airspace to the North, which inhibits ATC’s ability to vector these aircraft. Additionally, the density of aircraft on the DYAMD arrival is such that vectoring of aircraft creates a ripple effect, jeopardizing safety and resulting in delays. Because of this, aircraft flying the BDEGA arrival will only be assigned the East Leg when enough space exists between arrivals on the DYAMD to allow for it. As SFO and DYAMD traffic counts increase, opportunities to utilize the BDEGA East Leg will be affected.

**Summary of TWG Discussion:** FAA will try and maximize use of east leg for BDEGA but the FAA claims that there isn’t currently additional capacity. This is looking at only daytime operations currently. Community question on number of operations between Golden Gate Arrivals and BDEGA 2016 arrivals being shown in graphics. Community question on why the split for east vs west leg utilized differently. Up to controllers at this point to utilize BDEGA further as a question to ask the FAA. Since nighttime operations have already been discussed we are focusing on daytime now. Discussion on how the DYAMD conflicts with BDEGA with Bert showing on the screen where they merge. DYAMD has less of a conflict with BDEGA west since they merge further out so the focus is on east. Community question 4-5 a.m. oceanic arrivals use BDEGA east since there is limited traffic conflict at that time of day. Can DYAMD land on 28L with an offset? Comments: suggestions from residence to go back to the FAA with understanding of conflicts and do their best to place traffic to the east with “what ifs”. Elizabeth asks how high (altitude) aircraft can be raised on arrivals. Gene recommends asking FAA to look into raising the arrival altitude and slope. GBAS technology is a little ways out but something the group can consider. Comment that altitudes coming into the U-turn on west BDEGA has been lower than historical traffic since the introduction of Metroplex. Commenter would like to see if there is a trend to identify changes in altitude before aircraft start to make their U-turn or as they come down the spine of the peninsula. FAA would want an updated procedure to implement this ask of increased altitude before

their turn on west BDEGA. Burt provided altitudes at three points with an at or above 5,000' as of March. Community question to have louder aircraft use East BDEGA. Gene's response cautioned due to FAA perception of a use restriction and the need for a P161. Having a voluntary measure to request airlines to take the east vs west. Burt responded with visuals for pilots and many foreign carriers ask for right vs left due to safety.

## 2. Utilize Runway 28R

**FAA's Update on Phase 2 Initiative Document Reference:** Page 25 – Item 12, Page 26 – Item 13, Page 36 – Item 13, Page 37 – Item 14, Page 60 – Item 18, Page 60 – Item 21, Page 62 – Items 26-28

**Summary of Recommendations:** Whenever there is a single stream operation to only one runway, aircraft should approach and land only on Runway 28R. Aircraft landing 28R should be assigned noise friendlier approaches such as FMS Bridge Visual 28R, Quiet Bridge Visual, or RNAV (RNP) Y 28R. Increase controller awareness and pilots on keeping aircraft over water as much as possible, especially when aircraft are operating in a single stream and using Runway 28R.

**Summary of FAA Responses:** The FAA concurs with this recommendation to the extent operationally feasible. SFO's Runway 28R is listed within NCT's SOP as the preferred arrival runway. NCT will continue to reinforce the use of this procedure to personnel through training and briefings.

**Summary of TWG Discussion:** SFO should monitor the use of Runway 28R and provide recommendations on how to improve it, but FAA is in concurrence that Runway 28R is the preferred runway. Weather and times when low utilization they use single stream. Gene discussed the monitoring items to compile in a full recommendation list and set priority based on what the Roundtable wants to see added to a report since workload can be an issue. Community request to use a different procedure as well as using Runway 28R to meet overall goal.

## 3. Dual Offset Approaches

**FAA's Update on Phase 2 Initiative Document Reference:** Page 38 – Item 18

**Summary of Recommendations:** Roundtable will provide information and community input to FAA regarding process of creating, if feasible, dual satellite-based Runway 28 offset approaches closer to middle of the Bay.

**Summary of FAA Responses:** NCT will continue to be an active participant in Roundtable meetings, providing subject matter expertise in seeking solutions. The FAA has no plans for creating a dual satellite-based Runway 28L and 28R offset approach. Part of the procedure development process is to ascertain how a proposed procedure could be separated from all surrounding procedures. Such separation is required in order for the procedure to be published. This allows ATC to place an aircraft on the published procedure with the certainty that it is automatically separated from all other aircraft on other published procedures. The FAA researched publishing an offset approach to RWY 28L in its NorCal Phase One Report, 1.b.iii. and Appendix C. While this request was for a single offset approach to only Runway 28L, in actuality it was also evaluated against the existing offset approach to Runway 28R (an offset approach to Runway 28L would not operate in a vacuum). This research determined that an offset approach to Runway 28L would not have the required separation standards with the Runway 28R offset approach, making it untenable. Because

this research included both the offset approaches to Runway 28L and 28R, the FAA considers this recommendation as redundant.

**Summary of TWG Discussion:** Gene paused to note that AAAE made a request of the FAA to return to the meetings they have committed to. Roundtable is on record of making a formal request to the FAA for their attendance. The single stream to Runway 28L cannot be moved further to the east since Runway 28R shift will conflict with SJC airspace. Community note to collaborate with SJC since the items they are searching for conflict with SFO and vice versa.

#### 4. Vectoring

**FAA's Update on Phase 2 Initiative Document Reference:** Page 61 – Item 24, Page 65 – Item 41

**Summary of Recommendations:** Roundtable requests to work with the FAA to determine where aircraft can be vectored with least noise impact and identify locations that have most compatible land uses. FAA should use FAA Initiative phase 1, Appendix B as a baseline to compare improvements in decreasing vectoring.

**Summary of FAA Responses:** NCT will continue to be an active participant in Roundtable meetings, providing subject matter expertise in seeking solutions. Aircraft vectoring is a tactical decision used by ATC to establish and maintain the sequence of aircraft to the airport. Due to safety considerations, the FAA cannot support a restriction on when ATC may or may not use a vital component of its sequencing tools.

**Summary of TWG Discussion:** Elizabeth gave some background on the intent of the request. Gene suggested that the Roundtable be more specific of the areas and where the group would support and not support vectoring it could maybe be part of the training for ATC. How much notice does ATC have before they vector? Discussion on situations when the need to vector is needed. Recommendation that if they need to vector, it should be done over the ocean to prep for a continuous descent and sequencing into the airport. Community comment on the habitual vectoring he sees (such as the OAK CNDEL procedure), rather than a safety need that puts aircraft over Brisbane. Community comment to echo Gene's suggestion to be more specific and provide suggestions other than the ocean. Can CNDEL or STTIK be made noise abatement procedures on a regular basis? Discussion on areas of vectoring and procedures. Gene responded that this body can suggest to the Airport to make a procedure into a NADP and then SFO can include into their NCP – but it most likely will not meet the P150 requirements for FAA. Roundtable to reaffirm that they CAN vector since we do not want to take away their ability to vector to avoid potential emergencies. The refined ask is to vector further out when they know the need and provide suggested areas to reduce the vectoring that is occurring over populated areas or at a higher altitude. Discussion on community member concern of "railroad" overflights. Discussion on "noise footprint" and where to find a definition of land use compatibility. Request to look at OAK traffic and vectoring as well. Recommendation to look at flight percentages that utilize the published procedure. Request from community to adopt the BOS/MIT slower takeoff to reduce noise.

## 5. MENLO

**FAA's Update on Phase 2 Initiative Document Reference:** Page 55 – Item 1

**Summary of Recommendations:** Roundtable requests that the agreement stay in place (between noise office and NCT) where aircraft cross MENLO intersection during visual conditions at 5,000' AGL and 4,000' AGL during instrument conditions.

**Summary of FAA Responses:** The FAA agrees with this recommendation to the extent feasible. However, it should be noted that there is no such agreement as stated that references altitudes as Above Ground Level (AGL). The FAA, for clarity and consistency, typically references altitudes in Mean Sea Level (MSL) in orders, agreements and procedures. The FAA is in ongoing discussions with the SFO Airport to update the Fly Quiet program. *Consultant Note – I think AGL was a typo in the Roundtable recommendations and it should have been MSL like all other references.*

**Summary of TWG Discussion:** No discussion in the agreement on the visual vs the instrument and need for it to be 5,000' period. Burt gave a re-cap that FAA stated we could do it on the visual (which is 80% of the time) but FAA stated they could not do it for instrument. Burt mentioned the new procedure. Community member cautioned to declare victory at 5,000' and that what we are proposing conflicts with a 2,000' agreement and since there is a trend towards instrument this item will not be as useful in the future. Burt mentioned that it has been noted that pilots can fly quieter than auto-pilot. Summary of the discussion on Roundtable recommendation would be to go back on their FAA recommendation and not introduce the 4,000' and re-phrase to the intention of the request for a higher altitude.

### Recommendations Requiring Further Analysis/Information for the FAA to Address

The following recommended measures include those that the FAA responded that additional analysis, investigations and/or information is required to proceed with changes to their ongoing implementation of the Northern California Metroplex:

## 6. BDEGA

**FAA's Update on Phase 2 Initiative Document Reference:** Page 24 – Item 6

**Summary of Recommendations:** FAA should study whether an increase in in-trail spacing on BDEGA arrivals will result in a decrease in vectoring over Peninsula.

**Summary of FAA Responses:** The FAA is continuously working to improve aircraft setup and sequencing between facilities. The BDEGA Arrival has the lightest traffic load (24% of SFO arrivals), as compared to the SERFR Arrival (29% of SFO arrivals) and DYAMD Arrival (39% of SFO arrivals), and as such is a candidate for this type of action.

**Summary of TWG Discussion:** Gene noted that FAA looking into further analysis to see if they can increase in-trail spacing to decrease in vectoring over the peninsula. Burt read an updated statement that confirms that the FAA is looking into the recommendation. Community comments, until we know exactly what FAA will do this could result in louder noise to the community. Would like to ask the FAA for more specifics from the FAA. Burt gave a list of the entities that are taking the recommendation under review.

## 7. MENLO

**FAA's Update on Phase 2 Initiative Document Reference:** Page 26 – Item 17

**Summary of Recommendations:** Create a visual approach for Runway 28L with a MENLO crossing altitude at or above 5,000; MSL.

**Summary of FAA Responses:** NCT supports the development of an RNAV visual approach to SFO's Runway 28L. Due to safety considerations and current criteria, development of this type of procedure is on hold. The FAA is currently evaluating methods for overcoming these concerns.

**Summary of TWG Discussion:** Continuation on #5 about the 5,000' of MENLO. FAA needs more information due to safety concerns.

### Recommendations the FAA Determined They Will Not Address

The following recommended measures include those that the FAA rejected and stated changes to their ongoing implementation of the Northern California Metroplex will not occur:

## 8. BDEGA

**FAA's Update on Phase 2 Initiative Document Reference:** Page 23 – Items 2-3, Page 24 – Item 5, Page 34 – Item 4, Page 36 – Item 10, Page 46 – Item 49, Page 62 – Item 30

**Summary of Recommendations:** Explain the limitation of using BDEGA East downwind. Reinstate the FNISH transition in order to facilitate use of the BDEGA East downwind and create a connection between FNISH waypoint and a turn on to Runway 28R. Determine if BDEGA West downwind can be flown at a higher altitude or over compatible land uses. The BDEGA TWO procedure include the waypoints for a down the Bay procedure as done in BDEGA ONE.

**Summary of FAA Responses:** The Runway 28R and 28L transition (that contained the FINSH waypoint) was removed due to safety concerns. The issue stemmed from the necessity of pilots to program a transition into their FMS when issued the Standard Terminal Arrival (STAR) descent by the Center controller. However, this happens well before the TRACON controller advises the aircraft what runway and associated transition to expect – which is determined by traffic demands and sequencing needs as the aircraft gets closer to the airport. This led to a number of pilots arbitrarily selecting a transition, resulting in aircraft not flying as controllers expected, frequency congestion, and confusion during their approach and landing - a critical phase of flight. The FAA does not support the reinstatement of separate runway transitions to SFO's Runway 28R and 28L.

**Summary of TWG Discussion:** Gene read the summary and noted that the FAA will not address/implement any further. Elizabeth noted that SFO had runway confusion lately and there was a resolution made this week to correct the confusion. Burt gave a summary of the changes that have been made and how the problem areas have been addressed based on the changes. Elizabeth stated that if FAA believes due to safety concerns this cannot be implemented she is okay with that.



## 9. DYAMD

**FAA's Update on Phase 2 Initiative Document Reference:** Page 25 – Item 11

**Summary of Recommendations:** FAA should increase the in-trail spacing of aircraft on the DYAMD arrival to allow additional opportunities for aircraft to use the BDEGA east arrival, down the Bay.

**Summary of FAA Responses:** This recommendation conflicts with the Recommendation to route aircraft from the south to an arrival east of the bay, which would *increase* the number of aircraft arriving from the east. The SERFR and DYAMD arrivals contain 68% of SFO's arrival traffic. The SERFR arrival typically contains aircraft arriving from points to the South and Southeast, such as LAX, SAN, PHX and MMMX (Mexico City). The DYAMD arrival typically contains aircraft from points to the East, such as DEN, ATL, BOS, EWR, JFK, LAS and ORD. These aircraft are directed to their respective arrival because it's the shortest and most efficient route. The FAA is continuously working to improve aircraft setup and sequencing between facilities.

**Summary of TWG Discussion:** See #1.

## 10. Dual Offset Approaches

**FAA's Update on Phase 2 Initiative Document Reference:** Page 26 – Item 15, Page 37 – Item 16, Page 60 – Item 19

**Summary of Recommendations:** Determine feasibility of creating dual offset RNAV, RNAV (RNP) or other types of approaches to Runway 28.

**Summary of FAA Responses:** Part of the procedure development process is to ascertain how a proposed procedure could be separated from all surrounding procedures. Such separation is required in order for the procedure to be published. This allows ATC to place an aircraft on the published procedure with the certainty that it is automatically separated from all other aircraft on other published procedures. The FAA researched publishing an offset approach to RWY 28L in its NorCal Phase One Report, 1.b.iii. and Appendix C. While this request was for a single offset approach to only Runway 28L, in actuality it was also evaluated against the existing offset approach to Runway 28R (an offset approach to Runway 28L would not operate in a vacuum). This research determined that an offset approach to Runway 28L would not have the required separation standards with the Runway 28R offset approach, making it untenable. Because this research included both the offset approaches to Runway 28L and 28R, the FAA considers this recommendation as redundant.

**Summary of TWG Discussion:** Gene noted it is the same ask as #3 and received the same FAA response.

## 11. MENLO

**FAA's Update on Phase 2 Initiative Document Reference:** Page 26 – Item 16

**Summary of Recommendations:** Aircraft should cross the vicinity around the MENLO waypoint at or above 5,000' MSL. Aircraft within the vicinity of MENLO should use the 5,000' altitude when able.

**Summary of FAA Responses:** The average altitude of vectored traffic in the vicinity of MENLO waypoint is approximately 4,600 feet MSL. During the design phase of the SERFR arrival, the major airline carriers were present in order to ensure that the SERFR would be safe for their aircraft. During those discussions it was determined that in order to accommodate the majority of aircraft into SFO, the descent gradient into RWY 28 would need to be between 2.72° – 2.85°. With the altitude restriction of MENLO at 4,000 feet, the descent gradient to RWY 28L is 2.85°. The published altitude at MENLO cannot be any higher without jeopardizing the safe operation of each aircraft. The higher an aircraft flies while in the vicinity of MENLO, the farther away from the SFO airport the aircraft must travel in order to descend to the appropriate altitude for approach.

**Summary of TWG Discussion:** Continuation on MENLO. Gene mentioned the GBAS is a potential solution. Community commented that the data he received shows the altitude is closer to 4,000' not 4,600' as the FAA states. Discussion on OPD angle and the argument of efficient vs safe operation. Desire to have vectored flights consistent with RNAV procedure altitudes. Community wants to be on record stating the Roundtable does not agree with the FAA response and recommends re-wording the recommendation to the FAA. Burt stated that new airplanes will need to apply speed breaks and come in 'dirty' in order to slow down which could create more noise. Burt believes with GBAS the FAA will be able to introduce a 5,000' waypoint. Statement to re-visit this recommendation and re-word.

## 12. Vectoring

**FAA's Update on Phase 2 Initiative Document Reference:** Page 63 – Item 31

**Summary of Recommendations:** Determine altitudes to turn aircraft for vector purposes that minimizes noise.

**Summary of FAA Responses:** Aircraft vectoring is a tactical decision used by ATC to establish and maintain the sequence of aircraft to the airport. Due to safety considerations, the FAA cannot support a restriction on when ATC may or may not use a vital component of its sequencing tools.

**Summary of TWG Discussion:** Looking at altitudes for vectoring rather than ground location, which was discussed under the previous item.

### 13. Utilize Runway 28R

**FAA's Update on Phase 2 Initiative Document Reference:** Page 35 – Item 8

**Summary of Recommendations:** Airlines file routes from the south to a point east of the Bay in order to use a noise-friendlier approach to Runway 28R.

**Summary of FAA Responses:** The Bay Area airspace is very complicated due to the presence of three major airports in close proximity to each other. Without coordination with the SJC controller, NCT must keep their aircraft at a minimum of 1.5 miles away from SJC's airspace. The FAA cannot endorse modifying SJC's Class C airspace, as that would limit SJC's ability to safely manage aircraft. This recommendation conflicts with the Recommendation to increase the use of BDEGA East downwind arrivals. Routing aircraft arriving from the south to an arrival from the east would add more aircraft to an already saturated arrival stream, thereby reducing the available gaps for BDEGA arrivals to be routed to the East downwind. Shifting traffic that historically arrives from the South to a route that terminates east of the Bay (FAITH/DYAMD) would impact routes that currently arrive from the east and north, as well as shift aircraft noise.

**Summary of TWG Discussion:** Gene stated that San Jose's airspace is the conflict with moving southern aircraft arrivals to the east during high volumes of traffic. Community question on if the new software to help aircraft arrive on time will help the Roundtables request. Burt gave a summary of the GBAS and time based flow-monitoring technology and stated that this is putting the cart before the horse. This was an attempt to give RWY 28L residence a break.

The following section provides a summary of the 4<sup>th</sup> TWG discussions for Topic 4, “Near Bay Daytime Operations – Runway 28 Departures Only.”

## Near Bay Daytime Operations – Runway 28 Departures Only

This section provides brief descriptions of the recommended measures, the FAA responses provided to date and the recommendations resulting from the TWG review grouped into the three areas: recommendations the FAA has or will address, recommendations requiring further analysis/information for the FAA to address and recommendations the FAA determined they would not address.

### Recommendations the FAA Has or Will Address

The following recommended measures include those that the FAA either has or will address through changes to their ongoing implementation of the Northern California Metroplex:

#### 1. 3,000’ Altitude Restriction

**FAA’s Update on Phase 2 Initiative Document Reference:** Page 29 – Item 28, Page 42 – Item 33

**Summary of Recommendations:** Determine if existence of a VFR flyway or other conflicting airspace use off the coastline in the vicinity of the extended Runway 28 centerline, leads to Runway 28 straight-out departures being required to level off at 3,000’.

**Summary of FAA Responses:** There are VFR flyways in the vicinity of SFO, however the altitudes are below 2,100 feet and therefore would not cause runway 28 straight out departures at 3,000 feet. Aircraft on GNNRR and WESLA departures may be required to level off at 3,000 feet for safety due to spacing.

**Summary of TWG Discussion:** TRACON takes over at the end of the runway and are in control of the aircraft and are responsible for the 3,000’ limitation, community member asks why there is a conflict. Burt explained the charted rules and when ATC handoffs occur. Discussion of the communities that the straight out departure flies over. How can we get around the tendency of pilots to fly the departure as charted and get them to increase their altitude? Burt “find out how often they lift restriction right away” by asking TRACON and monitoring either radio or asking FAA to provide the figures. Trying to achieve a higher altitude by the time they are over Pacifica and Daily City. Discussion of conflicting departures from Runway 1. Concern from residence is the nighttime departures, so would like to see the restriction lifted. Typically the heavier flights with destinations to Asia are utilizing this departure. Discussion on keeping Runway 1 departures over the Bay and turning them at the Golden Gate Bridge. Gene stated that we did look at nighttime departures off Runway 1 to increase altitude for Runway 28 straight out departures. Discussion on Page 4 of NorCal Update dated April 2018 “NITE/HUSSH/CNDEL to GOBBS and South and to take this document into consideration when Roundtable formulates responses. Congestions, noise shifting and flying distance.

#### 2. GNNRR

**FAA’s Update on Phase 2 Initiative Document Reference:** Page 63 – Item 35

**Summary of Recommendations:** Remove GNNRR TWO in references to flying aircraft over less noise-sensitive areas and the associated inclusion in procedures used over less noise-sensitive areas that total 88%.

**Summary of FAA Responses:** GNNRR departure are not listed as a noise abatement procedure in any of the FAA's order or agreements. The Phase One Report does not list it as being used during nighttime hours. During these times, GNNRR departure is primary used by heavy aircraft that require the use of the long runways (Runway 28) and this procedure is for safety considerations.

**Summary of TWG Discussion:** Elizabeth is not exactly sure what the Roundtable was saying in their recommendation or what they were trying to achieve. Discussion on aircraft size trends (going smaller) and future need to utilize Runway 28. *Putting a pin in #2 to ask Kathleen the intent – is it for nighttime?* Burt requests that in resubmittal of requests the items are clearly labeled and numbered with references to where they originated in order to trace the steps.

### 3. WESLA

**FAA's Update on Phase 2 Initiative Document Reference:** Page 56 – Item 3, Page 65 – Item 40

**Summary of Recommendations:** WESLA procedure should be flown as charted and allow aircraft to climb unrestricted when there are no other conflicts.

**Summary of FAA Responses:** The FAA concurs with the recommendation that aircraft fly the WESLA procedure as charted to the extent operationally feasible. However, this recommendation incorrectly suggest that the WESLA departure allows aircraft to climb unrestricted as published, when in actuality the WESLA departure requires aircraft to maintain 3,000'. The GNNRR and WESLA contain a 3,000' altitude restriction for safety – providing minimum vertical separation with Runway 1 departures that turn over the top. This restriction can be waived by ATC if there are no traffic conflicts.

**Summary of TWG Discussion:** Same item that was previously discussed. No controller is going to hold aircraft down if able to be cleared.

### 4. TRUKN

**FAA's Update on Phase 2 Initiative Document Reference:** Page 66 – Item 47

**Summary of Recommendations:** When conditions permit and aircraft use TRUKN departure off Runway 28, the Roundtable request the FAA conduct controller outreach to educate them about staying east of Highway 101.

**Summary of FAA Responses:** TRUCKN departure was designed so that most aircraft that depart Runway 28 would be able to make the right turn remaining east of Highway 101. Aircraft that fly this procedure use the aircrafts FMS to follow the procedure requirements. This phase of flight is typically done with no communication with ATC. NCT will continue to reinforce the use of this procedure to personnel through training and briefings.

**Summary of TWG Discussion:** Gene stated that he sees the response that FAA is agreeing with the Roundtable and that Burt is monitoring for this. Burt gave a small history on the procedure with location and altitudes. Finding is that aircraft are not performing as well with the turn/benefit. This is due to the visual vs RNAV nature of the procedure and designs meeting the minimum abilities and rules for design.



## 5. GAP

**FAA's Update on Phase 2 Initiative Document Reference:** Page 64 – Item 36

**Summary of Recommendations:** When available, use the GAP SEVEN departure to avoid any top altitude restrictions for aircraft departing Runway 28 out the gap.

**Summary of FAA Responses:** The GAP departure, which does not have a published 3,000' altitude restriction, is a non-RNAV departure procedure and is used as much as possible. When traffic dictates, these aircraft must be stopped at 3,000 feet as well.

**Summary of TWG Discussion:** Same issue but different procedure. With the aircraft coming over the top dictate aircraft need to be held.

### Recommendations Requiring Further Analysis/Information for the FAA to Address

The following recommended measures include those that the FAA responded that additional analysis, investigations and/or information is required to proceed with changes to their ongoing implementation of the Northern California Metroplex:

None

### Recommendations the FAA Determined They Will Not Address

The following recommended measures include those that the FAA rejected and stated changes to their ongoing implementation of the Northern California Metroplex will not occur:

## 6. OFFSHORE

**FAA's Update on Phase 2 Initiative Document Reference:** Page 31 – Items 35-36, Page 51 – Item 68, Page 52 – Item 73

**Summary of Recommendations:** Create a RNAV overlay of the OFFSHORE ONE procedure to guide aircraft higher over the Bay before turning to a waypoint located in the ocean. Higher altitude over water is preferred. Use OFFSHORE ONE departure for Southern California destinations.

**Summary of FAA Responses:** OFFSHORE departure procedure is a conventional procedure and increasing its use would be counterproductive to the Agency's vision and is not supported. It has been replaced by the YYUNG transition on the SSTIK and WESLA procedures, both of which are RNAV. However, it has never been activated due to its close proximity to military airspace; however these procedures have since been corrected and are awaiting publication. There are no plans to develop any additional OFFSHORE RNAV overlays of the existing conventional.

**Summary of TWG Discussion:** More is to come from the FAA on this but the FAA has something but it's not exactly what we are asking for. Discussion on the military airspace and Burt's connection with NASA AIMS to move the military airspace. This helps Pacifica. Question: What is the YYUNG transition on the SSTIK and WESLA? Burt pulled up the Departure Procedure Chart to explain.

## 7. 3,000' Altitude Restriction

**FAA's Update on Phase 2 Initiative Document Reference:** Page 52 – Item 71

**Summary of Recommendations:** Determine if a reduced climb airspeed can be assigned until reaching 3,000' MSL or other higher altitude; a slower airspeed will allow the aircraft to climb to a higher altitude in a shorter distance before overflying noise-sensitive land uses.

**Summary of FAA Responses:** Aircraft that fly the SSTIK procedure use the aircraft's FMS to follow the procedure requirements, while also safely accounting for individual aircraft characteristics.

**Summary of TWG Discussion:** Previously discussed.

## 8. GNNRR

**FAA's Update on Phase 2 Initiative Document Reference:** Page 66 – Item 48

**Summary of Recommendations:** Aircraft climb unrestricted on the GNNRR procedure. Aircraft depart without a top altitude restriction when flying "out the gap" on Runway 28 and consider the use of the GAP departure that has no altitude restriction instead of GNNRR.

**Summary of FAA Responses:** FAA cannot agree with this recommendation for safety reasons. This altitude restriction provides the required minimum vertical separation with Runway 1 departures that turn over the top. This restriction can be waived traffic permitting.

**Summary of TWG Discussion:** Previously discussed.

The following is a list of recommended future meeting topics, in priority order, that were agreed upon to be discussed at upcoming TWG meetings.

## Recommended Future TWG Meeting Topics

- Near Bay Daytime Operations – Runway 10 Departures Only
- Other Procedures
  - SERFR (Santa Cruz)
  - HUSSH (Oakland)
- Pilot Outreach Program
- Upgraded Radar Display Equipment
- Land Use and Terrain Height Data to Assist NCT
- Noise Modeling or Other Tools
- Backblast Noise

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April 27, 2018

Maurice Hoffman, Director  
Mission Support Services – Federal Aviation Administration  
Wilbur Wright Building (FOB10B)  
FAA National Headquarters  
600 Independence Avenue SW  
Washington, DC 20597

Re: FAA Attendance at SFO Airport/Community Roundtable Meetings

Dear Mr. Hoffman,

We understand that you are now our Point of Contact at the FAA to coordinate our requests for an FAA representative to attend our San Francisco Airport/Community Roundtable (Roundtable) meetings. As the Chair of the Roundtable, I would like to provide a bit of history, background and outline what our current focus is in light of the FAA's Initiative, and response, to our recommendations.

## **HISTORY**

The Roundtable was established May 1981, via an MOU with San Mateo County, to address noise impacts related to aircraft operations at the San Francisco International Airport (SFO). This voluntary committee consists of 22 appointed and elected officials from the City and County of San Francisco, the County of San Mateo, and all but two of the cities in San Mateo County. A complete roster is attached.

The Roundtable provides a forum for the public to address local elected officials, SFO management, FAA staff, and airline representatives, regarding aircraft noise issues. The Roundtable monitors a performance-based aircraft noise mitigation program, as implemented by Airport staff, interprets community concerns, and attempts to achieve additional noise mitigation through a cooperative sharing of authority brought forth by the airline industry, the FAA, SFO management and local government officials.

The Roundtable adopts an annual Work Program to address key issues and meets on the first Wednesday of the month on a bi-monthly basis at 7:00 pm. The meetings are located at the David Chetcuti Community Room at Millbrae City Hall, 450 Poplar Avenue, Millbrae, California. Our remaining 2018 meetings are as follows.

- June 6, 2018
- August 1, 2018
- September 3, 2018
- December 5, 2018

## **POLICY STATEMENT**

The following Roundtable Policy Statement was formed in 1981, and has been continually reaffirmed.

*“The Airport/Community Roundtable members, as a group, when considering and taking actions to mitigate noise, will not knowingly or deliberately support, encourage, or adopt actions, rules, regulations or policies, that result in the “shifting” of aircraft noise from one community to another, when related to aircraft operations at San Francisco International Airport.”*

For the past 37 years, representatives from the cities/town councils of San Mateo County, San Mateo County Board of Supervisors, City and County of San Francisco Mayor’s office, City and County of San Francisco Board of Supervisors, and the airport director of SFO, have worked hard to listen to residents to bring aircraft noise issues to the FAA and NorCal TRACON with the hope to find meaningful noise mitigation solutions.

With the 2014/2015 roll-out of the FAA’s NextGen Metroplex procedures, our Roundtable has experienced a tremendous increase of resident complaints, not only from the communities we serve in San Mateo County and the City and County of San Francisco, but also from Santa Clara and Santa Cruz Counties as well.

## **WORK PLAN**

Since receiving the *FAA Responses to Address Noise Concerns of Santa Cruz/San Mateo/San Francisco Counties (FAA Initiative) Phase I* document from the FAA in the fall of 2015, our Roundtable has almost exclusively focused on responding to that document which was submitted to Congress Members, Speier, Eshoo, and Farr November 17, 2016; as well as responding to the *FAA Initiative Phase II* upon receipt on November 17, 2017.

## **TECHNICAL WORKING GROUPS**

To better understand the *FAA Initiative Phase II* response, members of our Roundtable meet on a regular basis with our noise consultant, HMMH.

We would like to request an FAA representative to attend each Technical Working Group meeting as scheduled below.

- Thursday, May 3, 2018 from 1:00 pm – 4:00 pm
- Thursday, July 12, 2018 from 1:00 pm – 4:00 pm
- Thursday, September 13, 2018 (tentative)
- Thursday, November 1, 2018 (tentative)

Meetings are typically held at our regular meeting location at the David Chetcuti Community Room at Millbrae City Hall.



The agenda for the upcoming Thursday, May 3, 2018 Technical Working Group meeting includes:

- Near Bay Daytime Operations (RWY 28 Arrivals Only)
- Review/Analysis of Topic 4 – Near Bay Daytime Operations (RWY 28 Departures Only)
- Review/Analysis of Topic 5 – Near Bay Daytime Operations (RWY 10 Departures Only)

For future Technical Working Group meetings, we will provide you with a detailed listing of the *FAA Initiative Phase II* items that we'll be studying in advance of those meetings.

In general, the topics we discuss relate to the *FAA Initiative Phase II* response, and airplane noise over our communities adversely affecting our residents' sleep, peace of mind, health and overall well-being. We seek your help in trying to identify ways to mitigate these adverse effects.

We would appreciate you assigning an FAA subject matter expert who can address not only the theoretical design features related to these recommendations but can also address how these recommendations under discussion would interact with and affect other existing Norcal procedures in use.

In the past, we have been fortunate to have members from NorCal TRACON, such as Thann McLeod, and other members from the FAA, such as Steve Karnes and Mindy Wright, who have been very helpful and knowledgeable.

If you need more information on any our meetings or background information I've provided in this letter, I invite you to visit our website ([sfoundtable.org](http://sfoundtable.org)). I look forward to hopefully meeting you some day, and hearing back from you soon.

Regards,

Elizabeth Lewis  
Chair, San Francisco Airport/Community Roundtable  
Councilmember, Town of Atherton

cc:

Jodi McCarthy, Vice President, Mission Support Services – Federal Aviation Administration (email)

Dennis Roberts, Regional Administrator – Federal Aviation Administration (email)

Members, San Francisco Airport/Community Roundtable

Attached:

Current Roundtable Roster



May 25, 2018

Maurice Hoffman, Director  
Mission Support Services – Federal Aviation Administration  
Wilbur Wright Building (FOB10B)  
FAA National Headquarters  
600 Independence Avenue SW  
Washington, DC 20597

Re: Follow up on our letter dated April 27, 2018

Dear Mr. Hoffman,

I am hoping that you have received our letter dated April 27, 2018 and have had a chance to review it. A copy is attached just in case it didn't make it to your desk.

As Chair of the San Francisco Airport/Community Roundtable (Roundtable), I am reaching out to you to confirm that you are still our Point of Contact at the FAA, and to restate our request to have a FAA representative attend our Roundtable meetings. Our next meeting is scheduled for June 6, 2018 beginning at 7:00pm and will be held at the David Chetcuti Community Room at Millbrae City Hall, 450 Poplar Avenue, Millbrae.

The Roundtable meets bi-monthly, at the same location and same time. It is our hope that you will facilitate the attendance of an FAA representative to help us find solutions to the noise problems our communities are facing.

- June 6 2018
- August 1, 2018
- October 3, 2018
- December 5, 2018

I look forward to hearing back from you confirming that you have received our correspondences and that we can expect to have an FAA representative at our June 6, 2018 meeting.

Sincerely,

Elizabeth Lewis  
Chair, San Francisco Airport/Community Roundtable  
Councilmember, Town of Atherton

**From:** Dave Ong (AIR)  
**To:** ["awengert@portolavalley.net"](mailto:awengert@portolavalley.net)  
**Cc:** ["Sue Chaput"](#); [Bert Ganoung \(AIR\)](#); ["James A Castañeda"](#)  
**Bcc:** [Anneliese Taing \(AIR\)](#); [Ara Balian \(AIR\)](#); [Anthony Carpeneti \(AIR\)](#); [Nastasja von Conta \(AIR\)](#)  
**Subject:** 1Q2018 Aircraft Noise Monitoring Results for Portola Valley  
**Date:** Tuesday, April 24, 2018 2:28:00 PM  
**Attachments:** [image001.png](#)  
[1Q 2018 Portola Valley Noise Monitoring Report.pdf](#)

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Dear Honorable Ann Wengert,

Please find attached the aircraft noise monitoring results for 1Q2018 noise measurements collected in the Town of Portola Valley. Please do not hesitate to call Nastasja von Conta, a Senior Noise Abatement Specialist with our office or me at (650) 821-5100 if you have any questions about the report or would like to discuss this information.

Thank you,

David



**David Ong**

Noise Systems Manager | Planning, Design & Construction  
San Francisco International Airport | P.O. Box 8097 | San Francisco, CA 94128  
Tel 650-821-5100 | [flsfo.com](http://flsfo.com)

[Facebook](#) | [Twitter](#) | [YouTube](#) | [Instagram](#) | [LinkedIn](#)

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**MEMORANDUM**

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**TO: PORTOLA VALLEY COMMUNITY**

**FROM: SAN FRANCISCO INTERNATIONAL AIRPORT AIRCRAFT NOISE  
ABATEMENT OFFICE**

**SUBJECT: 1Q 2018 PORTOLA VALLEY NOISE MONITORING REPORT**

**DATE: APRIL 17, 2018**

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The San Francisco International Airport (SFO) Aircraft Noise Abatement Office (ANAO) conducts aircraft noise monitoring in the Town of Portola Valley to determine noise levels within the community from aircraft operations at SFO. Noise monitoring occurs every quarter for a 14-day data collection period. This quarter's measurement period was from February 1, 2018 to February 15, 2018. The monitoring was made possible with the assistance of a Portola Valley resident.

The overall average daily noise level from all aircraft was 42dBA CNEL. The Community daily noise level was 46dBA CNEL. Noise from all aircraft over this location increased the total average daily noise level by 1dBA. During this monitoring period there were storm weather conditions resulting in delays and use of reverse flow traffic patterns for aircraft to safely operate. The Southeast Flow consists of aircraft landing to the south on Runways 19 and departing to the east on Runways 10. Non-aircraft noise sources included residential and construction noise. There were no Community Noise Events from February 6, 10-12.

The Town of Portola Valley is a quiet suburban community with ambient noise levels of 42dBA. On an average day, Portola Valley had 167 overflights out of which 47 exceeded the noise monitor thresholds and recorded a noise event. The thresholds were 55dBA during the daytime and 50dBA for nighttime. Aircraft destined to SFO typically overfly Portola Valley during high traffic conditions or inclement weather days with aircraft vectoring. Also known as delay vectoring, is when a FAA (Federal Aviation Administration) Air Traffic Controller instructs the pilot to fly specific headings. The headings are not the most direct path to the runways. Reasons why aircraft may be vectored include: adjusting the arrival sequence in order to maintain safe separation between all aircraft, maximizing use of available airspace, achieving an expeditious flow of aircraft traffic, avoiding areas of known hazardous weather or known severe turbulence, and maneuvering an aircraft into a suitable position to accommodate a visual approach and landing.

As flights to SFO cross over the peninsula, they are typically between 5,000 and 7,000 feet, and represent 70 percent of all aircraft noise events over Portola Valley. The remaining aircraft noise events are low-flying general aviation traffic using San Carlos Airport, Palo Alto Airport, and other airports. An average sound exposure level (SEL) for a single noise event for all aircraft were recorded at 70dBA and maximum noise levels (LMax) at 58dBA. SFO aircraft have lower SEL and LMax levels and are slightly quieter than the general aviation traffic as they overfly the area at higher altitudes. On average, there were four nighttime noise events from SFO aircraft. During the noise-monitoring period, SFO ANAO received noise reports from 36 individuals in Portola Valley primarily during the morning and nighttime hours. During these hours, there is a noticeable spike of noise reports disproportionate with aircraft noise events. Overall, it seems reasonable to assume that the evening hours are most disturbing to Portola Valley reporters.

In view of the fact that the monitoring location in Portola Valley is located in a quiet suburb with ambient noise in the low 40dB range, any aircraft noise above this threshold may become a nuisance for the residents.

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**dB**A- stands for A-weighted decibel. Decibel unit measures the loudness of a sound and is computed as the signal to noise ratio. A-weighting is used to adjust for frequency range of human hearing. An increase of ten decibels is perceived by human ear as a doubling of noise.

**SEL** - Sound Exposure Level of a noise event is measured over time between the initial and final points when the noise level exceeds a predetermined threshold and its energy is compressed into one second.

**LMax** - The maximum noise level is a measurement of the peak level of a noise event.

**CNEL**- This metric is used to assess and regulate aircraft noise exposure in communities surrounding the airport. California Title 21 Noise Regulations established acceptable level of aircraft noise of 65dBA CNEL.

# Short Term Noise Monitoring Report Portola Valley 1Q 2018

February 1 - 15

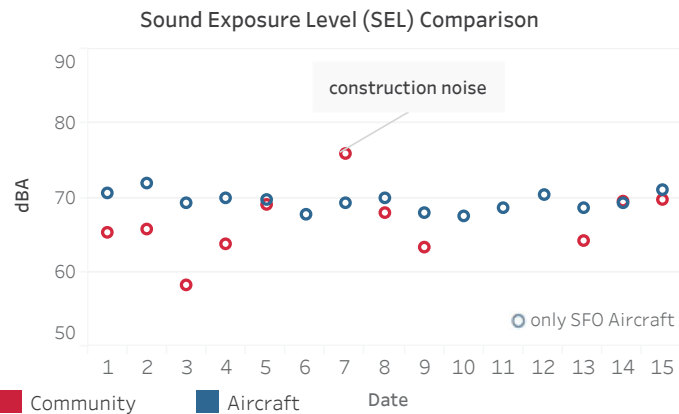
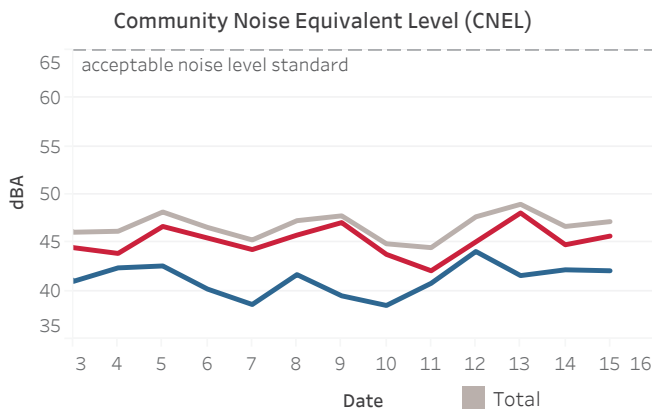
Aircraft CNEL: 42dBA  
 Community CNEL: 46dBA  
 Total CNEL: 47dBA  
 Aircraft SEL: 70dBA  
 Aircraft LMax: 58dBA  
 Ambient Noise: 42dBA  
 Noise Monitor Treshold: 55dBA (Day), 50dBA(Night)  
 SFO Aircraft Noise Events: 35 per day  
 SFO Operations Flow: West Flow, except on 2/2, 2/3, 2/5, 2/6 and 2/9 was a mix of both West Flow and Southeast Flow traffic patterns.  
 Cause of Aircraft Overflights : SFO aircraft arrivals, delayed vectoring, and small general aviation aircraft transitioning the area



## Daily Noise Event Averages

Date	SFO			Non-SFO			Community		
	Noise Events	SEL (dBA)	Avg. LMax (dB)	Noise Events	SEL (dBA)	Avg. LMax (dB)	Noise Events	SEL (dBA)	Avg. LMax (dB)
1	52	70	59	9	68	58	6	65	58
2	60	72	59	14	72	59	2	66	59
3	27	69	58	23	72	60	1	58	54
4	29	70	58	19	69	59	1	64	54
5	28	70	58	14	72	61	10	69	57
6	19	68	57	17	69	58			
7	23	69	57	15	70	59	4	76	62
8	24	70	56	13	70	59	6	68	61
9	35	68	57	13	71	60	4	63	53
10	21	67	57	18	69	59			
11	22	69	58	10	73	62			
12	61	70	59	11	68	57			
13	39	68	57	28	74	60	14	64	54
14	42	69	58	15	73	61	9	69	62
15	41	71	59	20	70	61	5	70	60
Daily Average	35	69	58	16	71	60	6	67	58

**SFO Events** are: Single SFO Aircraft, Multiple SFO Aircraft, Simultaneous SFO and Non-SFO Aircraft, and Simultaneous Community and SFO Aircraft.  
**SEL** - Sound Exposure Level of a noise event is measured over time between the initial and final points when the noise level exceeds a predetermined threshold and its energy is compressed into one second.  
**Lmax** - The maximum noise level is a measurement of the peak level of a noise event.  
**CNEL** - This metric is used to assess and regulate aircraft noise exposure in communities surrounding the airport. California Title 21 Noise Regulations established acceptable level of aircraft noise of 65dBA CNEL.

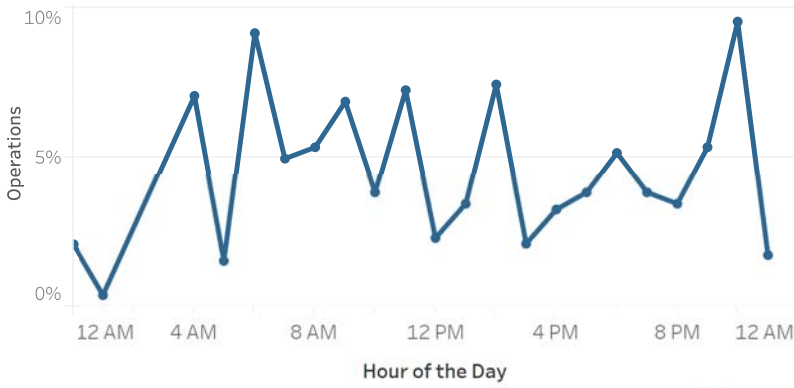


## SFO Aircraft Noise Events by Day (7am-7pm), Evening (7pm-10pm) and Night (10pm-7am)

	Noise Events	SFO Noise Events (%)	SEL (dBA)	Min. SEL (dBA)	Max. SEL (dBA)	Avg. LMax (dB)	Min. LMax (dBA)	Max. LMax (dBA)	Avg. Duration (sec)	Min. Duration (sec)	Max. Duration (sec)
Day	292	56%	70	59	80	59	55	69	18	5	42
Evening	66	13%	71	61	82	59	55	75	18	5	44
Night	165	32%	68	56	81	55	50	70	24	5	58



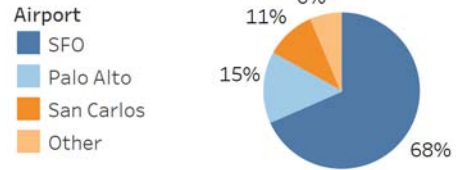
### SFO Noise Events by Hour of the Day



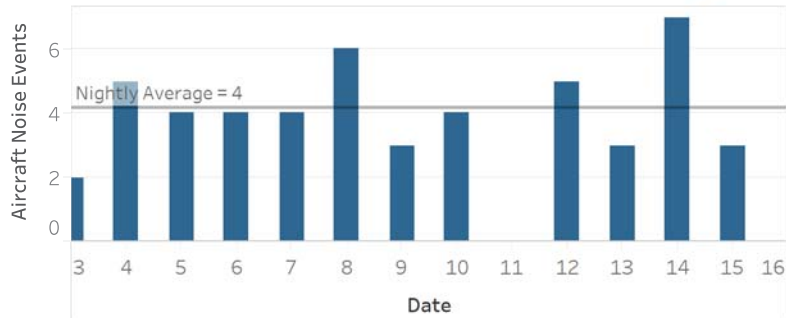
### SFO Arrivals Altitude

Altitude	Percentage
4000ft	16%
5000ft	34%
6000ft	33%
7000ft	14%
>8000ft	1%

Only aircraft that registered a noise event on the monitor are considered.



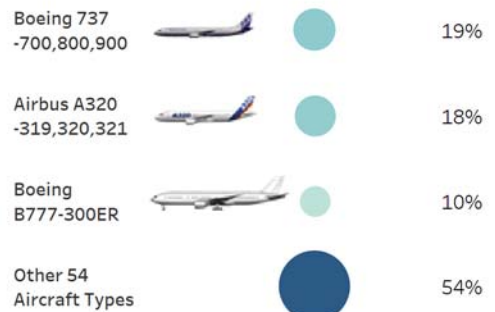
### SFO Nighttime (midnight-6am)



### Operation Type



### Aircraft Type



### Noise Reporters

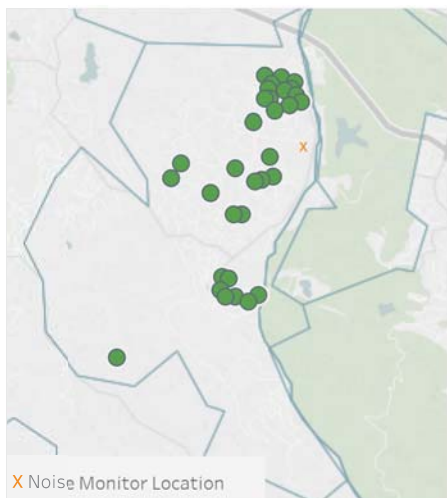
Date	Noise Reporters	Noise Reports
1	20	334
2	26	330
3	17	266
4	16	269
5	19	294
6	14	171
7	13	175
8	20	78
9	16	266
10	15	285
11	13	263
12	22	300
13	20	299
14	20	173
15	16	178
<b>Total</b>	<b>36</b>	<b>3,681</b>

**28%** of overflights registered a noise event. (167 avg daily overflights of which 47 created a noise event).

### Noise Reporters vs Aircraft Noise Events



### Noise Reporters Location



### Noise Monitor on Location



**From:** Dave Ong (AIR)  
**To:** ["c.shaw@woodsidesidetown.org"](mailto:c.shaw@woodsidesidetown.org)  
**Cc:** ["James A Castañeda"](#); [Bert Ganoung \(AIR\)](#)  
**Bcc:** [Anneliese Taing \(AIR\)](#); [Anthony Carpeneti \(AIR\)](#); [Nastasja von Conta \(AIR\)](#)  
**Subject:** 1Q 2018 Aircraft Noise Monitoring Results for Woodside VOR  
**Date:** Monday, April 30, 2018 9:56:00 AM  
**Attachments:** [1Q 2018 Woodside Noise Monitoring Report.pdf](#)  
[image001.png](#)

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Dear Honorable Chris Shaw,

Please find attached aircraft noise monitoring results for First Quarter 2018, for noise measurements collected in the Town of Woodside. Please do not hesitate to call Nastasja von Conta, a Senior Noise Abatement Specialist with our office or me at (650) 821-5100 if you have any questions about the report or would like to discuss this information.

Thank you,

David



**David Ong**

Noise Systems Manager | Planning, Design & Construction  
San Francisco International Airport | P.O. Box 8097 | San Francisco, CA 94128  
Tel 650-821-5100 | [flsfo.com](http://flsfo.com)

[Facebook](#) | [Twitter](#) | [YouTube](#) | [Instagram](#) | [LinkedIn](#)

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**MEMORANDUM**

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**TO: WOODSIDE COMMUNITY**

**FROM: SAN FRANCISCO INTERNATIONAL AIRPORT AIRCRAFT NOISE  
ABATEMENT OFFICE**

**SUBJECT: 1Q 2018 WOODSIDE NOISE MONITORING REPORT**

**DATE: APRIL 27, 2018**

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The San Francisco International Airport (SFO) Aircraft Noise Abatement Office (ANAO) conducts aircraft noise monitoring in the Town of Woodside to determine noise levels within the community from aircraft operations at SFO. The monitoring occurs every quarter for a 14-day data collection period. This quarter's measurement period was from February 1, 2018, to February 15, 2018. The monitoring is made possible with the assistance of the Federal Aviation Administration (FAA) San Jose Technical Operations team. They continue to provide support and participate in our efforts to collect noise data by allowing us access to their facility to monitor aircraft noise.

The overall average daily noise level from all aircraft was 45dBA CNEL. The Community daily noise level was 49dBA CNEL. Non-aircraft noise sources mainly included the FAA generator. Noise from all aircraft over this location increased the total average daily noise level by 1.4dBA.

The Town of Woodside is a quiet suburban community with ambient noise levels of 47dBA. On an average day of this study, Woodside had 153 overflights out of which 67 exceeded the noise monitor thresholds and recorded a noise event. The thresholds were 52dBA during the daytime and 50dBA in the nighttime. Aircraft destined to SFO typically overfly Woodside during high traffic conditions or inclement weather days with aircraft vectoring. Also known as delay vectoring, it is when an FAA Air Traffic Controller instructs the pilot to fly specific headings. These headings are not the most direct path to the runways. Reasons for aircraft vectoring may include adjusting the arrival sequence in order to maintain safe separation between all aircraft, maximizing use of available airspace, achieving an expeditious flow of aircraft traffic, avoiding areas of known hazardous weather or known severe turbulence, and maneuvering an aircraft into a suitable position to accommodate a visual approach and landing.

As flights to SFO cross over the peninsula, they represent 60 percent of all aircraft noise events over Woodside and are typically above 6,000 feet. The remaining 40 percent of aircraft were attributed to general aviation traffic using San Carlos Airport, San Jose International Airport, and Oakland International Airport. An average sound exposure level (SEL) for a single noise event for all aircraft were recorded at 71dBA and maximum noise levels (LMax) at 58dBA. SFO aircraft have lower SEL and LMax levels and are slightly quieter than other traffic as they overfly the area at higher altitudes. On average, there were six SFO nighttime noise events.

During the noise-monitoring period, SFO ANAO received noise reports from 20 individuals in Woodside. Majority of aircraft noise events occurred during the 5pm-6pm hour and between 8pm-10pm. The Town of Woodside is a quiet suburban community with ambient noise in the quiet 40-45dB range; any aircraft noise level above the background may become a nuisance for the residents.

---

**dBa**- stands for A-weighted decibel. Decibel unit measures the loudness of a sound and is computed as the signal to noise ratio. A-weighting is used to adjust for a frequency range of human hearing. An increase of ten decibels is perceived by the human ear as a doubling of noise.

**SEL** - Sound Exposure Level of a noise event is measured over time between the initial and final points when the noise level exceeds a predetermined threshold and its energy is compressed into one second.

**LMax** - The maximum noise level is a measurement of the peak level of a noise event.

**CNEL**- This metric is used to assess and regulate aircraft noise exposure in communities surrounding the airport. California Title 21 Noise Regulations established the acceptable level of aircraft noise of 65dBA CNEL.

Short Term Noise Monitoring Report

# Woodside 1Q 2018

February 1 - 15

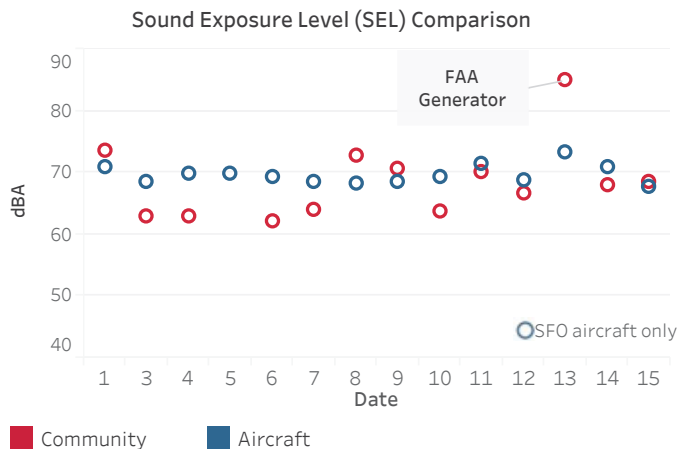
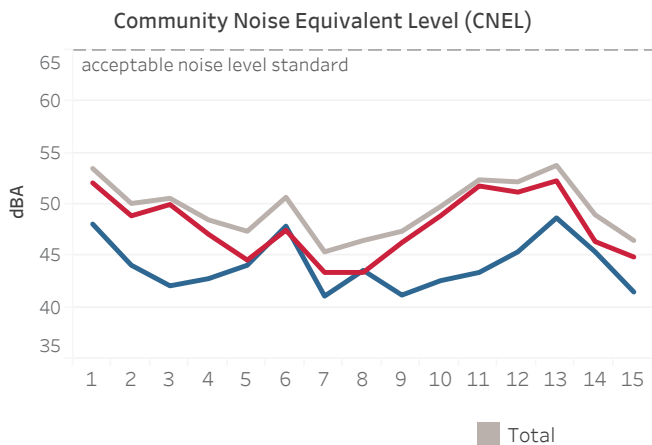
Aircraft CNEL: 45dBA  
 Community CNEL: 49dBA  
 Total CNEL: 50dBA  
 SEL: 71dBA  
 LMax: 58dBA  
 Ambient Noise: 47dBA  
 Noise Monitor Treshold: 52dBA (Day), 50dBA(Night)  
 SFO Aircraft Noise Events: 53 per day  
 SFO Operations Flow: West Flow, except on 2/2, 2/3, 2/5, and 2/6 was a mix of both West Flow and Southeast Flow traffic patterns.  
 Cause of Aircraft Overflights: SFO Oceanic Arrival Route, delayed vectoring, nighttime delays, general aviation-small aircraft



Daily Noise Event Averages

Date	SFO			Non-SFO			Community		
	Noise Events	Avg. SEL (dBA)	Avg. LMax (dB)	Noise Events	Avg. SEL (dBA)	Avg. LMax (dB)	Noise Events	Avg. SEL (dBA)	Avg. LMax (dB)
1	47	71	58	40	68	58	14	71	55
2	56	71	58	37	71	59	87	63	54
3	38	68	56	34	73	60	84	63	54
4	40	70	57	30	73	60	32	63	54
5	38	70	57	37	74	59			
6	38	69	57	38	80	63	19	62	54
7	35	68	57	25	72	60	3	64	57
8	44	68	56	34	75	61	5	73	63
9	36	69	57	26	71	60	35	70	56
10	44	69	57	29	75	62	101	64	55
11	78	71	58	58	72	59	118	68	56
12	73	69	57	55	71	59	57	66	54
13	85	73	59	43	69	57	40	85	64
14	63	71	58	23	70	58	19	66	57
15	46	68	56	26	73	60	16	68	54
Daily Average	51	70	58	36	72	60	45	68	55

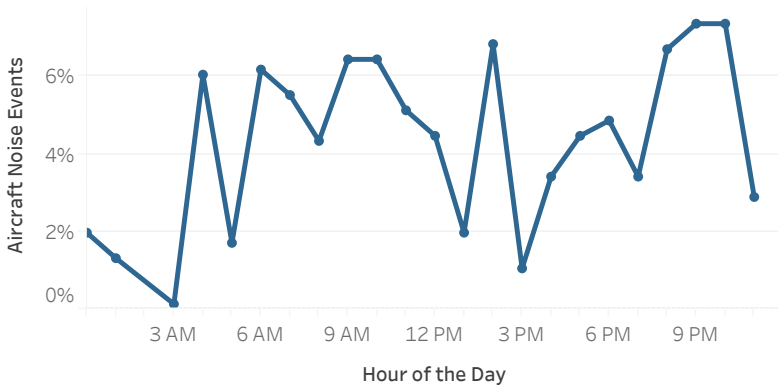
**SFO Events** are: Single SFO Aircraft, Multiple SFO Aircraft, Simultaneous SFO and Non-SFO Aircraft, and Simultaneous Community and SFO Aircraft.  
**SEL** - Sound Exposure Level of a noise event is measured over time between the initial and final points when the noise level exceeds a predetermined threshold and its energy is compressed into one second.  
**Lmax** - The maximum noise level is a measurement of the peak level of a noise event.  
**CNEL** - This metric is used to assess and regulate aircraft noise exposure in communities surrounding the airport. California Title 21 Noise Regulations established acceptable level of aircraft noise of 65dBA CNEL.



SFO Aircraft Noise Events by Day (7am-7pm), Evening (7pm-10pm) and Night (10pm-7am)

Day	Noise Events	SFO Noise Events (%)	Avg. SEL (dBA)	Min. SEL (dBA)	Max. SEL (dBA)	Avg. LMax (dB)	Min. LMax (dBA)	Max. LMax (dBA)	Avg. Duration (sec)	Min. Duration (sec)	Max. Duration (sec)
Day	418	55%	71	52	85	58	52	76	22	1	60
Evening	133	17%	71	58	81	58	52	69	24	5	60
Night	210	28%	68	56	77	56	50	69	22	5	55

### SFO Noise Events by Hour of the Day

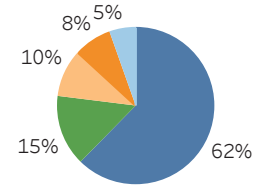


### SFO Aircraft Altitude

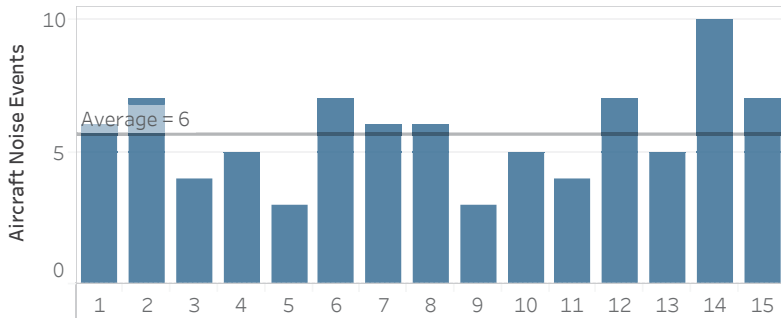
	≤6000ft	≥6000ft	≥7000ft	≥8,000ft	≥9,000ft
Arrivals	25%	25%	33%	16%	
Departures	14%				85%

Only aircraft that registered a noise event on the monitor are considered.

- Airport**
- SFO
  - San Carlos
  - Other Airport
  - San Jose Intl
  - PAO



### SFO Nighttime (midnight-6am)



### Aircraft Type



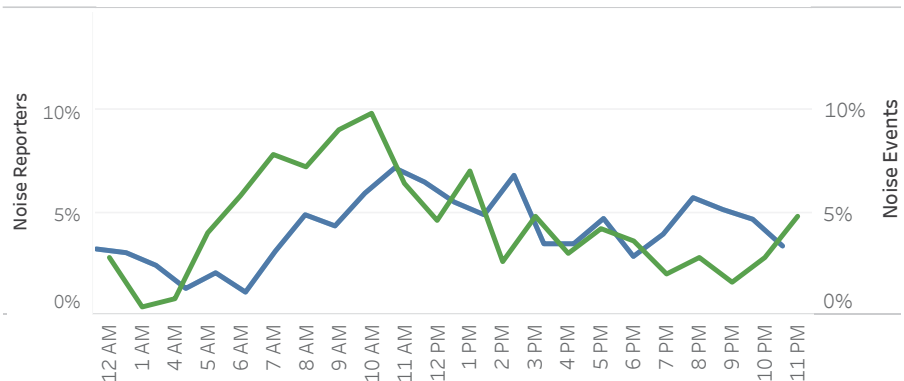
**44%**

of overflights registered a noise event.  
(153 avg daily overflights of which 67 created a noise event)

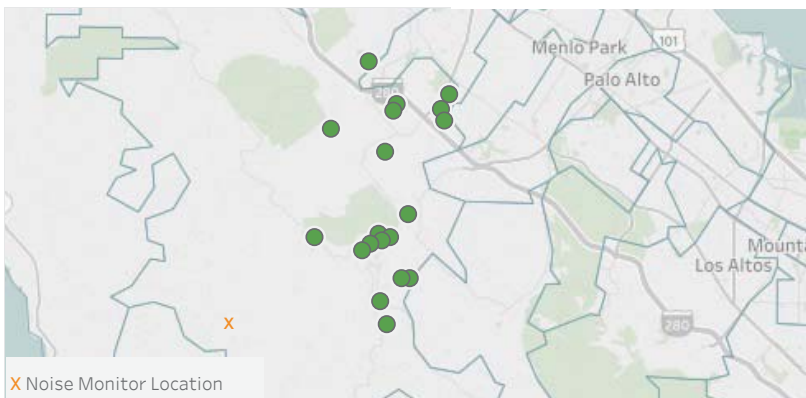
### Noise Reporters

	Noise Reporters	Noise Reports
1	9	35
2	8	18
3	10	37
4	11	42
5	12	80
6	9	49
7	7	21
8	3	9
9	6	30
10	8	83
11	7	26
12	7	20
13	8	21
14	8	18
<b>Total</b>	<b>20</b>	<b>489</b>

### Noise Reporters vs Noise Events



### Noise Reporters Location



### Hour

### Noise Monitor on Location





From: [Ara Balian \(AIR\)](#) on behalf of [Noise Abatement Office \(AIR\)](#)  
To: "[clayh@ci.brisbane.ca.us](mailto:clayh@ci.brisbane.ca.us)"; "[terryoconnell@ci.brisbane.ca.us](mailto:terryoconnell@ci.brisbane.ca.us)"  
Cc: [James A. Castañeda](#); [Bert Ganoung \(AIR\)](#)  
Subject: 1Q2018 Aircraft Noise Monitoring Results for Brisbane  
Date: Monday, April 09, 2018 5:08:00 PM  
Attachments: [image001.png](#)  
[1Q 2018 Brisbane Noise Monitoring Report.pdf](#)

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Dear Mr. Holstine,

Please find attached the aircraft noise monitoring results for 1Q2018 noise measurements collected in the city of Brisbane. Please do not hesitate to call our office at (650) 821-5100 if you have any questions about the report or would like to discuss this information.

Regards,



**Ara Balian**

Senior Noise Abatement Specialist | Planning, Design & Construction  
San Francisco International Airport | P.O. Box 8097 | San Francisco, CA 94128  
Tel 650-821-5100 | [flysfo.com](http://flysfo.com) | [flyquietsfo.com](http://flyquietsfo.com)

[Facebook](#) | [Twitter](#) | [YouTube](#) | [Instagram](#) | [LinkedIn](#)



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MEMORANDUM

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**TO: BRISBANE COMMUNITY**

**FROM: SAN FRANCISCO INTERNATIONAL AIRPORT AIRCRAFT NOISE ABATEMENT OFFICE**

**SUBJECT: 1Q 2018 BRISBANE NOISE MONITORING REPORT**

**DATE: APRIL 9, 2018**

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The San Francisco International Airport (SFO) Aircraft Noise Abatement Office conducts aircraft noise monitoring in the City of Brisbane, California to determine noise levels within the community from aircraft operations at SFO. Noise monitoring occurs every quarter for a 14-day data collection period. This quarter's measurement period was from January 18, 2018 to February 1, 2018. The monitoring is made possible with the assistance of the City Manager, resulting in two temporary sites in Brisbane. The first site, Site 966 was located at Mission Blue Center and the second site, Site 997 was located above the Brisbane Community Garden on Solano Street. The overall average daily noise level from all aircraft at Site 966 was 50 A-weighted decibels (dBA) Community Noise Equivalent Level (CNEL), and at Site 997 the aircraft CNEL was 52dBA. The Community daily noise level at Site 966 was 54dBA CNEL and at Site 997, it was 59dBA. Noise from all aircraft increased the total average daily noise level by 1.5dBA at Site 966 and 1.3dBA at Site 997. SFO aircraft comprised 98% of all aircraft noise events over Site 966 and 96% over Site 997. During the monitoring period, there were no runway construction projects that altered the departure patterns, however on January 24<sup>th</sup> and January 25<sup>th</sup> for nearly a nine hour and a two and half hour period respectively, SFO departures from Runways 01L/R (Left/Right) were suspended due to strong west southwest winds on the airfield. All departures used Runways 28L/R during this suspension. Furthermore, on January 24<sup>th</sup> for an one hour period the airport operated in a Southeast Plan configuration where aircraft arrived on 19L/R and departed 10R/L. This one-hour period on the 24<sup>th</sup> caused a reduction in flights over both noise monitoring sites. During the other time period when the airport was in a 28/28 operation, also caused fewer flights over Sites 966 and 997 due to departure configurations of SFO and Oakland airports. Non-aircraft noise sources included vehicular traffic, gardening services, and rain noise.

Brisbane is located approximately 4 miles from the airport. The city typically experiences aircraft utilizing the SSTIK and OFFSHORE departure procedures. Aircraft departing SFO from Runways 01L/R for destinations to the west, south and southeast typically overfly Brisbane. Occasionally when the winds on the airfield are stronger from the west, the TRUKN or NIITE departures will be utilized for destinations to the northeast and east. Departing aircraft from Runways 28L/R will initiate a right turn once the aircraft reaches the minimum altitude of 520 feet, consequently this may have some aircraft fly over Brisbane. SFO traffic arriving from the north on the BDEGA, STINS or GOLDEN GATE arrival on a typical day (West Plan) overfly Brisbane at 10,000 feet or higher. The ambient levels within Brisbane during the monitoring period were as follows: Site 966 - 50dBA and Site 997 - 54dBA.

On an average day, Site 966 had 425 overflights, 12% exceeded the noise monitor thresholds and recorded a noise event. The threshold was set at 65dBA for the monitoring period. Site 997 had 408 overflights, 18% exceeded the noise monitor threshold and recorded a noise event. The threshold was set at 62dBA for the monitoring period.

During the noise-monitoring period, SFO Aircraft Noise Abatement Office received noise reports from 27 individuals in Brisbane. Majority of aircraft noise events at both sites occurred between 6am and 9pm. On average, there were only 3 nighttime (midnight – 6am) noise events at Site 966 and 2 nighttime events at Site 997. In view of the fact that the monitoring locations in Brisbane are located in a suburb with ambient noise in the low 50s dBA, any aircraft noise above this threshold may become a nuisance for the residents.

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**dBA-** stands for A-weighted decibel. Decibel unit measures the loudness of a sound and is computed as the signal to noise ratio. A-weighting is used to adjust for frequency range of human hearing. An increase of ten decibels is perceived by human ear as a doubling of noise.

**CNEL-** This metric is used to assess and regulate aircraft noise exposure in communities surrounding the airport. California Title 21 Noise Regulations established acceptable level of aircraft noise of 65dBA CNEL.

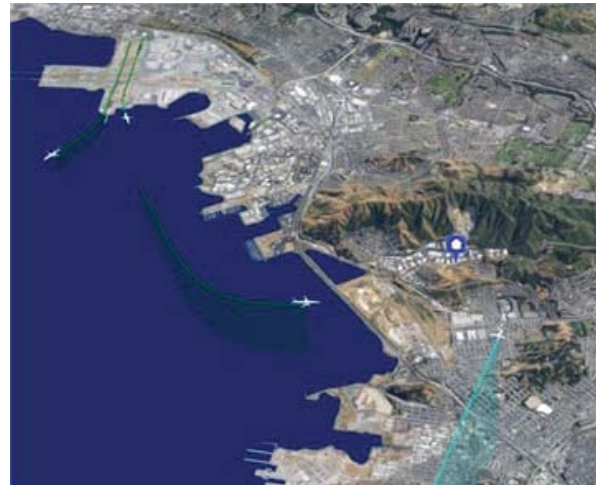
**West Plan** – Standard operations at the Bay Area International Airports. Aircraft arrive to the west at all three airports. At San Jose and Oakland Airports, aircraft depart to the west. While at San Francisco Airport, aircraft depart either to the north or to the west depending on wind conditions on the airfield.

**TRUKN and NIITE** – RNAV departure procedures off Runways 28L/R at SFO, has aircraft climb heading of 284° to 520 feet then right turn to initial fix. These procedures replaced the legacy departures procedures SHORELINE and QUIET, respectively.

City of Brisbane - Site 966  
 Short Term Noise Monitoring Report  
**Mission Blue Center 1Q 2018**

January 18 - February 1

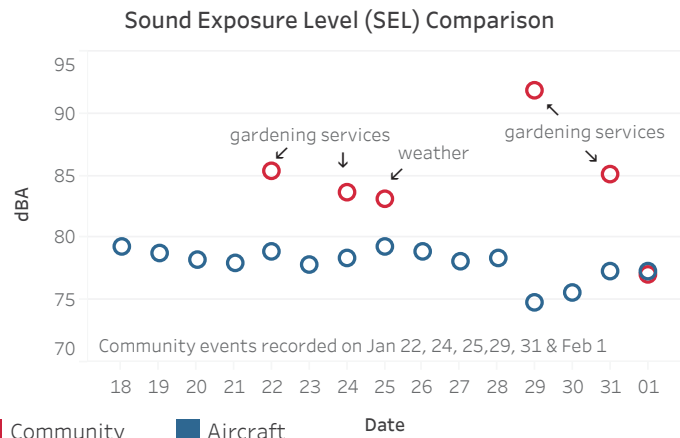
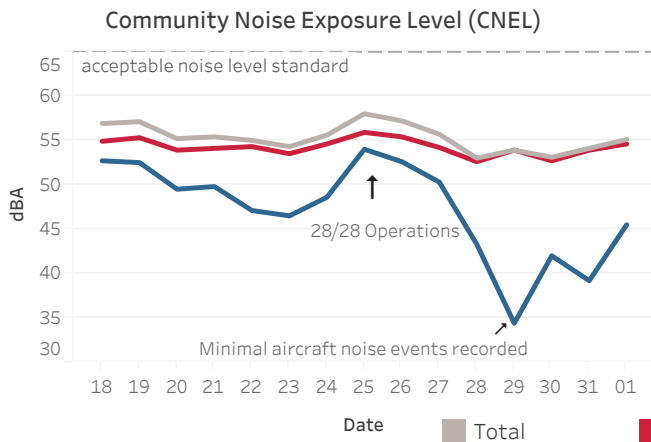
Aircraft CNEL: 50dBA  
 Community CNEL: 54dBA  
 Total CNEL: 56dBA  
 Aircraft SEL: 79dBA  
 Aircraft LMax: 69dBA  
 Ambient Noise: 50dBA  
 Noise Monitor Treshold: 65dBA  
 SFO Aircraft Noise Events: 47 per day  
 SFO Operations Flow: West Flow (all days)  
 Cause of Aircraft Overflights : SFO SSTIK Departures from Runway 01L/R making the left turn over Brisbane and departures making a right turn from Runways 28L/R performing the TRUKN / NIITE Departure



**Daily Noise Event Averages**

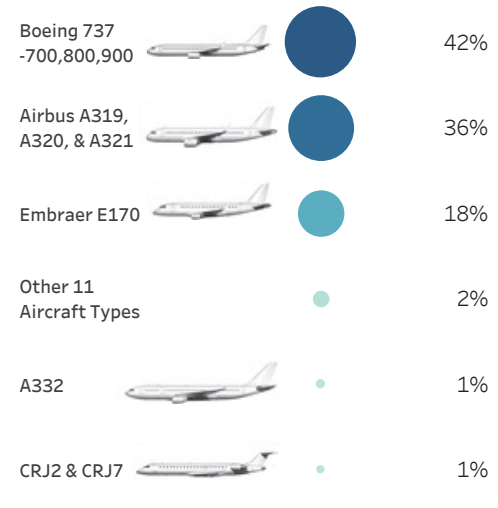
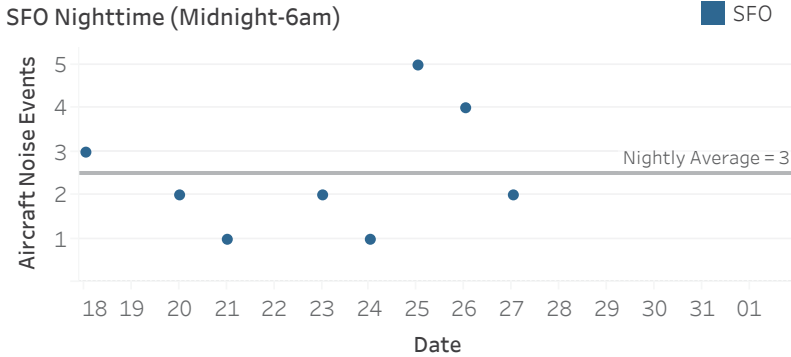
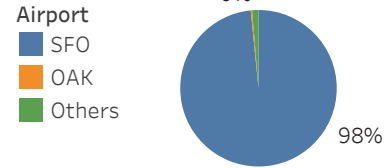
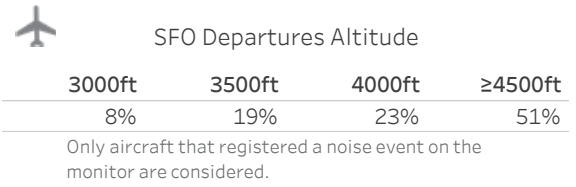
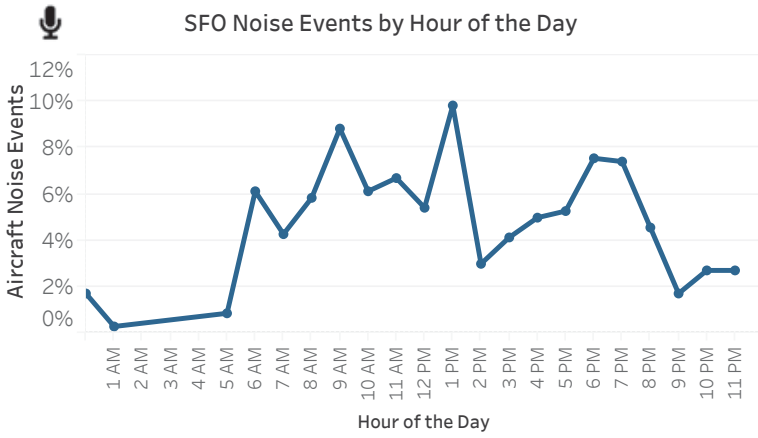
Date	Noise Events	SFO		Noise Events	Non-SFO		Community		
		Avg. SEL (dBA)	Avg. LMax (dB)		Avg. SEL (dBA)	Avg. LMax (dB)	Noise Events	Avg. SEL (dBA)	Avg. LMax (dB)
Jan 18	79	79	69						
19	81	79	69	3	77	68			
20	66	78	69	1	76	68			
21	66	78	69	2	75	69			
22	37	79	69				10	85	71
23	22	78	68						
24	21	78	69				2	84	72
25	98	79	69				3	83	73
26	82	79	68						
27	59	78	68	1	76	70			
28	17	78	69	1	73	65			
29	7	75	67	1	75	68	2	92	75
30	19	76	67						
31	12	77	68				12	85	71
Feb 1	36	77	68	3			3	77	71
Daily Average	47	78	69	2	75	68	5	84	71

**SFO Events** are: Single SFO Aircraft, Multiple SFO Aircraft, Simultaneous SFO and Non-SFO Aircraft, and Simultaneous Community and SFO Aircraft.  
**SEL** - Sound Exposure Level of a noise event is measured over time between the initial and final points when the noise level exceeds a predetermined threshold and its energy is compressed into one second.  
**Lmax** - The maximum noise level is a measurement of the peak level of a noise event.  
**CNEL** - This metric is used to assess and regulate aircraft noise exposure in communities surrounding the airport. California Title 21 Noise Regulations established acceptable level of aircraft noise of 65dBA CNEL.



**SFO Aircraft Noise Events by Day (7am-7pm), Evening (7pm-10pm) and Night (10pm-7am)**

Day	Noise Events	SFO Noise Events (%)	Avg. SEL (dBA)	Min. SEL (dBA)	Max. SEL (dBA)	Avg. LMax (dB)	Min. LMax (dBA)	Max. LMax (dBA)	Avg. Duration (sec)	Min. Duration (sec)	Max. Duration (sec)
Day	505	72%	79	71	85	69	65	76	14	5	54
Evening	96	14%	78	70	84	68	65	75	13	5	26
Night	101	14%	78	71	83	68	65	72	13	5	27

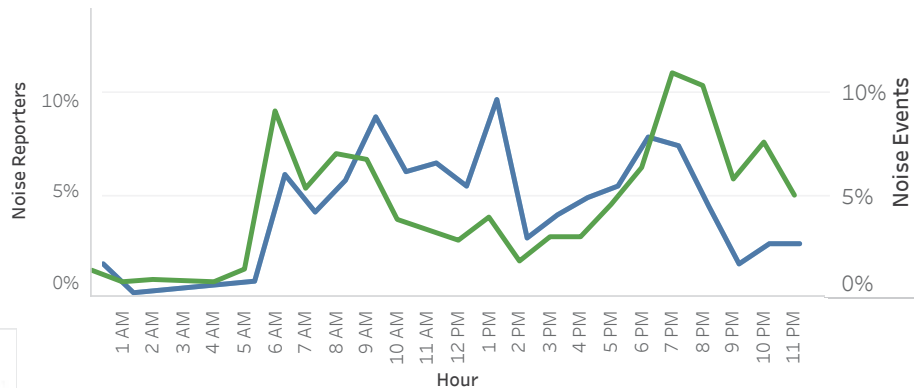


### Noise Reporters

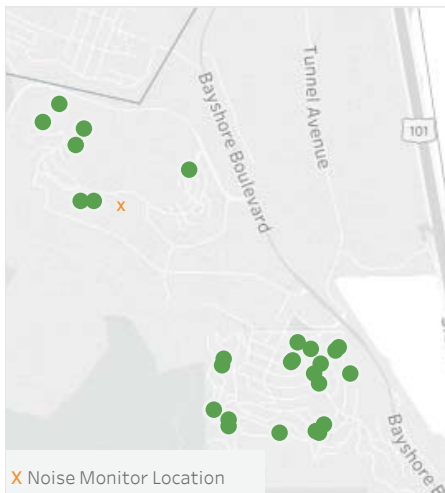
Date	Noise Reporters	Noise Reports
Jan 18	15	141
Jan 19	17	163
Jan 20	13	96
Jan 21	13	185
Jan 22	13	60
Jan 23	9	88
Jan 24	11	88
Jan 25	12	145
Jan 26	14	94
Jan 27	13	116
Jan 28	11	152
Jan 29	5	31
Jan 30	11	47
Jan 31	9	32
Feb 1	14	143
<b>Total</b>	<b>27</b>	<b>1,581</b>

**12%** of overflights registered a noise event. (425 avg daily overflights of which 49 created a noise event)

### Noise Reporters vs Aircraft Noise Events



### Noise Reporters Location



### Noise Monitor on Location



# Solano Street 1Q 2018

January 18 - February 1

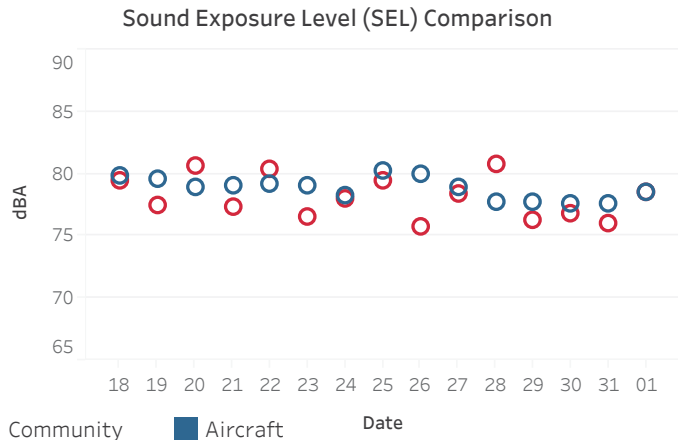
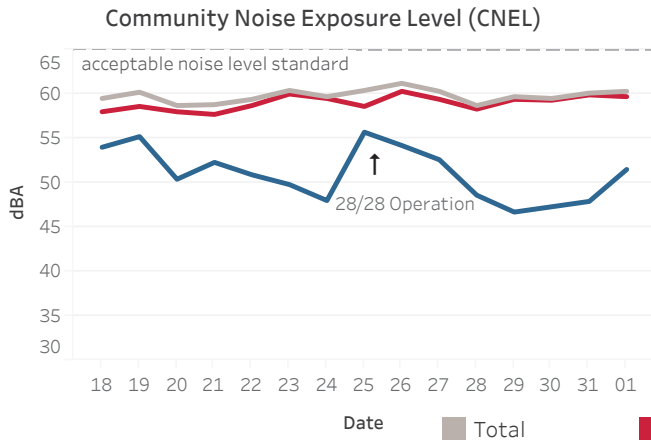
Aircraft CNEL: 52dBA  
Community CNEL: 59dBA  
Total CNEL: 60dBA  
Aircraft SEL: 79dBA  
Aircraft LMax: 68dBA  
Ambient Noise: 54dBA  
Noise Monitor Treshold: 62dBA  
SFO Aircraft Noise Events: 70 per day  
SFO Operations Flow: West Flow (all days)  
Cause of Aircraft Overflights : SFO SSTIK Departures from Runway 01L/R making the left turn over Brisbane and departures making a right turn from Runways 28L/R performing the TRUKN / NIITE Departure



## Daily Noise Event Averages

Date	Noise Events	SFO		Noise Events	Non-SFO		Community		
		Avg. SEL (dBA)	Avg. LMax (dB)		Avg. SEL (dBA)	Avg. LMax (dB)	Noise Events	Avg. SEL (dBA)	Avg. LMax (dB)
Jan 18	105	80	68	1	80	70	38	79	69
19	113	80	68	7	77	67	12	77	68
20	71	79	68	4	73	65	6	81	72
21	86	79	68				4	77	70
22	63	79	68	1	79	69	45	80	68
23	56	79	67				19	77	68
24	35	78	68	4	78	67	63	78	69
25	109	80	69	4	77	66	35	79	69
26	85	80	68				20	76	68
27	69	79	67	5	76	66	7	78	68
28	50	78	67	3	82	70	6	81	69
29	37	78	66	2	75	67	12	76	68
30	43	78	67	5	81	69	31	77	68
31	57	78	66	1	77	70	25	76	67
Feb 1	64	78	67	3	74	65	25	78	68
Daily Average	70	79	68	3	77	67	23	78	68

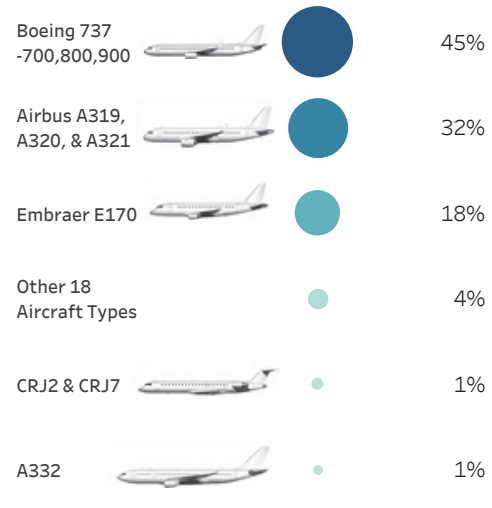
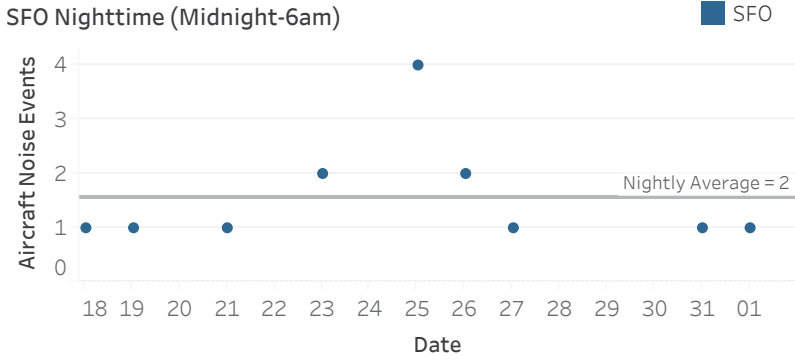
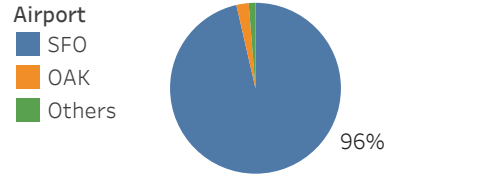
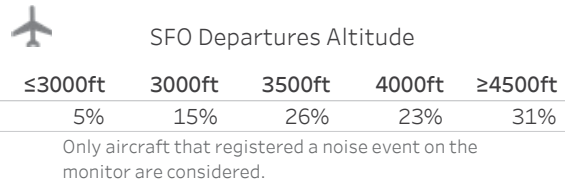
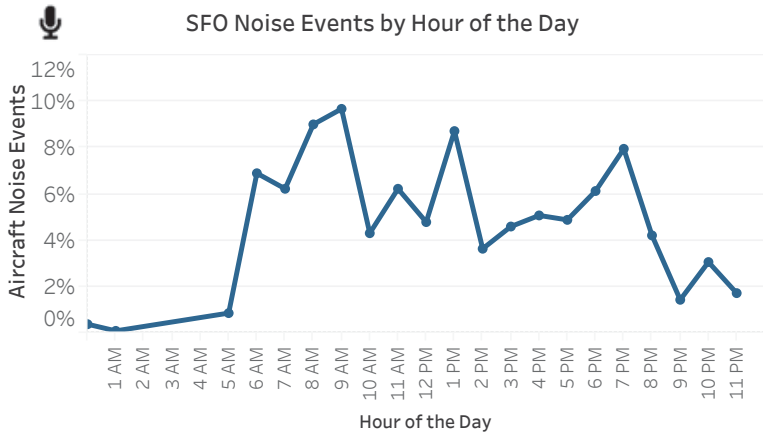
**SFO Events** are: Single SFO Aircraft, Multiple SFO Aircraft, Simultaneous SFO and Non-SFO Aircraft, and Simultaneous Community and SFO Aircraft.  
**SEL** - Sound Exposure Level of a noise event is measured over time between the initial and final points when the noise level exceeds a predetermined threshold and its energy is compressed into one second.  
**Lmax** - The maximum noise level is a measurement of the peak level of a noise event.  
**CNEL** - This metric is used to assess and regulate aircraft noise exposure in communities surrounding the airport. California Title 21 Noise Regulations established acceptable level of aircraft noise of 65dBA CNEL.



## SFO Aircraft Noise Events by Day (7am-7pm), Evening (7pm-10pm) and Night (10pm-7am)

Day	Noise Events	SFO Noise Events (%)	Avg. SEL (dBA)	Min. SEL (dBA)	Max. SEL (dBA)	Avg. LMax (dB)	Min. LMax (dBA)	Max. LMax (dBA)	Avg. Duration (sec)	Min. Duration (sec)	Max. Duration (sec)
Day	765	73%	79	70	89	68	62	82	21	5	60
Evening	142	14%	79	70	85	68	63	76	22	8	43
Night	136	13%	79	71	86	68	63	76	22	8	47



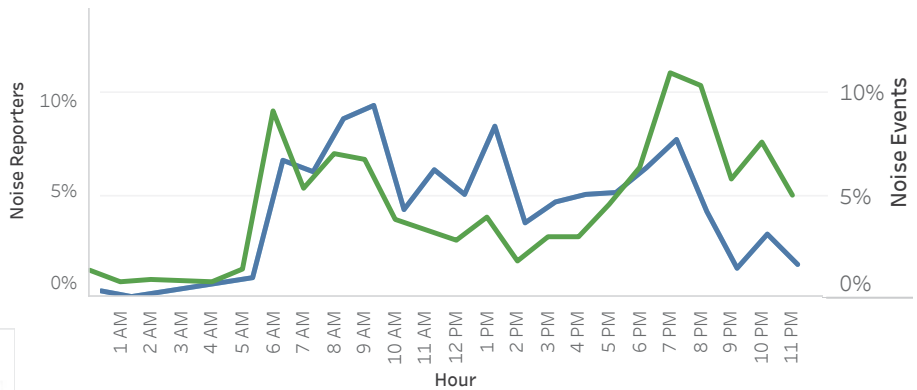


### Noise Reporters

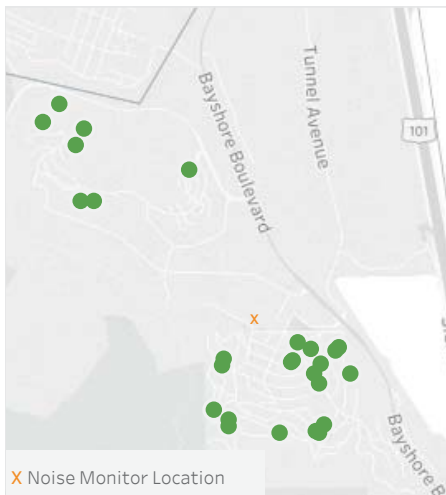
Date	Noise Reporters	Noise Reports
Jan 18	15	141
Jan 19	17	163
Jan 20	13	96
Jan 21	13	185
Jan 22	13	60
Jan 23	9	88
Jan 24	11	88
Jan 25	12	145
Jan 26	14	94
Jan 27	13	116
Jan 28	11	152
Jan 29	5	31
Jan 30	11	47
Jan 31	9	32
Feb 1	14	143
<b>Total</b>	<b>27</b>	<b>1,581</b>

**18%** of overflights registered a noise event. (408 avg daily overflights of which 73 created a noise event)

### Noise Reporters vs Aircraft Noise Events



### Noise Reporters Location



### Noise Monitor on Location



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**MEMORANDUM**

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**TO: BURLINGAME COMMUNITY**

**FROM: SAN FRANCISCO INTERNATIONAL AIRPORT AIRCRAFT NOISE  
ABATEMENT OFFICE**

**SUBJECT: BURLINGAME SHORT-TERM NOISE MONITORING REPORT**

**DATE: APRIL 3, 2018**

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The San Francisco International Airport (SFO) Aircraft Noise Abatement Office (ANAO) conducted aircraft noise monitoring in Burlingame to determine the noise levels within the community from aircraft operations at SFO. This measurement period was from December 23, 2017 to January 4, 2018. The monitoring was made possible with the assistance of Burlingame Gate neighborhood residents. The Burlingame neighborhood is relatively quiet with ambient noise levels of 56dBA, considering its location in a suburban community setting with vehicle traffic on an adjacent street to the north and two Caltrain commuter rail lines across that street.

The overall average daily noise level from all aircraft was 58dBA CNEL. The Community daily noise level was 62dBA CNEL. Noise from all aircraft over this location increased the total average daily noise level by 2dBA. SFO aircraft attributed approximately 98% of all aircraft noise events over the Burlingame community. During this monitoring period there were no weather or other impacts that would cause significant delays, require use of reverse flow or alter the flight patterns in any way. Non-aircraft noise sources included residential noise, train horns, and train movements. Majority of the community events that exceeded the noise threshold and recorded a noise event were associated with train activity.

On an average day, this community had 153 overflights out of which 101 exceeded the noise monitor threshold of 65dBA and recorded a noise event. These events included departing aircraft engine start, ground idle, take-off thrust and initial climb thrust. Runways 01-Left and 01-Right departing aircraft accounted for 65% of the noise events recorded at the monitor. Majority of flights departing SFO use over water departure procedures that reduces noise in residential communities when wind speed and wind direction allow for a safe take-off. Arriving aircraft caused noise upon landing by applying reverse thrust.

Low frequency aircraft noise study conducted at SFO in 2001 suggests that C-weighting is preferred over A-weighting to describe aircraft back-blast noise in areas such as this Burlingame community. ANAO included C-weighted metric in its analysis and the results are shown on page 3 of the monitoring data report.

During the noise-monitoring period, ANAO received noise reports from three individuals in Burlingame. Of the 107 reports submitted, 40 were in the daytime hours, 31 for the evening hours, and 36 for the nighttime hours. There were 824 (60%) SFO Aircraft noise events in the daytime, 246 (18%) in the evening hours and 307 (22%) during the nighttime period. On average night, there were seven aircraft noise events. During the morning, evening and nighttime hours there is a noticeable spike of noise reports disproportionate with aircraft noise events. All things considered, it seems reasonable to assume that the evening hours are most disturbing to Burlingame noise reporters.

In conclusion, any aircraft noise above the ambient noise level may become a nuisance for the residents. The recorded noise levels are what we would normally anticipate in a location 1.5 miles from runway ends at SFO.

**CNEL-** Community Noise Equivalent Level- This metric is used to assess and regulate aircraft noise exposure in communities surrounding the airport. California Title 21 Noise Regulations established acceptable level of aircraft noise of 65dBA CNEL.

**dBA-** stands for A-weighted decibel. Decibel unit measures the loudness of a sound and is computed as the signal to noise ratio. A-weighting is used to adjust for frequency range of human hearing. An increase of ten decibels is perceived by human ear as a doubling of noise.

**dBC-** stands for C-weighted decibel.

**Day, Evening, Night-** Day is considered the time between 7 a.m.-7 p.m., Evening between 7 p.m. - 10 p.m., and Night between 10 p.m. – 7 a.m.

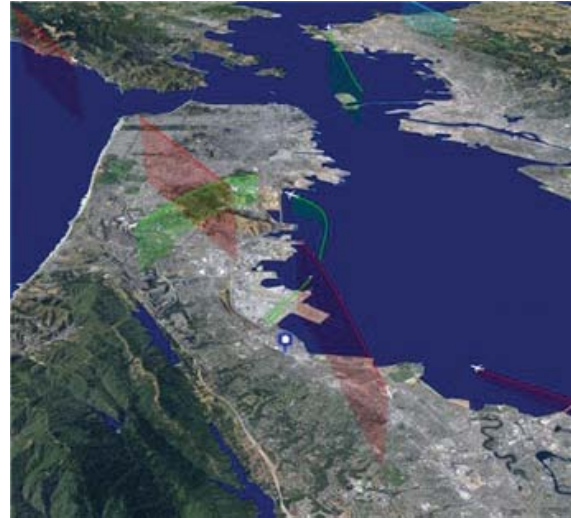
**Reverse Thrust-** Aircraft engine thrust is directed forward rather than backward to help reduce speed for stopping.



# Short Term Noise Monitoring Report Burlingame

December 23, 2017 - January 4, 2018

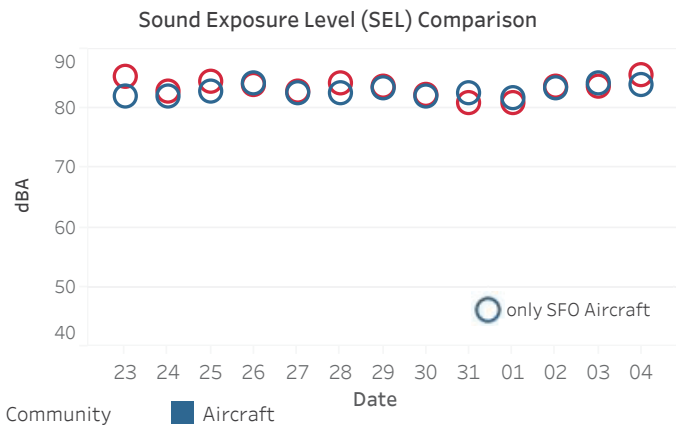
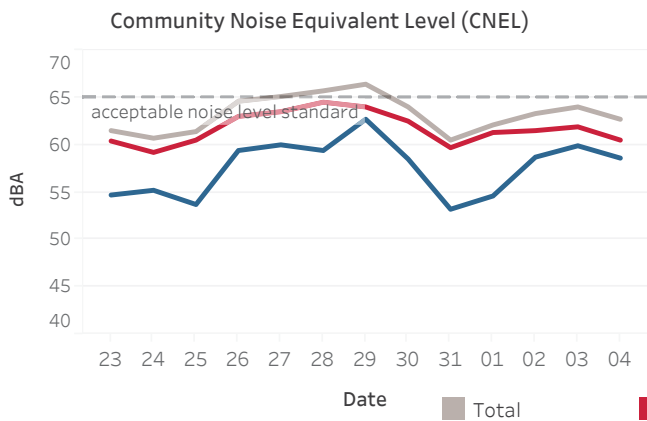
Aircraft CNEL: 58dBA  
 Community CNEL: 62dBA  
 Total CNEL: 58dBA  
 SEL: 83dBA  
 LMax: 73dBA  
 Ambient Noise: 56dBA  
 Noise Monitor Treshold: 65dBA  
 SFO Aircraft Noise Events: 106 per day  
 SFO Operations Flow: West Flow  
 Cause of Aircraft Noise: SFO departures from Runway 01L/R, landing aircraft on Runway 28L/R, General Aviation traffic above Highway 101 corridor



## Daily Noise Event Averages

Date	SFO			Non-SFO			Community		
	Noise Events	Avg. SEL (d BA)	Avg. LMax (d B)	Noise Events	Avg. SEL (d BA)	Avg. LMax (d B)	Noise Events	Avg. SEL (dBA)	Avg. LMax (dB)
December 23	64	82	72	4	75	68	8	85	76
December 24	61	82	72	2	74	67	3	83	74
December 25	46	83	72	1	79	72	4	84	76
December 26	134	84	74	3	75	69	18	84	76
December 27	173	83	73	2	79	71	22	83	74
December 28	157	83	73	4	76	67	32	84	76
December 29	192	83	73	3	77	69	27	84	75
December 30	91	82	71	1	76	69	5	82	73
December 31	42	82	73	2	77	70	6	81	72
January 1	63	82	72	3	81	73	15	81	72
January 2	120	83	75				25	84	75
January 3	131	84	74	2	85	76	23	84	76
January 4	103	84	75	3	82	71	19	85	76
Daily Average	106	83	73	3	78	70	16	83	75

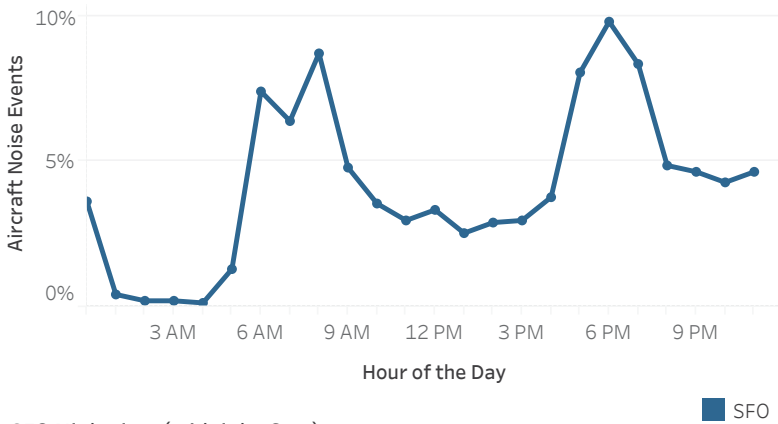
**SFO Events** are: Single SFO Aircraft, Multiple SFO Aircraft, Simultaneous SFO and Non-SFO Aircraft, and Simultaneous Community and SFO Aircraft.  
**SEL** - Sound Exposure Level of a noise event is measured over time between the initial and final points when the noise level exceeds a predetermined threshold and its energy is compressed into one second.  
**Lmax** - The maximum noise level is a measurement of the peak level of a noise event.  
**CNEL** - This metric is used to assess and regulate aircraft noise exposure in communities surrounding the airport. California Title 21. Noise Regulations established acceptable level of aircraft noise of 65dBA CNEL.



## SFO Aircraft Noise Events by Day (7am-7pm), Evening (7pm-10pm) and Night (10pm-7am)

	Noise Events	SFO Noise Events (%)	Avg. SEL (d BA)	Min. SEL (d BA)	Max. SEL (d BA)	Avg. LMax (d B)	Min. LMax (d BA)	Max. LMax (d BA)	Avg. Duration (sec)	Min. Duration (sec)	Max. Duration (sec)
Day	824	60%	84	70	94	74	65	91	12	5	60
Evening	246	18%	83	72	94	73	65	88	12	5	48
Night	307	22%	82	71	90	72	65	86	12	5	48

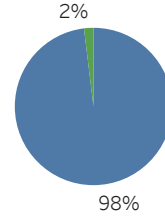
### SFO Noise Events by Hour of the Day



	01L	01R	28L	28R
Arrivals			48%	51%
Departures	26%	57%	12%	2%

Only aircraft that registered a noise event on the monitor are considered.

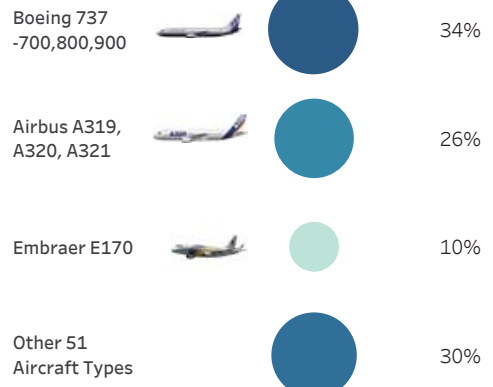
Airport  
■ SFO  
■ Others



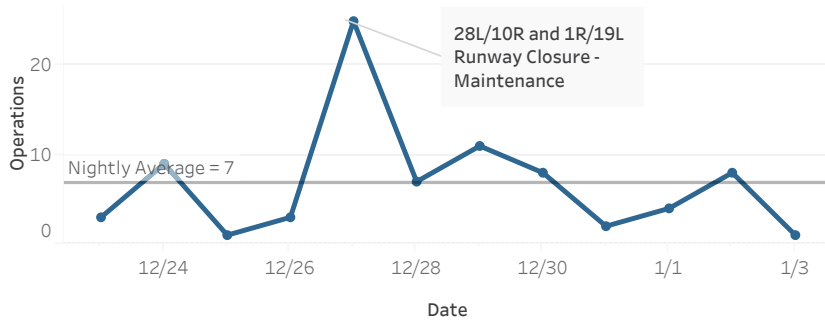
Operation Type

Arrivals	Departures
35%	65%

Aircraft Type



### SFO Nighttime (midnight-6am)



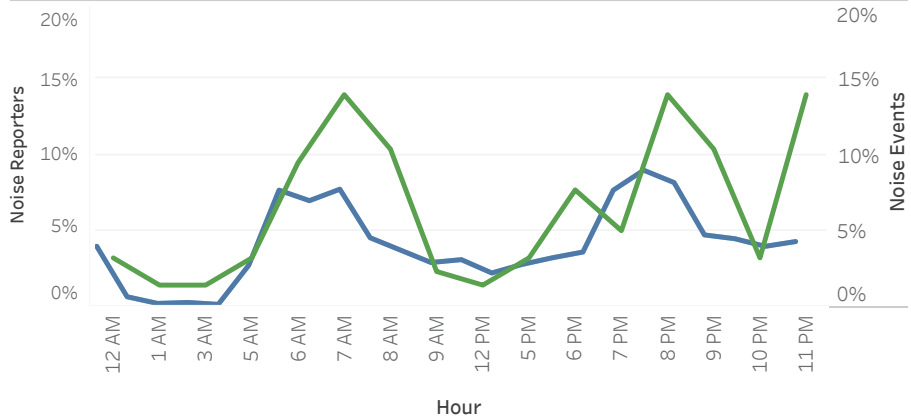
### Noise Reporters

Date	Noise Reporters	Noise Reports
23	2	6
24	1	2
25	2	5
26	2	6
27	1	17
28	3	7
29	2	19
30	1	12
31	1	5
1/1	2	7
2	2	17
3	1	3
4	1	1
<b>Total</b>	<b>3</b>	<b>107</b>

66%

of overflights registered a noise event.  
 (153 avg daily overflights of which 101 created a noise event)

### Noise Reporters vs Noise Events



### Noise Reporters Location



# Low Frequency Noise Levels

Low frequency aircraft noise study conducted at SFO in 2001 suggests that C-weighting is preferred over A-weighting to describe aircraft back-blast noise. The standard to measure aircraft overflight noise is typically done using A-weighting which better conforms to the response of the human ear. This frequency range are in the mid to high frequencies between 500 Hertz (Hz) and 6,000 Hz. C-weighting sound levels are deep tones in the low frequency range from the 16 Hz to 256 Hz. In the event of low frequency noise (airplane taking off, engine run-up) the duration and spectral content of the event is quite different from that of an aircraft overflight.

For this measurement the average aircraft, generated Maximum Noise Level (LCmax) was 81dBC compared to 73dBA. The average Sound Exposure Level (LCE) was 90dBC compared to 83dBA.

In general, the C-weighted levels will be greater than the A-weighted level behind the departing aircraft. Low frequency back-blast noise levels decrease by about 6 decibels per doubling of distance. The reduction of noise from air and ground absorption is small (Wyle, 2001).

## C-Weighted Decibels (dBC)

	SFO			Non-SFO			Community			
	Noise Events	LCE	LCMax	Noise Events	LCE	LCMax	Noise Events	LCE	LCMax	
December	23	64	89	79	4	83	76	8	91	83
	24	61	89	80	2	84	78	3	89	81
	25	46	90	80	1	90	84	4	91	82
	26	134	91	81	3	85	78	18	89	81
	27	173	90	80	2	87	80	22	89	80
	28	157	90	80	4	85	77	32	90	81
	29	192	91	80	3	87	79	27	89	80
	30	91	91	81	1	84	78	5	89	79
	31	42	89	79	2	86	79	6	88	78
	January	1	63	90	80	3	89	81	15	87
2		120	89	81				25	91	80
3		131	90	81	2	91	82	23	90	80
4		103	90	82	3	90	79	19	92	82
<b>Daily Average</b>	<b>106</b>	<b>90</b>	<b>81</b>	<b>3</b>	<b>87</b>	<b>79</b>	<b>16</b>	<b>90</b>	<b>80</b>	

**SFO Events** are: Single SFO Aircraft, Multiple SFO Aircraft, Simultaneous SFO and Non-SFO Aircraft, and Simultaneous Community and SFO Aircraft.  
**LCE** - Sound Exposure Level of a noise event is measured over time between the initial and final points when the noise level exceeds a predetermined threshold and its energy is compressed into one second.  
**LCmax** - The maximum noise level is a measurement of the peak level of a noise event.

## LEQ-A and LEQ-C Equivalent Sound Pressure Levels

