



# MEETING PACKET

Meeting No. 305

**Wednesday, February 1, 2017 - 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.

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## AGENDA

1. **Call to Order / Roll Call / Declaration of a Quorum Present**  
*ACTION*  
Cliff Lentz, Roundtable Chairperson / James A. Castaneda, AICP, Roundtable Coordinator
2. **Elections of Roundtable Chairperson for Calendar Year 2017**  
*ACTION*  
Roundtable Chairperson
3. **Elections of Roundtable Vice-Chairperson for Calendar Year 2017**  
*ACTION*  
Roundtable Chairperson
4. **Approval of Resolution 17-01: Designating Roundtable Meeting Dates, Time and Place for Calendar Year 2017** pg. 9  
*ACTION*  
Roundtable Chairperson
5. **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.

## REGULAR AGENDA

7. **Review of Airport Director's Report & New Summary Format Introduction**
  - October 2016 pg. 15
  - November 2016 pg. 23
  - December 2016 pg. 31
  - New Airport Director's Report Offerings for Roundtable** pg. 39*INFORMATION*



- 8. **Review of SFO FlyQuiet Report for Q4 2016** pg. 43  
*INFORMATION*  
Bert Ganoung, Manager - Aircraft Noise Abatement Office
  
- 9. **Airport Director's Comments**  
*INFORMATION*  
Ivar Satero, Director – San Francisco International Airport
  
- 10. **Subcommittee Appointments**  
*INFORMATION*  
James Castañeda, Roundtable Coordinator
  
- 11. **FY 2016-2017 Budget** pg. 71  
*INFORMATION / ACTION*  
James Castañeda, Roundtable Coordinator
  
- 12. **Discussion, Video Streaming of Roundtable Meetings**  
*INFORMATION / ACTION*  
James Castañeda, Roundtable Coordinator
  
- 13. **Status, Initiative Response Review Progress**  
*INFORMATION*  
Roundtable Chair / FAA Staff

OTHER MATTERS

- 14. **Member Communications / Announcements**  
*INFORMATION*  
Roundtable Members and Staff
  
- 15. **Adjourn**  
*ACTION*  
Roundtable Chairperson

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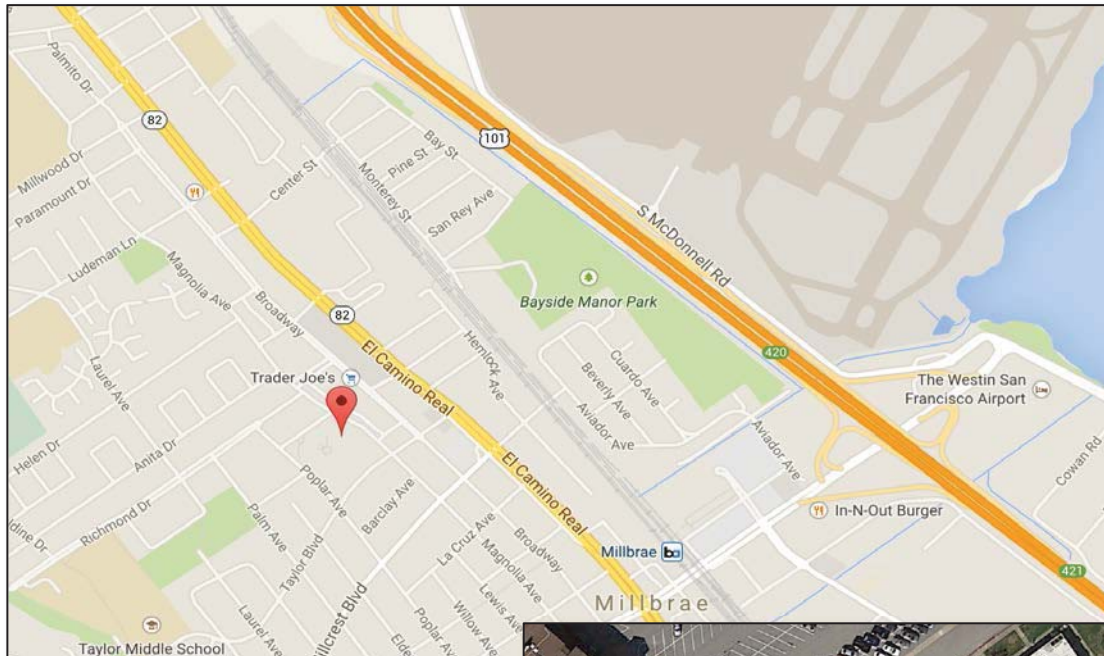
Correspondences pg. 83  
    Portola Valley Aircraft Noise Monitoring p. 85  
    Burlingame Aircraft Noise Monitoring p.102

Airport Noise Industry News pg. 143  
Glossary of Common Acoustic & Air Traffic Control Terms pg. 147

## REGULAR MEETING LOCATION

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

Access through Millbrae Library parking lot on Poplar Avenue





## ABOUT THE AIRPORT/COMMUNITY ROUNDTABLE

### OVERVIEW

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.” (49 U.S.C. A. Section 1302(a)(1)).





## 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, Agenda 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.

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### AIRPORT/COMMUNITY ROUNDTABLE OFFICERS & STAFF

**Chairperson:**

**CLIFF LENTZ**

Representative, City of Brisbane  
[cliffrentz@ci.brisbane.ca.us](mailto:cliffrentz@ci.brisbane.ca.us)

**Vice-Chairperson:**

**ELIZABETH LEWIS**

Representative, Town of Atherton  
[elewis@ci.atherton.ca.us](mailto:elewis@ci.atherton.ca.us)

**Roundtable Coordinator:**

**JAMES A. CASTAÑEDA, AICP**

County of San Mateo  
Planning & Building Department  
[jcastaneda@sforoundtable.org](mailto:jcastaneda@sforoundtable.org)





## MEMBERSHIP ROSTER FEBRUARY 2017 REGULAR MEMBERS

### **CITY AND COUNTY OF SAN FRANCISCO**

#### **BOARD OF SUPERVISORS**

**Representative:** Vacant

**Alternate:** Vacant

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

**Vacant**, (Appointed)

**Alternate:** Edwin Lee, Mayor

### **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 OF SAN MATEO COUNTY (C/CAG)**

#### **AIRPORT LAND USE COMMITTEE (ALUC)**

**Adam Kelly**, ALUC Chairperson (Appointed)

### **TOWN OF ATHERTON**

**Elizabeth Lewis**, Council Member/Roundtable Vice-Chairperson

**Alternate:** Bill Widmer, Council Member

### **CITY OF BELMONT**

**Douglas Kim**, Council Member

**Alternate:** Eric Reed

### **CITY OF BRISBANE**

**Cliff Lentz**, Council Member/Roundtable Chairperson

**Alternate:** Lori Liu, Council Member

### **CITY OF BURLINGAME**

**Ricardo Ortiz**, Council Member

## **MEMBERSHIP ROSTER FEBRUARY 2017**

Page 2 of 3

### **CITY OF DALY CITY**

**Raymond Buenaventura**, Mayor

### **CITY OF FOSTER CITY**

**Sam Hindi**, Council Member

### **CITY OF HALF MOON BAY**

**Deborah Penrose**, Council Member

Alternate: Marina Fraser, 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**

**Ann Schneider**, Council Member

### **CITY OF PACIFICA**

**Sue Digre**, Council Member

### **TOWN OF PORTOLA VALLEY**

**Ann Wengert**: Council Member

Alternate: Maryann Derwin, Council Member

### **CITY OF REDWOOD CITY**

**Rosanne Foust**, Council Member

Alternate: Vacant

### **CITY OF SAN BRUNO**

**Ken Ibarra**, Council Member

Alternate: Rico Medina, Council Member

### **CITY OF SAN CARLOS**

**Matt Grocott**: Council Member

Alternate: Bob Grassilli, Council Member

### **CITY OF SAN MATEO**

**David Lim**, Council Member

Alternate: Rick Bonilla, Council Member

## **MEMBERSHIP ROSTER FEBRUARY 2017**

Page 3 of 3

### **CITY OF SOUTH SAN FRANCISCO**

**Mark Addiego**, Council Member

Alternate: Pradeep Gupta, Council Member

### **TOWN OF WOODSIDE**

**Deborah Gordon**, Council Member

Alternate: Thomas Shanahan, Council Member

## **ROUNDTABLE ADVISORY MEMBERS**

### **AIRLINES/FLIGHT OPERATIONS**

Captain James Abell, United Airlines

Glenn Morse, United Airlines

### **FEDERAL AVIATION ADMINISTRATION**

Don Kirby, Northern California Terminal Radar Approach Control (NORCAL TRACON)

Tony DiBernardo, FAA District Manager – Sierra-Pacific District

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## **ROUNDTABLE STAFF**

James A. Castañeda, AICP, Roundtable Coordinator

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## **SAN FRANCISCO INTERNATIONAL AIRPORT NOISE ABATEMENT STAFF**

Bert Ganoung, Noise Abatement Manager

David Ong, Noise Abatement Systems Manager

Ara Balian, Noise Abatement Specialist

John Hampel, Noise Abatement Specialist

Nastasja Gjorek, Noise Abatement Specialist

William Brown, Noise Abatement Specialist

Joyce Satow, Noise Abatement Office Administration Secretary





February 1, 2017

**TO:** Roundtable Representatives, Alternatives, and Interested Persons

**FROM:** James A. Castañeda, AICP, Roundtable Coordinator 

**SUBJECT:** Review/Approval of Resolution 17-01: Designating Roundtable Meeting Dates, Time, and Place for Calendar Year 2017

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## RECOMMENDATION:

Adopt the attached Roundtable Resolution No. 17-01 that specifies the date, time, and place for holding Regular Meetings of the SFO Airport/Community Roundtable, as required by the Brown Act and the Roundtable Bylaws for calendar year 2017.

## BACKGROUND:

California Government Code Section 54950 et seq., commonly known as the Ralph M. Brown Act (Open Meeting Law for local government bodies) and the adopted Roundtable Bylaws, as amended, require the Roundtable to establish the date, time, and place for holding its Regular Meetings. The amended Roundtable Bylaws state the following:

*“The Roundtable membership shall establish, by adopted resolution, the date, time and place for Regular Roundtable Meetings. Such resolution shall be adopted at the February Regular Meeting or at the first Regular Meeting held thereafter each year.”  
(Roundtable Bylaws Article VI, Paragraph 1).*

Special meetings, workshops, and other Roundtable related activities may be held as needed, in accordance with the relevant provisions in the Brown Act and the adopted Roundtable Bylaws.

## DISCUSSION

The proposed dates are reflective of maintaining approximately five to six meetings per fiscal year. Similar to 2016, staff is again including an August meeting date to reduce the gap between the June and October meeting. Regular Meetings for calendar year 2017 are to be held at 7:00pm on the first Wednesday of the following months: February, April, June, August, October and December, and therefore with adoption of Roundtable Resolution 17-01, the Regular Meetings would be scheduled as follows:

- **February 1, 2017**
- **April 5, 2017**
- **June 7, 2017**
- **August 2, 2017**
- **October 4, 2017**
- **December 6, 2017**

The meetings will continue to be held at the David Chetcuti Community Room at 450 Poplar Street, Millbrae, CA. This does not preclude any additional meetings the Roundtable finds necessary.

**Attachments:**

Roundtable Resolution 17-01



## RESOLUTION No. 17-01

\* \* \* \* \*

### A RESOLUTION PROVIDING FOR THE DAY, TIME, AND PLACE FOR HOLDING REGULAR MEETINGS OF THE SAN FRANCISCO INTERNATIONAL AIRPORT/COMMUNITY ROUNDTABLE FOR CALENDAR YEAR 2017

**WHEREAS**, the San Francisco International Airport/Community Roundtable (Roundtable) was established in 1981, via a Memorandum of Understanding (MOU), to serve as a public forum to address community noise issues related to aircraft operations at San Francisco International Airport, and

**WHEREAS**, Article VI, Paragraph I of the adopted Roundtable Bylaws, as amended, requires the Roundtable to establish, by resolution, the date, time, and place for Regular Roundtable Meetings and that such resolution shall be adopted at the February Regular Meeting or at the first Regular Meeting held thereafter, and

**WHEREAS**, the Regular Meetings of the Roundtable are held in accordance with the relevant provisions of the Ralph M. Brown Act, which requires the Roundtable to establish a regular day, time, and place for holding its Regular Meetings (California Government Code Section 54950 et seq.).

**NOW, THEREFORE BE IT RESOLVED**, that the Regular Meetings of the Roundtable shall be scheduled as follows: the first Wednesday of February, April, June, August, October, and December 2017, at 7:00 p.m. in the David Chetcuti Community Room at Millbrae City Hall, 450 Poplar Avenue, Millbrae, California. Special Meetings and workshops may be scheduled and held, as needed, in accordance with the relevant provisions in the Brown Act and the adopted Roundtable Bylaws.

\* \* \* \* \*

**PASSED, APPROVED, AND ADOPTED ON FEBURARY 1, 2017.**

Roundtable Chairperson

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# **REGULAR AGENDA**

Regular Meeting # 305  
February 1, 2017

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# Airport Director's Report

Presented at the February 1, 2017  
Airport Community Roundtable Meeting

Aircraft Noise Abatement Office  
October 2016



San Francisco  
International  
Airport

Monthly Noise Exceedance Report

San Francisco International Airport -- Director's Report

Period: October 2016



Airline	Noise Exceedances				Noise Exceedance Quality Rating
	Total Noise Exceedances	Total Operations per Month	Exceedances per 1,000 Operations	Score	
SKW	43	5,842	7	9.98	
KLM	1	72	14	9.95	
CSN	1	62	16	9.95	
CPZ	18	722	25	9.92	
SWA	77	2,749	28	9.91	
VRD	98	3,480	28	9.91	
DAL	63	2,209	29	9.91	
ETD	2	62	32	9.89	
FFT	16	482	33	9.89	
JBU	37	958	39	9.87	
ASA	47	1,037	45	9.85	
WOW	2	42	48	9.84	
ANZ	3	62	48	9.84	
BAW	6	124	48	9.84	
DLH	6	124	48	9.84	
ACA	36	721	50	9.84	
UAL	590	11,260	52	9.83	
AAL	146	2,718	54	9.82	
WJA	7	89	79	9.74	
CCA	12	98	122	9.60	
FDX	12	85	141	9.54	
CMP	10	62	161	9.47	
AMX	29	176	165	9.46	
NCA	7	41	171	9.44	
HAL	24	124	194	9.37	
TAI	19	89	213	9.30	
GTI	19	88	216	9.29	
AIC	8	26	308	8.99	
SIA	42	124	339	8.89	
CKS	3	8	375	8.77	
JAL	30	63	476	8.44	
EVA	67	134	500	8.36	
CPA	75	144	521	8.30	
CAL	65	110	591	8.07	
KAL	85	122	697	7.72	
AAR	114	114	1,000	6.73	
PAL	63	62	1,016	6.67	
QFA	165	54	3,056	0.00	
<b>TOTAL</b>	<b>2,048</b>	<b>34,539</b>	<b>10,985</b>		

Source: SFO Noise Abatement Office



**Historical Significant Exceedances Report**  
 San Francisco International Airport -- Director's Report  
 Period: **October 2016**



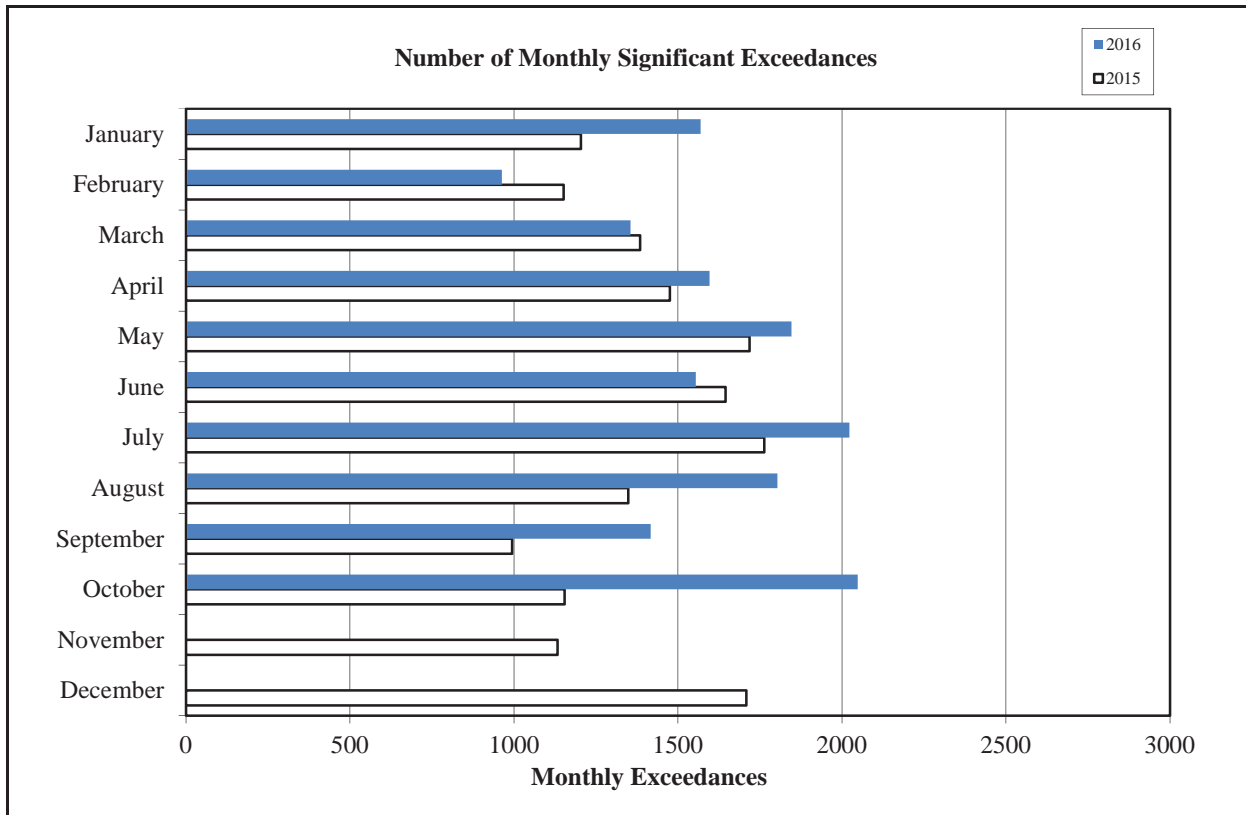
San Francisco International Airport

Month	Number of Monthly Significant Exceedances					Change from Last Year
	2012	2013	2014	2015	2016	
January	1,378	1,428	1,184	1,204	1,569	365
February	1,581	1,176	1,141	1,151	963	-188
March	1,703	1,671	1,345	1,384	1,355	-29
April	1,870	1,910*	1,362	1,475	1,596	121
May	1,912	1,859*	1,515	1,718	1,846	128
June	2,355	1,915	1,740	1,645	1,554	-91
July	2,621	1,647	1,619	1,763***	2,023	260
August	1,823	1,638**	1,460	1,348	1,803	455
September	1,464	1,352	1,111	994	1,417	423
October	1,689	1,277	1,055	1,154	2,048	894
November	1,421	1,262	1,245	1,133		0
December	1,439	1,160	1,670	1,708		0
<b>Annual Total</b>	<b>21,256</b>	<b>18,295</b>	<b>16,447</b>	<b>16,677</b>	<b>16,174</b>	
<b>Year to Date Trend</b>	<b>21,256</b>	<b>18,295</b>	<b>16,447</b>	<b>16,677</b>	<b>16,174</b>	<b>2338</b>

\* Revised with correct amount of exceedance - 8/5/13

\*\* No data available from Site 7, August 1-26

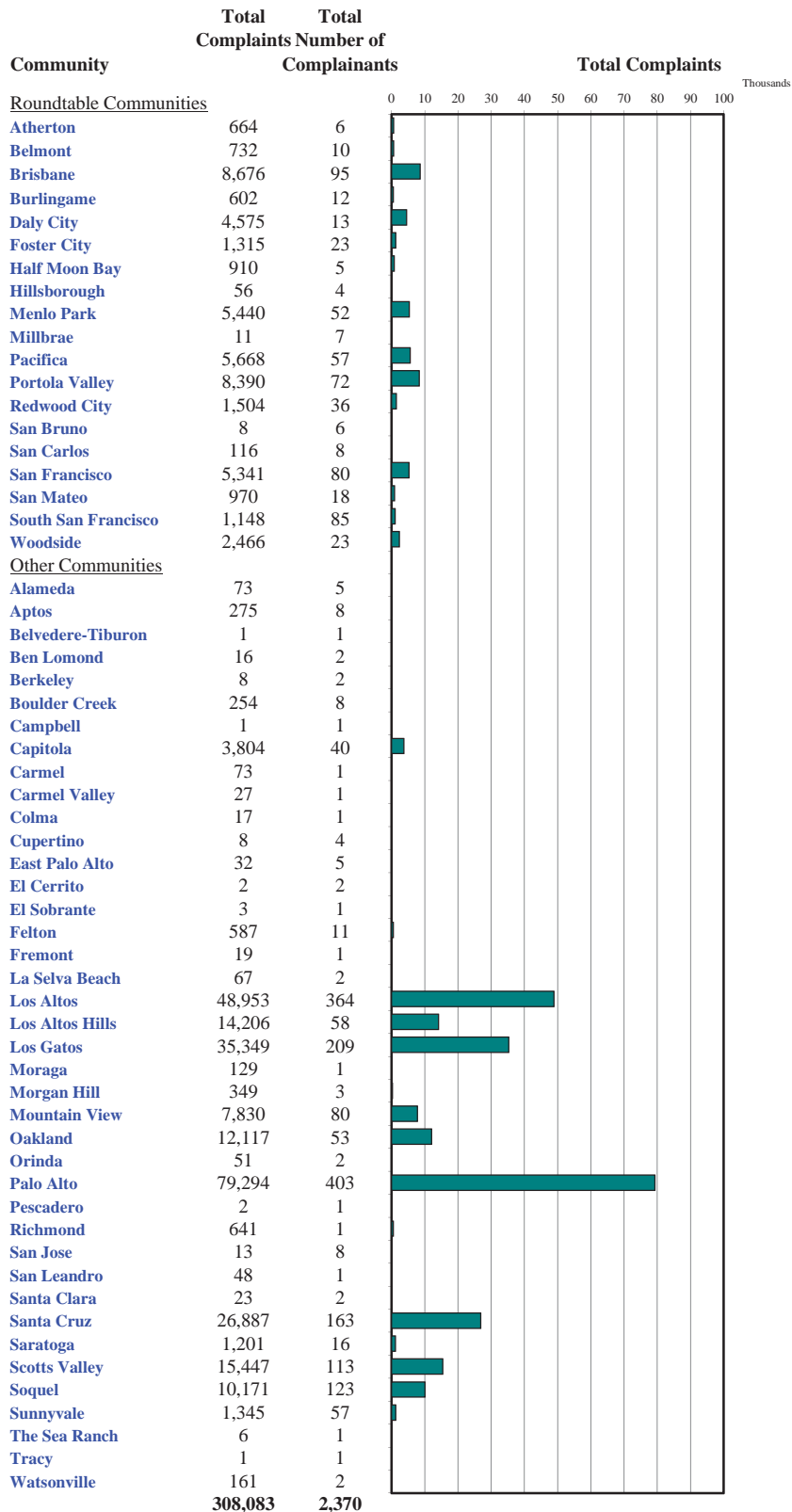
\*\*\*No data available from Site 2 starting July 17





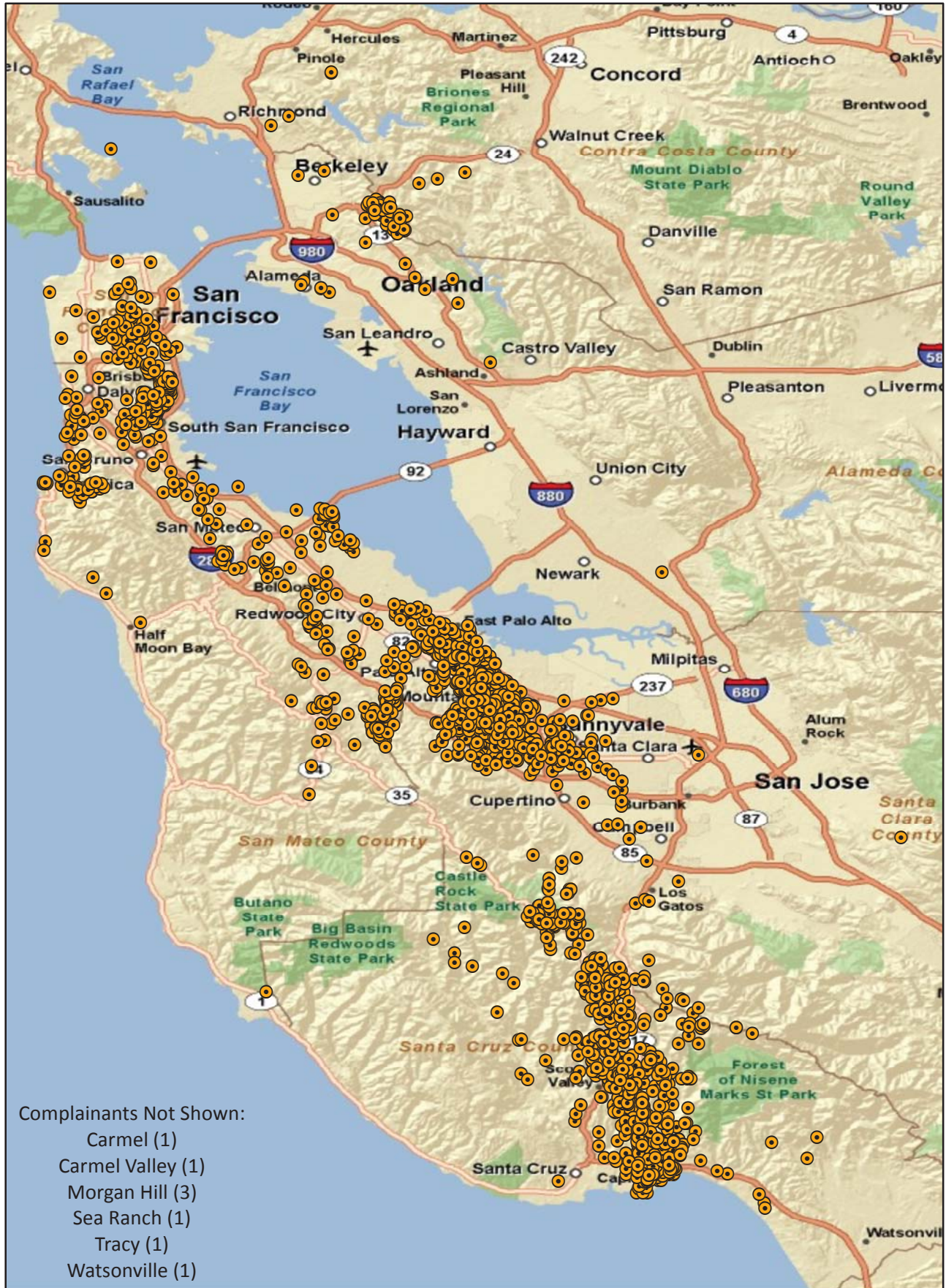
**Monthly Calls by Community**

Source: Airport Noise Monitoring System



"Our software vendor's address validation relies on USPS-provided ZIP code look up table and USPS-specified 'default city' values."

# Monthly Noise Complainant Summary Map October 2016



“Our software vendor’s address validation relies on USPS-provided ZIP code look-up table and the USPS-specified ‘default city’ values”

● Complainant Location




**Monthly Nighttime Power Runups Report (85-06-AOB)**

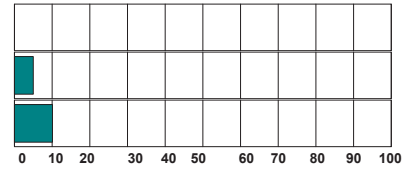
San Francisco International Airport -- Director's Report

Period : **October 2016**

Time of Day : From 10 pm through 7 am



Airline	Code	Number of Runups	Runups Per 1,000 Departures	Percentage of Runups
	VRD	1	0.6	6%
	UAL	6	1.1	33%
	AAL	11	8.1	61%
<b>Total</b>		<b>18</b>		



*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 power settings tested range from idle to full power and may vary in duration.*



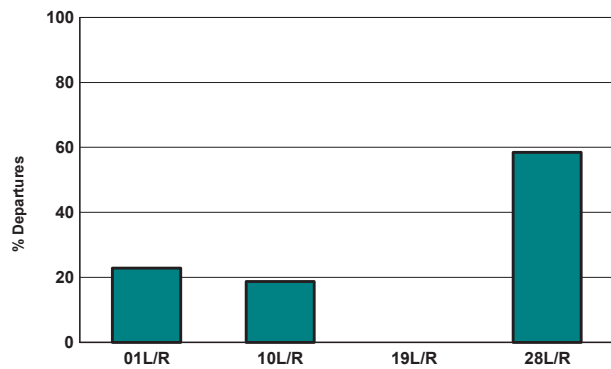


**Runway Utilization (1 am to 6 am)**

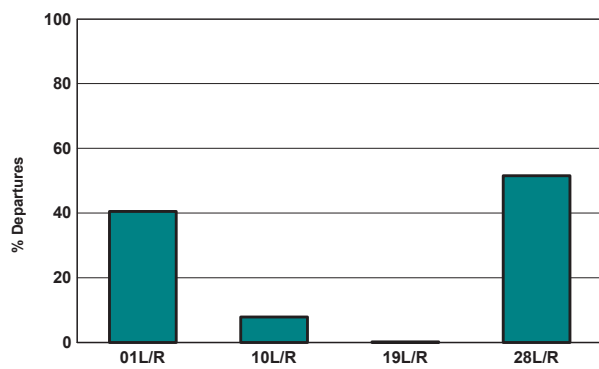
**Monthly Jet Departures**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
01L/R	155	149	168	166	167	216	335	265	140	111	-	-	1,872
10L/R	72	14	85	8	3	9	19	27	36	91	-	-	364
19L/R	5	-	-	-	-	-	-	-	-	-	-	-	5
28L/R	85	93	216	250	287	282	298	309	278	284	-	-	2,382
<b>Total</b>	<b>317</b>	<b>256</b>	<b>469</b>	<b>424</b>	<b>457</b>	<b>507</b>	<b>652</b>	<b>601</b>	<b>454</b>	<b>486</b>	-	-	<b>4,623</b>
01L/R	49%	58%	36%	39%	37%	43%	51%	44%	31%	23%	0%	0%	40%
10L/R	23%	5%	18%	2%	1%	2%	3%	4%	8%	19%	0%	0%	8%
19L/R	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
28L/R	27%	36%	46%	59%	63%	56%	46%	51%	61%	58%	0%	0%	52%

**Current Month (1 am to 6 am)**



**Year-to-Date (1am to 6 am)**



**Current Month (1 am to 6 am)**



Numbers rounded to nearest whole percentages

**Year-to-Date (1am to 6am)**



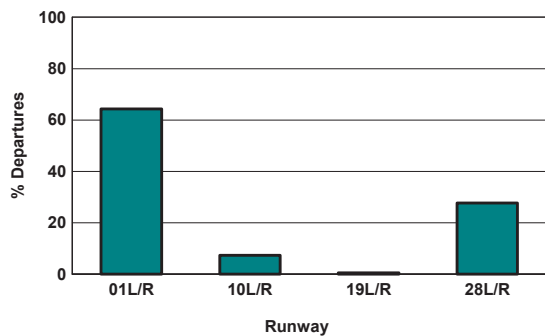
Numbers rounded to nearest whole percentages

**Runway Utilization (All Hours)**

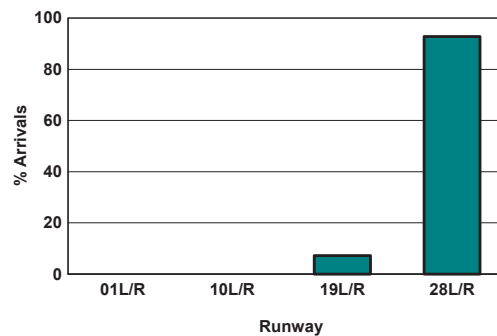
Source: Airport Noise Monitoring System

	Runway Utilization				Total
	01L/R	10L/R	19L/R	28L/R	
<b>Total Monthly Operations</b>					
Departures	11,249	1,292	88	4,853	17,482
Arrivals	0	0	1,261	16,190	17,451
<b>Percentage Utilization</b>					
Departures	64.3%	7.4%	0.5%	27.8%	100%
Arrivals	0.0%	0.0%	7.2%	92.8%	100%

**Departures (All Hours)**



**Arrivals (All Hours)**



**Percentage Departure Utilization**



Numbers rounded to nearest whole percentages

**Percentage Arrival Utilization**



Numbers rounded to nearest whole percentages



# Airport Director's Report

Presented at the February 1, 2017  
Airport Community Roundtable Meeting

Aircraft Noise Abatement Office  
November 2016



San Francisco  
International  
Airport



Monthly Noise Exceedance Report

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SKW	24	6,147	4	9.99	
SCX	1	118	8	9.97	
CES	1	86	12	9.96	
DAL	28	1,952	14	9.95	
CPZ	11	683	16	9.94	
VRD	64	3,577	18	9.94	
DLH	2	111	18	9.94	
ACA	12	477	25	9.91	
SWA	71	2,712	26	9.91	
FFT	9	331	27	9.91	
ASA	31	996	31	9.89	
JBU	30	947	32	9.89	
SWR	2	58	34	9.88	
BAW	4	115	35	9.88	
AAL	112	2,619	43	9.85	
UAL	528	10,361	51	9.82	
FDX	11	84	131	9.55	
CKS	1	7	143	9.50	
CCA	13	86	151	9.48	
HAL	20	120	167	9.42	
AMX	34	188	181	9.37	
CMP	27	118	229	9.21	
GTI	21	90	233	9.19	
TAI	22	86	256	9.11	
NCA	14	52	269	9.07	
ETD	18	59	305	8.94	
SIA	47	119	395	8.63	
AIC	14	34	412	8.57	
CAL	45	102	441	8.47	
EVA	61	124	492	8.29	
ABX	1	2	500	8.26	
PAL	34	60	567	8.03	
KAL	73	120	608	7.89	
CPA	85	137	620	7.85	
AAR	121	109	1,110	6.15	
QFA	121	42	2,881	0.00	
<b>TOTAL</b>	<b>1,713</b>	<b>33,029</b>	<b>10,486</b>		

Source: SFO Noise Abatement Office

**Historical Significant Exceedances Report**  
 San Francisco International Airport -- Director's Report  
 Period: **November 2016**



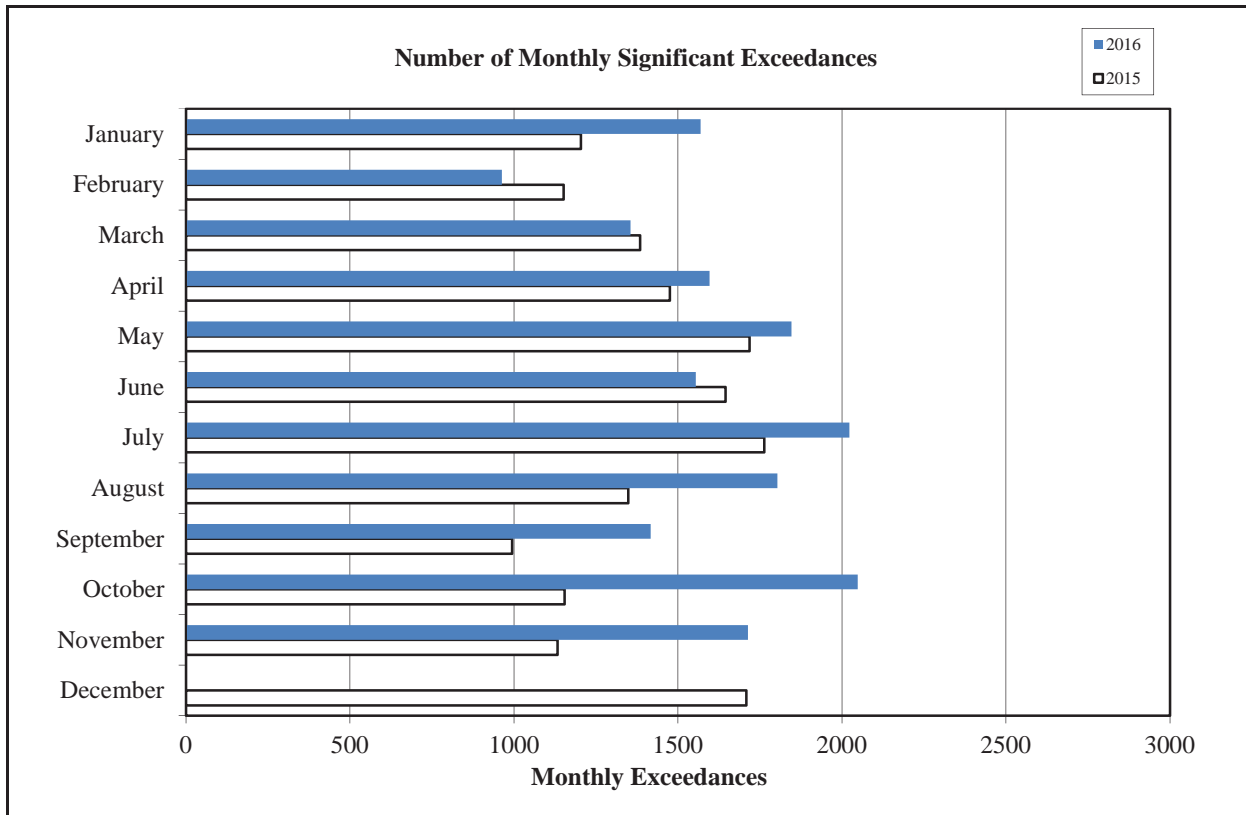
San Francisco International Airport

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	2012	2013	2014	2015	2016	
January	1,378	1,428	1,184	1,204	1,569	365
February	1,581	1,176	1,141	1,151	963	-188
March	1,703	1,671	1,345	1,384	1,355	-29
April	1,870	1,910*	1,362	1,475	1,596	121
May	1,912	1,859*	1,515	1,718	1,846	128
June	2,355	1,915	1,740	1,645	1,554	-91
July	2,621	1,647	1,619	1,763***	2,023	260
August	1,823	1,638**	1,460	1,348	1,803	455
September	1,464	1,352	1,111	994	1,417	423
October	1,689	1,277	1,055	1,154	2,048	894
November	1,421	1,262	1,245	1,133	1,713	580
December	1,439	1,160	1,670	1,708		0
<b>Annual Total</b>	<b>21,256</b>	<b>18,295</b>	<b>16,447</b>	<b>16,677</b>	<b>17,887</b>	
<b>Year to Date Trend</b>	<b>21,256</b>	<b>18,295</b>	<b>16,447</b>	<b>16,677</b>	<b>17,887</b>	<b>2918</b>

\* Revised with correct amount of exceedance - 8/5/13

\*\* No data available from Site 7, August 1-26

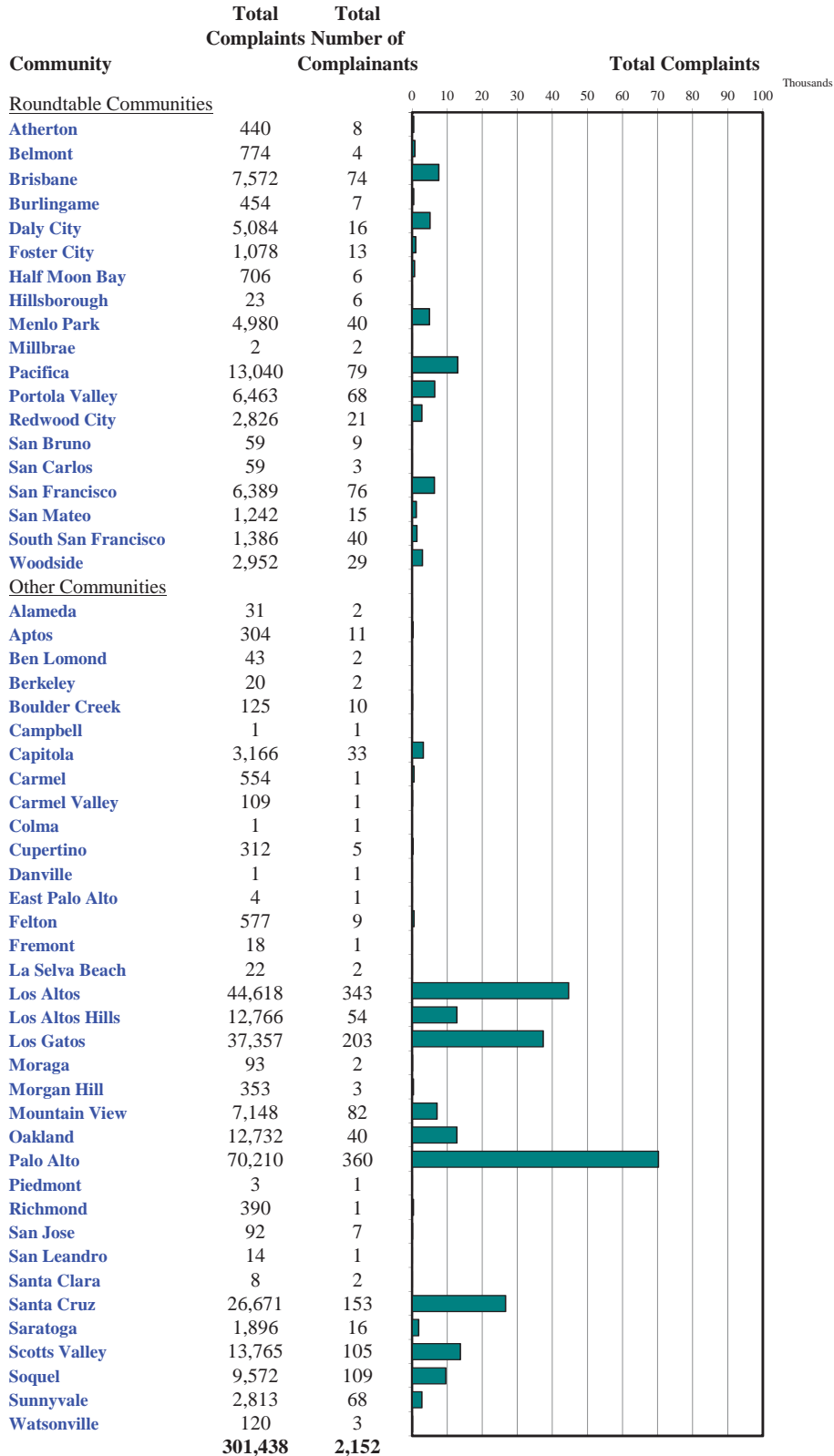
\*\*\*No data available from Site 2 starting July 17





**Monthly Calls by Community**

Source: Airport Noise Monitoring System



"Our software vendor's address validation relies on USPS-provided ZIP code look up table and USPS-specified 'default city' values."

# Monthly Noise Complainant Summary Map November 2016



“Our software vendor’s address validation relies on USPS-provided ZIP code look-up table and the USPS-specified ‘default city’ values”

● Complainant Location




**Monthly Nighttime Power Runups Report (85-06-AOB)**

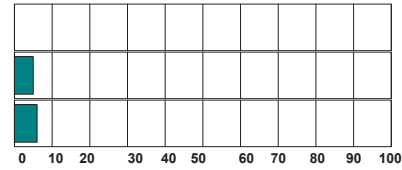
San Francisco International Airport -- Director's Report

Period : **November 2016**

Time of Day : From 10 pm through 7 am



Airline	Code	Number of Runups	Runups Per 1,000 Departures	Percentage of Runups
	VRD	1	0.6	7%
	UAL	6	1.2	43%
	AAL	7	5.4	50%
<b>Total</b>		<b>14</b>		



*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 power settings tested range from idle to full power and may vary in duration.*



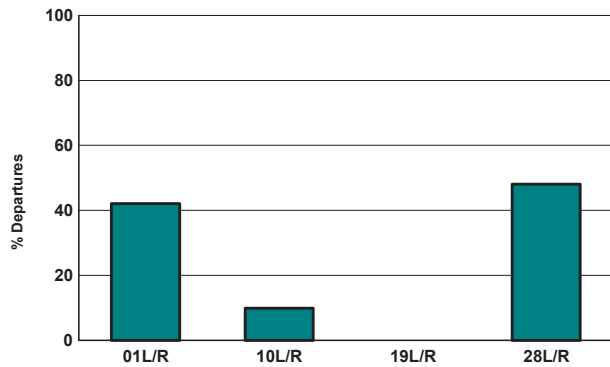


**Runway Utilization (1 am to 6 am)**

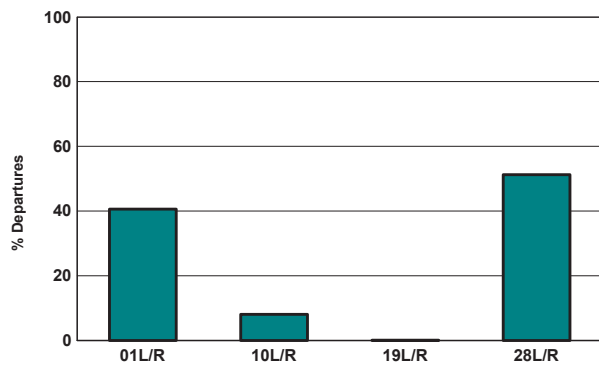
**Monthly Jet Departures**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
01L/R	155	149	168	166	167	216	335	265	140	111	140	-	2,012
10L/R	72	14	85	8	3	9	19	27	36	91	33	-	397
19L/R	5	-	-	-	-	-	-	-	-	-	-	-	5
28L/R	85	93	216	250	287	282	298	309	278	284	160	-	2,542
<b>Total</b>	<b>317</b>	<b>256</b>	<b>469</b>	<b>424</b>	<b>457</b>	<b>507</b>	<b>652</b>	<b>601</b>	<b>454</b>	<b>486</b>	<b>333</b>	<b>-</b>	<b>4,956</b>
01L/R	49%	58%	36%	39%	37%	43%	51%	44%	31%	23%	42%	0%	41%
10L/R	23%	5%	18%	2%	1%	2%	3%	4%	8%	19%	10%	0%	8%
19L/R	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
28L/R	27%	36%	46%	59%	63%	56%	46%	51%	61%	58%	48%	0%	51%

**Current Month (1 am to 6 am)**



**Year-to-Date (1am to 6 am)**



**Current Month (1 am to 6 am)**



Numbers rounded to nearest whole percentages

**Year-to-Date (1am to 6am)**



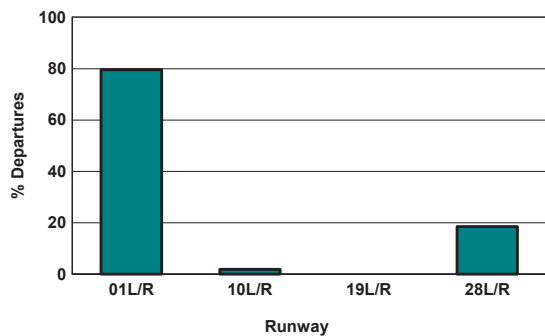
Numbers rounded to nearest whole percentages

**Runway Utilization (All Hours)**

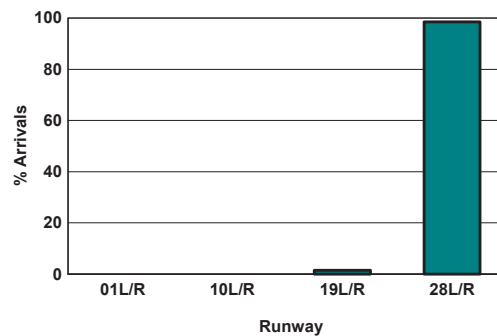
Source: Airport Noise Monitoring System

	Runway Utilization				Total
	01L/R	10L/R	19L/R	28L/R	
<b>Total Monthly Operations</b>					
Departures	13,160	326	0	3,059	16,545
Arrivals	0	0	242	16,409	16,651
<b>Percentage Utilization</b>					
Departures	79.5%	2.0%	0.0%	18.5%	100%
Arrivals	0.0%	0.0%	1.5%	98.5%	100%

**Departures (All Hours)**



**Arrivals (All Hours)**



**Percentage Departure Utilization**



Numbers rounded to nearest whole percentages

**Percentage Arrival Utilization**



Numbers rounded to nearest whole percentages





# Airport Director's Report

Presented at the February 1, 2017  
Airport Community Roundtable Meeting

Aircraft Noise Abatement Office  
December 2016



San Francisco  
International  
Airport

Monthly Noise Exceedance Report

San Francisco International Airport -- Director's Report

Period: December 2016



Airline	Noise Exceedances				Noise Exceedance Quality Rating
	Total Noise Exceedances	Total Operations per Month	Exceedances per 1,000 Operations	Score	
SKW	32	6,236	5	9.98	
DLH	1	114	9	9.96	
CES	1	90	11	9.95	
CSN	1	62	16	9.93	
CPZ	15	636	24	9.90	
VRD	88	3,661	24	9.89	
ASA	24	981	24	9.89	
WOW	1	39	26	9.89	
DAL	50	1,923	26	9.88	
JBU	29	968	30	9.87	
SCX	4	133	30	9.87	
SWA	95	2,715	35	9.85	
FFT	12	313	38	9.83	
AAL	110	2,506	44	9.81	
UAL	575	10,509	55	9.76	
ACA	34	528	64	9.71	
FDX	8	88	91	9.60	
HAL	12	126	95	9.58	
VOI	7	69	101	9.55	
GTI	16	94	170	9.25	
AMX	37	213	174	9.23	
CCA	16	89	180	9.20	
TAI	19	99	192	9.15	
NCA	13	46	283	8.75	
CMP	35	123	285	8.74	
ETD	18	62	290	8.71	
PAL	24	81	296	8.69	
SIA	48	123	390	8.27	
AIC	22	55	400	8.23	
FJI	8	18	444	8.03	
SQC	2	4	500	7.79	
EVA	66	131	504	7.77	
CPA	77	150	513	7.73	
CAL	58	107	542	7.60	
KAL	84	122	689	6.95	
AAR	107	112	955	5.77	
CKS	65	58	1,121	5.04	
QFA	122	54	2,259	0.00	
<b>TOTAL</b>	<b>1,936</b>	<b>33,438</b>	<b>10,936</b>		

Source: SFO Noise Abatement Office

**Historical Significant Exceedances Report**  
 San Francisco International Airport -- Director's Report  
 Period: **December 2016**



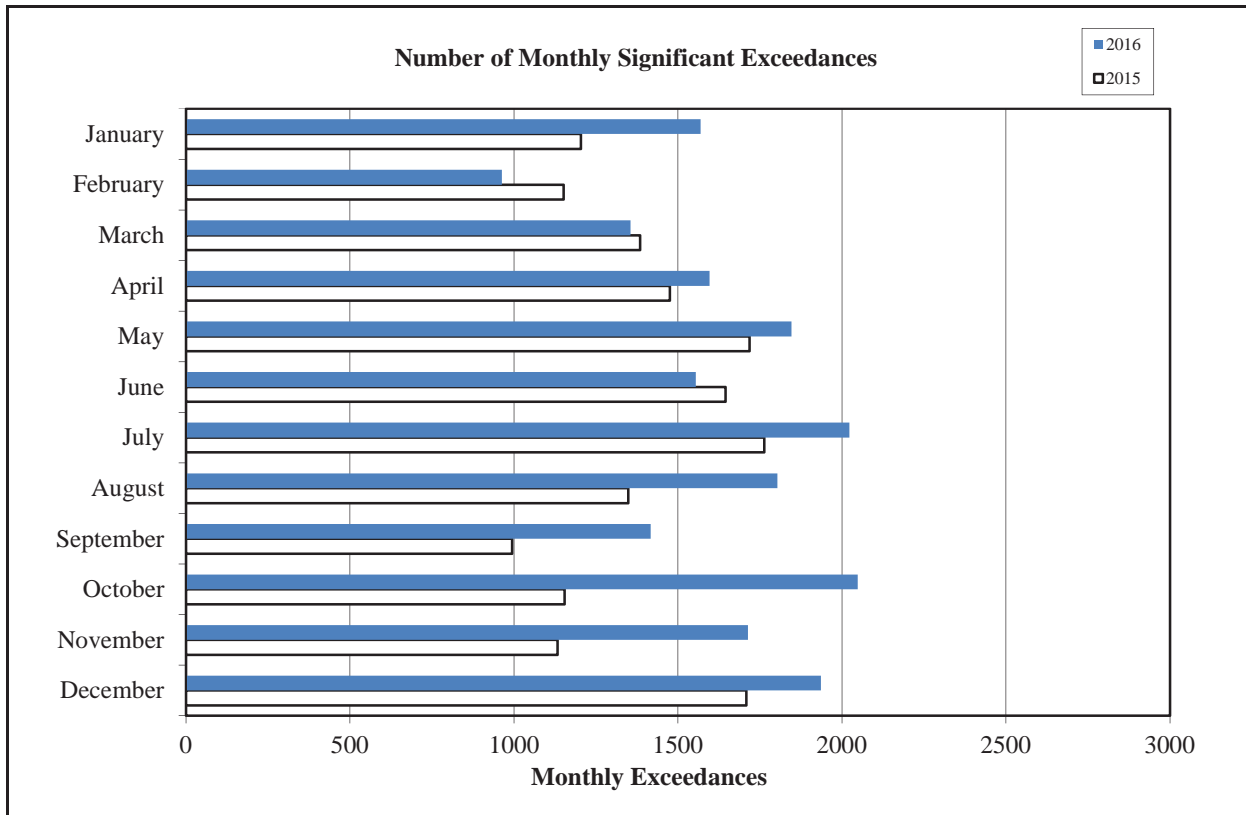
San Francisco International Airport

Month	Number of Monthly Significant Exceedances					Change from Last Year
	2012	2013	2014	2015	2016	
January	1,378	1,428	1,184	1,204	1,569	365
February	1,581	1,176	1,141	1,151	963	-188
March	1,703	1,671	1,345	1,384	1,355	-29
April	1,870	1,910*	1,362	1,475	1,596	121
May	1,912	1,859*	1,515	1,718	1,846	128
June	2,355	1,915	1,740	1,645	1,554	-91
July	2,621	1,647	1,619	1,763***	2,023	260
August	1,823	1,638**	1,460	1,348	1,803	455
September	1,464	1,352	1,111	994	1,417	423
October	1,689	1,277	1,055	1,154	2,048	894
November	1,421	1,262	1,245	1,133	1,713	580
December	1,439	1,160	1,670	1,708	1,936	228
<b>Annual Total</b>	<b>21,256</b>	<b>18,295</b>	<b>16,447</b>	<b>16,677</b>	<b>19,823</b>	
<b>Year to Date Trend</b>	<b>21,256</b>	<b>18,295</b>	<b>16,447</b>	<b>16,677</b>	<b>19,823</b>	<b>3146</b>

\* Revised with correct amount of exceedance - 8/5/13

\*\* No data available from Site 7, August 1-26

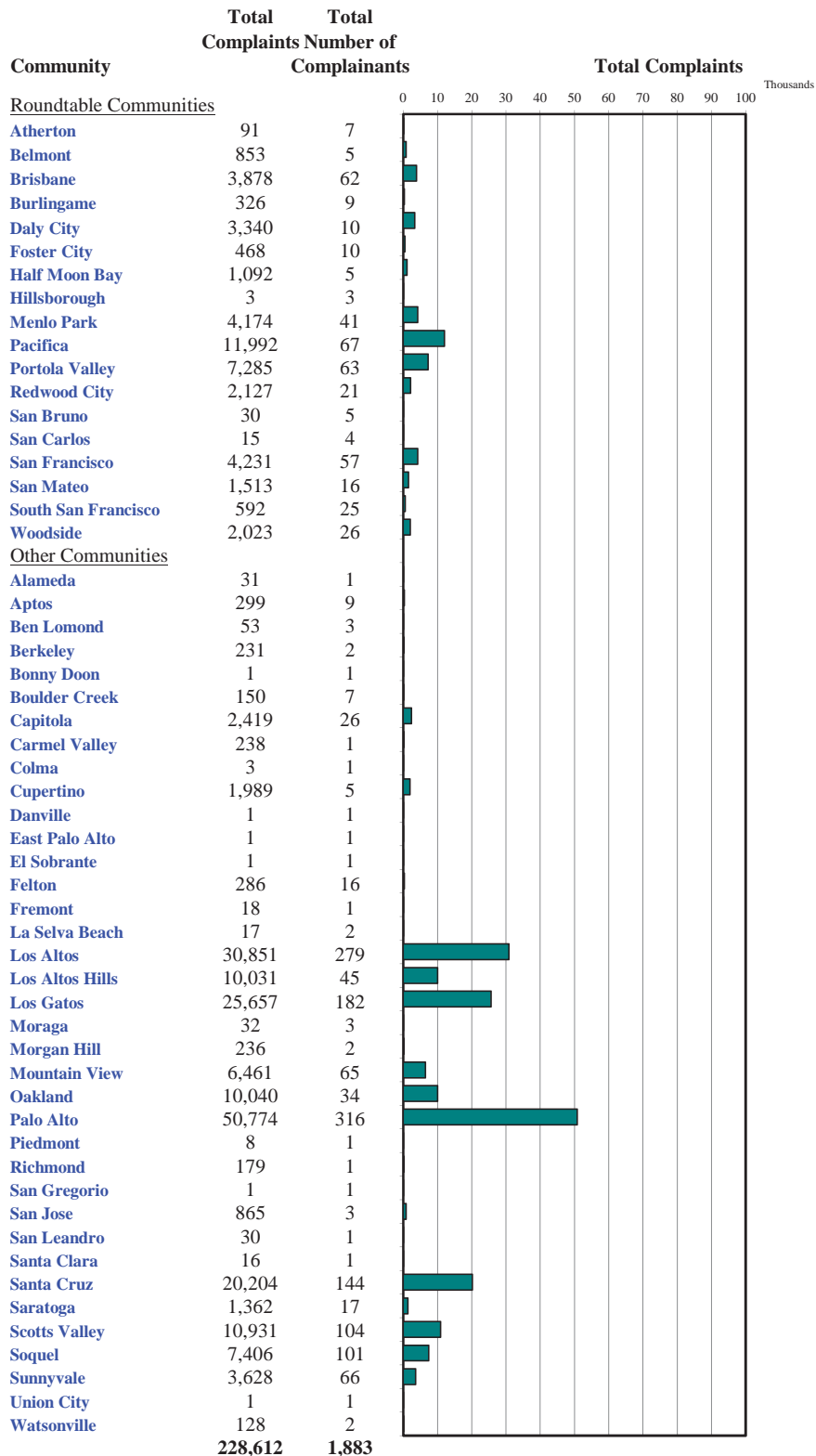
\*\*\*No data available from Site 2 starting July 17





**Monthly Calls by Community**

Source: Airport Noise Monitoring System



"Our software vendor's address validation relies on USPS-provided ZIP code look up table and USPS-specified 'default city' values."



# Monthly Noise Complaint Summary Map December 2016



Complainants Not Shown:  
 Carmel Valley (1)  
 Morgan Hill (1)  
 Watsonville (1)

 Complainant Location

“Our software vendor’s address validation relies on USPS-provided ZIP code look-up table and the USPS-specified ‘default city’ values”



**Monthly Nighttime Power Runups Report (85-06-AOB)**

San Francisco International Airport -- Director's Report

Period : **December 2016**

Time of Day : From 10 pm through 7 am



Airline	Code	Number of Runups	Runups Per 1,000 Departures	Percentage of Runups
American Airlines 	AAL	2	1.6	100% 
<b>Total</b>		<b>2</b>		

*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 power settings tested range from idle to full power and may vary in duration.*

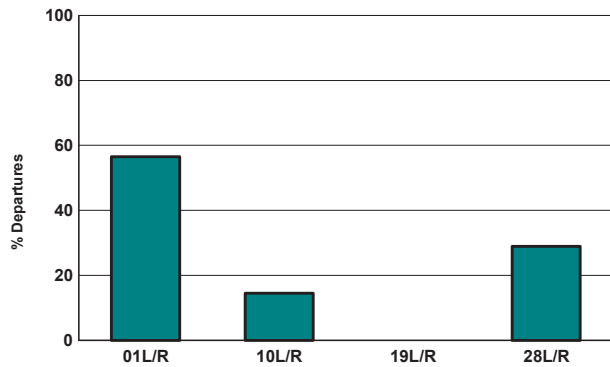


**Runway Utilization (1 am to 6 am)**

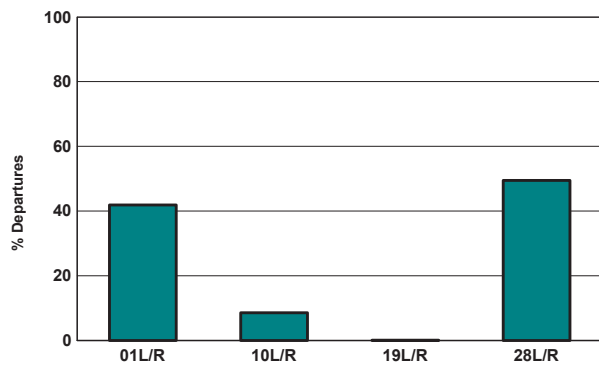
**Monthly Jet Departures**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
01L/R	156	149	168	166	167	216	336	265	140	111	140	264	2,278
10L/R	72	14	85	8	3	9	19	27	36	91	33	68	465
19L/R	5	-	-	-	-	-	-	-	-	-	-	-	5
28L/R	87	96	216	252	288	282	300	312	282	284	161	135	2,695
<b>Total</b>	<b>320</b>	<b>259</b>	<b>469</b>	<b>426</b>	<b>458</b>	<b>507</b>	<b>655</b>	<b>604</b>	<b>458</b>	<b>486</b>	<b>334</b>	<b>467</b>	<b>5,443</b>
01L/R	49%	58%	36%	39%	36%	43%	51%	44%	31%	23%	42%	57%	42%
10L/R	23%	5%	18%	2%	1%	2%	3%	4%	8%	19%	10%	15%	9%
19L/R	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
28L/R	27%	37%	46%	59%	63%	56%	46%	52%	62%	58%	48%	29%	50%

**Current Month (1 am to 6 am)**



**Year-to-Date (1am to 6 am)**



**Current Month (1 am to 6 am)**



Numbers rounded to nearest whole percentages

**Year-to-Date (1am to 6am)**



Numbers rounded to nearest whole percentages

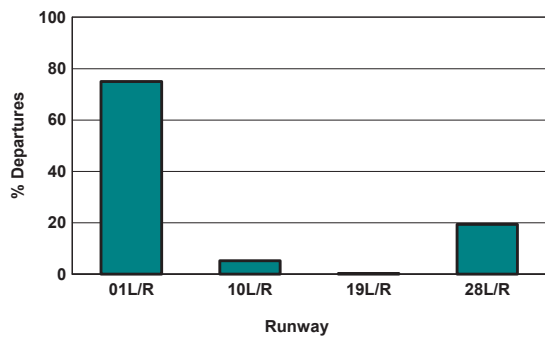


**Runway Utilization (All Hours)**

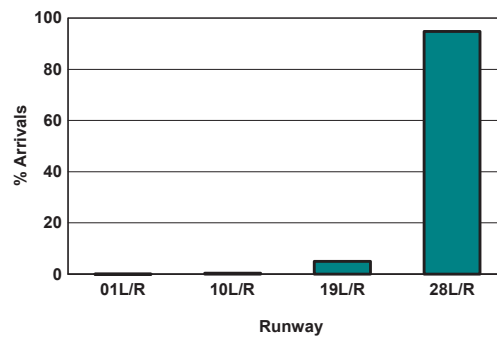
Source: Airport Noise Monitoring System

	Runway Utilization				Total
	01L/R	10L/R	19L/R	28L/R	
<b>Total Monthly Operations</b>					
Departures	12,890	904	61	3,347	17,202
Arrivals	2	59	847	16,399	17,307
<b>Percentage Utilization</b>					
Departures	74.9%	5.3%	0.4%	19.5%	100%
Arrivals	0.0%	0.3%	4.9%	94.8%	100%

**Departures (All Hours)**



**Arrivals (All Hours)**



**Percentage Departure Utilization**



Numbers rounded to nearest whole percentages

**Percentage Arrival Utilization**



Numbers rounded to nearest whole percentages

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**MEMORANDUM**

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**TO:** JAMES CASTAÑEDA  
**FROM:** BERT GANOUNG  
**SUBJECT:** AIRCRAFT NOISE ABATEMENT  
NEW AIRPORT DIRECTOR'S REPORT OFFERINGS FOR THE  
AIRPORT/COMMUNITY ROUNDTABLE  
**DATE:** JANUARY 24, 2017

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Following general Airport/Community Roundtable Member and community comments wanting changes in the information presented in the Monthly Airport Director's Report, the Aircraft Noise Abatement Office requested specific direction to accommodate these changes. Though the feedback we received had little in the way of direction I stated that we would get creative and present what we had understood and/or felt that the membership would like to have in this report going forward.

I am submitting two new pages that cover the noise complaint reporting and the operations at SFO during a monthly cycle. The first submittal is the Noise Report Summary that combines pages three and four of the Director's Report into a concise one-page summary while including new information on percentage of reports received being for SFO aircraft vs other airports, average daily noise reports by hour and the top three flight numbers receiving reports.

The Operations Summary page is loosely based on page seven of the Director's Report, the Air Carrier Runway Use Summary Report. It was further inspired by information asked about during meetings and conversations with our customers. This one-page summary affords a monthly view of SFO's operations, average daily operations, percentage of arrivals by route, top three destinations, airline operations, operations by aircraft type, daily operations counts and runway utilization. These are created using a complex reporting software that allows us to provide more information than we were previously able to in clear and concise one-page summaries. We will be asking for feedback, likes and dislikes before replacing pages three, four and seven with these two reports if accepted by the Roundtable Membership.

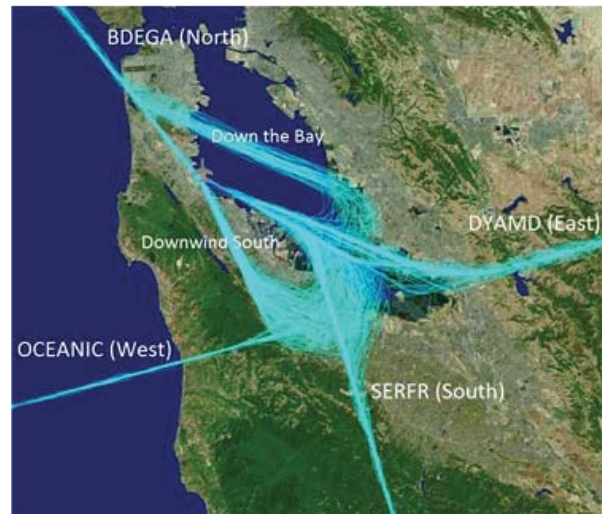
# Monthly Operations Summary



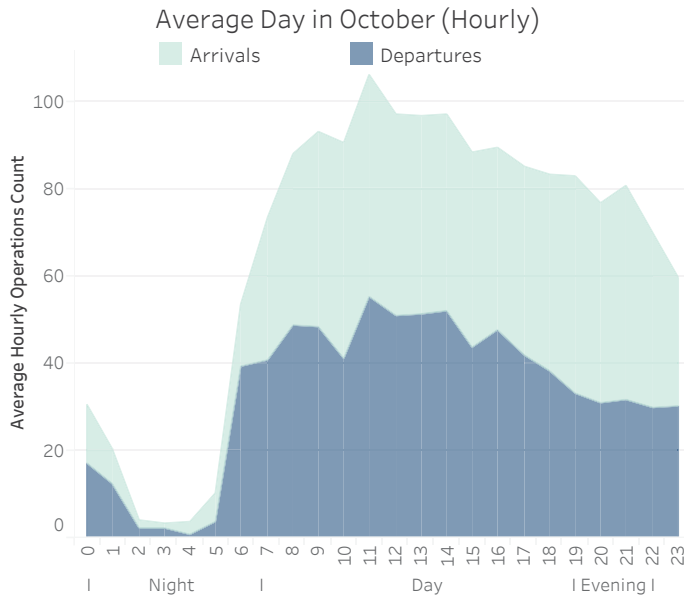
October 2016

37,995	1,226	335,366	5%
Monthly Operations	Average Daily Operations	Year to Date Operations	Year over Year Growth

## Arrival Routes

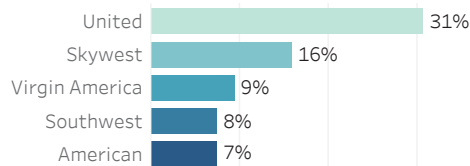


BDEGA (North)	23%	Downwind South	73%
DYAMD (East)	41%	Down the Bay	27%
OCEANIC (West)	5%	95% / 5% West Flow / Southeast Flow	
SERFR (South)	31%		

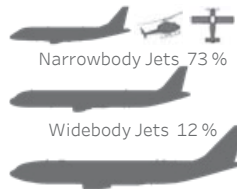


Top Destinations	Los Angeles	Las Vegas	Seattle
	10%	5%	4%

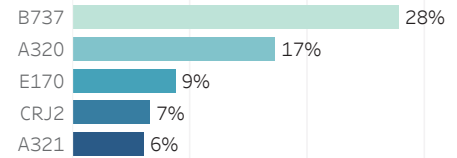
## Airlines with the Most Operations



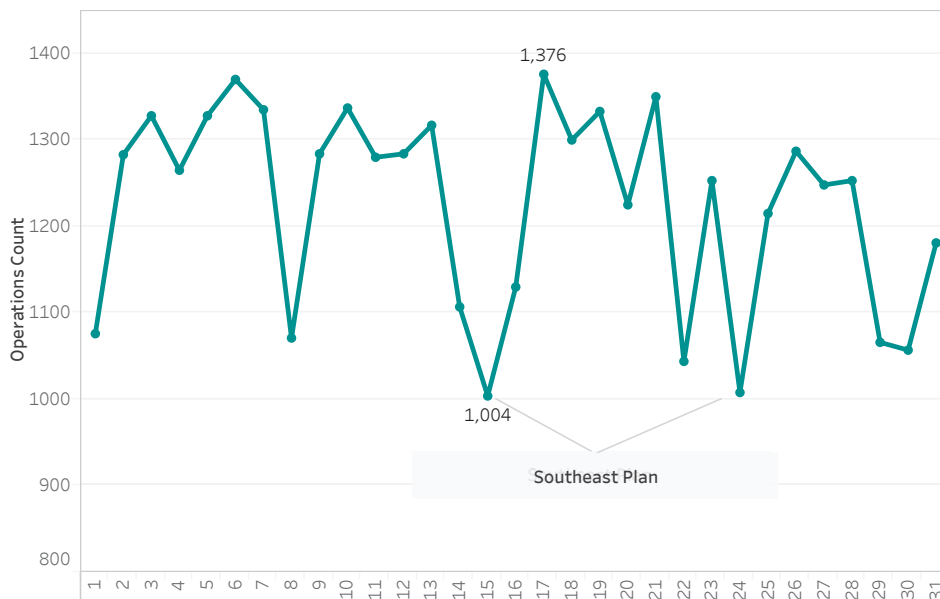
## Business Jets / Helicopters / GA 15%



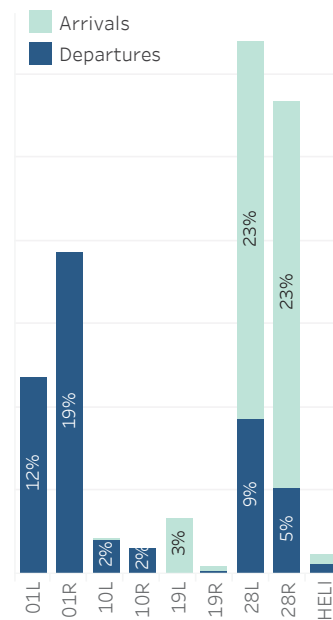
## Most Utilized Aircraft Types



## Daily Counts



## Runway Utilization



# Noise Report Summary



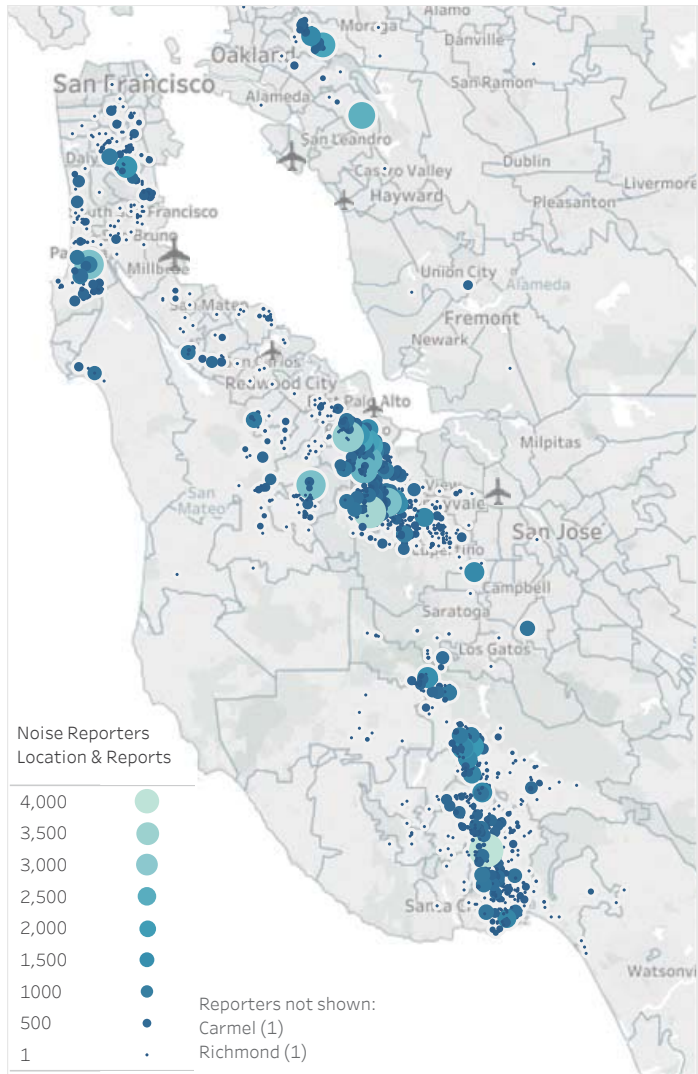
December 2016

Noise Reporters / Noise Reports

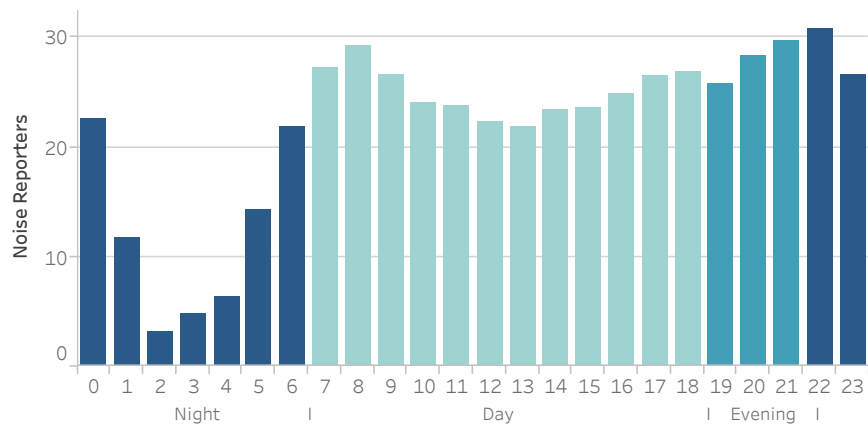
	Noise Reporters	Noise Reports
<b>Roundtable Communities</b>		
Atherton	7	91
Belmont	5	853
Brisbane	62	3,878
Burlingame	9	326
Daly City	10	3,340
Foster City	10	468
Half Moon Bay	5	1,092
Hillsborough	3	3
Menlo Park	41	4,174
Pacifica	67	11,992
Portola Valley	63	7,285
Redwood City	21	2,127
San Bruno	5	30
San Carlos	4	15
San Francisco	57	4,231
San Mateo	16	1,513
South San Francisco	25	592
Woodside	26	2,023
<b>Other Communities</b>		
Alameda	1	31
Aptos	9	299
Ben Lomond	3	53
Berkeley	2	231
Bonny Doon	1	1
Boulder Creek	7	150
Capitola	26	2,419
Carmel	1	238
Colma	1	3
Cupertino	5	1,989
Danville	1	1
East Palo Alto	1	1
El Sobrante	1	1
Felton	16	286
Fremont	1	18
La Selva Beach	2	17
Los Altos	279	30,851
Los Altos Hills	45	10,031
Los Gatos	182	25,657
Moraga	3	32
Morgan Hill	2	236
Mountain View	65	6,461
Oakland	34	10,040
Palo Alto	316	50,774
Piedmont	1	8
Richmond	1	179
San Gregorio	1	1
San Jose	3	865
San Leandro	1	30
Santa Clara	1	16
Santa Cruz	144	20,204
Saratoga	17	1,362
Scotts Valley	104	10,931
Soquel	101	7,406
Sunnyvale	66	3,628
Union City	1	1
Watsonville	2	128
<b>Totals</b>	<b>1,883</b>	<b>228,612</b>

- 2,045 Noise Reporters (YTD)
- 301,288 Noise Reports (YTD)
- 93 New Reporters
- Sunnyvale New Reporters Top City
- 85 miles Furthest Report
- 5 Reports/SFO Operation
- B737 A320 E170 Top Aircraft Type
- KAL213\* CMP382\* JBU736 Top Flight Number \*Night

## Noise Reporters Location Map



Average Day (SFO Reporters by Hour of the Day)



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



Our software vendor's address validation relies on USPS-provided ZIP code look up table and USPS-specified 'default' city values.

Source: San Francisco International Airport Noise Monitoring System

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# Fly Quiet Report

Presented at the February 1, 2017  
Airport Community Roundtable Meeting

Aircraft Noise Abatement Office  
Fourth Quarter 2016



San Francisco  
International  
Airport

Meeting 305 - Feb 1, 2017  
Packet Page 43

# 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.

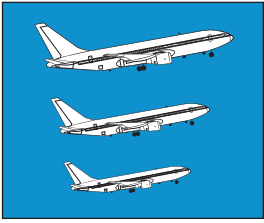
## Program Elements

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

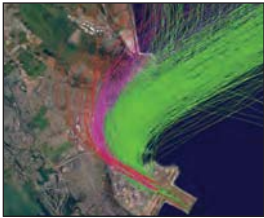
Eliminating high-level noise events is a long-standing goal of the Airport and the Airport Community Roundtable. As a result the Airport has established single event maximum noise level limits at each noise-monitoring site. These thresholds were set to identify aircraft producing noise levels higher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

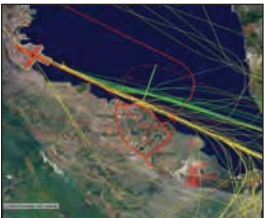
In order to evaluate each airline's performance when flying a Shoreline Departure, a corridor was established using Interstate 101 (green colored flight tracks) as a reference point. The corridor runs north along 101, beginning approximately one-mile north-northwest of the end of Runways 28L and 28R 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.

























































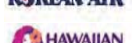

















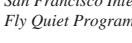
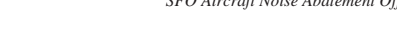


## Foster City Arrival Quality

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.







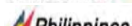


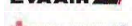
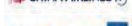


Airline Fly Quiet Summary Report - 4th Quarter 2016

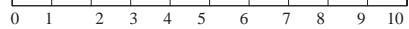
October 1 to December 31, 2016




































Airline		Fleet Noise Quality	Noise Exceedance	Nighttime Runway Use	Departures Shoreline Gap	Arrivals Foster City	Final Score	Airline Fly Quiet Rating			
 VIR	9.50	10.00	-	-	8.01	-	9.17				
 CSN	9.50	9.96	10.00	-	6.97	-	9.11				
 DLH	9.08	9.90	-	10.00	6.14	-	8.78				
 ANA	7.15	10.00	-	-	7.76	-	8.30				
 NCA	9.25	9.10	10.00	-	6.03	5.22	7.92				
 ANZ	6.71	9.93	-	-	6.17	-	7.60				
 AFR	7.83	10.00	-	-	4.81	-	7.55				
 SAS	8.17	10.00	-	-	4.41	-	7.53				
 SWR	8.17	9.96	-	-	4.11	-	7.41				
 SCX	5.82	9.95	5.00	9.38	5.31	8.57	7.34				
 BAW	7.91	9.90	-	-	4.02	-	7.28				
 CES	6.20	9.97	-	-	5.50	-	7.22				
 CPZ	10.00	9.92	3.33	9.17	5.64	5.00	7.18				
 AIC	7.15	8.58	-	-	7.73	5.00	7.11				
 KLM	7.77	9.98	-	2.00	8.41	-	7.04				
 SKW	10.00	9.98	4.63	7.66	4.36	5.23	6.98				
 ACA	5.45	9.82	3.81	8.06	6.42	7.99	6.92				
 CCA	9.07	9.44	1.48	-	7.40	-	6.85				
 UAE	10.00	10.00	-	5.00	2.37	-	6.84				
 ETD	7.15	9.23	-	-	5.80	5.00	6.80				
 ASA	5.15	9.87	5.83	8.57	6.00	4.86	6.72				
 DAL	6.41	9.91	4.22	6.01	5.24	7.27	6.51				
 SWA	5.73	9.89	3.72	8.36	4.34	6.82	6.48				
 THY	7.15	10.00	-	-	2.22	-	6.45				
 JBU	4.79	9.88	5.67	6.27	3.71	8.10	6.40				
							6.40	<b>SFO AVERAGE</b>			
 VOI	4.87	9.80	3.15	-	8.89	5.00	6.34				
 FFT	5.46	9.88	4.50	7.05	2.69	8.33	6.32				
 JAL	7.15	9.40	1.33	-	6.98	-	6.21				
 UAL	5.89	9.81	4.35	5.54	4.88	6.45	6.15				
 KAL	9.61	7.54	2.67	-	5.81	4.88	6.10				
 HAL	4.04	9.44	-	-	5.56	5.00	6.01				
 AAL	5.07	9.83	4.40	6.19	2.94	7.50	5.99				
 FJI	4.05	8.36	-	-	5.42	-	5.94				
 WJA	5.82	9.71	-	6.67	2.50	5.00	5.94				
 FDX	2.27	9.55	-	6.36	3.66	6.89	5.75				
 WOW	4.06	9.91	-	1.67	8.07	5.00	5.74				
 VRD	4.96	9.91	2.00	8.00	3.39	6.18	5.74				
 CPA	7.15	7.96	1.00	-	6.59	-	5.68				

















Airline Fly Quiet Summary Report - 4th Quarter 2016

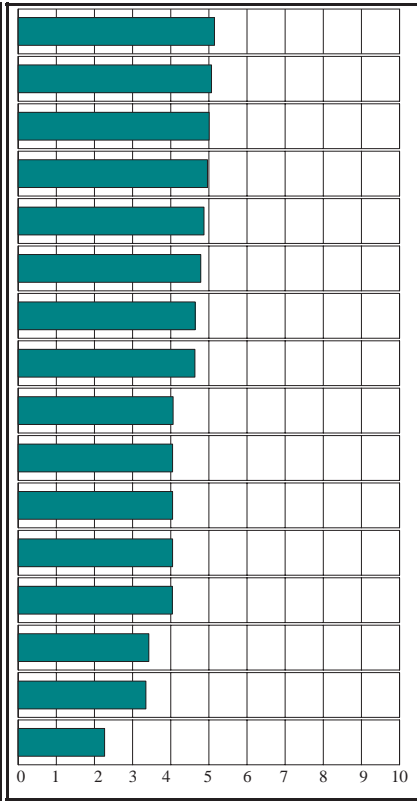
October 1 to December 31, 2016

Airline		Fleet Noise Quality	Noise Exceedance	Nighttime Runway Use	Departures Shoreline Gap	Arrivals Foster City	Final Score	Airline Fly Quiet Rating
 SIA		8.03	8.61	1.46	-	4.30	-	5.60
 AMX		5.82	9.36	4.17	3.33	5.84	4.86	5.56
 GTI		4.64	9.24	1.11	4.29	7.74	5.98	5.50
 TAI		5.01	9.20	3.39	5.00	4.69	5.59	5.48
 EIN		4.05	10.00	-	-	2.34	-	5.46
 AAR		4.63	6.21	2.66	-	7.81	5.16	5.29
 PAL		7.29	7.79	3.33	-	2.96	5.00	5.28
 BER		4.05	10.00	-	-	1.56	-	5.20
 EVA		6.93	8.15	1.34	-	4.42	5.00	5.17
 CAL		5.56	8.05	1.63	-	5.22	5.00	5.09
 CMP		5.82	9.12	0.90	3.33	3.03	5.18	4.56
 CKS		3.35	6.50	5.91	1.00	3.54	5.00	4.22
 QFA		3.43	0.00	0.00	-	5.88	-	2.33
SFO Average		6.47	9.19	3.57	6.04	5.21	5.87	6.40





















































Airline	Nationwide		San Francisco		Fleet Noise Quality Rating
	Fleet Noise Quality Rating	Average Daily Jet Operations	Score		
 UAE	7.89	1	10.00		
 CPZ	10.00	11	10.00		
 SKW	10.00	87	10.00		
 KAL	4.05	2	9.61		
 CSN	5.64	1	9.50		
 VIR	5.84	2	9.50		
 NCA	3.90	1	9.25		
 DLH	6.09	2	9.08		
 CCA	3.46	1	9.07		
 SAS	4.96	1	8.17		
 SWR	5.17	1	8.17		
 SIA	5.93	2	8.03		
 BAW	4.34	2	7.91		
 AFR	5.49	1	7.83		
 KLM	4.67	1	7.77		
 PAL	5.09	1	7.29		
 AIC	4.77	1	7.15		
 ANA	5.43	1	7.15		
 CPA	4.18	2	7.15		
 ETD	0.00	1	7.15		
 JAL	4.20	1	7.15		
 THY	6.80	1	7.15		
 EVA	5.05	2	6.93		
 ANZ	4.00	1	6.71		
			6.47	SFO AVERAGE	
 DAL	4.92	33	6.41		
 CES	4.63	1	6.20		
 UAL	5.83	175	5.89		
 CMP	6.46	2	5.82		
 WJA	5.82	0	5.82		
 AMX	5.54	3	5.82		
 SCX	5.82	2	5.82		
 SWA	5.70	44	5.73		
 CAL	3.62	2	5.56		
 FFT	6.41	6	5.46		
 ACA	6.75	9	5.45		

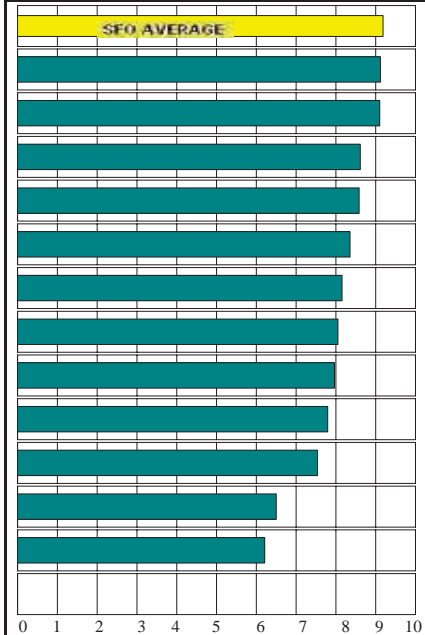
Airline	San Francisco		Fleet Noise Quality Rating
	Nationwide Fleet Noise Quality Rating	Average Daily Jet Operations	
 ASA	5.10	16	5.15
 AAL	3.94	43	5.07
 TAI	5.18	1	5.01
 VRD	5.31	58	4.96
 VOI	0.00	1	4.87
 JBU	6.13	16	4.79
 GTI	0.93	1	4.64
 AAR	3.93	2	4.63
 WOW	0.00	1	4.06
 BER	5.92	0	4.05
 FJI	0.00	0	4.05
 EIN	4.05	1	4.05
 HAL	6.21	2	4.04
 QFA	3.47	1	3.43
 CKS	0.60	0	3.35
 FDX	2.80	1	2.27
<b>AVERAGE</b>	<b>4.75</b>	<b>11</b>	<b>6.47</b>









































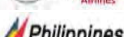
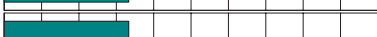






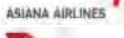















Airline	Noise Exceedances				Noise Exceedance Quality Rating
	Total Noise Exceedances	Total Quarterly Operations	Exceedances per 1000 Operations	Score	
 AFR	0	188	0	10.00	
 ANA	0	185	0	10.00	
 BER	0	36	0	10.00	
 EIN	0	145	0	10.00	
 SAS	0	176	0	10.00	
 THY	0	178	0	10.00	
 UAE	0	184	0	10.00	
 VIR	0	316	0	10.00	
 KLM	1	196	5	9.98	
 SKW	99	18,261	5	9.98	
 CES	2	263	8	9.97	
 CSN	2	185	11	9.96	
 SWR	2	182	11	9.96	
 SCX	5	365	14	9.95	
 ANZ	3	160	19	9.93	
 CPZ	44	2,044	22	9.92	
 DAL	141	6,095	23	9.91	
 VRD	250	10,733	23	9.91	
 WOW	3	121	25	9.91	
 DLH	9	349	26	9.90	
 BAW	10	358	28	9.90	
 SWA	243	8,183	30	9.89	
 FFT	37	1,129	33	9.88	
 JBU	96	2,873	33	9.88	
 ASA	102	3,015	34	9.87	
 AAL	368	7,860	47	9.83	
 ACA	82	1,729	47	9.82	
 UAL	1,692	32,174	53	9.81	
 VOI	7	128	55	9.80	
 WJA	7	89	79	9.71	
 FDX	31	256	121	9.55	
 CCA	41	273	150	9.44	
 HAL	56	371	151	9.44	
 JAL	30	185	162	9.40	
 AMX	100	578	173	9.36	
 GTI	56	272	206	9.24	
 ETD	38	183	208	9.23	
 TAI	59	274	215	9.20	


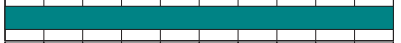











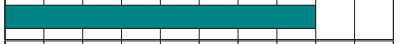

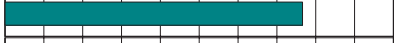

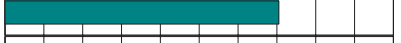



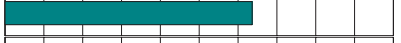

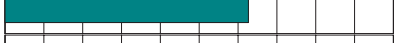












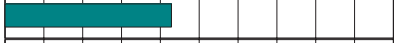









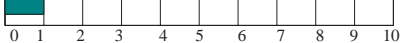
Airline	Noise Exceedances				Noise Exceedance Quality Rating
	Total Noise Exceedances	Total Quarterly Operations	Exceedances per 1000 Operations	Score	
				<b>9.19</b>	<b>SFO AVERAGE</b>
 CMP	72	303	238	<b>9.12</b>	
 NCA	34	140	243	<b>9.10</b>	
 SIA	137	366	374	<b>8.61</b>	
 AIC	44	115	383	<b>8.58</b>	
 FJI	8	18	444	<b>8.36</b>	
 EVA	194	389	499	<b>8.15</b>	
 CAL	168	319	527	<b>8.05</b>	
 CPA	237	431	550	<b>7.96</b>	
 PAL	121	203	596	<b>7.79</b>	
 KAL	242	364	665	<b>7.54</b>	
 CKS	69	73	945	<b>6.50</b>	
 AAR	343	335	1024	<b>6.21</b>	
 QFA	408	151	2702	<b>0.00</b>	
<b>TOTAL</b>	<b>5,693</b>	<b>103,499</b>			
<b>SFO AVERAGE</b>			<b>220</b>	<b>9.19</b>	



Nighttime Preferential Runway Use - 4th Quarter 2016























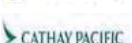



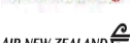









































October 1 to December 31, 2016

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	
 CSN	2	100%	0%	0%	0%	10.00	
 NCA	1	100%	0%	0%	0%	10.00	
 CKS	22	18%	55%	14%	14%	5.91	
 ASA	4	25%	25%	50%	0%	5.83	
 JBU	10	20%	40%	30%	10%	5.67	
 SCX	2	0%	50%	50%	0%	5.00	
 SKW	18	22%	6%	61%	11%	4.63	
 FFT	63	16%	11%	65%	8%	4.50	
 AAL	122	10%	22%	58%	10%	4.40	
 UAL	269	15%	10%	65%	10%	4.35	
 DAL	15	20%	0%	67%	13%	4.22	
 AMX	64	19%	3%	63%	16%	4.17	
 ACA	7	0%	14%	86%	0%	3.81	
 SWA	96	6%	2%	89%	3%	3.72	
							<b>SFO AVERAGE</b>
 TAI	56	14%	0%	59%	27%	3.39	
 CPZ	1	0%	0%	100%	0%	3.33	
 PAL	3	33%	0%	0%	67%	3.33	
 VOI	18	0%	0%	94%	6%	3.15	
 KAL	86	27%	0%	0%	73%	2.67	
 AAR	64	27%	0%	0%	73%	2.66	
 VRD	5	0%	0%	60%	40%	2.00	
 CAL	43	16%	0%	0%	84%	1.63	
 CCA	27	15%	0%	0%	85%	1.48	
 SIA	41	15%	0%	0%	85%	1.46	
 EVA	67	13%	0%	0%	87%	1.34	
 JAL	30	13%	0%	0%	87%	1.33	
 GTI	3	0%	0%	33%	67%	1.11	
 CPA	60	10%	0%	0%	90%	1.00	
 CMP	37	5%	5%	0%	89%	0.90	
 QFA	1	0%	0%	0%	100%	0.00	
<b>TOTAL</b>	<b>1,237</b>						
<b>SFO AVERAGE</b>		<b>19%</b>	<b>8%</b>	<b>35%</b>	<b>38%</b>	<b>3.57</b>	

Airline	Shoreline Departures					Shoreline Departure Rating
	Total	Successful	Marginal	Poor	Score	
 DLH	1	100%	0%	0%	10.00	
 SCX	16	88%	13%	0%	9.38	
 CPZ	6	83%	17%	0%	9.17	
 ASA	77	73%	26%	1%	8.57	
 SWA	73	71%	25%	4%	8.36	
 ACA	72	64%	33%	3%	8.06	
 VRD	202	60%	39%	0%	8.00	
 SKW	342	67%	20%	13%	7.66	
 FFT	39	49%	44%	8%	7.05	
 WJA	6	33%	67%	0%	6.67	
 FDX	11	36%	55%	9%	6.36	
 JBU	75	31%	64%	5%	6.27	
 AAL	252	33%	57%	10%	6.19	
					6.04	
 DAL	184	37%	46%	17%	6.01	
 UAL	679	36%	39%	25%	5.54	
 TAI	1	0%	100%	0%	5.00	
 UAE	1	0%	100%	0%	5.00	
 GTI	7	14%	57%	29%	4.29	
 AMX	3	0%	67%	33%	3.33	
 CMP	3	0%	67%	33%	3.33	
 KLM	10	0%	40%	60%	2.00	
 WOW	3	0%	33%	67%	1.67	
 CKS	15	0%	20%	80%	1.00	
<b>TOTAL</b>	<b>2,078</b>					
<b>SFO AVERAGE</b>		<b>38%</b>	<b>45%</b>	<b>17%</b>	<b>6.04</b>	

Gap Departure Climb Rating - 4th Quarter 2016



































October 1 to December 31, 2016










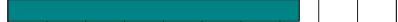












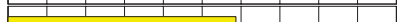
























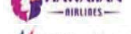













Airline	Gap Departures		Gap Departure Quality Rating
	Total	Score	
 VOI	9	8.89	
 KLM	11	8.41	
 WOW	24	8.07	
 VIR	66	8.01	
 AAR	144	7.81	
 ANA	87	7.76	
 GTI	21	7.74	
 AIC	55	7.73	
 CCA	126	7.40	
 JAL	84	6.98	
 CSN	80	6.97	
 CPA	199	6.59	
 ACA	30	6.42	
 ANZ	78	6.17	
 DLH	167	6.14	
 NCA	62	6.03	
 ASA	101	6.00	
 QFA	71	5.88	
 AMX	37	5.84	
 KAL	152	5.81	
 ETD	81	5.80	
 CPZ	97	5.64	
 HAL	18	5.56	
 CES	123	5.50	
 FJI	9	5.42	
 SCX	8	5.31	
 DAL	164	5.24	
 CAL	147	5.22	
			<b>SFO AVERAGE</b>
 UAL	3475	4.88	
 AFR	87	4.81	
 TAI	20	4.69	
 EVA	177	4.42	
 SAS	85	4.41	
 SKW	580	4.36	



Gap Departure Climb Rating - 4th Quarter 2016

October 1 to December 31, 2016

Airline	Gap Departures		Gap Departure Quality Rating
	Total	Score	
 SWA	367	4.34	
 SIA	165	4.30	
 SWR	86	4.11	
 BAW	144	4.02	
 JBU	99	3.71	
 FDX	14	3.66	
 CKS	12	3.54	
 VRD	525	3.39	
 CMP	140	3.03	
 PAL	95	2.96	
 AAL	409	2.94	
 FFT	33	2.69	
 WJA	2	2.50	
 UAE	88	2.37	
 EIN	70	2.34	
 THY	84	2.22	
 BER	12	1.56	
<b>TOTAL</b>	<b>9020</b>		
<b>SFO Average</b>		<b>5.21</b>	

Airline	Foster City Arrivals					Foster City Arrival Rating
	Total	Successful	Marginal	Poor	Score	
 SCX	7	71%	29%	0%	8.57	
 FFT	90	67%	33%	0%	8.33	
 JBU	205	62%	38%	0%	8.10	
 ACA	122	60%	40%	0%	7.99	
 AAL	543	51%	49%	1%	7.50	
 DAL	264	47%	51%	2%	7.27	
 FDX	45	38%	62%	0%	6.89	
 SWA	247	41%	55%	4%	6.82	
 UAL	1,276	32%	65%	3%	6.45	
 VRD	238	26%	72%	2%	6.18	
 GTI	46	22%	76%	2%	5.98	
					5.87	
 TAI	76	14%	83%	3%	5.59	
 SKW	133	11%	83%	6%	5.23	
 NCA	23	4%	96%	0%	5.22	
 CMP	28	11%	82%	7%	5.18	
 AAR	64	5%	94%	2%	5.16	
 AIC	11	0%	100%	0%	5.00	
 CAL	12	0%	100%	0%	5.00	
 CKS	3	0%	100%	0%	5.00	
 CPZ	35	0%	100%	0%	5.00	
 ETD	1	0%	100%	0%	5.00	
 EVA	5	0%	100%	0%	5.00	
 HAL	2	0%	100%	0%	5.00	
 PAL	1	0%	100%	0%	5.00	
 VOI	18	0%	100%	0%	5.00	
 WJA	3	0%	100%	0%	5.00	
 WOW	1	0%	100%	0%	5.00	
 KAL	82	0%	98%	2%	4.88	
 ASA	37	5%	86%	8%	4.86	
 AMX	36	3%	92%	6%	4.86	
<b>TOTAL</b>	<b>3,654</b>					
<b>SFO AVERAGE</b>		<b>19%</b>	<b>79%</b>	<b>2%</b>	<b>5.87</b>	



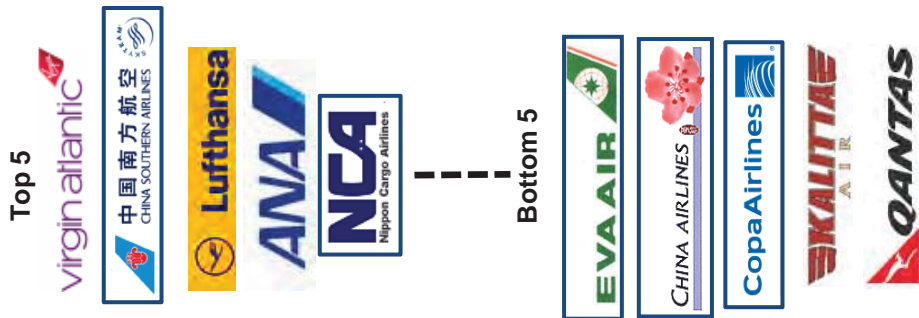
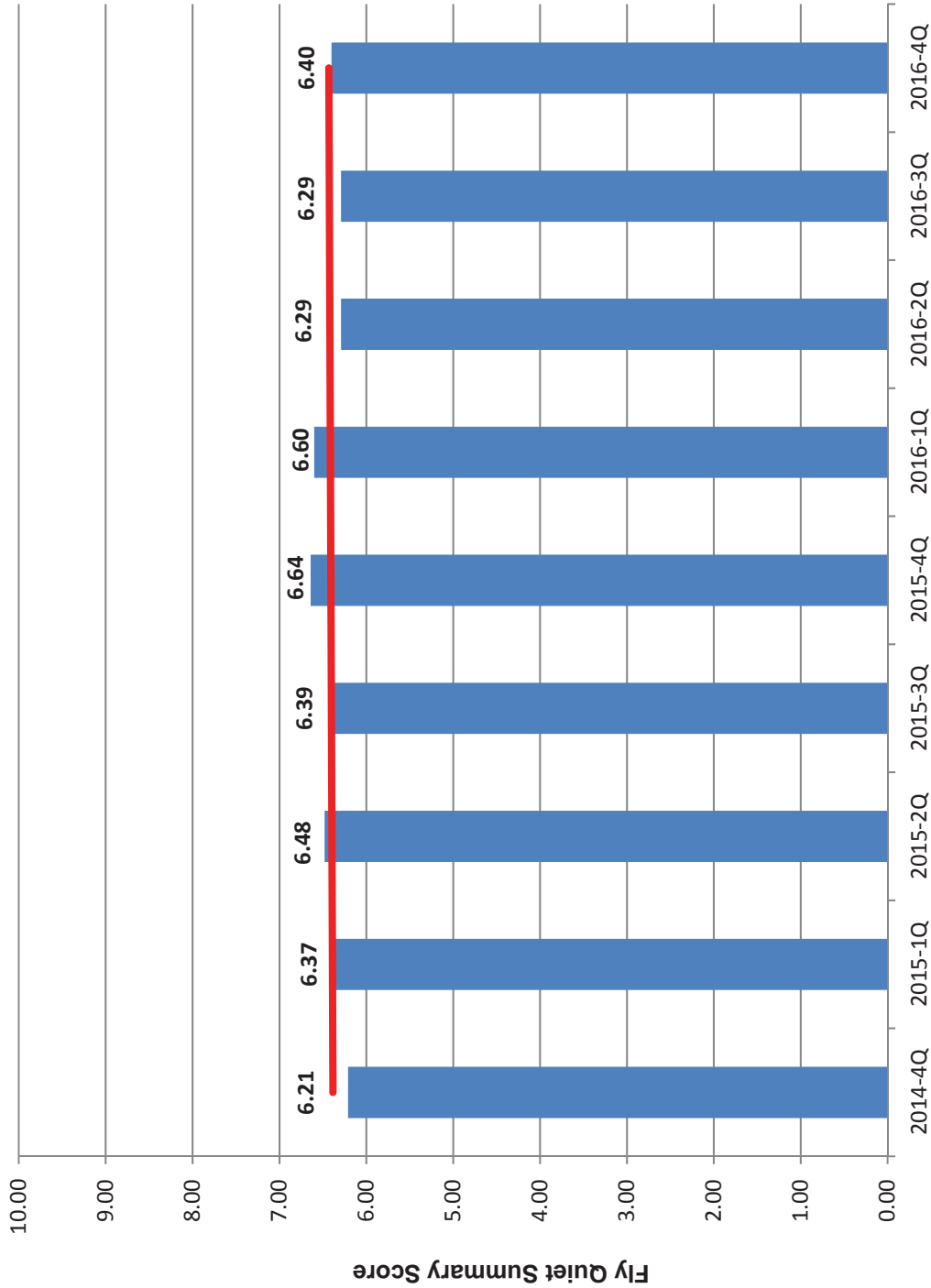
# Fly Quiet Report

Presented at the February 1, 2017  
Airport Community Roundtable Meeting  
Aircraft Noise Abatement Office  
Fourth Quarter 2016



San Francisco  
International  
Airport

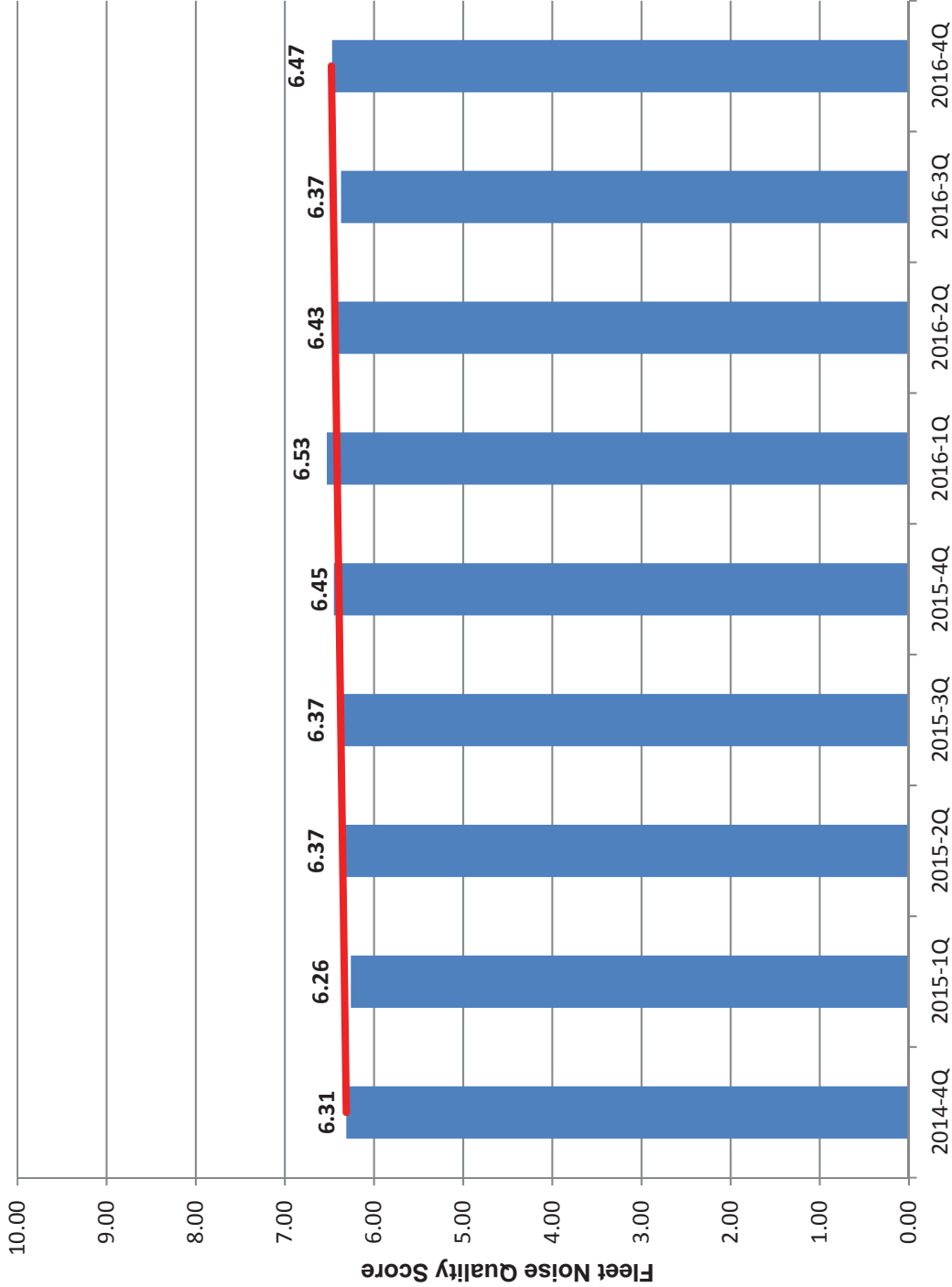
# Fly Quiet Summary Averages



Year & Quarter

— Average of Quarterly Averages, Airline Rankings are for top 5 and bottom 5 performers for this category for current quarter,  new airlines to top and bottom 5

# Fleet Noise Quality Averages



Year & Quarter

— Average of Quarterly Averages, Airline Rankings are for top 5 and bottom 5 performers for this category for current quarter,  new airlines to top and bottom 5

Top 5



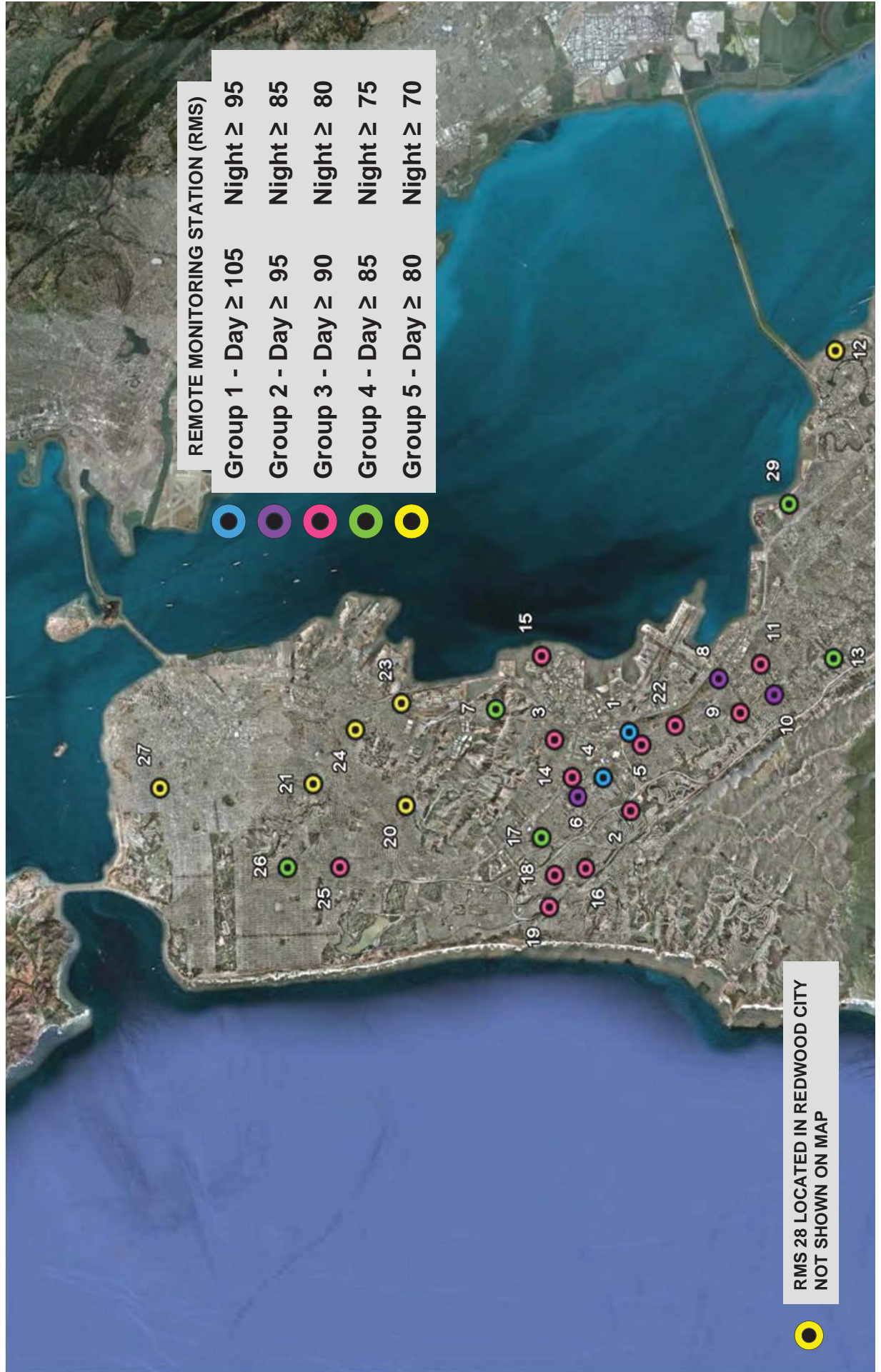
Bottom 5





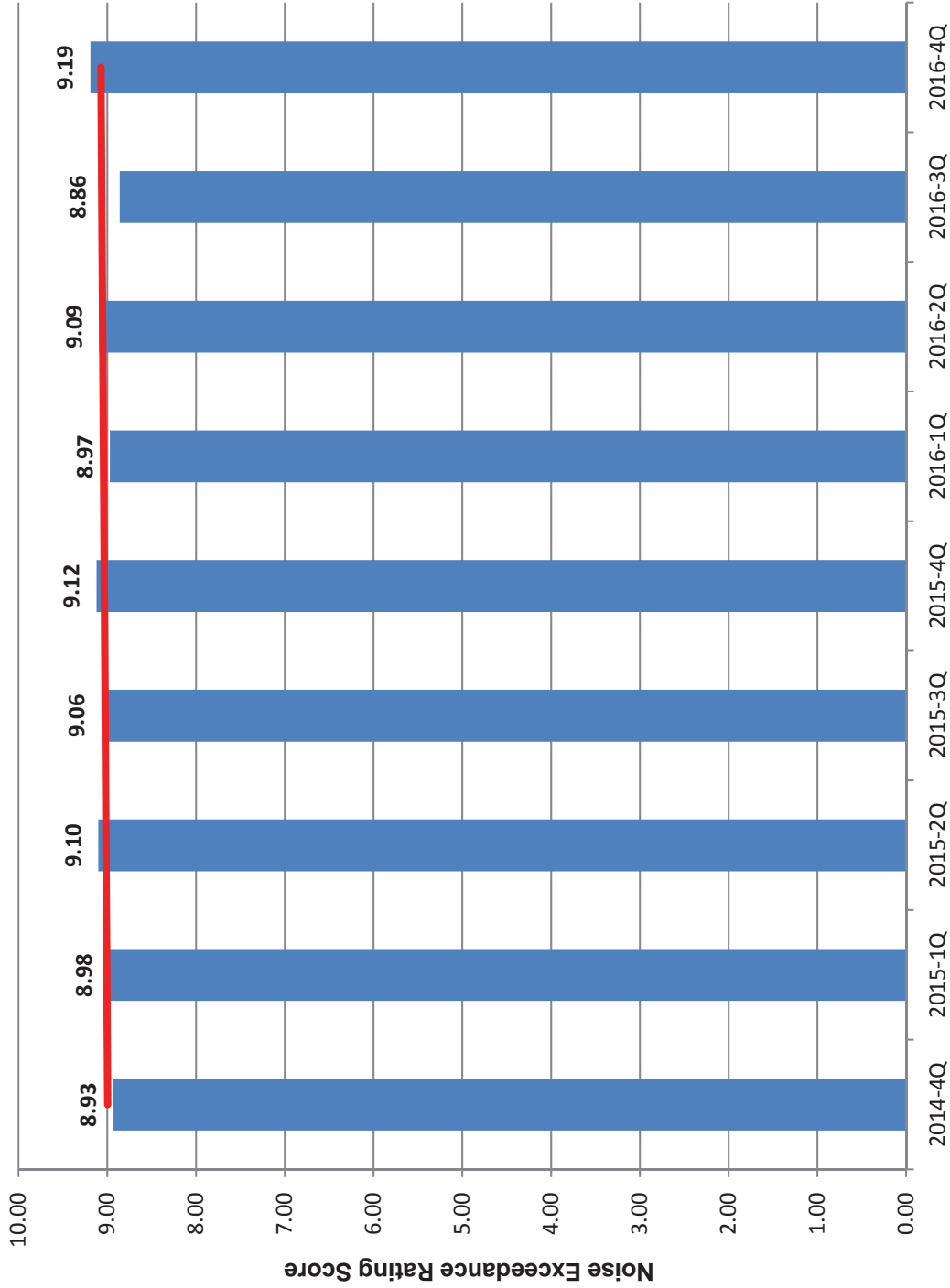
# Noise Exceedance Rating

## Noise Monitor Day/Night Thresholds





# Noise Exceedance Rating Averages



## Year & Quarter

— Average of Quarterly Averages, Airline Rankings are for top 5 and bottom 5 performers for this category for current quarter,  new airlines to top and bottom 5

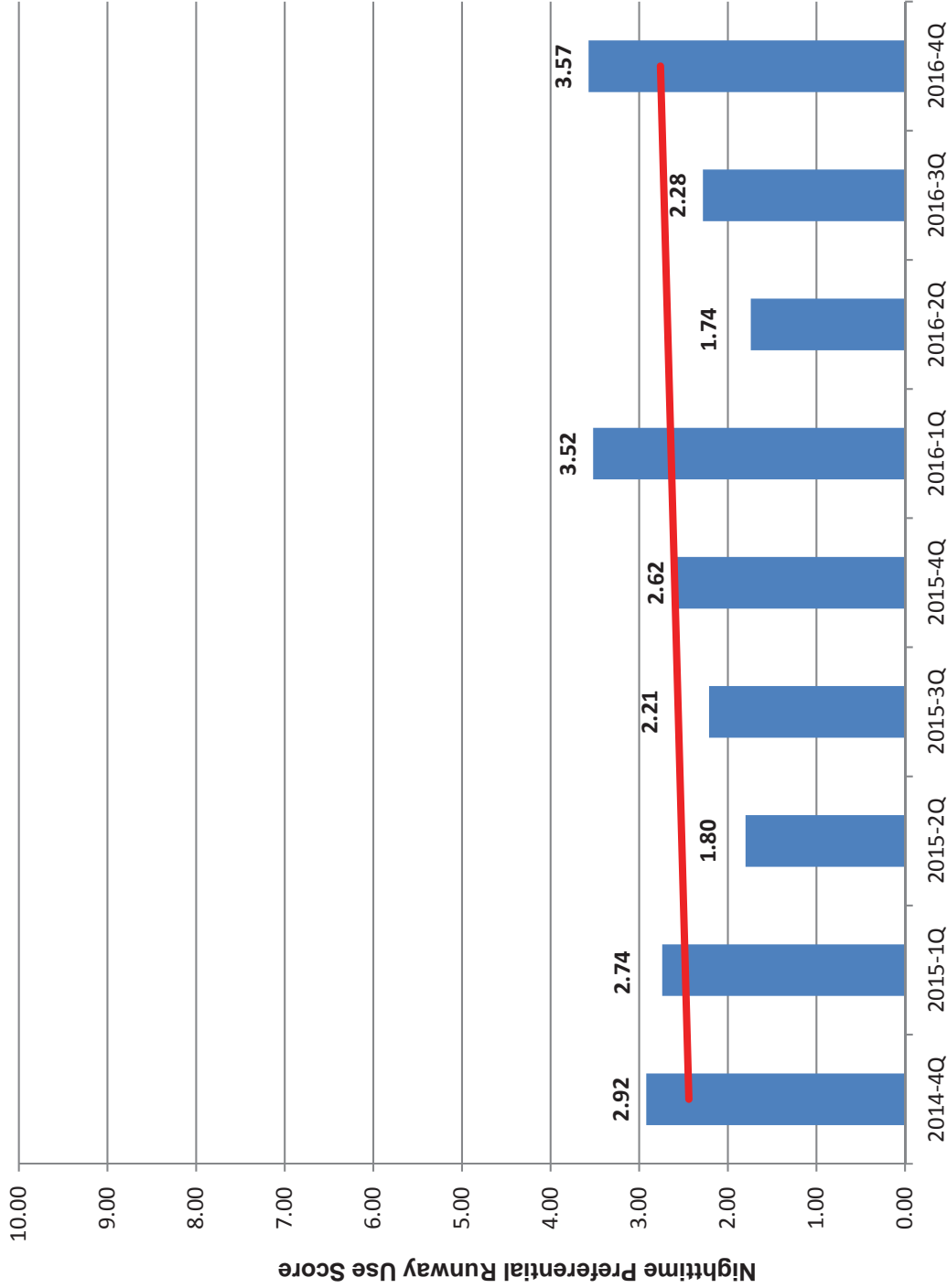


# Nighttime Preferential Runway Use



- Runways 10L/R +3 points
- Runways 28L/R with Shoreline departure +2 points
- Runways 01L/R +1 points
- Runways 28L/R with Straight-out departure +0 points

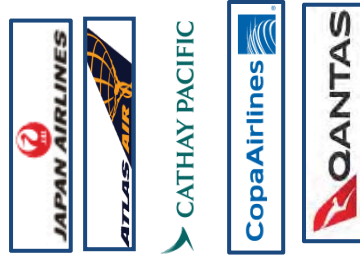
# Nighttime Preferential Runway Use Averages



Top 5



Bottom 5

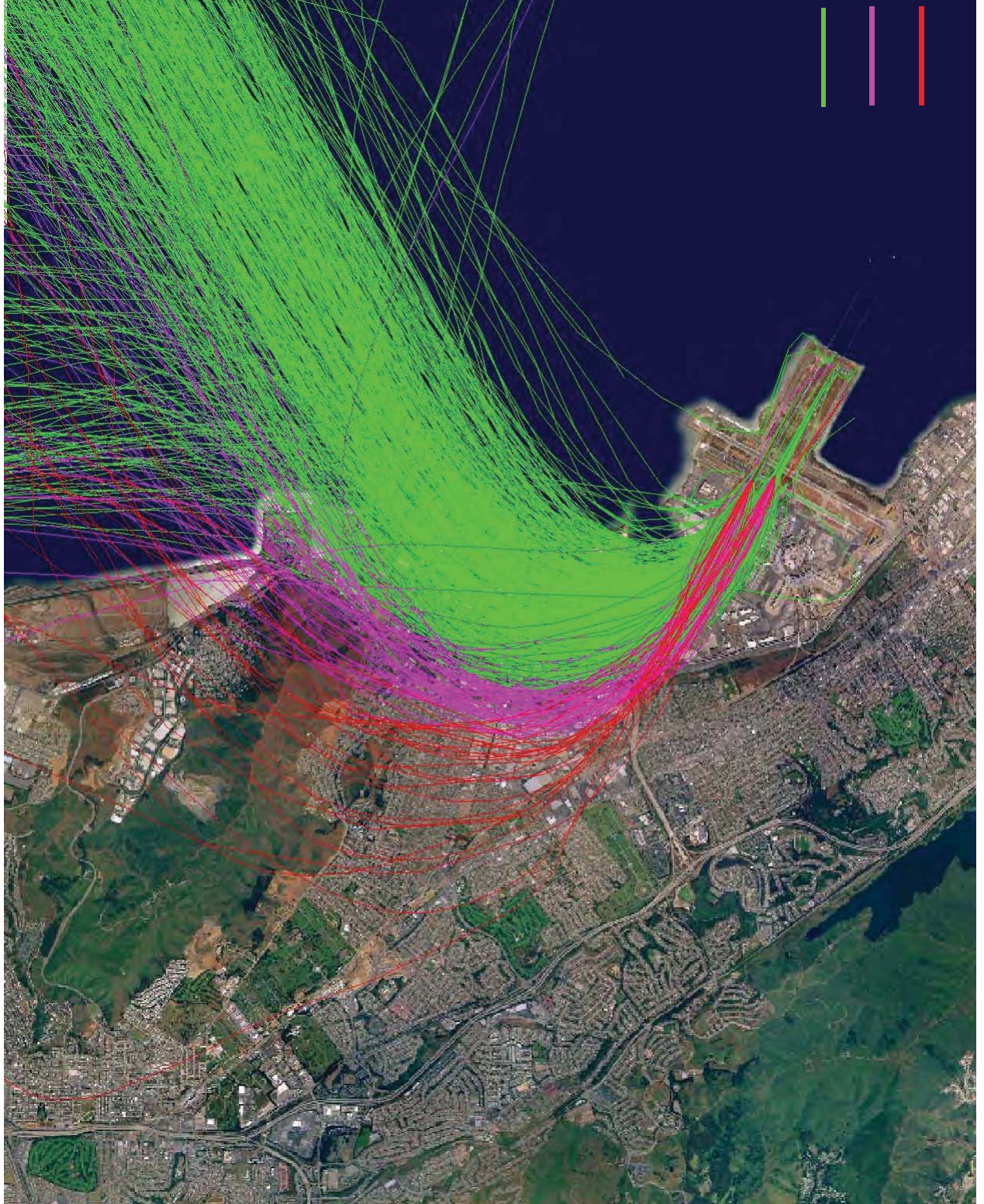


Year & Quarter

— Average of Quarterly Averages, Airline Rankings are for top 5 and bottom 5 performers for this category for current quarter,  new airlines to top and bottom 5

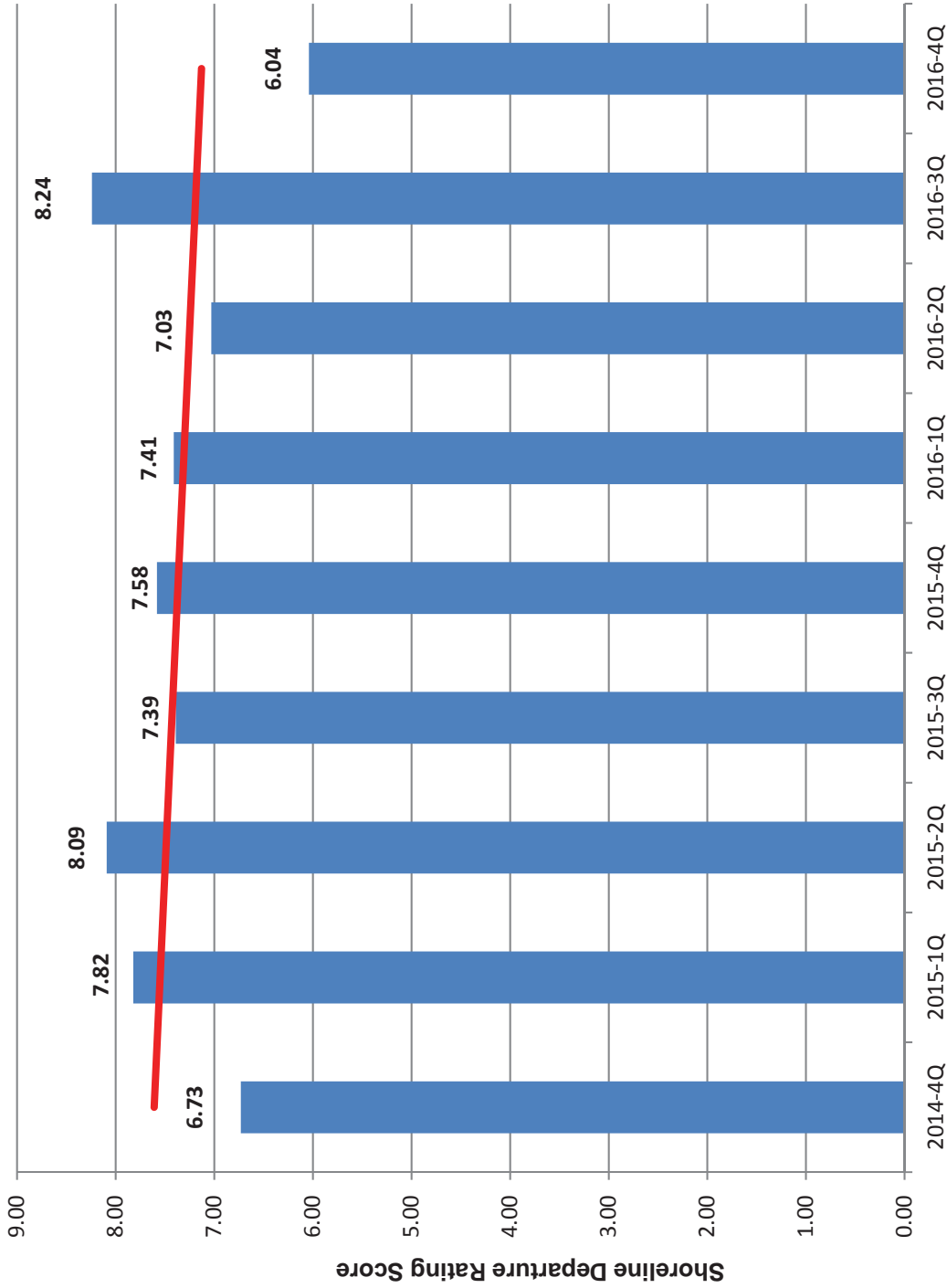


# Shoreline Departure Rating





# Shoreline Departure Rating Averages



Top 5



...

Bottom 5

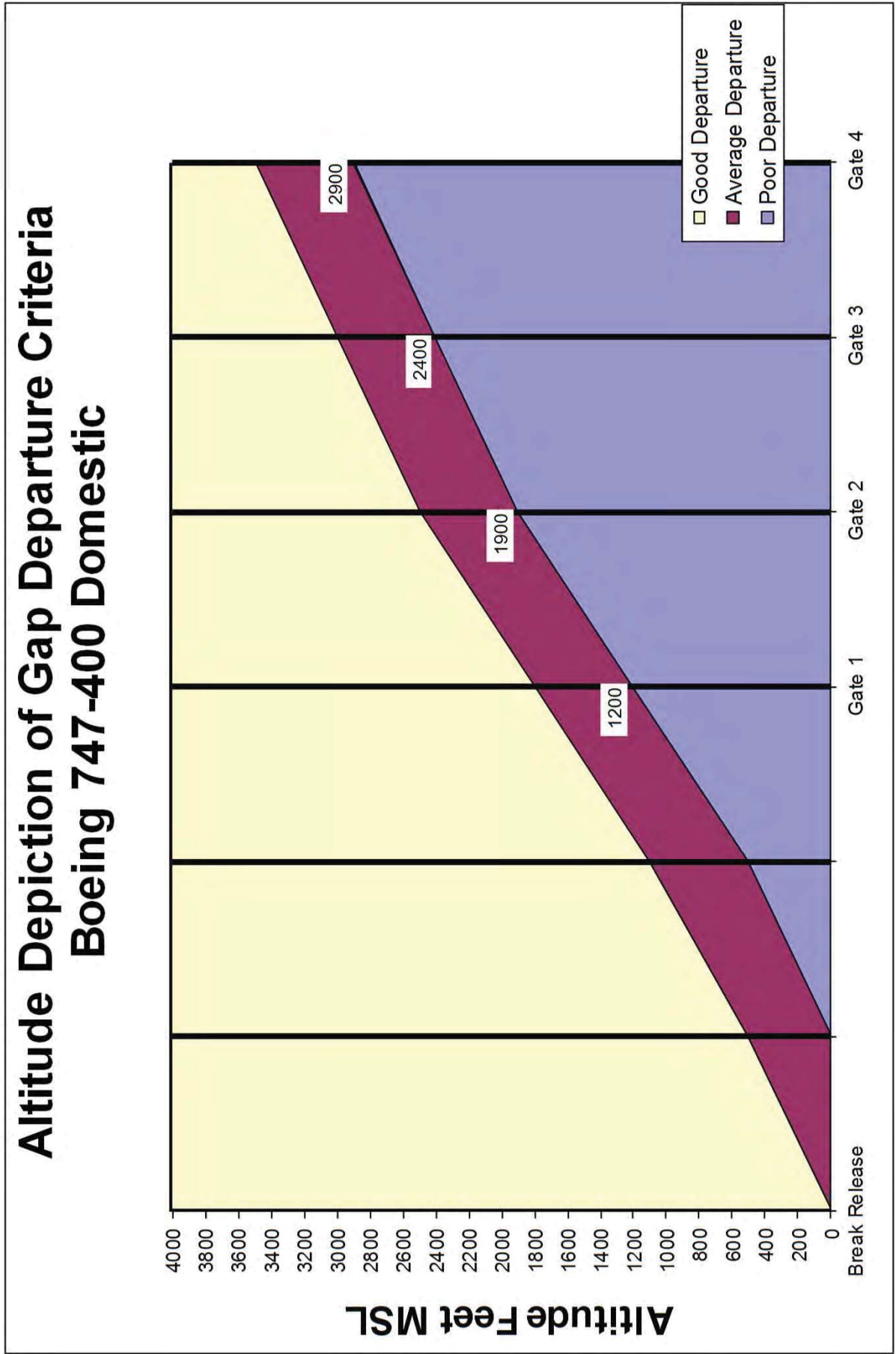


Year & Quarter

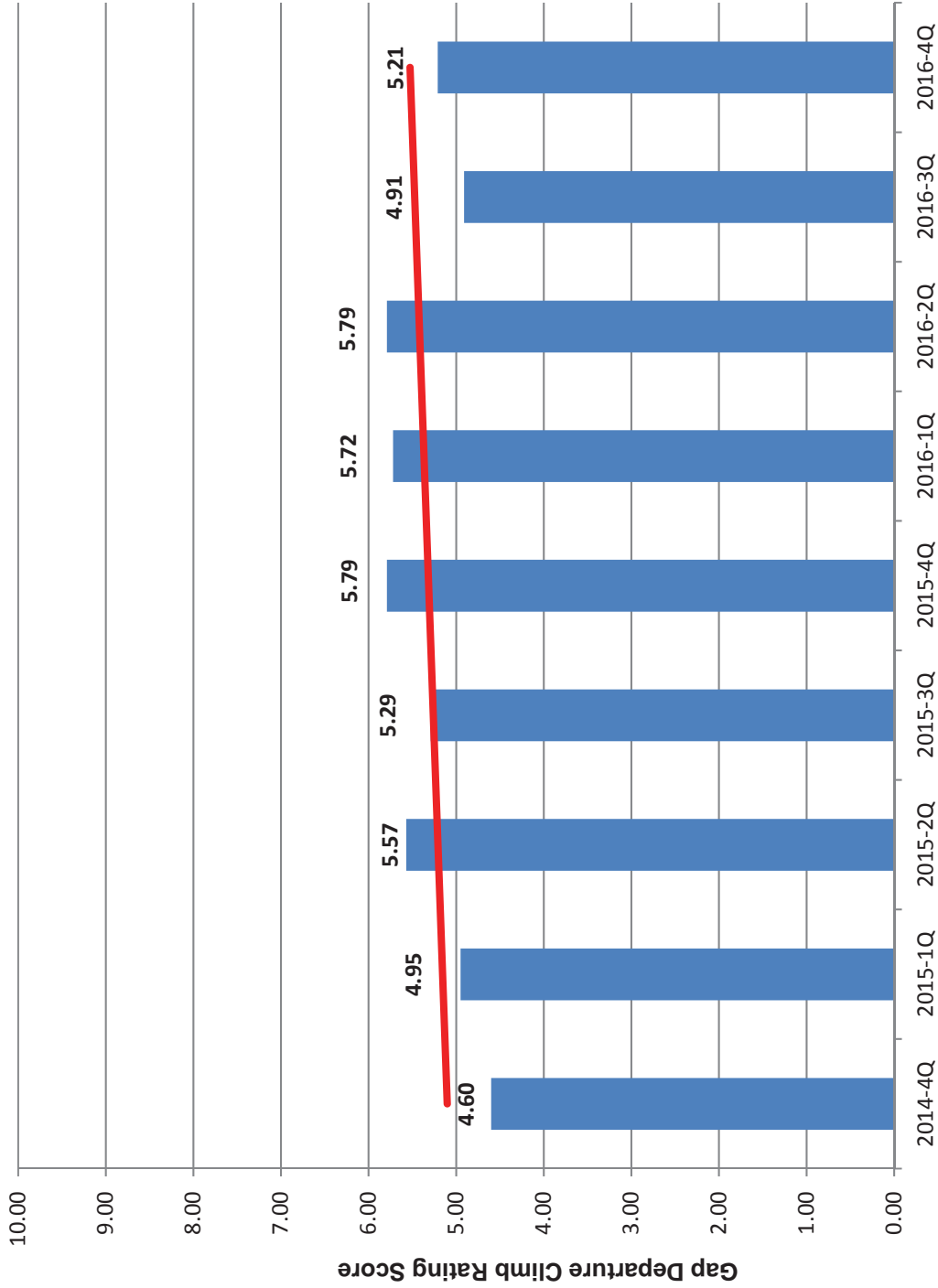
— Average of Quarterly Averages, Airline Rankings are for top 5 and bottom 5 performers for this category for current quarter,  new airlines to top and bottom 5

# Gap Departure Rating

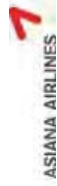
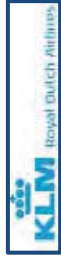
## Altitude Depiction of Gap Departure Criteria Boeing 747-400 Domestic



# Gap Departure Climb Rating Averages



Top 5



Bottom 5

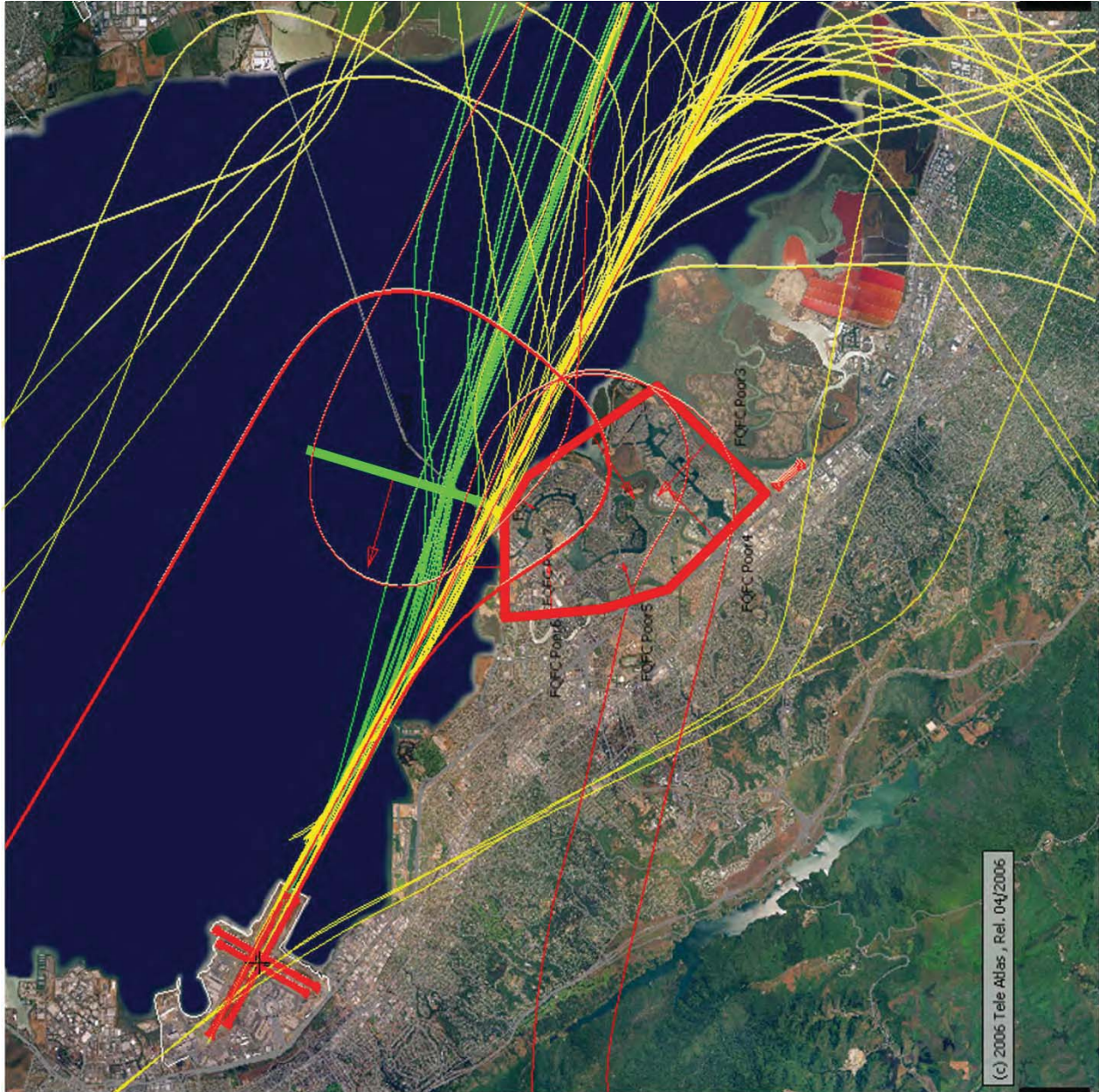


Year & Quarter

— Average of Quarterly Averages, Airline Rankings are for top 5 and bottom 5 performers for this category for current quarter,  new airlines to top and bottom 5



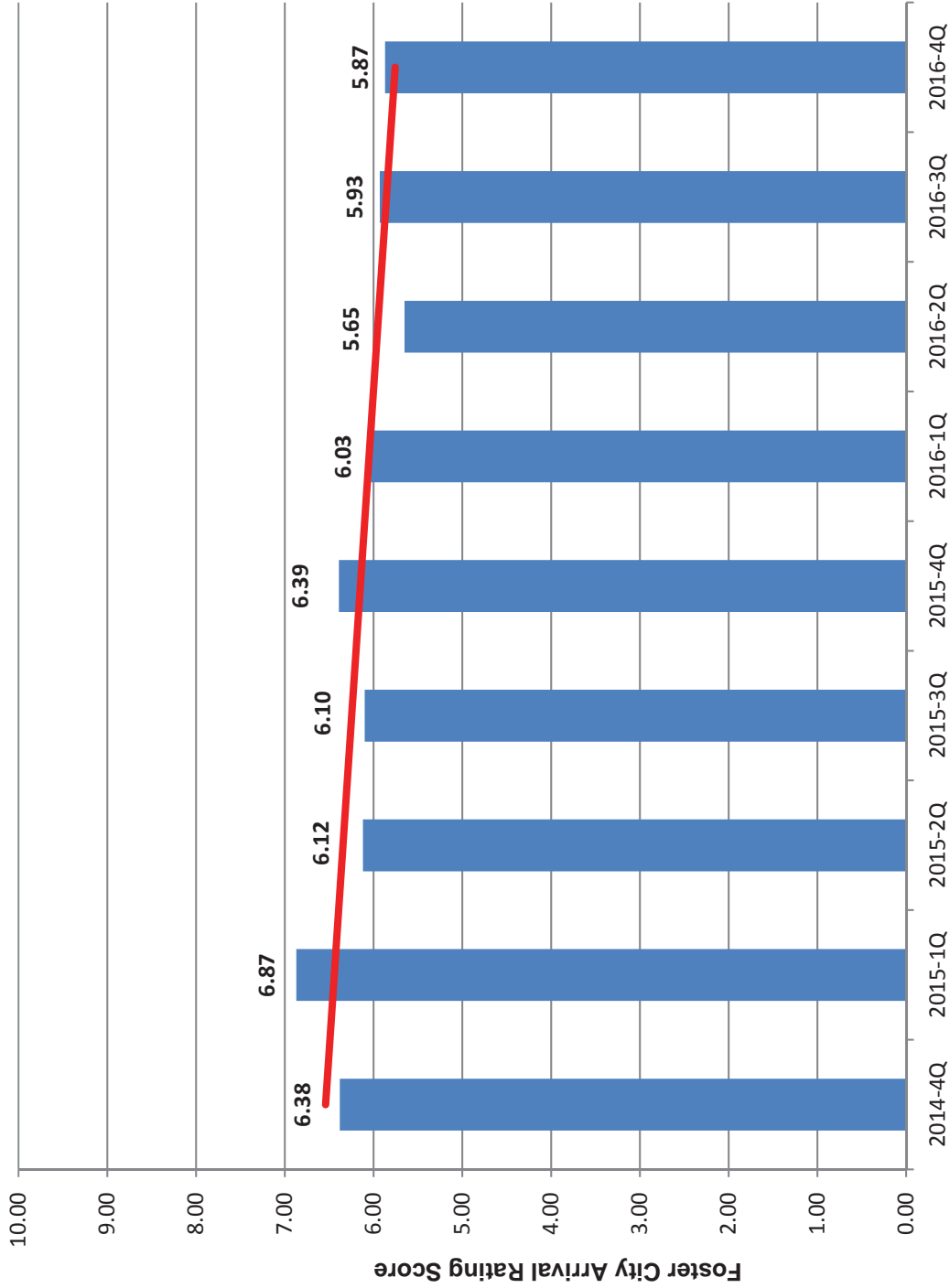
# Foster City Arrival Rating



- Good (+2 points)
- Marginal (+1 points)
- Poor (0 points)



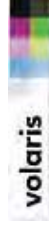
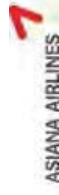
# Foster City Arrival Rating Averages



Top 5



Bottom 5



Year & Quarter

— Average of Quarterly Averages, Airline Rankings are for top 5 and bottom 5 performers for this category for current quarter,  new airlines to top and bottom 5




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February 1, 2017

**TO:** Roundtable members and Interested Persons

**FROM:** James A. Castañeda, AICP, Roundtable Coordinator 

**SUBJECT:** Service Performance Report and Proposed Roundtable Budget for FY 2016-2017

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Staff has prepared a draft Roundtable Budget for the current FY 2016-2017 for the Roundtable's consideration. Due to the Roundtable's focus on the FAA Initiative document published in November 2016, staff has been unable to present the budget for the current fiscal year earlier than what is typical.

As part of preparing the draft budget, staff has prepared a brief review of the work and services provided by staff during the prior fiscal year, as well as an overview of the expenditures incurred during that time.

## **COUNTY SERVICE REPORT**

### **BACKGROUND**

On July 1, 2016, the City and County of San Francisco and the County of San Mateo entered a three-year agreement to provide coordinating services for the Roundtable in their role to identify noise impacts and reduction measures. The prior contract ended on June 30, 2015, and the renewed contract process experienced unexpected delays and was not completed till summer 2016. The renewed contract (unchanged from the prior contract) requires the following from the County of San Mateo:

- Planner (half-time position) as Program Coordinator
- Retain qualified technical consultant for technical support
- Administrative Support to the Program Coordinator
- Roundtable Media Program, Media Support and Website Content
- Provide operating needs of the Roundtable (postage, photocopying, office equipment/supplies, website support, etc.)

San Mateo County is compensated for the aforementioned requirements from the Roundtable Trust Fund, which is funded from contributions by the City and County of San Francisco Airport Commission (Airport) and the Roundtable membership cities' annual dues.

As part of this agreement, the San Mateo County is to provide a report to SFO that generally describes the work performed for the Roundtable by County staff. That report is as follows:

## **SERVICE DETIALS**

### **A. Planner (half-time position) - Program Coordinator**

Per the established agreement, San Mateo County assigns a Planner from the Planning & Building Department to act as Program Coordinator at a half-time (20 hours/week, or 1,040 hours annually) position. The typical assigned Coordinator tasks performed and completed in FY 2015-2016 by the Coordinator include (but not limited) to the following:

- Maintain communications with Airport staff regarding Roundtable agenda items, Work Program items, noise complaints, monthly noise reports, quarterly reports, and related items.
- Manage a technical consultant to provide technical support to the Roundtable (BridgeNet International).
- Coordinate, review, and approve the work products and monthly billing per the scopes of work of the technical consultant.
- Directs/assigns administrative assistance work to available County Planning & Building administrative staff when needed.
- Administrative support to Roundtable including preparation of materials for agenda items, annual draft budget, meeting summaries, and preparation and distribution of monthly agenda packets.
- Attend all Regular Roundtable Meetings, workshops and subcommittee meetings.
- Update website as necessary.
- Provide technical and logistical support at all meetings.

### **B. Retain qualified technical consultant for technical support**

In October 2012, the Roundtable accepted a three-year agreement with BridgeNet International, who began technical support services to the Roundtable November 2012. Their service to the Roundtable had been extended past their three-year contract to assist the Roundtable through the FAA Initiative Response process. BridgeNet's service with the Roundtable ended on December 31, 2016. Staff has circulated a Request for Proposal on December 3, 2016 and January 6, 2017 to

solicit potential qualified technical consultants to provide service starting in spring 2017.

**C. Administrative Support to the Program Coordinator**

As part of the County service structure, the Program Coordinator has utilized County Planning administrative staff to assist the Roundtable when necessary. Due to the increased work load of the past year, dedicated half-time administrative support is being explored to assist the Program Coordinator with meeting coordination and logistics, as well as assistance at Roundtable meetings.

**D. Roundtable Media Program, Media Support and Website Content**

Staff has maintained and updated the Roundtable's website with agendas, minutes, published reports, and other relevant information. Staff also manages e-mail distribution to lists to cities and other interested parties for important noise impact announcements. In 2015, staff implemented an "eNews" distribution designed to give periodic updates, news and information to Roundtable members and interested parties between meetings and other events. Staff will continue explore other media opportunities with resources available.

**E. Provide operating needs of the Roundtable (postage, photocopying, office equipment/supplies, website support, etc.)**

County staff over the course of the current fiscal year has provided all materials necessary for the Roundtable's operations. This includes expenses incurred related to the Fly Quiet Awards expenses, meeting supplies, as well as independent data services and storage.

**BUDGET EXPENDITURES FY 2015-2016**

**A. Income**

Due to an unforeseen delay in processing a contract renewal between the San Mateo County and the City and County of San Francisco, the expected invoice of \$175,000 was unable to be processed. As a result of timing and in an effort to continue to reduce the surplus as a result of unused contingency funds from 2013 through 2015, the new three-year contract commenced on July 1, 2016. Since 2015, the Airport and San Mateo County have been attempting to reduce the surplus uncommitted funds to eliminate a revenue diversion of Airport's funds.

San Mateo County will invoice the Airport for \$220,000 as part of the current fiscal year which will be contributions for both FY2015-2016 and FY2016-2017. Going forward, San Mateo County will invoice the City and County of San Francisco per

the contract agreement not to exceed \$220,000 per fiscal year based on the financial needs of the Roundtable as outlined and approved in the annual budget.

With all other sources of funding received as expected in addition to aforementioned contributions from the Airport, the Roundtable trust is expected to close the current fiscal year with no uncommitted funds. Contributions from Roundtable member cities, San Mateo County, and C/CAG ALUC remained at half of the normal dues as practiced since FY 2011-2012 on a year-by-year temporary basis.

## **B. Expenditures**

At the end of FY 2015-2016, the Roundtable Trust Fund incurred approximately \$179,624 in expenditures. In the budget table (attached) the total amount expended reflects \$66,624 instead of \$179,624. This is because the \$113,000 reimbursement to the County of San Mateo for Coordinator Services during FY 2015-2016 was not drawn during that fiscal year, and will be transferred from the Roundtable trust during the current FY 2016-2017.

### Staff/Consultant Support

Of the total \$179,624 expenses for FY 2015-2016, the expenditures included the allocated staff and consulting support cost of \$175,934, which did not exceed allocated amounts as set from the adopted FY2015-2016 budget. Of that amount, \$62,934 was used for the Roundtable's Technical Consultant, and the remaining \$113,000 for the Coordinator Services from the County of San Mateo (again, reflected on the budget table as not being drawn in FY 2015-2016, but will be in FY 2016-2017), and the transfer is accounted for in the FY 2016-2017 allocation for Coordination Services.

### Administration/Operations

Roundtable administration/operational costs accounted for \$2,171 of the allocated \$3,500. Postage and printing did not meet or exceed the allocation, as no additional meetings were required, but also staff reduced cost by limiting printing of packets in black and white, limiting printed distribution, and encouraging use of the electronic version of the meeting packets. Allocations were made to expand the Roundtable's remote meeting/conference web-hosting abilities for Technical Working Group meetings throughout FY 2015-2016, in which a total of \$806 was utilized. A total of \$1,074 was used to purchase supplies, equipment exclusive for Roundtable's use, mileage reimbursements, FlyQuiet Awards trophies, and meeting supplies.



During FY 2015-2016, allocations were established to allow the Roundtable coordinator and interested Roundtable members to attend the UC Davis Noise Symposium, of which the Roundtable Coordinator nor members attended.

Starting with the adoption of the budget for FY 2012-2013, contingency funds were allocated in order to cover unanticipated costs associated with additional work required of the technical consultants or other expenses not originally accounted for with the adoption of the budget during the course of the upcoming fiscal year. During the FY 2015-2016, no funds were utilized from either contingency allocation.

## **PROPOSED FY 2016-2017 BUDGET**

### **BACKGROUND**

The Roundtable is funded by its membership. The annual membership contributions are maintained in a Roundtable Trust Fund. The County of San Mateo Planning and Building Department, on behalf of the Roundtable, manage the fund. All Roundtable expenses, such as staff support, technical support consultant contracts, office supplies/equipment, mailing/photocopying costs, etc. are paid from that fund. Any monies that are not spent each year are added as revenue to the budget for the following fiscal year. All staff support and professional consultant services are provided to the Roundtable through the County of San Mateo Planning and Building Department. The amounts for these support services are shown as budgeted expenditures in the annual Roundtable budget.

### **BUDGET DISCUSSION**

The expected funding sources for the FY 2016-2017 include the following: 1) the San Francisco Airport Commission, 2) Roundtable member cities (18 cities), 3) the County of San Mateo, and 4) the City/County Association of Governments of San Mateo County (C/CAG), for a representative of the C/CAG Airport Land Use Commission (ALUC), and 5) the estimated Roundtable fund balance from FY 2015-2016.

As discussed earlier, San Mateo County and the City and County of San Francisco (Airport) entered a new three-year contract on July 1, 2016 to provide the same services agreed upon with the prior contract. The renewed contract maintains SFO contributions not to exceed \$220,000 per year. San Mateo County will invoice the Airport based on the financial needs of the Roundtable as outlined and approved in the annual budget.

Per the Roundtable's bylaws, the contributions for member cities and C/CAG ALUC is \$1,500, and \$12,000 for San Mateo County. In FY 2011-2012, the Roundtable had agreed on a temporary reduction of dues by 50% to allow financial relief during the years of recession recovery and encourage ongoing membership. Since, the Roundtable has continued to maintain the reduced amount on a year-by-year temporary basis. To maintain such for FY

**Service Performance Report and Proposed Roundtable Budget for FY 2016-2017**

**February 1, 2017**

**Page 6 of 10**

2016-2017, the Roundtable will need to approve the budget acknowledging the 50% reduction. The amounts below reflects the reduced amounts:

San Francisco Int'l Airport:	\$220,000
Member Cities (18 cities):	\$750
County of San Mateo:	\$6,000
C/CAG:	\$750

**Expected Funding Sources**

**A. Annual Funding from the San Francisco Airport Commission**

The Commission's contribution for FY 2015-2016 is \$220,000.

**B. Annual Funding from Other Roundtable Members**

The annual funding amounts from the other Roundtable members (18 cities, the County of San Mateo, and C/CAG for the C/CAG Airport Land Use Committee (ALUC)) will be at the original normal fees, resulting in the following dues: Cities - \$750 each; County - \$6,000, and C/CAG - \$750.

**C. Roundtable Fund Balance from the Prior Fiscal Year**

The Roundtable fund balance from the previous fiscal year (FY 2015-2016) is \$42,435. This is the balance after closeout of all prior contract obligations from that fiscal year with the exception of the \$113,000 for Coordinator Services to San Mateo County (allocated and collected in FY 2016-2017), as well as contingencies funds that were not utilized.

*Summary*

<b>EXPECTED FUNDING</b>		<b>2015-2016</b>		<b>2016-2017</b>
		<u>EXPECTED</u>	<u>RECEIVED</u>	<u>EXPECTED</u>
<b>FUND SOURCE</b>				
1	San Francisco Airport Commission	\$175,000	\$0	\$220,000
2	Roundtable Member Cities (18 Cities)	\$13,500	\$13,500	\$13,500
3	County of San Mateo	\$6,000	\$6,000	\$6,000
4	C/CAG Airport Land Use Committee	\$750	\$750	\$750
5	Unused Fund Balance from Previous Year	\$88,809	\$88,809	\$42,435
	<b>TOTAL:</b>	<b>\$276,890</b>	<b>\$109,059</b>	<b>\$282,685</b>

**Potential Funding Allocations for FY 2016-2017**

**A. Staff and Consultant Support Services - \$269,000**

Funding for staff support to the Roundtable will consist of the following:

1. **Roundtable Coordinator (\$113,000 per year, total \$226,000).** This amount represents a reimbursement to the County of San Mateo for both the prior FY 2015-2016 and current FY 2016-2017 to provide half-time Planner support to the Roundtable. This cost is the half-time loaded wage rate for a Planner III provided from San Mateo County that includes administrative support to the coordinator to conduct meetings and Roundtable business for one year. This amount allocated per year is unchanged from FY 2015-2016, however, as mentioned earlier in this report, the reimbursement for FY 2015-2016 was not drawn during that year, and will occur in the current FY 2016-2017. The amount reflected in the budget table is both fiscal years combined.
  
2. **Roundtable Aviation Consultant for Technical Support (\$42,000).** This allocation is to cover the work performed by the Roundtable’s Aviation Technical Support. This amount reflects a reduction due to the end of BridgeNet’s work midway through the current fiscal year, and anticipates work by a new consultant starting in spring 2017.

*Summary*

		2015-2016		2016-2017
STAFF/CONSULTANT SUPPORT		ALLOCATED	EXPENDED	ALLOCATED
		<b>\$183,000</b>	<b>\$62,934</b>	<b>\$269,000</b>
1	Count of San Mateo Coordination Services	\$113,000	\$0	\$226,000
2	Roundtable Aviation Technical Consultant	\$70,000	\$62,934	\$43,000

**B. Roundtable Administration/Operations - \$6,285**

1. **Postage/Photocopying (\$600).** This amount represents a reimbursement to the County of San Mateo for costs associated with reproduction of meeting materials and postage. This amount is a reduction from FY 2015-2016, as staff has continued to reducing printed materials and encouraging use of the electronic version of the meeting packets.
  
2. **Website (\$200).** This amount represents a reimbursement to the County of San Mateo for costs associated with paying website hosting dues and renewal of domain registration. This amount is unchanged from FY 2015-2016.

**Service Performance Report and Proposed Roundtable Budget for FY 2016-2017**

February 1, 2017

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3. **Data Storage and Conference Services (\$900).** This amount represents a reimbursement to the County of San Mateo for the cost associated with maintaining all of the Roundtable's email system, digital files and archives to Internet based storage. The Roundtable has also begin to offer online conference services at subcommittee meeting for remote members when the location logistics allow. This amount is an increase of \$100 from FY 2015-2016 to account for increased cost of services provided.
  
4. **Supplies/Equipment (\$1,585).** This amount represents a reimbursement to the County of San Mateo to provide supplies and equipment to the Roundtable Coordinator and administrative support staff when needed, as well as supplies used during meetings, including the FlyQuiet Awards in the spring. This amount is an increase from FY 2015-2016 to allow additional funding for potential equipment upgrade and/or dedicated Roundtable laptop/mobile equipment for Coordinator/staff for meeting use.
  
5. **Video Services (\$3,000).** This amount represents a reimbursement to the County of San Mateo to contract video streaming services for Roundtable meetings for the remaining two meetings of the FY 2016-2017 if the Roundtable chooses to offer such. While cost and logistics are still being investigated, it should be expected that the estimated cost to provide video at Roundtable meetings is \$1,100 to \$1,300 per meeting.

*Summary*

		<b>2015-2016</b>		<b>2016-2017</b>
<b>ADMINISTRATION / OPERATIONS</b>		<u>ALLOCATED</u>	<u>EXPENDED</u>	<u>ALLOCATED</u>
		<b>\$3,500</b>	<b>\$2,171</b>	<b>\$6,285</b>
1	Postage / Printing	\$1,500	\$184	\$600
2	Website	\$200	\$107	\$200
3	Data Storage & Conference Services	\$800	\$806	\$900
4	Miscellaneous Office Expenses/Equipment	\$1,000	\$1,074	\$1,585
5	Video Services			\$3,000

**C. Projects, Programs, and Additional Allocations - \$7,400**

For FY 2015-2016, the Roundtable allocated additional funds to cover expenses associated with attendance at noise conferences, TRACON field trips, and subscription to aircraft noise publications. The Roundtable also allocated funds for the Roundtable's 35<sup>th</sup> Anniversary event, which is no longer needed in the current fiscal year. All other items will remain, however some of the allocations will reflect zero as its anticipated those allocations will not be required before the end of the fiscal year.

- 1. Noise Conference Attendance, Coordinator (\$1,800).** This amount represents a reimbursement to the Coordinator for attendance to Aircraft Noise related conferences such as the annual UC Davis Noise Symposium held in the spring. This amount is a reduction from FY 2015-2016 as its unlikely staff will attend additional conferences past the Noise Symposium.
- 2. Additional Noise Conferences Attendees (\$4,000).** This amount represents the cost associated with additional Roundtable member attendance to Aircraft Noise related conferences such as the annual UC Davis Noise Symposium held in the spring, National Organization to Insure a sound Control Environment (N.O.I.S.E.) legislative summit, and/or other aircraft noise related conferences that would be beneficial to the Roundtable. This amount should allow two to three members to attend one conference. This amount is unchanged from FY 2015-2016.
- 3. TRACON Field Trip (\$750).** This amount represents the estimated cost associated with providing transportation and lunch to members for a field trip to the NorCal TRACON facility, normally in conjunction with the Oakland Noise Forum. This amount is a reduction from FY 2015-2016, as past trends have shown the average cost to be below \$750.
- 4. Airport Noise Report newsletter subscription (\$850).** This amount represents the annual subscription dues for the Roundtable to receive the Airport Noise Report to help keep Roundtable staff and members informed of news related to aircraft noise. This amount is unchanged from FY 2015-2016.
- 5. LAX Roundtable Attendance, Coordinator (\$0).** This amount represents a reimbursement to the Coordinator to attend an LAX Roundtable meeting. In the past, the Roundtable has sent the Coordinator to observe their practices and exchange information with their staff. At this time, the amount allocated is zero as the Roundtable Coordinator will not be attending an LAX Roundtable event before the end of the fiscal year.



**6. Join National Organization to Insure A Sound Control Environment (\$0).**

This amount represents the cost associated with membership with National Organization to Insure a sound Control Environment (N.O.I.S.E.). While funds were allocated in FY 2014-2015 to joining, allocations were not utilized to participate in that fiscal year. At this time the amount allocated is zero until the Roundtable has committed to participation with organization.

*Summary*

		2015-2016		2016-2017
PROJECTS, PROGRAMS, & ADDITIONAL ALLOCATION		ALLOCATED	EXPENDED	ALLOCATED
		<b>\$10,850</b>	<b>\$1,518</b>	<b>\$7,400</b>
1	Noise Conferences Attendance, Coordinator	\$3,000	\$0	\$1,800
2	Noise Conferences Attendance, Members	\$4,000	\$0	\$4,000
3	TRACON Field Trip(s)	\$1,000	\$0	\$750
4	Airport Noise Report subscription	\$850	\$850	\$850
5	N.O.I.S.E.	\$0	\$0	\$0
6	LAX Roundtable Attendance, Cooridnator/Staff	\$1,000	\$0	\$0
7	35th Roundtable Anniversary Event	\$1,000	\$668	

**D. Contingency Funds - \$0**

Starting in FY 2012-2013, the Roundtable allocated the remaining uncommitted funds to be used as a contingency reserve for unanticipated work for either Roundtable staff or the Aviation consultant. However, since that time, none of the contingencies have been used, which has resulted a surplus that has grown year over year. Since it is unanticipated that any contingency reserve will be required before the end of the year, the amount reflects zero.

**Attachments:**

Expense Report and Proposed FY 2016-2017 Budget Allocations

SFO Airport/Community Roundtable - Expense Report & Proposed Budget FY 2016-2017

A	EXPECTED FUNDING FUND SOURCE	2012-2013		2013-2014		2014-2015		2015-2016		2016-2017	
		EXPECTED	RECEIVED	EXPECTED	RECEIVED	EXPECTED	RECEIVED	EXPECTED	RECEIVED	EXPECTED	RECEIVED
	1 San Francisco Airport Commission	\$222,000	\$220,000	\$220,000	\$220,000	\$220,000	\$110,000	\$175,000	\$0	\$220,000	\$220,000
	2 Roundtable Member Cities (18 Cities)	\$13,500	\$13,500	\$13,500	\$13,500	\$13,500	\$13,500	\$13,500	\$13,500	\$13,500	\$13,500
	3 County of San Mateo	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000
	4 C/CAG Airport Land Use Committee	\$750	\$750	\$750	\$750	\$750	\$750	\$750	\$750	\$750	\$750
	5 Unused Fund Balance from Previous Year	\$2,124	\$2,124	\$69,457	\$69,457	\$118,881	\$118,122	\$88,809	\$88,809	\$42,435	\$42,435
	<b>TOTAL:</b>	<b>\$242,374</b>	<b>\$242,374</b>	<b>\$309,707</b>	<b>\$309,707</b>	<b>\$359,131</b>	<b>\$248,372</b>	<b>\$276,890</b>	<b>\$109,059</b>	<b>\$282,685</b>	<b>\$282,685</b>
<b>B</b>	<b>POTENTIAL FUNDING ALLOCATIONS STAFF/CONSULTANT SUPPORT</b>	2012-2013		2013-2014		2014-2015		2015-2016		2016-2017	
	1 Count of San Mateo Coordination Services	ALLOCATED \$190,016	EXPENDED \$166,683	ALLOCATED \$183,000	EXPENDED \$185,863	ALLOCATED \$183,000	EXPENDED \$161,769	ALLOCATED \$183,000	EXPENDED \$62,934	ALLOCATED \$269,000	EXPENDED \$269,000
	2 Roundtable Aviation Technical Consultant	\$120,016	\$120,016	\$113,000	\$113,000	\$113,000	\$113,000	\$113,000	\$0	\$226,000	\$226,000
		\$70,000	\$46,667	\$70,000	\$72,863	\$70,000	\$48,769	\$70,000	\$62,934	\$43,000	\$43,000
	<b>ADMINISTRATION / OPERATIONS</b>	ALLOCATED	EXPENDED	ALLOCATED	EXPENDED	ALLOCATED	EXPENDED	ALLOCATED	EXPENDED	ALLOCATED	EXPENDED
	1 Postage / Printing	\$4,800	\$4,120	\$4,100	\$2,988	\$4,300	\$1,490	\$3,500	\$2,171	\$6,285	\$6,285
	2 Website	\$3,500	\$2,984	\$2,500	\$1,616	\$2,500	\$529	\$1,500	\$184	\$600	\$600
	3 Data Storage & Conference Services	\$200	\$0	\$200	\$152	\$200	\$83	\$200	\$107	\$200	\$200
	4 Miscellaneous Office Expenses/Equipment	\$300	\$250	\$400	\$250	\$400	\$246	\$800	\$806	\$900	\$900
	5 Video Services	\$800	\$886	\$1,000	\$969	\$1,200	\$632	\$1,000	\$1,074	\$1,585	\$1,585
	<b>PROJECTS, PROGRAMS, &amp; ADDITIONAL ALLOCATIONS</b>	ALLOCATED	EXPENDED	ALLOCATED	EXPENDED	ALLOCATED	EXPENDED	ALLOCATED	EXPENDED	ALLOCATED	EXPENDED
	1 Noise Conferences Attendance, Coordinator	\$0	\$0	\$15,350	\$2,734	\$15,350	\$3,473	\$10,850	\$1,518	\$7,400	\$7,400
	2 Noise Conferences Attendance, Members	\$0	\$0	\$2,000	\$1,255	\$3,000	\$0	\$3,000	\$0	\$1,800	\$1,800
	3 TRACON Field Trip(s)	\$0	\$0	\$12,000	\$0	\$4,000	\$2,333	\$4,000	\$0	\$4,000	\$4,000
	4 Airport Noise Report subscription	\$0	\$0	\$500	\$629	\$1,500	\$0	\$1,000	\$0	\$750	\$750
	5 N.O.I.S.E.	\$0	\$0	\$850	\$850	\$850	\$850	\$850	\$850	\$850	\$850
	6 LAX Roundtable Attendance, Coordinator/Staff					\$5,000	\$0	\$0	\$0	\$0	\$0
	7 35th Roundtable Anniversary Event					\$1,000	\$290	\$1,000	\$0	\$0	\$0
	<b>CONTINGENCY FUND</b>	ALLOCATED	EXPENDED	ALLOCATED	EXPENDED	ALLOCATED	EXPENDED	ALLOCATED	EXPENDED	ALLOCATED	EXPENDED
	1 Aviation Consultant Contingency	\$47,558	\$2,114	\$40,000	\$0	\$40,000	\$0	\$40,000	\$0	\$0	\$0
	2 General Contingency	\$20,000	\$0	\$20,000	\$0	\$20,000	\$0	\$20,000	\$0	\$0	\$0
		\$27,558	\$2,114	\$20,000	\$0	\$20,000	\$0	\$20,000	\$0	\$0	\$0
	<b>EXPENSES SUBTOTAL</b>	ALLOCATED \$242,374	EXPENDED \$172,917	ALLOCATED \$242,450	EXPENDED \$191,585	ALLOCATED \$242,650	EXPENDED \$166,732	ALLOCATED \$237,350	EXPENDED \$66,624	ALLOCATED \$282,685	EXPENDED \$282,685
	<b>UNCOMMITTED FUNDS / YEAR END BALANCE</b>	PROJECTED \$0	ACTUAL \$69,457	PROJECTED \$67,257	ACTUAL \$118,122	PROJECTED \$116,481	ACTUAL \$88,809	PROJECTED \$39,540	ACTUAL \$42,435	PROJECTED \$0	ACTUAL \$0

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# **CORRESPONDENCES**

Regular Meeting # 305  
February 1, 2017

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# Portola Valley Aircraft Noise Monitoring

Prepared by San Francisco International Airport  
Aircraft Noise Abatement Office  
Technical Report #012017-978

January 2017

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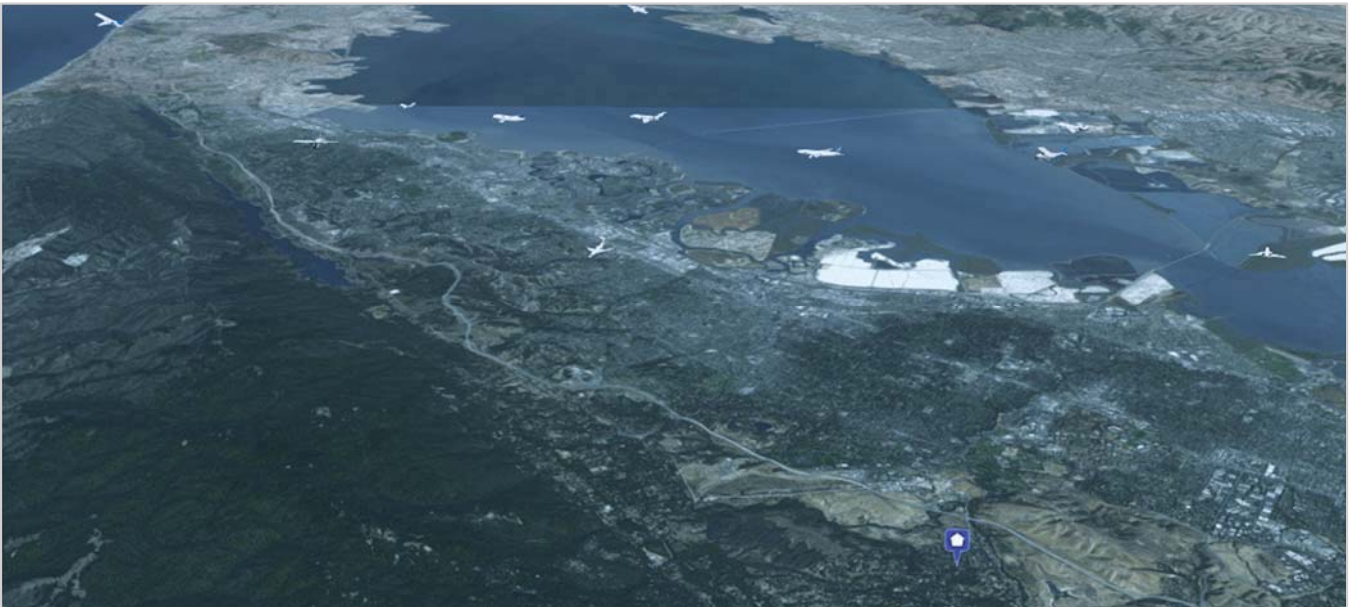
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## Executive Summary

The San Francisco International Airport (SFO) Aircraft Noise Abatement Office conducted aircraft noise monitoring in Portola Valley to determine the noise level within the community from aircraft operations at SFO. The monitoring was made possible with the assistance of a Portola Valley resident, located in the northeastern part of Portola Valley. The overall average daily noise level from all aircraft was measured at 40dBA CNEL, the Community daily noise level was 46dBA CNEL. Noise from all aircraft over this location increased the total average daily noise level by 0.1dBA. SFO aircraft represents 65% of all traffic over the Portola Valley community.

## Community and SFO Operations

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 an 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. During the monitoring periods there were no significant weather impacts or other disruptions to air traffic that would alter the flight paths. SFO operated on a West Flow Plan (Appendix 1) the entire monitoring period. Non aircraft noise sources include residential noise, leaf blower, occasional vehicular traffic and construction noise. The ambient levels in Portola Valley are approximately 40 decibels in the day and about 42 decibels at night.



## Equipment

Portola Valley aircraft noise monitoring is conducted every quarter, typically for a 14-day measurement period. The measurement period is performed during the same time period each quarter. This provides a sufficient data sample to evaluate the overall noise climate similar to a permanent noise monitor site installation. The equipment used to measure the sound level was an Environmental Monitor Unit 2200 noise monitor and Type 41DM-2 microphone manufactured by Bruel & Kjaer. The measurements consisted of monitoring the A-weighted decibels (dBA) in accordance with procedures and equipment which comply with International Electrotechnical Commission and measurement standards established by the American National Standards Institute for Type I instrumentation. The microphone was calibrated prior to the start of the measurement. The monitor was housed in a weatherproof case and powered by two external battery packs. The microphone was mounted on a tripod at a height of 7 feet (see Figure 1). The sound levels at the site were continuously monitored, stored on the onboard memory and transferred to a removable memory stick for decoding. The decoded noise data was then processed in the Airport Noise and Operations Management System (ANOMS) for identification, noise to flight track matching and Community Noise Equivalent Level (CNEL) noise metric calculations.

### Aircraft Noise Analysis

Noise measurements were performed in the northeastern part of Portola Valley. This report evaluates 2015 and 2016 yearly quarters (see Appendix 1 for all measurement days). Quarterly monitoring period typically consists of 14 full 24 hour days. The noise monitor measures noise at the pre-defined sound level threshold of 51dBA (Day) and 50dBA (Night). This means that not every aircraft passing over Portola Valley creates a noise event. During the eight monitoring periods a total of 10,011 noise events were recorded. There were 7,085 (71%) aircraft noise events of which 4,477 (63%) were correlated to SFO operations (SFO Events) and 2,608 (37%) correlated to other Bay Area airports (Non-SFO Events). The average aircraft generated Maximum Noise Level (Lmax) was 60dBA, the average Sound Exposure Level (SEL) was 70dBA, and the average aircraft noise event duration was 30 seconds. The event counts (SFO Events, Non SFO Events and Community) in Table 1 are presented as Quarterly daily averages.

**Table 1 - Noise Event Averages by Yearly Quarter**

Years	Quarter	SFO Events <sup>1</sup>	SEL (dBA) <sup>2</sup>	Lmax(dBA) <sup>3</sup>	Non- SFO Event	SEL (dBA)	Lmax (dBA)	Community	SEL (dBA)	Lmax (dBA)
<b>2015</b>	Qtr1	24	70	59	22	70	59	108	74	62
	Qtr2	55	69	59	25	73	65	17	75	64
	Qtr3	44	69	58	30	70	60	35	69	54
	Qtr4	41	70	60	28	71	61	10	74	67
<b>2016</b>	Qtr1	28	69	58	24	71	61	7	68	58
	Qtr2	47	70	59	18	70	60	6	76	69
	Qtr3	23	70	59	11	72	63	33	74	57
	Qtr4	28	70	60	14	72	63	2	73	69
<b>Average Total</b>		<b>36</b>	<b>70</b>	<b>59</b>	<b>22</b>	<b>71</b>	<b>62</b>	<b>27</b>	<b>74</b>	<b>63</b>

<sup>1</sup> SFO Events are: Single SFO Aircraft, Multiple SFO Aircraft, Simultaneous SFO and Non-SFO Aircraft, and Simultaneous Community and SFO Aircraft. Counts are presented as Daily average of the monitoring period.

<sup>2</sup> 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.

<sup>3</sup> Lmax - The maximum noise level is a measurement of the peak level of a noise event.

**Table 2 – SEL Comparison of Quarterly Averages**

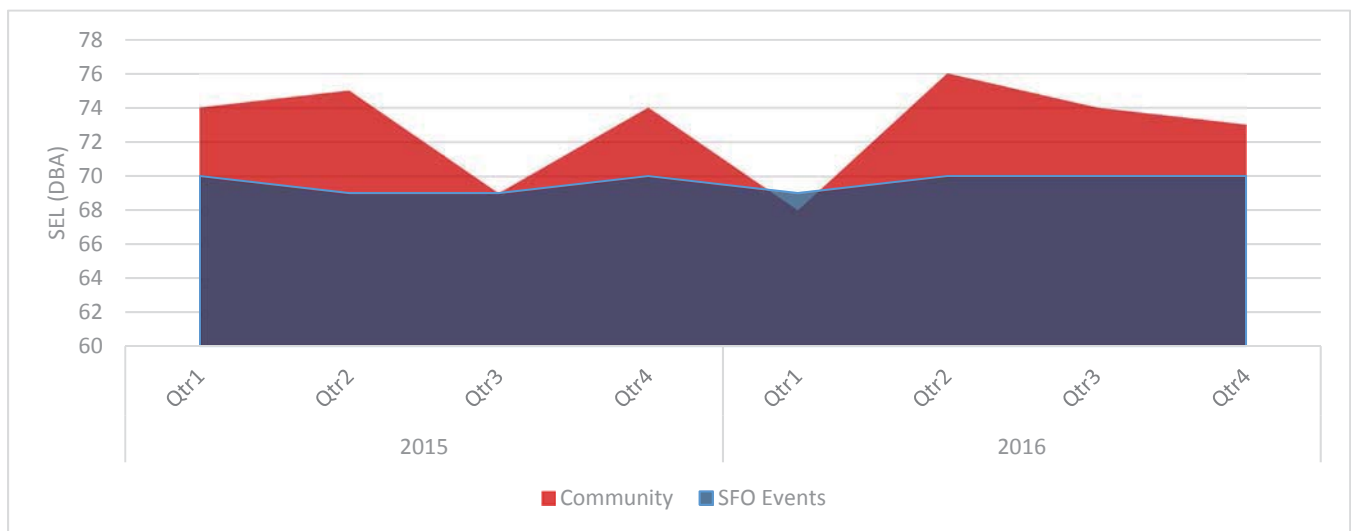
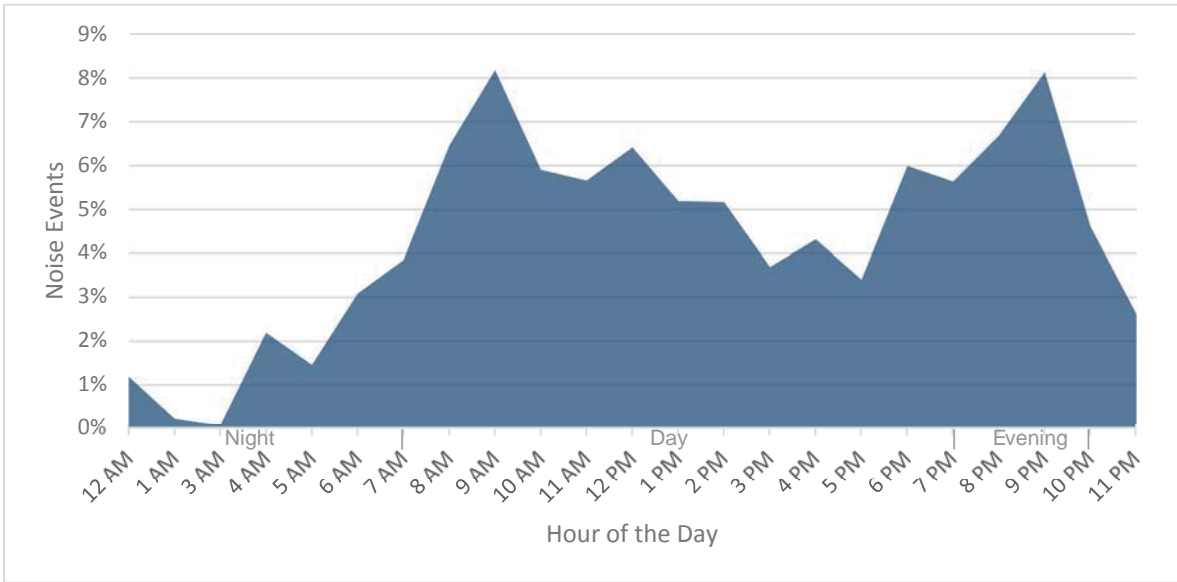


Table 2 shows a graphic comparison between the SEL of SFO Events and SEL of Community Events. For example, 2<sup>nd</sup> Quarter 2015 (quarter with the most amount of SFO Events), SFO aircraft events were on average 6dBA quieter than the Community Events. While SFO Events were quieter the ratio between the average amount of SFO Event and Community Event vary (See Table 1). SFO Events (55) occurred more than three times than the community events (17).

**Table 3– Average SFO Noise Events by Hour of the Day**



**Table 4 – SFO Events by Daytime, Evening and Nighttime hours**

SFO Aircraft Noise Data (Single Noise Events)		Lowest (dBA)	Highest (dBA)	Average (dBA)
<b>Day (7:00 am-7:00 p.m.)</b>	2872 events 64%	LMax	51	83
		SEL	57	89
		Duration	5 sec	120 sec
<b>Evening 7:00 pm-10:00 p.m.)</b>	915 events 21%	LMax	50	69
		SEL	57	80
		Duration	5 sec	120 sec
<b>Night (10:00 pm-7:00 a.m.)</b>	690 events 15%	LMax	49	67
		SEL	55	77
		Duration	5 sec	97 sec

**Table 5 – Average SFO Quarterly Nighttime Noise Events 10:00 PM – 7:00 AM**

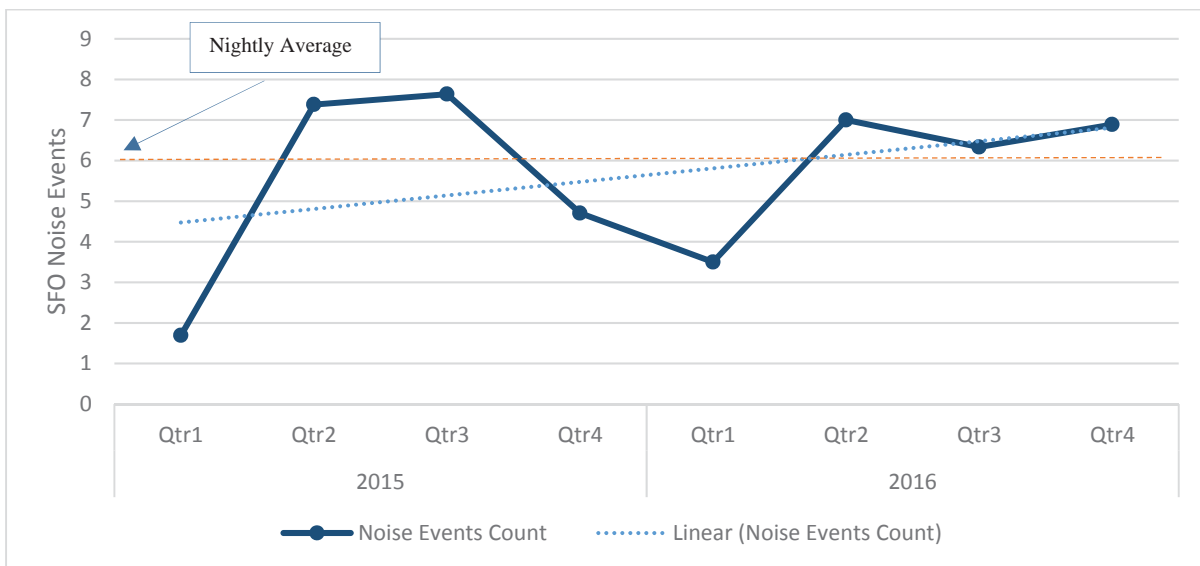




Table 6- Quarterly CNEL

Table 6 shows quarterly CNEL values for Aircraft, Community and the Total CNEL. Air traffic is seasonal so it is important to compare the same yearly quarters. Aircraft CNEL values have been consistent throughout the 2 year monitoring period. Community increase in Qtr3 2015 is due to nearby house construction.

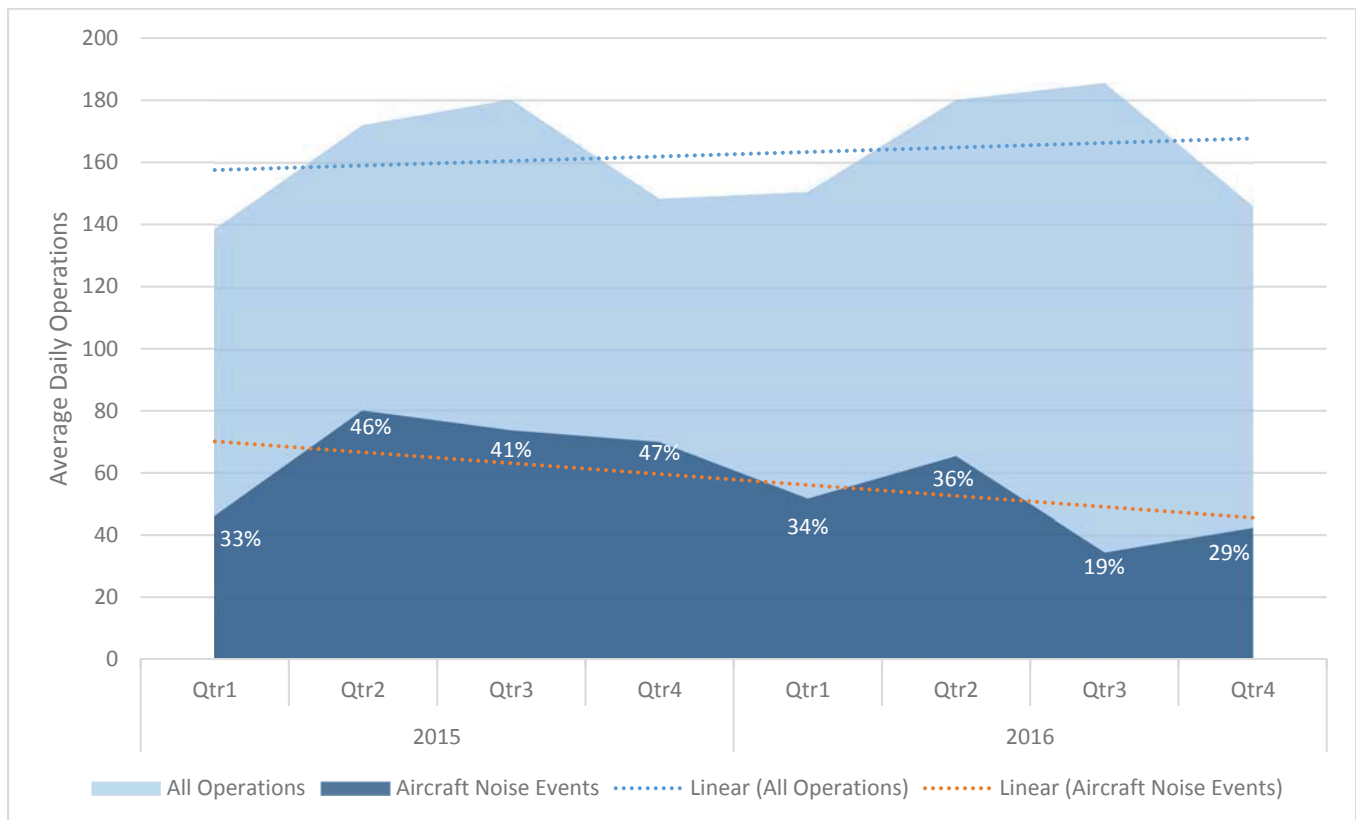
Portola Valley aircraft noise monitoring threshold is set at a monitor minimum level of 50dB. In view of the fact that the monitoring location in Portola Valley is located in a quiet suburban community with ambient noise in low 40s, consequently any aircraft noise above this threshold may become a nuisance for the residents.

Yearly Quarters	Aircraft CNEL (dBA)	Community CNEL (dBA)	Total CNEL (dBA)
<b>2015</b>			
Qtr1	38	46	47
Qtr2	42	44	46
Qtr3	41	51	51
Qtr4	41	45	47
<b>2016</b>			
Qtr1	39	43	45
Qtr2	41	44	46
Qtr3	39	54	54
Qtr4	40	46	47
<b>Average</b>	<b>40</b>	<b>46</b>	<b>48</b>

### Aircraft Operations

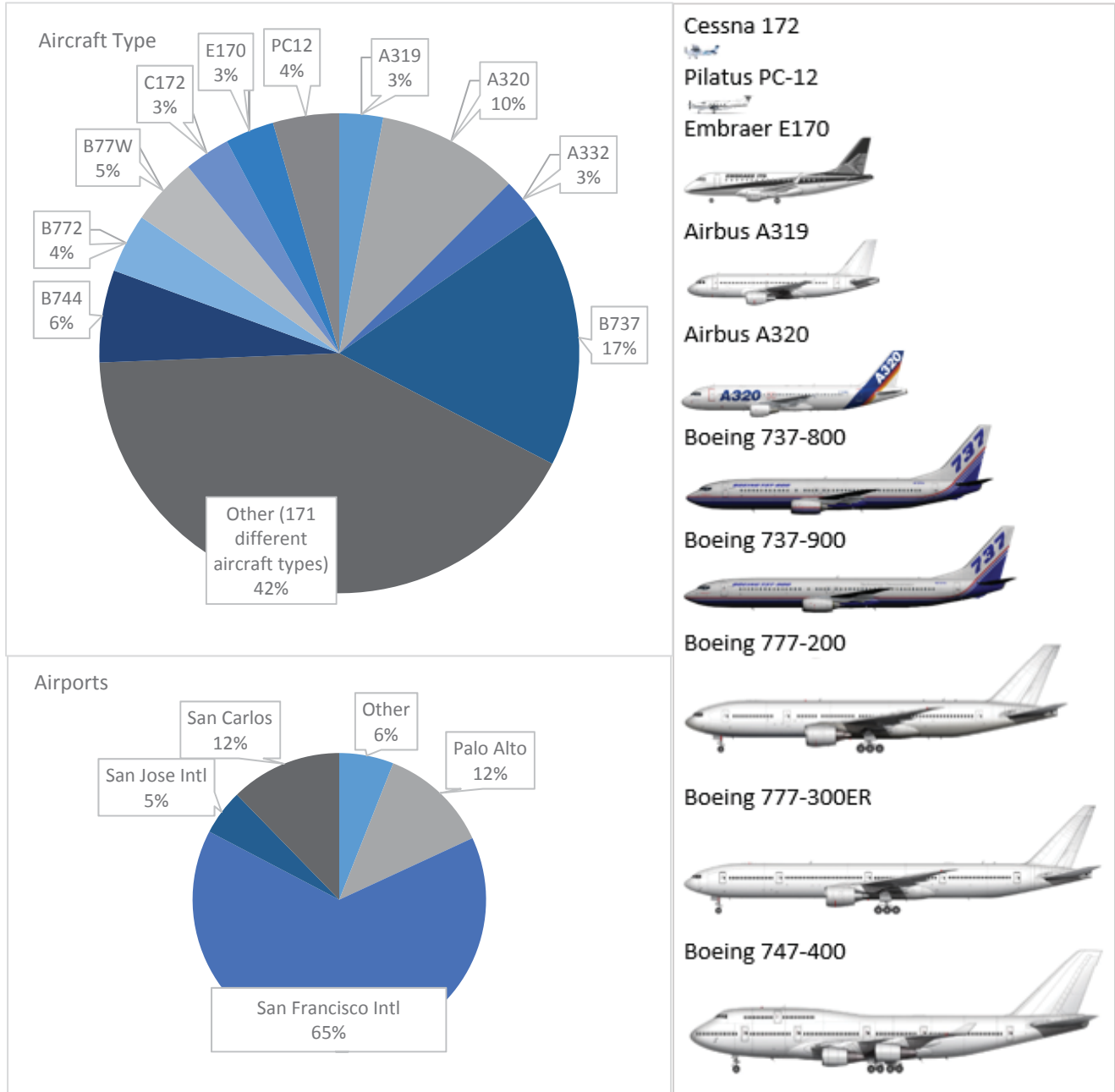
All aircraft which flew within a cylindrical airspace of 2 miles in radius and 15,000 feet in height, known as Point of Closest Approach (PCA); centered on the measurement location were evaluated for this measurement period. A daily average of 162 flights penetrated this airspace. An average of 37% of flights exceeded the threshold used to detect aircraft noise and registered events on the noise monitor. Appendix 3 lists these aircraft by type.

Table 7- All Operations vs. Aircraft Noise Events (%)



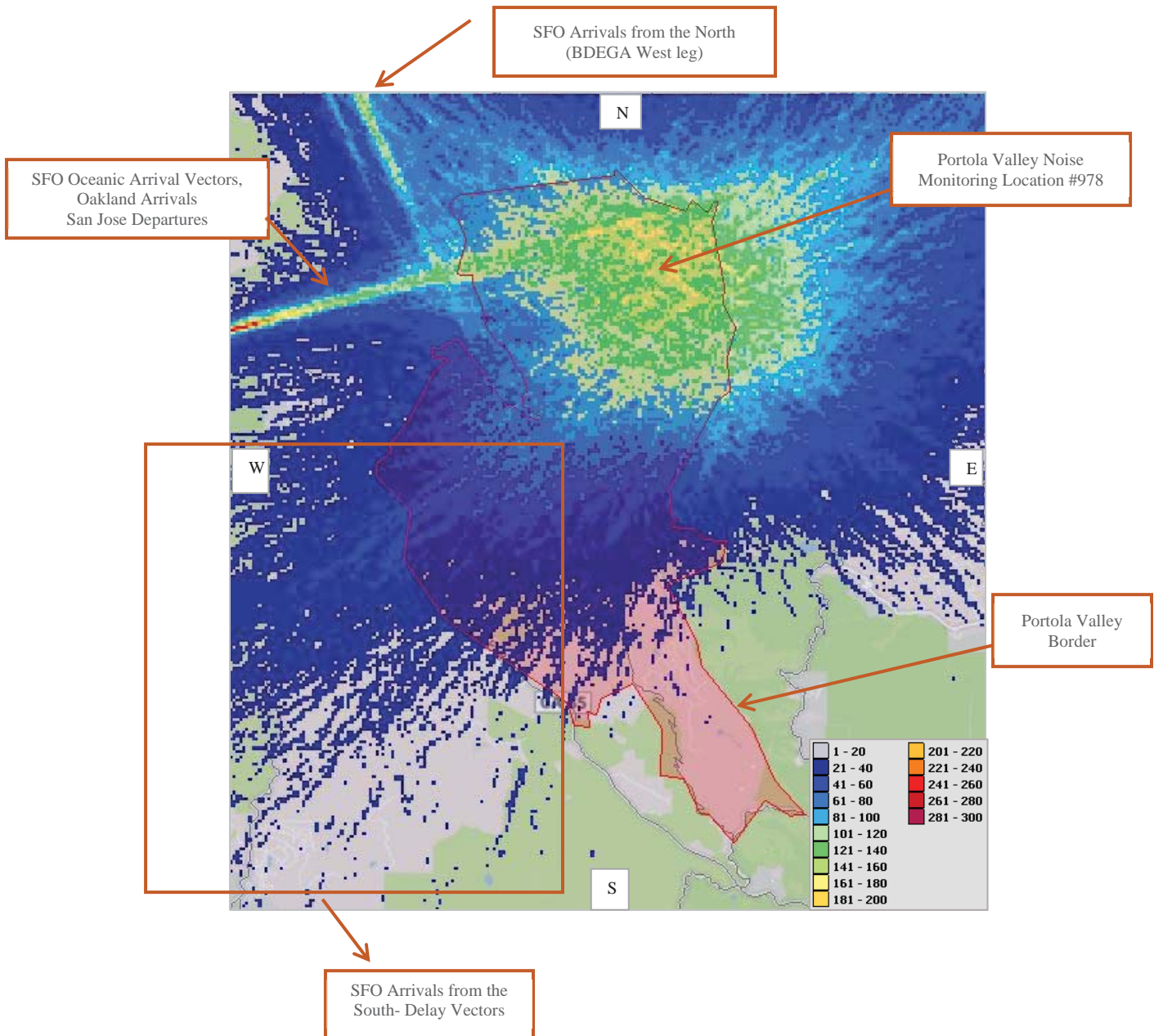
Aircraft noise events that have complete flight data information (91%) were studied based on the aircraft type, airport origin, and operation type. SFO air traffic represented 65% of all correlated aircraft noise events, followed by San Carlos (12%), Palo Alto (12%) and San Jose International Airport (5%). Moreover, 70% of traffic were arrivals, 27% were departures and 3% were overflights. 181 different aircraft types (Appendix 3- Aircraft Type Reference Sheet) were tracked; top 10 aircraft types account for 58% of all traffic. Eight of the Top 10 types are commercial aircraft and two are general aviation; Cessna 172 (C172) and Pilatus (PC-12), that do not fly to SFO.

**Table 8 – All Aircraft Operations**



### Track Density

Below photo shows the track density of all flights that created a noise event during the monitoring periods. A track density plot is a grid, displayed over the map, and colored according to the number of flights that have passed through each grid point. It shows the density of flights using the same route. Looking at the below track density photo and comparing it to the noise reporter's location on Page 9, we can see that a higher concentration of flights in the northeastern part of Portola Valley has consequently more noise reporters.



Noise Reporters

Analysis of noise reports includes all Portola Valley noise reporters and reports from January 2015 to December 2016, not just during the noise monitoring periods. The number of noise reporters and more significantly the number of noise reports has increased, starting Qtr3, 2015. Nighttime reports between 10:00 PM and 7:00 AM account for 16% of all submitted noise reports. Table 10 depicts percentage of aircraft noise events and noise reports by hour of the day. During the evening hours there is 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 noise reporters.

Table 9- Noise Reporters

	Noise Reporters <sup>1</sup>	Noise Reports
<b>2015</b>		
Qtr1	15	1,721
Qtr2	23	2,427
Qtr3	89	16,490
Qtr4	92	55,618
<b>Total</b>	<b>143<sup>2</sup></b>	<b>76,256</b>
<b>2016</b>		
Qtr1	85	43,685
Qtr2	83	22,822
Qtr3	86	18,976
Otr4	83	22,152
<b>Total</b>	<b>128</b>	<b>107,635</b>
<b>2015/2016 Total</b>	<b>178</b>	<b>183,891</b>

<sup>1</sup>Unique noise reporters for each quarter.

<sup>2</sup>Unique yearly reporters.

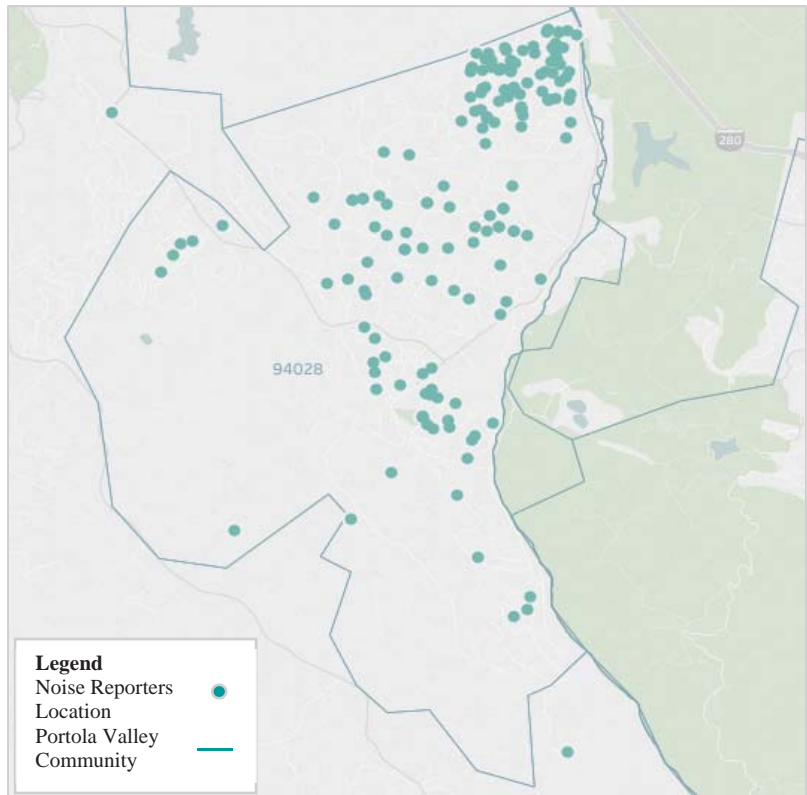
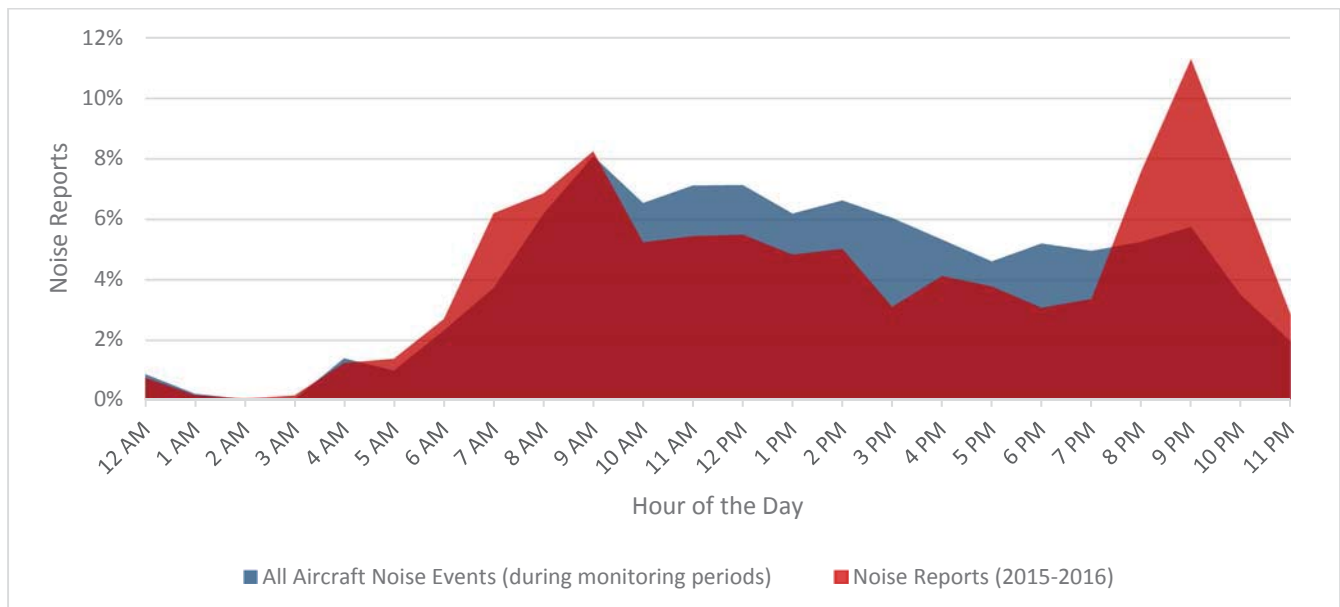


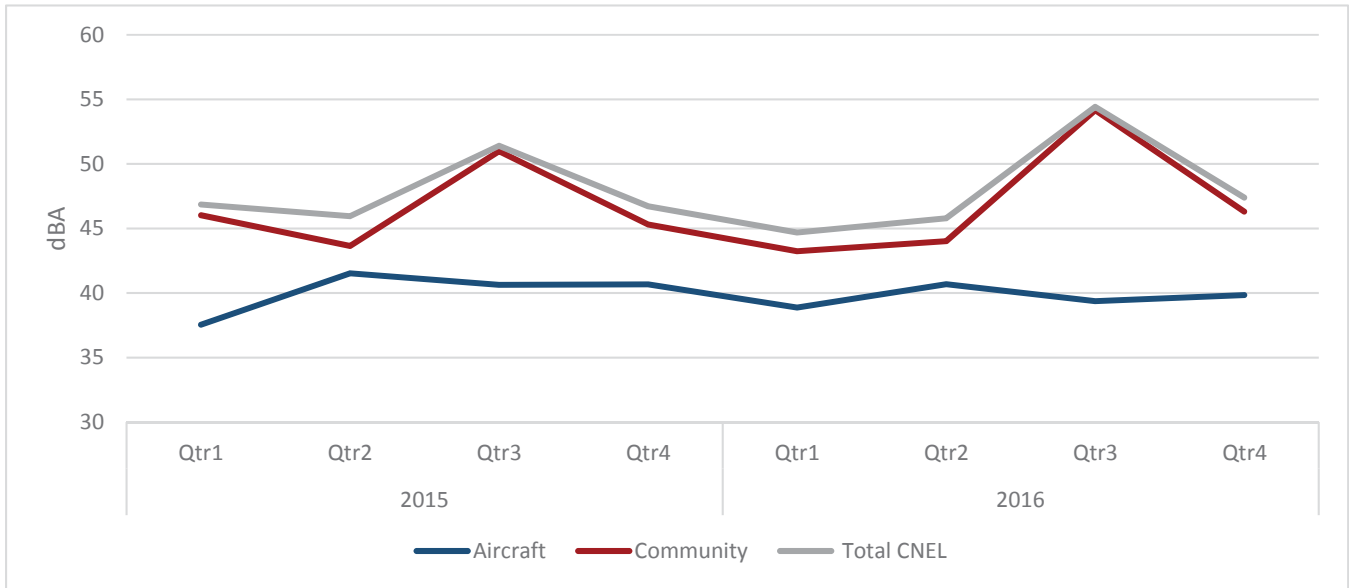
Table 10 –Average Noise Reports by Hour of the Day (%)



Conclusion

Aircraft noise levels were measured in Portola Valley, a quiet suburban community approximately 16 miles away from SFO. Flights above Portola Valley consist of arrival traffic to the Bay Area airports, SFO accounts for more than half of those flights. Community sees increase of flights in high traffic conditions or inclement weather days due to aircraft vectoring. The Aircraft noise levels have been consistent during two-year period and will serve as a base measurement for further monitoring. The computed level for the average **Aircraft CNEL** was 40dBA, and the average **Community CNEL** was 46dBA. Overall aircraft noise measurements contribute 0.1dBA additional noise to the total cumulative average noise level of 48dBA CNEL.

Table 11 –CNEL



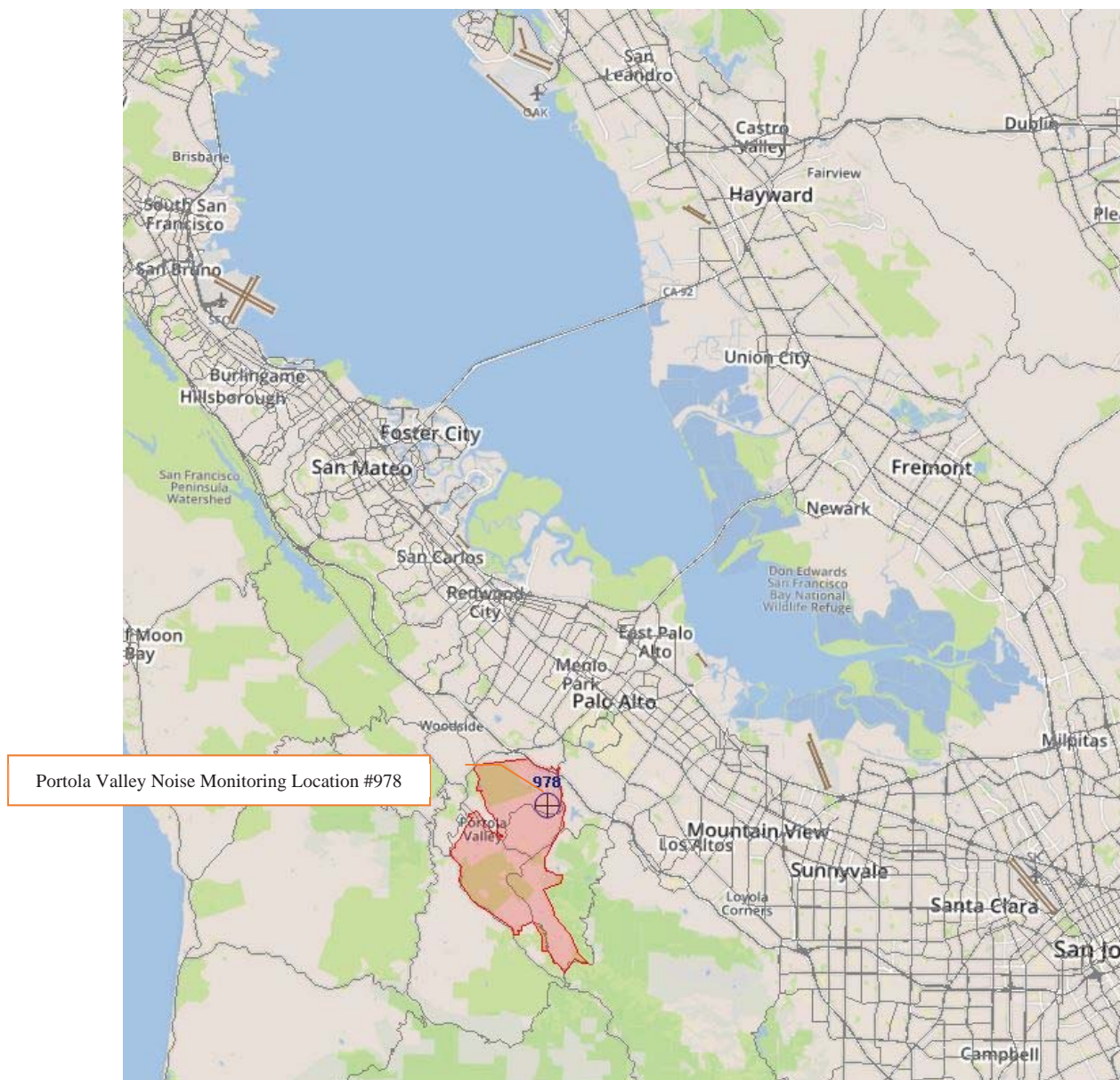
The California Code of Federal Regulations, Title 21, Division 2.5, Chapter 6, paragraph 5012 states, “The standard for the acceptable level of aircraft noise for persons living in the vicinity of airports is hereby established to be a community noise equivalent level of 65 decibels.” Since the average Aircraft CNEL was measured at 40dBA for Portola Valley, this residential area has an acceptable level of aircraft noise as defined by state law. The extent of the 65dBA CNEL noise impact contour at SFO is shown on page 17. This noise contour was generated using Federal Aviation Administration’s Integrated Noise Model (version 7.0d). The Federal Aviation Administration accepted this map as part of the Noise Exposure Map update under Federal Aviation Regulations Part 150 on January 29, 2016. The results of the field monitoring validate the extent of the 65dBA CNEL noise impact boundary confirming Aircraft CNEL is less than 65dBA CNEL for this location.



Figure 1 – Microphone, tripod and Monitor at Portola Valley



Figure 2 - Monitoring Location #978 and Portola Valley county (red zone)



Appendix 1 – Noise Measurement Days

Quarter	Date	Number of monitoring days
1stQ 2015	02/04 – 02/17	13
2ndQ 2015	05/08 – 05/28	21
3rdQ 2015	7/30 - 08/12 (no data on 8/4, 8/5, 8/6)	11
4thQ 2015	11/05 - 11/21	17
1stQ 2016	2/18 - 03/02	14
2ndQ 2016	05/05 - 05/18	14
3rdQ 2016	08/04 - 08/15	12
4thQ 2016	11/04 – 11/21	18
<b>120 noise monitoring days over 2 year period</b>		

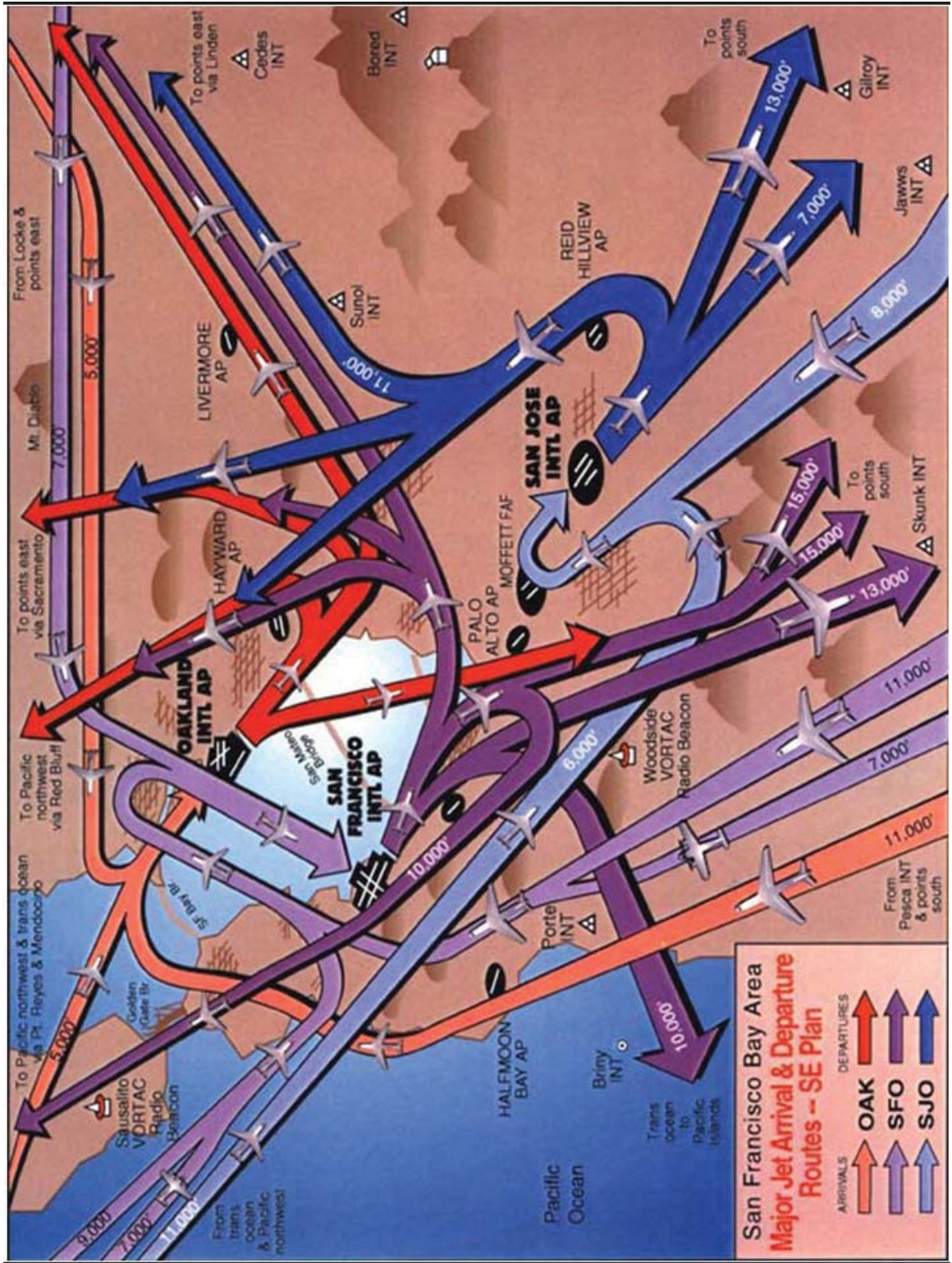






Appendix 2 – San Francisco Bay Area Major Jet Arrival and Departure Routes

Southeast Flow Plan



Note: Image not to scale and not all flight paths are shown.

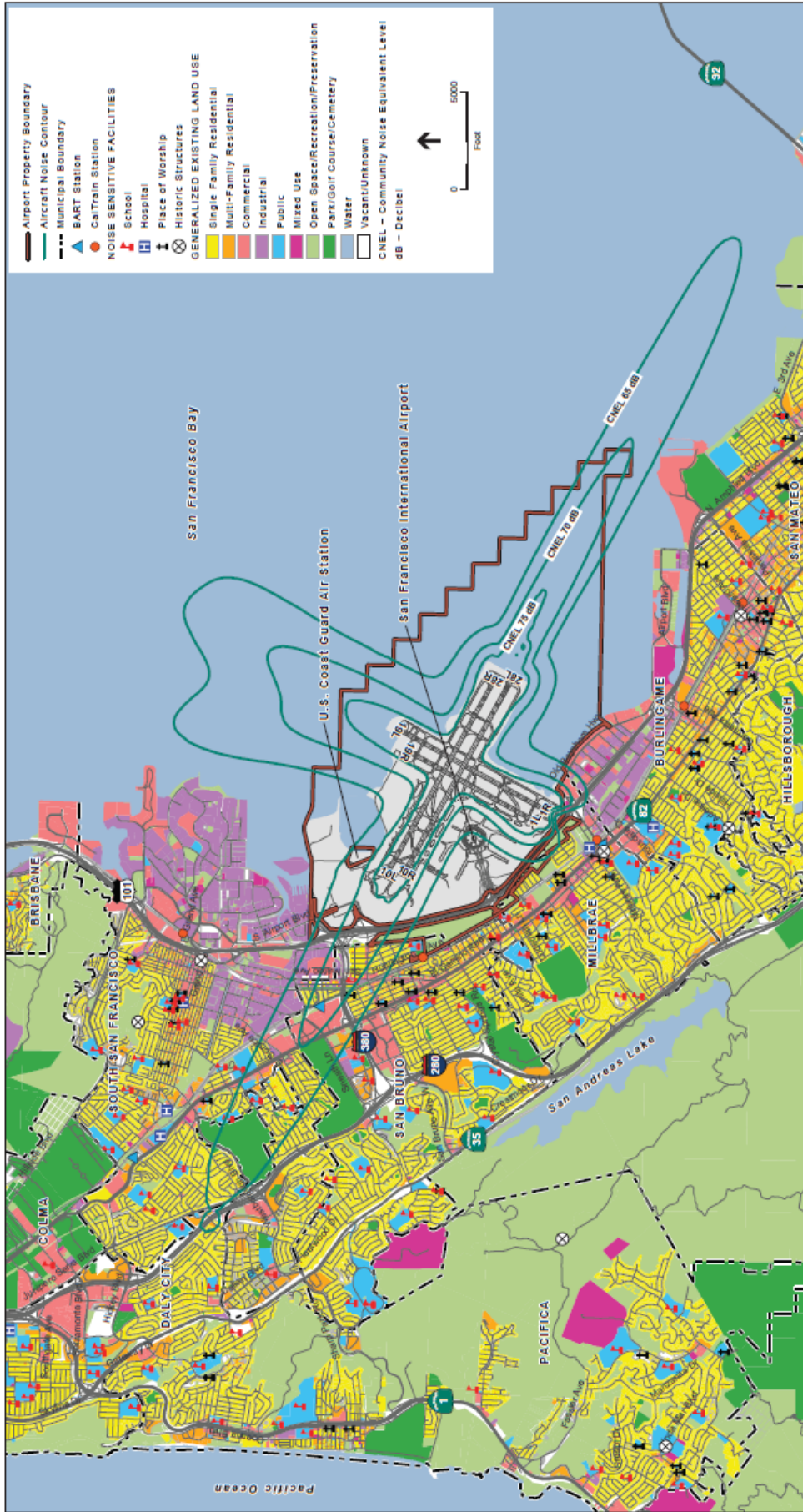


Appendix 3 – Aircraft Type Reference Sheet

Aircraft Code	Description	B753	Boeing 757-300	H60	Sikorsky H-60	P28A	Piper 28A Cherokee	C25C	Cessna Citation CJ4
<b>Wide Body Jet</b>		<b>CRJ2</b>	Bombardier CRJ200	<b>HELO</b>	Helicopter	<b>P46T</b>	Piper Meridian	<b>C510</b>	Cessna 510 Citation Mustang
A330	Airbus A330	<b>CRJ7</b>	Bombardier CRJ700	<b>R44</b>	Robinson R-44	<b>PA28</b>	Same as P-28B	<b>C525</b>	Cessna 525 Citation CJ1
A332	Airbus A330-200	<b>CRJ9</b>	Bombardier CRJ-900	<b>General Aviation Aircraft</b>		<b>PA31</b>	Piper PA-31 Navajo	<b>C56X</b>	Cessna 560XL Citation Excel
A333	Airbus A330-300	<b>DH8D</b>	DeHavilland Dash 8	<b>AA5</b>	Grumman AA-5 Tiger	<b>PA32</b>	Piper PA-32 Cherokee	<b>S6650</b>	Cessna Citation III
A343	Airbus A340-300	<b>J328</b>	Dornier 328 Jet	<b>AC11</b>	Rockwell Commander	<b>PA46</b>	Piper Malibu/Mirage	<b>C680</b>	Cessna 680 Citation Sovereign
A346	Airbus A340-600	<b>E45X</b>	Embraer ERJ-145	<b>AC50</b>	Aero Commander 500	<b>RV7</b>	Van's Aircraft RV-7	<b>C750</b>	Cessna 750 Citation X
A359	Airbus A350-900	<b>E170</b>	Embraer EMB 170	<b>BE33</b>	Beechcraft Debonair	<b>RV8</b>	Vans RV-8	<b>CL30</b>	Bombardier Challenger 300
A388	Airbus A380-800	<b>E190</b>	Embraer ERJ-190	<b>BE36</b>	Beechcraft 36 Bonanza	<b>SR20</b>	Cirrus SR-20	<b>CL35</b>	Bombardier Challenger 350
B744	Boeing 747-400	<b>E75L</b>	Embraer E175	<b>BE55</b>	Beechcraft 55 Baron	<b>SR22</b>	Cirrus SR-22	<b>CL60</b>	Bombardier Challenger 600
B748	Boeing 747-8	<b>E75S</b>	Embraer E175	<b>BE76</b>	Beechcraft 76 Duchess	<b>AA4</b>	Grumman American	<b>E55P</b>	Embraer EMB-500 Phenom 300
B762	Boeing 767-200	<b>MD83</b>	McDonnell Douglas MD-83	<b>MD-83</b>	Cessna C152	<b>B17</b>	Boeing Flying Fortress	<b>F2TH</b>	Dassault Falcon 2000
B763	Boeing 767-300	<b>MD90</b>	McDonnell Douglas MD-90	<b>MD-90</b>	Cessna C162	<b>B24</b>	Consolidated Liberator	<b>FA7X</b>	Dassault Falcon 7X
B764	Boeing 767-400	<b>R721</b>	Boeing 727-100	<b>C172</b>	Cessna Skyhawk	<b>B25</b>	North American Mitchell	<b>G280</b>	Gulfstream G280
B772	Boeing 777-200	<b>Military</b>		<b>C177</b>	Cardinal	<b>C-120</b>	Cessna 120	<b>FA90</b>	Dassault Falcon 900EX
B773	Boeing 777-300	<b>C130</b>	Lockheed C-130	<b>C180</b>	Cessna C180	<b>EDGE</b>	Zivko Edge	<b>GL5T</b>	Bombardier Global Express
B77L	Boeing 777-200LR	<b>C2</b>	Grumman Greyhound	<b>C182</b>	Cessna Skylane	<b>P32R</b>	Piper Cherokee Six	<b>GLEX</b>	Bombardier Global Express (twin-jet)
B77W	Boeing 777-300ER	<b>E2</b>	Grumman Hawkeye	<b>C185</b>	Cessna Skywagon	<b>PA30</b>	Piper Twin Comanche	<b>GLF3</b>	Gulfstream III
B788	Boeing 787-8	<b>P3</b>	Lockheed P-3 Orion	<b>C206</b>	Cessna Stationair	<b>PA34</b>	Piper Seneca	<b>GLF4</b>	Gulfstream 4
B789	Boeing 787-9	<b>TEX2</b>	Beechcraft T-6 Texan II	<b>C210</b>	Cessna Centurion	<b>PA44</b>	Piper Seminole	<b>GLF5</b>	Gulfstream 5
MD11	McDonnell Douglas MD-11	<b>T38</b>	Northrop T-38 Talon	<b>C310</b>	Cessna 310	<b>PITS</b>	Pitts Special	<b>GLF6</b>	Gulfstream 6
<b>Narrow Body Jet</b>		<b>V22</b>	Boeing Osprey	<b>C337</b>	Cessna Skymaster	<b>RV10</b>	Vans Aircraft RV-10	<b>HA4T</b>	Hawker 400
A319	Airbus A319	<b>Helicopter</b>		<b>C340</b>	Cessna 340	<b>TB21</b>	Socata Trinidad	<b>H25B</b>	Raytheon/Hawker 800
A320	Airbus A320	<b>AS50</b>	Aerospatiale A Star	<b>C414</b>	Cessna 414	<b>YAK</b>	Yakovlev	<b>LJ35</b>	Learjet 35
A321	Airbus A321	<b>A139</b>	AgustaWestland 139	<b>C421</b>	Cessna 421	<b>Business Aircraft</b>		<b>MU2</b>	Mitsubishi MU-2
B712	Boeing 717-200	<b>B206</b>	Bell Jet Ranger	<b>C425</b>	Cessna 425	<b>EPIC</b>	Epic Aircraft	<b>PAY2</b>	Piper Cheyenne ii
B733	Boeing 737-300	<b>B407</b>	Bell Long Ranger	<b>C441</b>	Cessna Conquest	<b>E120</b>	Embraer Brasilia	<b>PC12</b>	Pilatus PC-12
B734	Boeing 737-400	<b>CH7</b>	Kompress	<b>COL4</b>	Cessna 400/TTx	<b>BE9L</b>	Beechcraft King Air	<b>TBM7</b>	Socata TBM 700
B737	Boeing 737-700	<b>EC20</b>	Eurocopter 120 Colibri	<b>DA40</b>	Diamond DA-40	<b>B350</b>	Super King Air	<b>FA50</b>	Falcon 50
B738	Boeing 737-800	<b>EC35</b>	Eurocopter 135	<b>DA42</b>	Diamond DA-42	<b>BE20</b>	Beechcraft 200 King Air	<b>LJ25</b>	LearJet 25
B739	Boeing 737-900	<b>EC45</b>	Eurocopter 145	<b>LNC4</b>	Lancair 4	<b>C208</b>	Cessna 208 Caravan	<b>LJ40</b>	LearJet 45
B752	Boeing 757-200	<b>EH1</b>	AgustaWestland 101	<b>M20P</b>	Mooney M-20	<b>C25B</b>	Cessna Citation CJ3	<b>SW4</b>	Swearingen Metroliner

**Wide Body Jet** (wide enough for two passenger aisles); **Narrow Body Jet** (wide enough for one passenger aisles); **Business Aircraft** (transportation for small groups of people); **General Aviation Aircraft** (Generally small, propeller-driven aircraft); **Helicopters** (Aircraft operated by rotor blades); **Military** (U.S. Military Aircraft).

Appendix 4 – 2014 Noise Exposure Map



SOURCE: EBRI, 2014; San Mateo County Planning and Building Department, 2014; ESA Reports, 2014

## Dave Ong (AIR)

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**From:** Dave Ong (AIR)  
**Sent:** Tuesday, January 24, 2017 1:13 PM  
**To:** 'Pranay Kapadia'  
**Cc:** 'rortiz@burlingame.org'; 'James A Castañeda'; Bert Ganoung (AIR); John Bergener (AIR)  
**Subject:** Short Term Aircraft Noise Monitoring Report for the Easton Addition South Neighborhood of Burlingame  
**Attachments:** Short Term Aircraft Noise Monitoring - Burlingame.pdf; Supplement Aircraft Noise Terminology Metric.pdf; Raw Aircraft Noise Event Data.pdf

Dear Mr. Pranay Kapadia:

Thank you for allowing San Francisco International Airport (SFO) Noise Abatement Office the opportunity to collect aircraft noise measurements at your residence. Please find attached Short Term Aircraft Noise Monitoring report #012017-P51-986. This document contains the results of the monitoring performed from Friday, December 2 to Wednesday, December 21, 2016. Also attached are Aircraft Noise Terminology & Metric Supplement to help explain some of the terms used in the report and a list of the raw aircraft noise event data collected.

I have also copied Honorable Ricardo Ortiz, the Burlingame Airport Community Roundtable Representative to share the results with.

SFO will strive to improve aircraft noise abatement procedures to further reduce aircraft noise in your community and are continually developing initiatives to mitigate the impacts of aircraft noise by working with the Airport Community Roundtable, the Federal Aviation Administration, and the airlines operating here at SFO.

As always, please feel free to call me at (650) 821-5100 if you have any questions or would like to discuss this information.

Sincerely,

**David Ong** SFO  
Noise Systems Manager | Aircraft Noise Abatement Office  
San Francisco International Airport | P.O. Box 8097 | San Francisco 94128  
Tel 650-821-5100 | [www.flysfo.com](http://www.flysfo.com) | [www.flyquietsfo.com](http://www.flyquietsfo.com)





# Burlingame Short Term Aircraft Noise Monitoring

Prepared by San Francisco International Airport  
Aircraft Noise Abatement Office  
Technical Report #012017-P51-986

January 2017

**Meeting 305 - Feb 1, 2017  
Packet Page 103**

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## Executive Summary

The San Francisco International Airport (SFO) Aircraft Noise Abatement Office conducted short term noise monitoring in Burlingame. Noise Monitoring was performed to determine the noise level within the Easton Addition South neighborhood from aircraft operations at SFO. This report provides an analysis of the sound levels collected for a period of 18 days. This location was selected as it experiences low-frequency back-blast noise from departing SFO aircraft. The monitoring was made possible at the request and assistance of a Burlingame resident. The report finds that the overall average daily noise level from all aircraft was 50 decibels Community Noise Equivalent Level (CNEL). The Community daily noise level was 58 decibels CNEL. Noise from all aircraft over this location increased the total average daily noise level by 1.2 decibels.

## Equipment

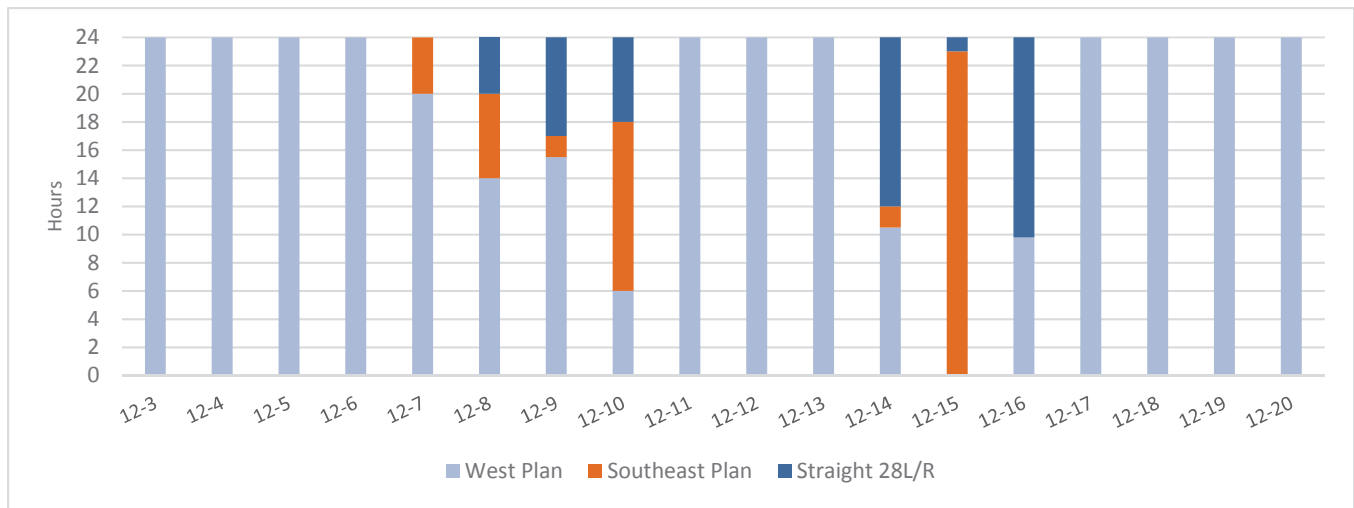
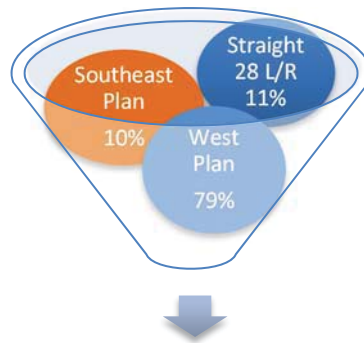
The noise monitoring equipment used to measure the sound level was an Environmental Monitor Unit 2200 noise monitor and Type 41DM-2 microphone manufactured by Bruel & Kjaer. The measurements consisted of monitoring the A-weighted decibels (dBA) in accordance with procedures and equipment which comply with International Electrotechnical Commission, and measurement standards established by the American National Standards Institute for Type I instrumentation. The microphone was calibrated prior to the start of the measurement. The monitor was housed in a weatherproof case and powered by a standard exterior electrical wall outlet. The microphone was mounted on a tripod at a height of 7 feet (see Figure 1) and placed in the resident’s backyard area. The sound levels at the site were continuously monitored, data was stored on the onboard memory and transferred to a removable memory stick for decoding. The decoded noise data was then processed in the Airport Noise and Operations Management System for identification, noise to flight track matching and CNEL noise metric calculations.

## Community and SFO Operations

Residing near the end of airport runways and behind (downwind) departing aircraft, the majority of Burlingame’s neighborhoods are exposed to noise that is very different to that from overflights. During ground operations, low frequency noise may become a disturbance. These operations include engine maintenance run-ups, reverse thrust on landing to slow the aircraft to a safe stop, back-blast in areas behind aircraft taxiing and taking off. Nevertheless, SFO is responsible for the noise impacts within the immediate vicinity of the airport. We have restricted aircraft engine run-up activity during nighttime hours and have designated locations on the airfield furthest away from communities for high power run-ups. We have also installed ground run-up monitoring system that allows us to remotely monitor aircraft run-up activity via cameras and noise monitors 24 hours a day.



Meteorological effects are the major factor affecting sound propagation over long distances. Temperature inversions and downwind propagation will increase low-frequency noise levels (Wyle, 2001). During the monitoring period there were flight delays at SFO due to inclement weather conditions in addition to increased operations due to holiday travel season. Delays occurred on days when SFO operated on a Southeast Plan (Appendix 1) or when operating on a West Plan (Appendix 1) but only using runways 28L and 28R for departing aircraft, also known as “Straight 28”. When the winds exceed 25 knots (29 miles per hour), runways facing the San Francisco Bay (01L, 01R) are not available for take-offs due to safety. All aircraft regardless of size or weight will use runways 28L and 28R to depart into the wind. See Figure 4 for more information on the impacts of wind to the runway usage and determination of the flight patterns at SFO. During these adverse conditions, your community located downwind of runways 28L/R will continue being effected by the back-blast noise. On the contrary, when on Southeast Plan your community will experience the least amount of aircraft noise. However, Southeast Plan typically occurs less than 5% of the year and is not a preferable flow as SFO aircraft acceptance rate decreases from 60 to just 30 aircraft per hour.



In addition, at night the ambient or background noise is lower than during the day. The measured ambient noise level was approximately 50 decibels during the day and about 46 decibels at night. When ambient noise is lower, any noise that occurs above the background noise will seem louder. Other than the aircraft noise, the community sound levels consisted of noise from adjacent school, occasional vehicular traffic, gardening equipment, and pets.

## Aircraft Noise Analysis

Noise measurements were taken in the Easton Addition South neighborhood starting December 3, 2016 to December 20, 2016. The noise monitor measures noise 24 hours a day at the pre-defined sound level threshold of 61dBA. This means that not every aircraft passing over the Burlingame neighborhood may register a noise event. During the monitoring period a total of 693 aircraft noise events were recorded. This report evaluates periods where full 24 hour days of data are available, from December 3rd to December 20<sup>th</sup>. For this 18-day period, there were no incomplete days. There were 632 identified correlated aircraft noise events associated with SFO operations (SFO Events) and 61 identified correlated aircraft noise events associated with other Bay Area airports (Non-SFO Events) over the evaluation period. For the 632 aircraft noise events, the average aircraft generated Maximum Noise Level (Lmax) was 67dBA, the average Sound Exposure Level (SEL) was 75dBA, and the average aircraft noise event duration was 12 seconds. Table 1 below lists the aircraft totals along with community noise event totals that were detected by the noise monitor arranged by date with the events' daily energy averages.

**Table 1 - Noise Events by Date**

Date	SFO Events <sup>1</sup>	SEL (dBA) <sup>2</sup>	Lmax (dBA) <sup>3</sup>	Non-SFO Events	SEL (dBA)	Lmax (dBA)	Community Events	SEL (dBA)	Lmax (dBA)
12/3	16	73	65	13	73	65	3	69	63
12/4	40	77	67	10	75	67	8	87	75
12/5	32	77	68	1	72	64	80	81	70
12/6	83	74	68	4	76	68	129	82	72
12/7	24	74	68	3	77	68	57	82	72
12/8	1	79	72	-	-	-	22	87	77
12/9	28	73	66	-	-	-	70	93	78
12/10	28	76	66	-	-	-	1	74	69
12/11	26	74	67	7	77	68	1	74	66
12/12	72	72	65	9	75	67	118	78	67
12/13	31	74	65	1	73	64	50	79	67
12/14	24	74	67	-	-	-	72	74	66
12/15	7	81	72	-	-	-	78	86	76
12/16	55	73	65	1	74	67	85	81	68
12/17	15	73	66	6	75	66	6	73	65
12/18	12	73	65	3	76	68	2	72	64
12/19	78	73	65	2	76	67	84	75	66
12/20	60	73	65	1	77	68	63	76	67
<b>Total</b>	<b>632</b>			<b>61</b>			<b>929</b>		

<sup>1</sup> SFO Events are: Single SFO Aircraft, Multiple SFO Aircraft, Simultaneous SFO and Non-SFO Aircraft, and Simultaneous Community and SFO Aircraft.

<sup>2</sup> 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.

<sup>3</sup> Lmax - The maximum noise level is a measurement of the peak level of a noise event.

Table 2 shows a graphic comparison between the SEL of SFO Aircraft Events and Community Events. For example, on December 6th (the day with the highest number of SFO Events- see Table 1) these 83 events were on average 8dB quieter than the 129 Community Events. While the single event noise levels of SFO Event and Community Event varied, single event noise levels of SFO Events were on average 5dBA lower than Community Events for this measurement period.

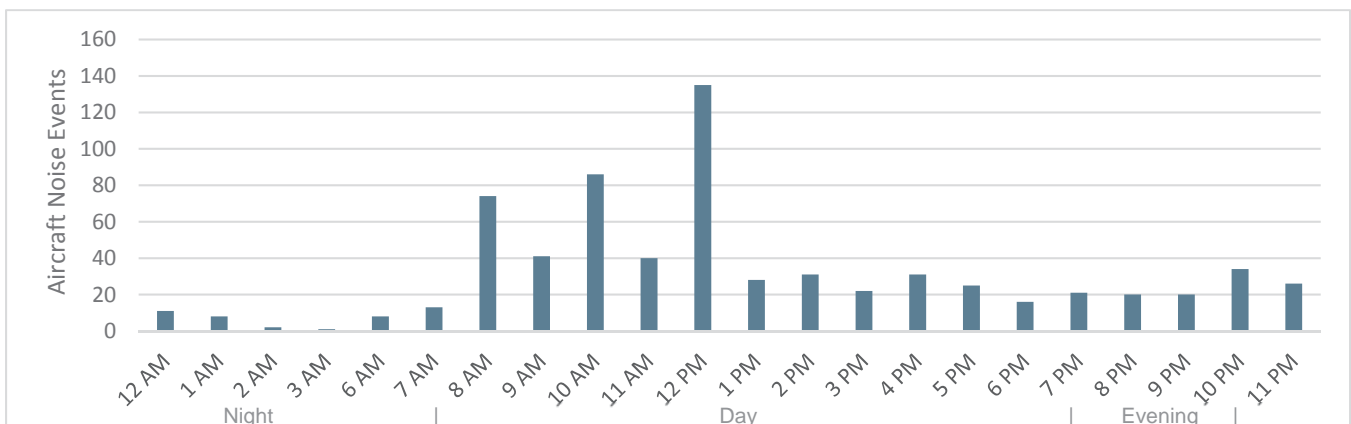
**Table 2 – SEL Comparison**



**Table 3 - SFO Events by Daytime, Evening and Nighttime hours**

SFO Aircraft Noise Data (Single Noise Events)		Lowest (dBA)	Highest (dBA)	Average (dBA)	
Day (7:00 a.m. - 7:00 p.m.)	485 (77%)	Lmax	61	81	65
		SEL	65	90	72
		Duration	5 sec	67 sec	12 sec
Evening (7:00 p.m. - 10:00 p.m.)	58 (9%)	Lmax	62	72	65
		SEL	68	82	74
		Duration	5 sec	30 sec	12 sec
Night (10:00 p.m. - 7:00 a.m.)	89 (14%)	Lmax	61	76	65
		SEL	67	82	73
		Duration	5 sec	31 sec	12 sec

**Table 4 - Aircraft Noise Events by Hour (SFO Aircraft and Non-SFO Aircraft)**



### Low Frequency Noise Levels

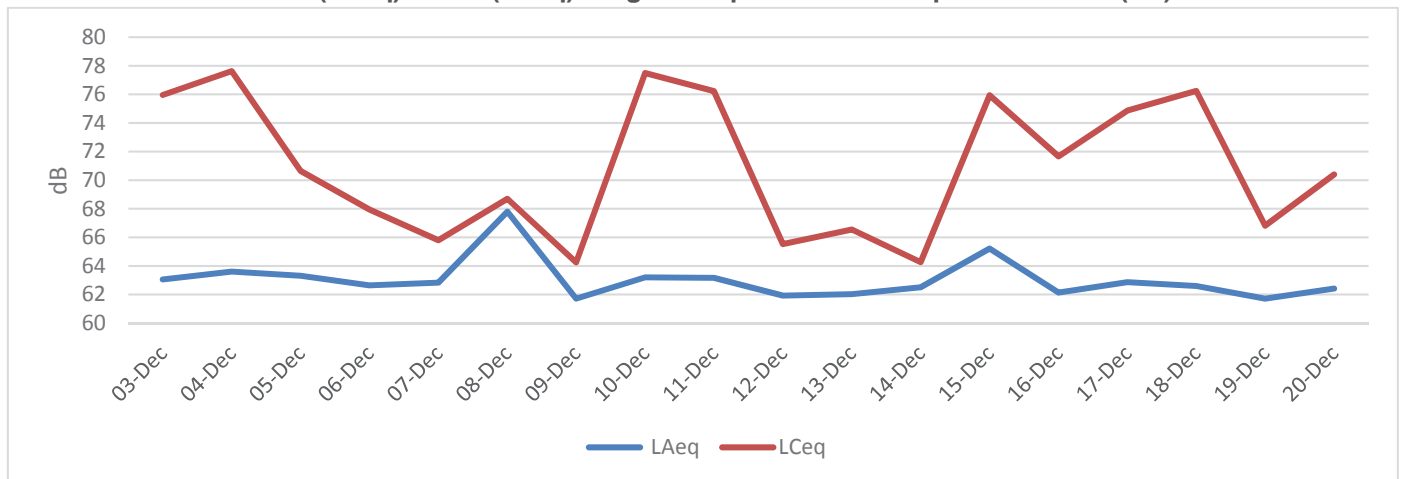
Low frequency aircraft study conducted at SFO in 2001 suggests that C-weighting is preferred over A-weighting to describe back-blast noise. Noise measurements from aircraft overflights typically use A-weighted decibels that measure sound levels in the mid to high frequencies. In the event of a low frequency noise (airplane take-off, engine run-up) the duration and spectral content of the event is different from that of an aircraft overflight. Low frequency back-blast noise levels decrease by about 6dB per doubling of distance. The reduction of noise from air and ground absorption is small (Wyle, 2001). For this measurement the average aircraft generated Maximum Noise Level (LCmax) was 76dBC, and the average Sound Exposure Level (LCE) was 84dBC. Table 5 C-weighted sound exposure and maximum noise level values can be contrasted to Table 1 A-weighted values.

The same study also suggests that removing aircraft with LBPR (low bypass ratio engines) would be a mitigation measure to consider. Noise radiated to the rear of the aircraft is reduced significantly in the HBPR (high bypass ratio engines) installed on Stage 3 aircraft or greater. Consequently, SFO has phased out Stage 2 aircraft (Appendix 3).

**Table 5 - Noise Events by Date (C-weighted frequency)**

Date	SFO Events <sup>1</sup>	LCE (dBC) <sup>2</sup>	LCMax (dBC) <sup>3</sup>	Non-SFO Events	LCE (dBC)	LCMax (dBC)	Community Events	LCE (dBC)	LCMax (dBC)
12/3	16	87	78	13	77	85	3	68	75
12/4	40	91	81	10	75	84	8	77	88
12/5	32	86	77	1	75	82	80	70	82
12/6	83	84	76	4	77	85	129	73	83
12/7	24	79	71	3	75	84	57	72	84
12/8	1	80	72	-	-	-	22	77	88
12/9	28	76	67	-	-	-	70	81	97
12/10	28	91	81	-	-	-	1	70	75
12/11	26	88	80	7	78	87	1	79	86
12/12	72	77	69	9	77	85	118	69	81
12/13	31	79	70	1	76	85	50	68	82
12/14	24	80	71	-	-	-	72	67	76
12/15	7	89	80	-	-	-	78	85	93
12/16	55	86	77	1	77	84	85	70	84
12/17	15	85	77	6	75	84	6	75	83
12/18	12	86	78	3	78	87	2	71	79
12/19	78	78	69	2	75	84	84	70	81
12/20	60	84	75	1	77	88	63	72	82
<b>Total</b>	<b>632</b>			<b>61</b>			<b>929</b>		

**Table 6 - A (LAeq) and C (LCeq) weighted equivalent sound pressure level (dB)**





## Aircraft Operations

All aircraft which flew within a cylindrical airspace of 2.5 miles in radius and 2,000 feet in height, known as Point of Closest Approach (PCA); centered on the measurement location were evaluated for this measurement period. A daily average of 1,218 flights penetrated this airspace- typical SFO operations average. An average of 3% of flights exceeded the threshold used to detect aircraft noise and registered events on the noise monitor. The majority of these operations were departing aircraft from 1R and 28L and arriving aircraft to 28L. 70% were departures and 30% were arrivals. Table 5 and 6 below detail the amount of daily overflights versus aircraft noise events. Appendix 2 lists these aircraft by type.

**Table 5 - Aircraft Overflights versus Noise Events**

Date	Amount of PCA Flights <sup>3</sup>	Amount of Aircraft Noise Events <sup>4</sup>	Aircraft CNEL (dBA) <sup>5</sup>	Range (dBA)		Flow Pattern <sup>8</sup>
				Lmax <sup>6</sup>	SEL <sup>7</sup>	
12/3 <sup>1</sup>	1,020	29	42	62-69	68-77	West
12/4	1,176	50	45	62-76	68-86	West
12/5	1,187	33	46	62-77	67-90	West
12/6	1,208	87	48	61-81	67-85	West
12/7	1,118	27	41	61-78	67-80	West & SE
12/8	1,145	1	29	72-72	79-79	West & SE
12/9	1,171	28	38	61-73	67-83	West & SE
12/10	900	28	49	61-71	67-81	West & E
12/11	1,142	33	46	61-74	67-81	West
12/12	1,240	81	44	61-71	67-79	West
12/13	1,193	32	40	61-70	67-81	West
12/14	1,111	24	39	62-74	68-84	West
12/15	830	7	42	62-78	71-86	Southeast
12/16	1,322	56	49	61-76	67-82	West
12/17	1,180	21	42	61-72	67-80	West
12/18	1,238	15	43	62-70	69-79	West
12/19	1,262	80	44	61-70	65-80	West
12/20 <sup>2</sup>	1,220	61	45	61-71	68-79	West
<b>Total</b>	<b>21,928</b>	<b>693</b>				
<b>Daily Average</b>	<b>1,218</b>	<b>39</b>	<b>45</b>			

<sup>1</sup> 12/03/16 first Aircraft Noise Event was measured at 1:22 a.m. for this survey.

<sup>2</sup> 12/20/16 last Aircraft Noise Event was measured at 10:47 p.m. for this survey.

<sup>3</sup> The Amount of PCA Overflights through a defined cylindrical airspace, centered on the monitor's location for a 24-hour period starting at midnight to 11:59:59 p.m.

<sup>4</sup> Aircraft Noise Events include all SFO Aircraft, Multiple SFO Aircraft, Non-SFO Aircraft, and Simultaneous SFO & Non-SFO Aircraft.

<sup>5</sup> This value is an energy average.

<sup>6</sup> Lmax - The maximum noise level is a measurement of the peak level of a noise event.

<sup>7</sup> 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.

<sup>8</sup> Flow Pattern is the general flight pattern used by arriving and departing aircraft based on wind speed and direction. See Appendix 1 for San Francisco Bay Area Major Jet Arrival and Departure patterns: West Flow Plan and Southeast Flow Plan.

Flights that Registered Noise Events during the monitoring period. Red circle shows 2.5-mile radius centered on the noise monitoring station.

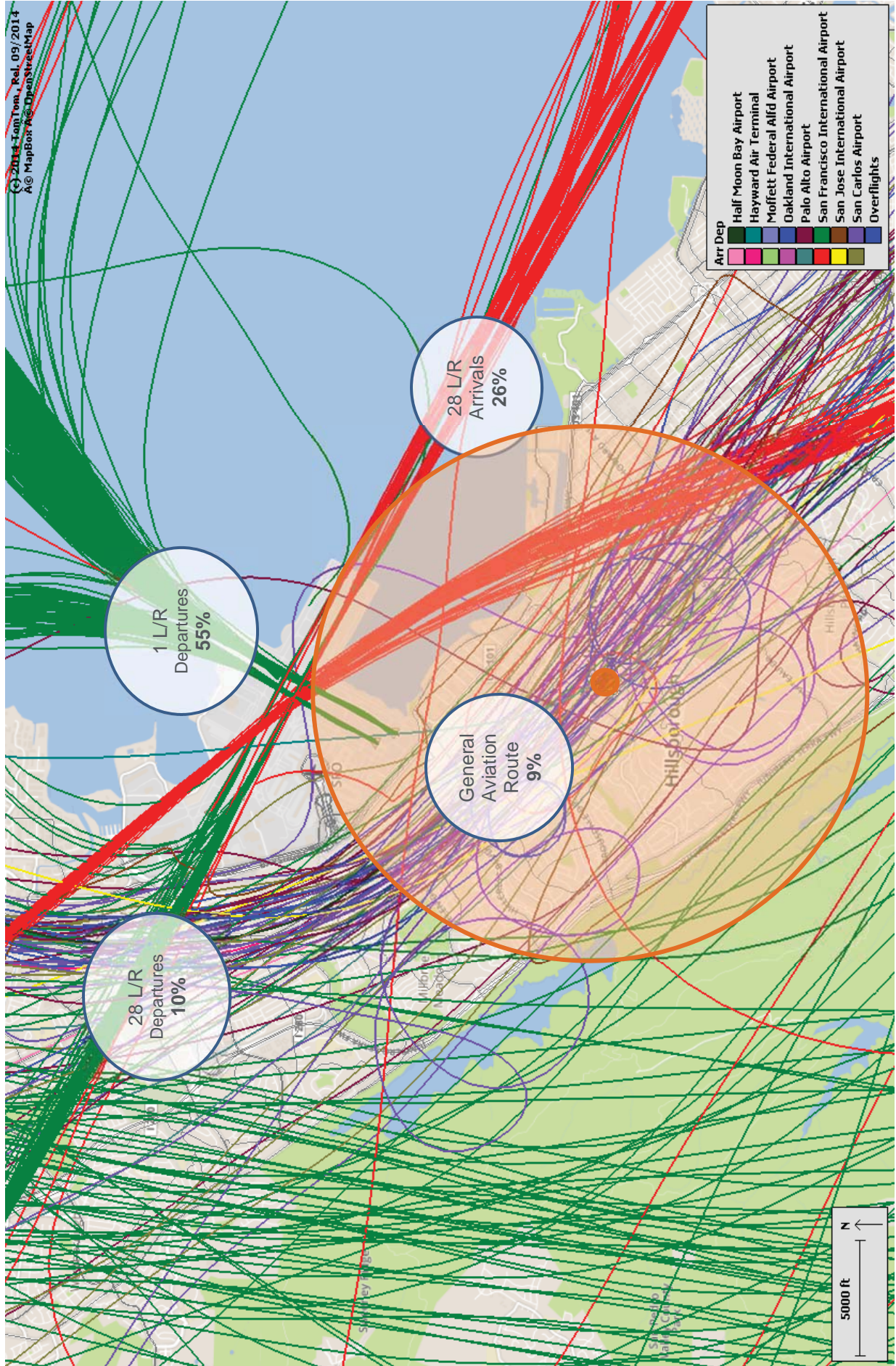


Table 6 – All SFO Operations versus Noise Events

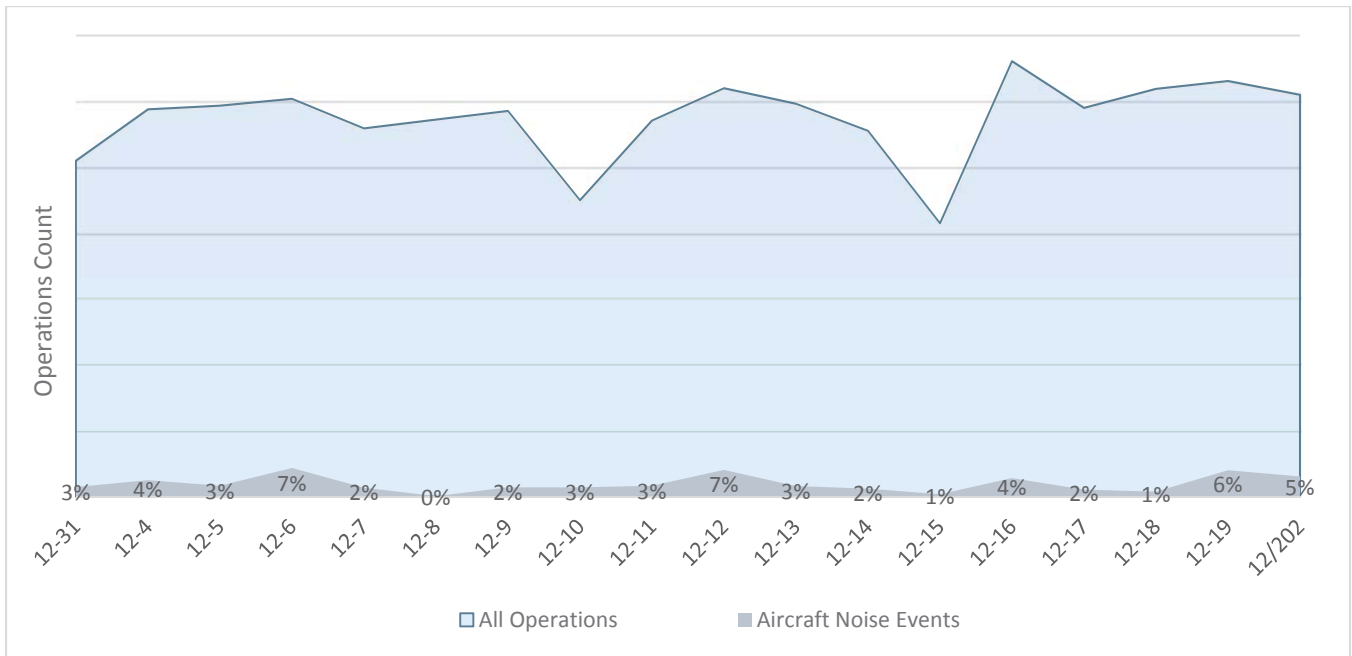
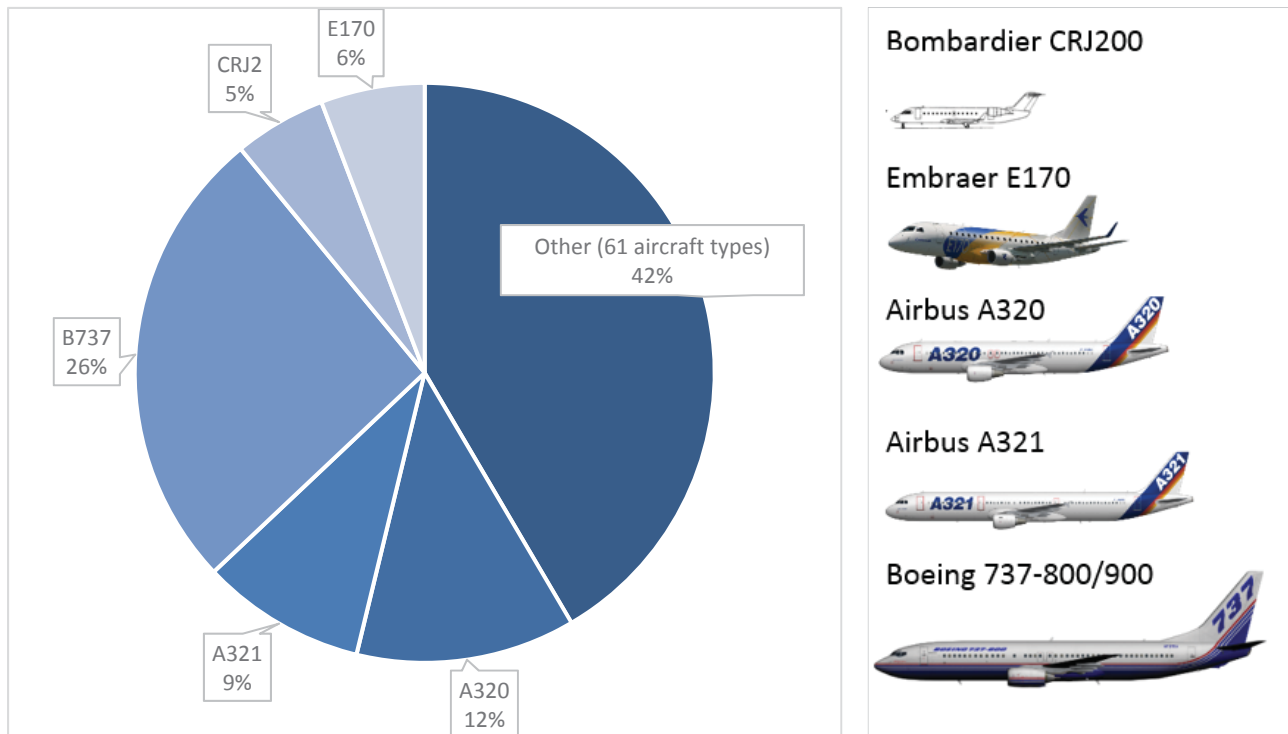


Table 7 - Noise Events by Aircraft Type

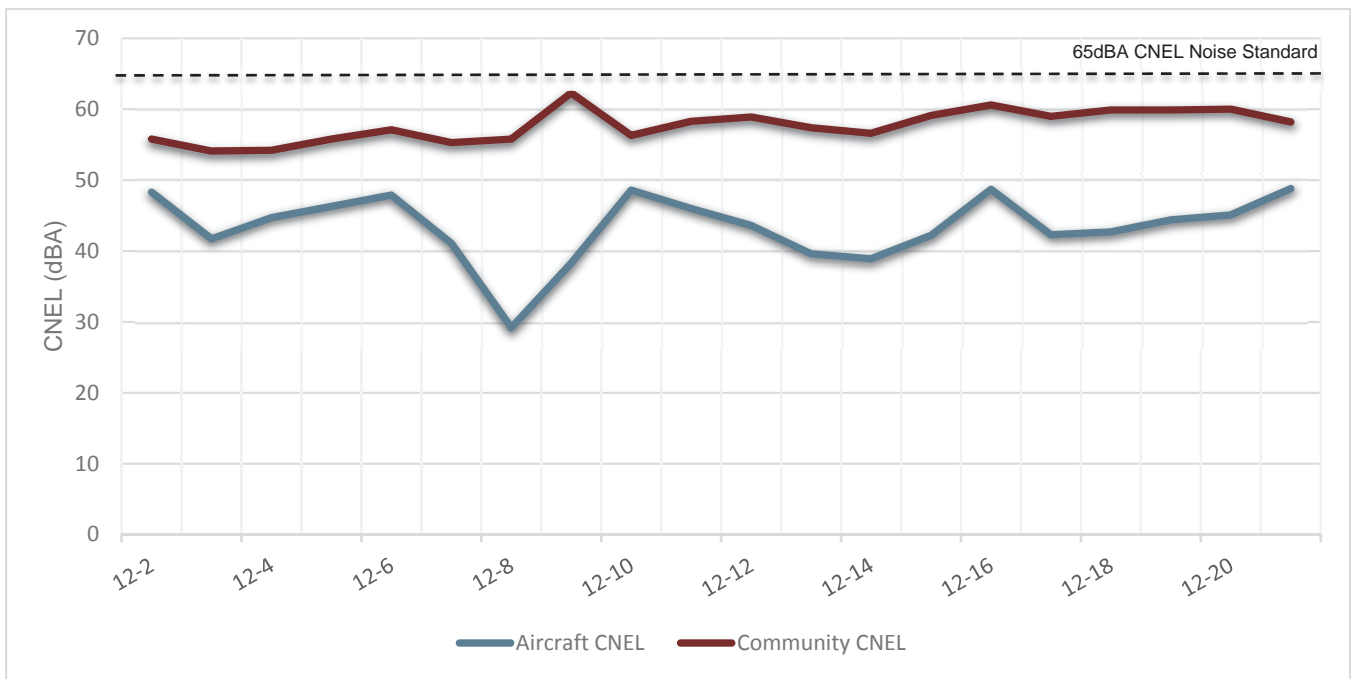


## Conclusion

Aircraft noise levels were measured in the Easton Addition South neighborhood of Burlingame, adjacent to Roosevelt Elementary School, two miles away from SFO Runway 19 L/R. This community is located behind (downwind) SFO departure runways (28L, 28R, 01L, 01R) and affected by low-frequency back-blast noise of the departing aircraft and reverse thrust noise from arriving aircraft. The computed levels for the average **Aircraft CNEL** was 43dBA, the average **Community CNEL** was 58dBA, and the **Total CNEL** was 58dBA (see Table 8). Aircraft noise events peaked during the hours of 8am and 12pm (Table 4) and accounted for 60% of all events. This coincides with the peak activity of SFO operations during these hours. Nighttime hours of 10pm and 6am, averaged five aircraft noise events per night and accounted for 14% of all aircraft noise events. Amount of aircraft noise events and CNEL value was lowest when SFO operated on a Southeast Plan. Throughout the measuring period Community Events were significantly lower on the weekends due to school being closed.

Overall aircraft noise measurements contribute 0.3dBA additional noise to the total cumulative average noise level of 58dBA CNEL. For comparison purposes, the computed average Aircraft CNEL at permanent noise monitor #11 (1804 Deveraux Dr., Burlingame) located less than a mile north west was 50dBA for the same period.

Table 8 – CNEL



The California Code of Federal Regulations, Title 21, Division 2.5, Chapter 6, paragraph 5012 states, “The standard for the acceptable level of aircraft noise for persons living in the vicinity of airports is hereby established to be a community noise equivalent level of 65 decibels.” Since the average Aircraft CNEL was measured at 43dBA for this Burlingame neighborhood, the residential area has an acceptable level of aircraft noise as defined by state law. The extent of the 65dBA CNEL noise impact contour at SFO is shown on page 13. This noise contour was generated using Federal Aviation Administration’s Integrated Noise Model (version 7.0d). The Federal Aviation Administration accepted this map as part of the Noise Exposure Map update under Federal Aviation Regulations Part 150 on January 29, 2016 (Figure 3). The results of the field monitoring validate the extent of the 65dBA CNEL noise impact boundary confirming Aircraft CNEL is less than 65dBA CNEL for this location.



Figure 1 – Microphone and tripod (main) and Monitor (bottom right).





Figure 2 - Monitoring Location #986 (red circle – 2.5-mile radius) and Permanent Noise Monitor Sites (blue circles)

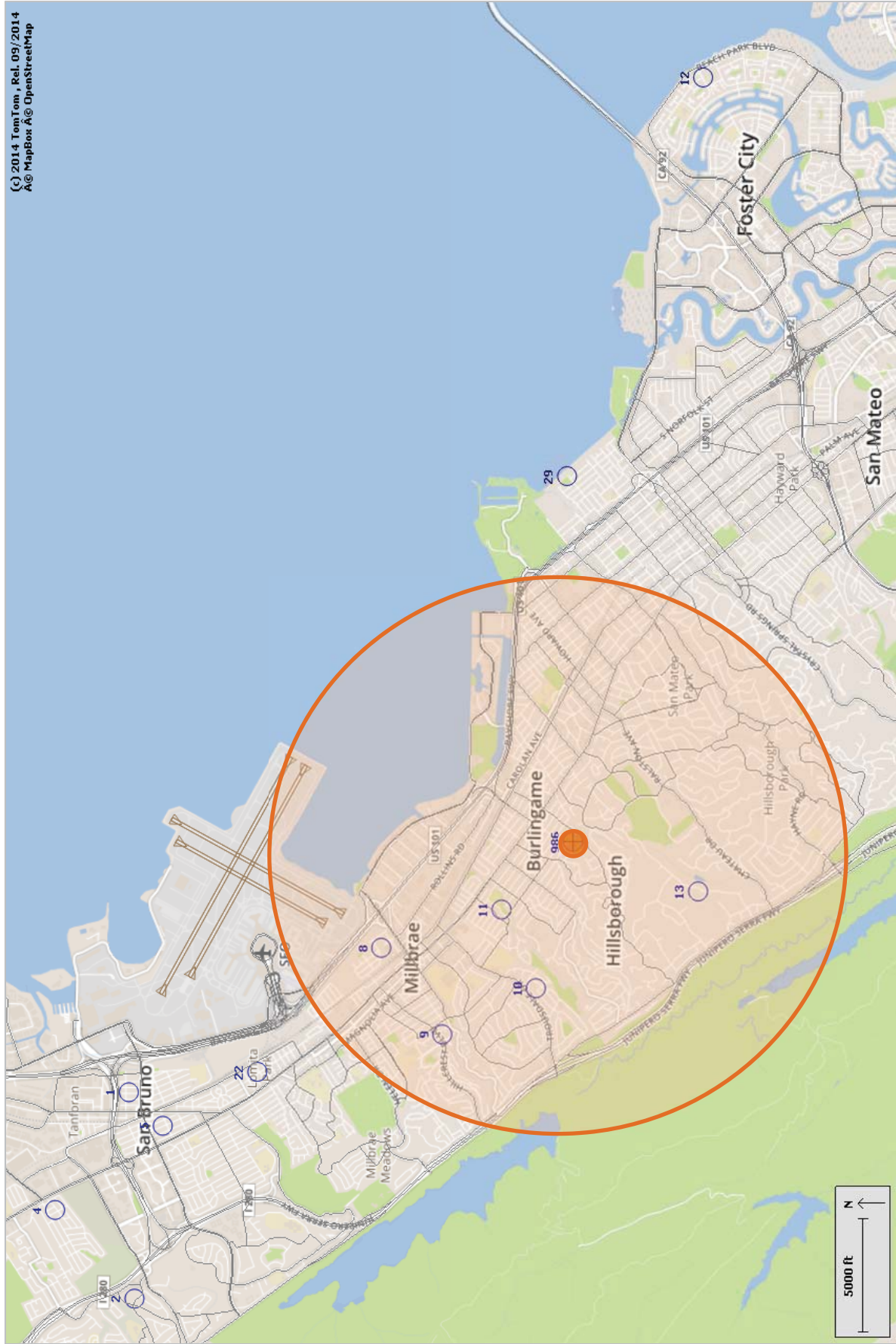
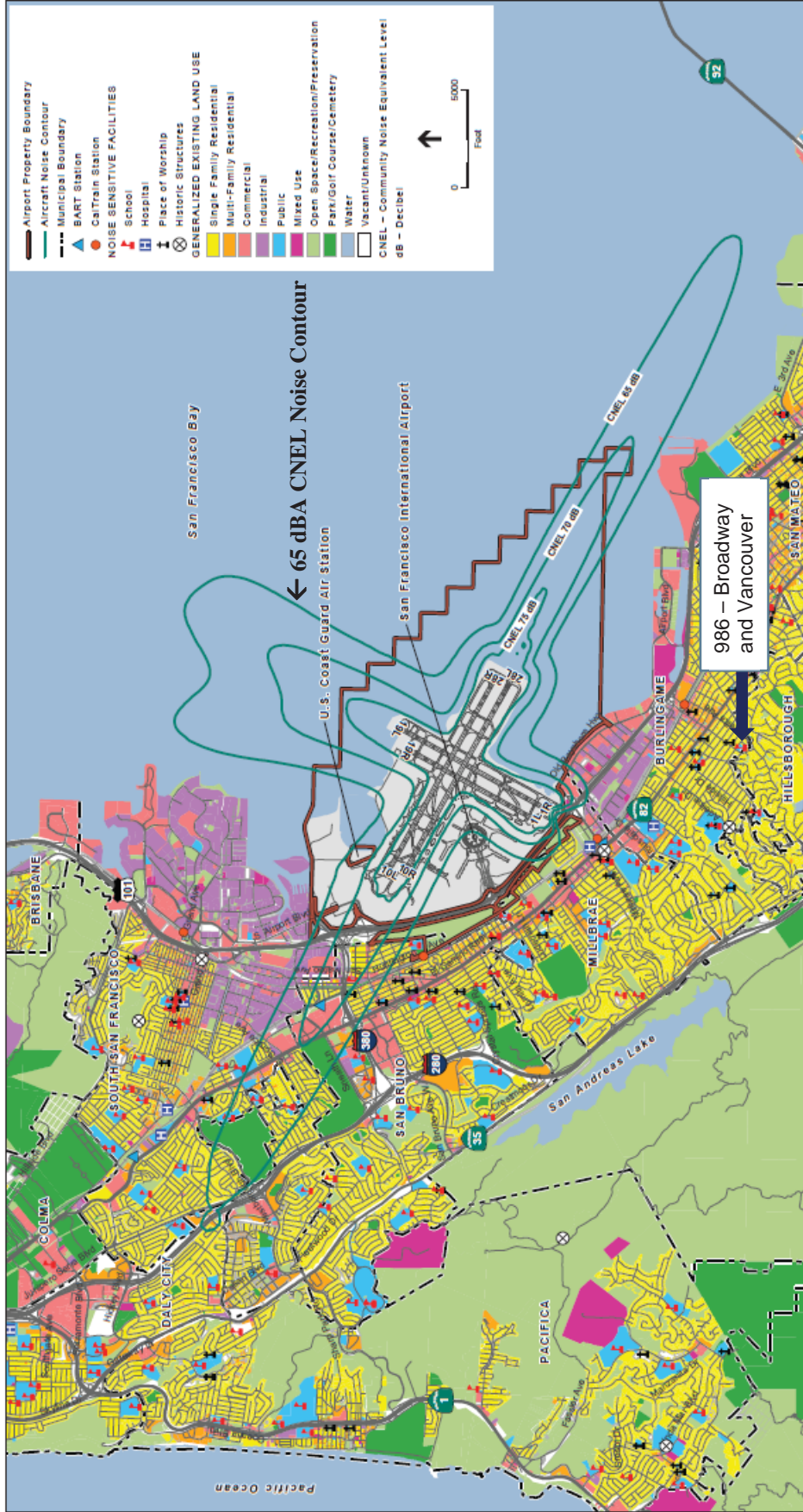


Figure 3 – 2014 Noise Exposure Map

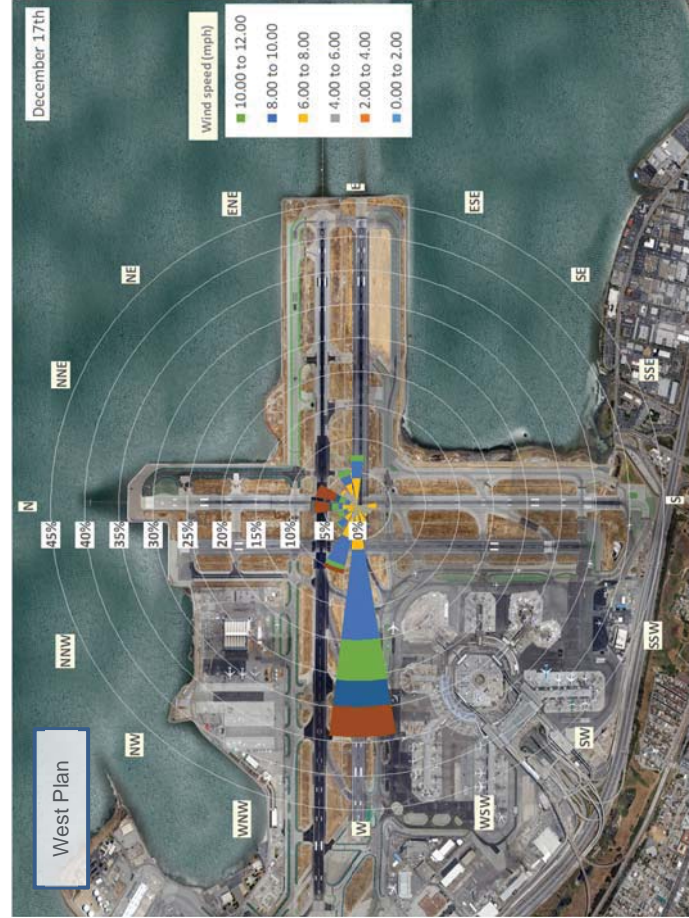
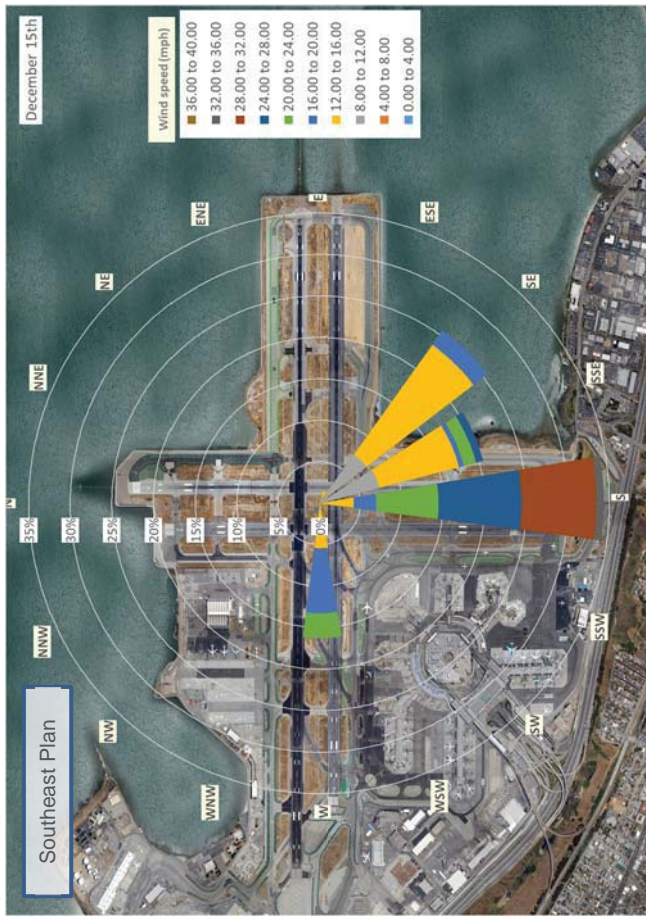


SOURCE: ESRI, 2014; San Mateo County Planning and Building Department, 2014; ESA, Airports, 2014

SFO FAR Part 150 Noise Exposure Map Report, 120832  
 Exhibit 5-1  
 2014 Noise Exposure Map – San Francisco International Airport



Figure 4 – SFO Wind Rose Map for different SFO flow patterns

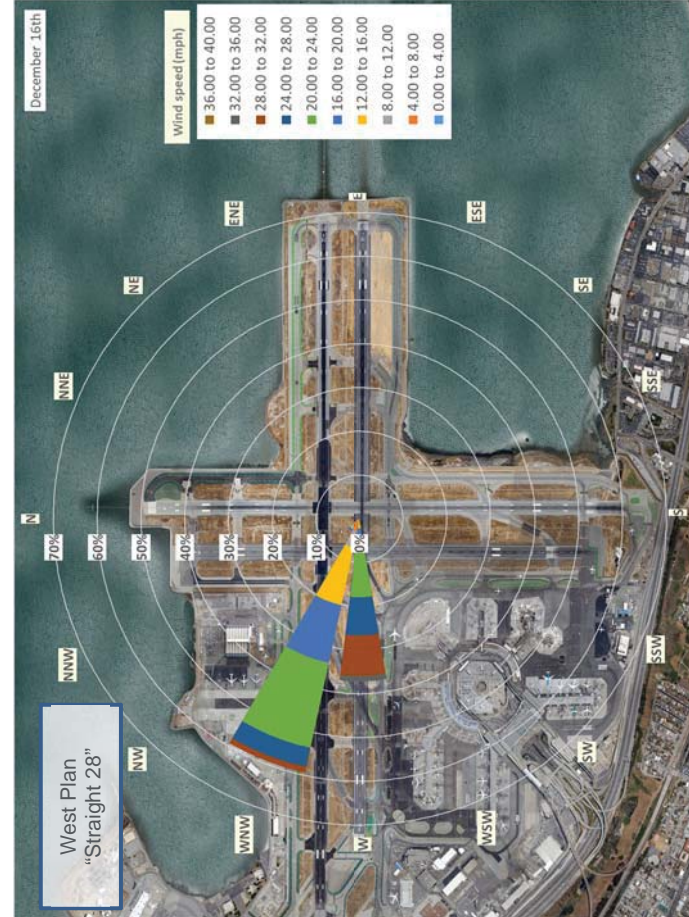


**West Plan** – Wind blows predominantly out of the West. Aircraft are arriving 28 L/R and departing 1 L/R.

**West Plan “Straight 28”**- Wind blows predominantly out of the West, North West at speeds greater than the maximum crosswind component for 1 L/R departures therefore aircraft arrive and depart 28 L/R.

**Southeast Plan**- Wind blows predominantly out of the South, Southeast. Aircraft are arriving on 19 L/R and departing 10 L/R.

Wind rose graphically displays wind **speed** and wind **direction** at the airport over a period of time. Wind directions are presented in terms of the cardinal wind directions (north, east, south, west) and their intermediate directions (16 spokes). Each “spoke” shows how often the wind blows from each direction and how often the wind blows at each pre-defined wind speed bins for each wind direction (shown by color bands). Wind speed is represented in miles per hour.



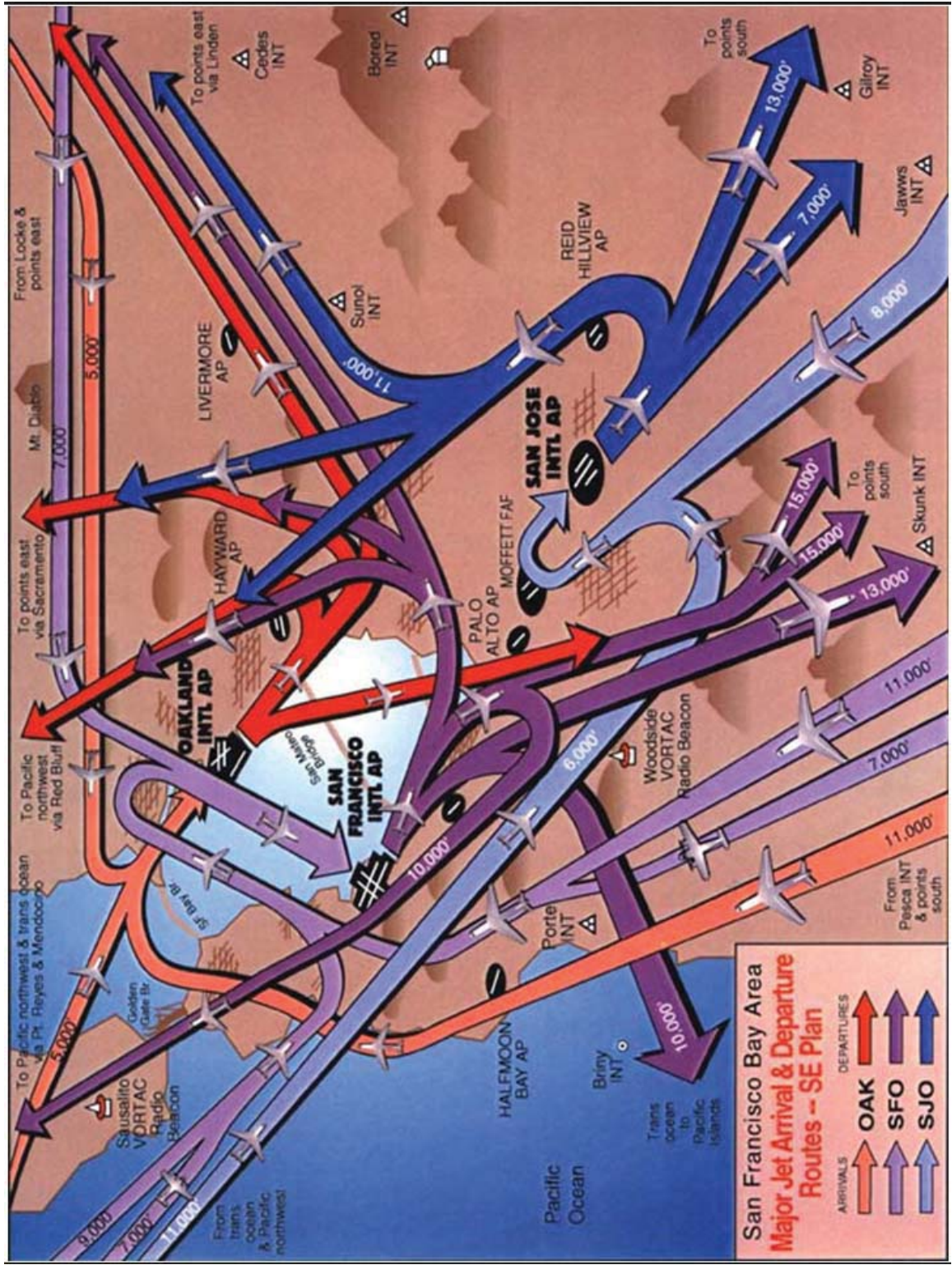






Appendix 1 – San Francisco Bay Area Major Jet Arrival and Departure Routes

Southeast Flow Plan



Note: Image not to scale and not all flight paths are shown.



Appendix 2 – Aircraft Type Reference Sheet

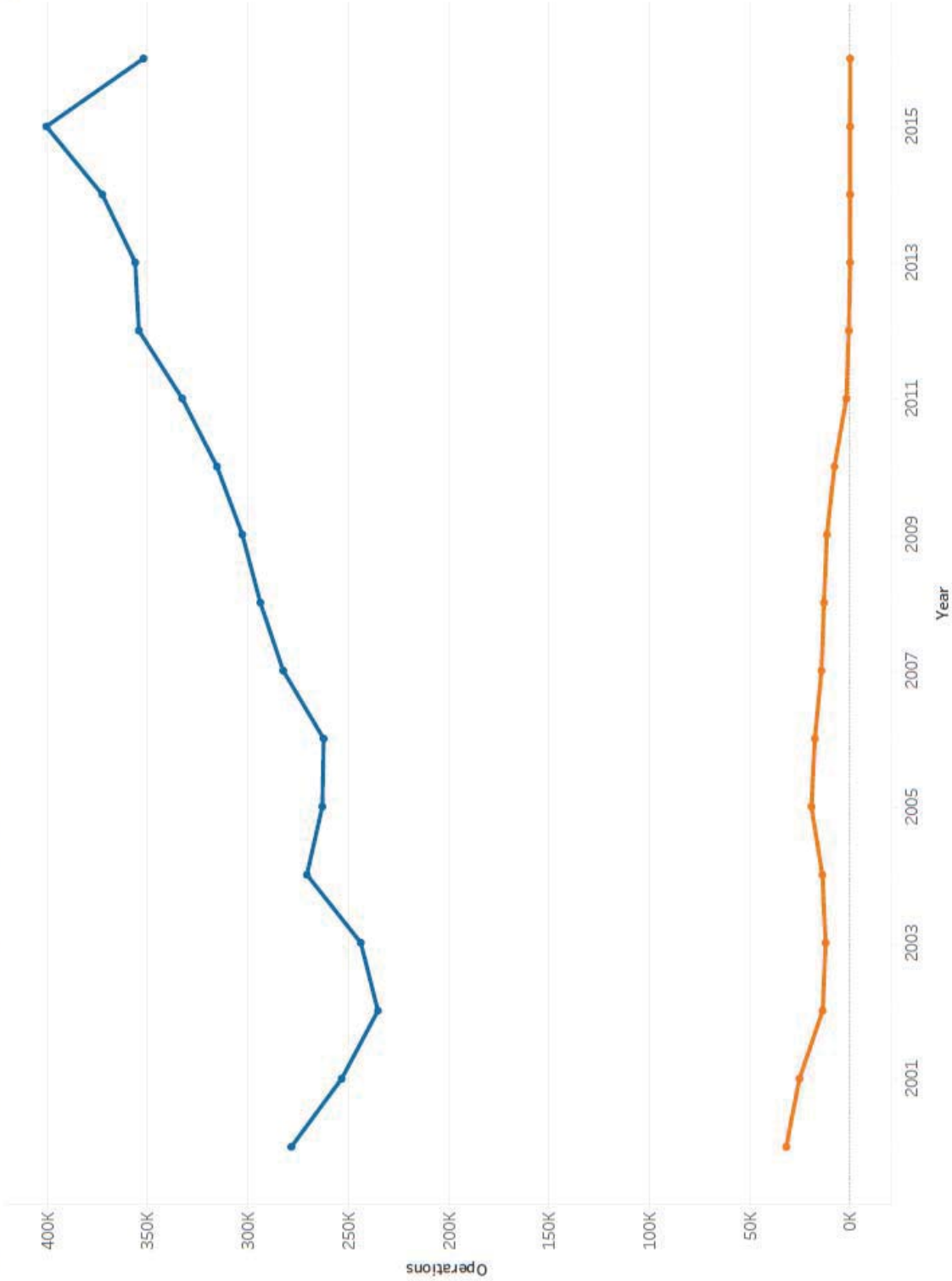
	<b>Wide Body Jet</b> (wide enough for two passenger aisles)	<b>Narrow Body Jet</b> (wide enough for one passenger aisles)	<b>Business Aircraft</b> (transportation for small groups of people)	<b>General Aviation Aircraft</b> (Generally small, propeller-driven aircraft)
<b>A330</b>	Airbus A330	A319 Airbus A319	B350 Beechcraft King Air 350	C172 Cessna 172 Skyhawk
<b>A332</b>	Airbus A330-200	A320 Airbus A320	BE20 Beechcraft 200 King Air	C182 Cessna C182 Skylane
<b>A333</b>	Airbus A330-300	A321 Airbus A321	C25B Cessna Citation CJ3	C414 Cessna C414
<b>A388</b>	Airbus A380-800	B712 Boeing 717-200	C680 Cessna 680 Citation Sovereign	DA40 Diamond DA-40
<b>B744</b>	Boeing 747-400	B733 Boeing 737-300	C750 Cessna 750 Citation X	PA46 Piper Malibu/Mirage
<b>B748</b>	Boeing 747-8	B737 Boeing 737-700	CL30 Bombardier Challenger 300	P32R Piper Cherokee Six
<b>B763</b>	Boeing 767-300	B738 Boeing 737-800	CL35 Bombardier Challenger 350	
<b>B772</b>	Boeing 777-200	B739 Boeing 737-900	CL60 Bombardier Challenger 600	<b>Helicopter</b>
<b>B773</b>	Boeing 777-300	B752 Boeing 757-200	F2TH Dassault Falcon 2000	<b>(Generally small, propeller-driven aircraft)</b>
<b>B77L</b>	Boeing 777-200LR	B753 Boeing 757-300	GALX Gulfstream 200	B206 Bell 206 Long Ranger
<b>B77W</b>	Boeing 777-300ER	CRJ2 Bombardier CRJ200	GLEX Bombardier Global Express (twin-jet)	HELO Helicopter
<b>B788</b>	Boeing 787-8	CRJ7 Bombardier CRJ700	GLF4 Gulfstream 4	
<b>B789</b>	Boeing 787-9	CRJ9 Canadair/Bombardier CRJ-900	GLF5 Gulfstream 5	
<b>E170</b>	Embraer EMB 170	E170 Embraer EMB 170	H25B Raytheon/Hawker 800	
<b>E545</b>	Embraer Legacy 450	E545 Embraer Legacy 450	LJ75 Learjet 75	
<b>E75L</b>	Embraer E175	E75L Embraer E175	PRM1 Beechcraft Raytheon 390 Premier1	
<b>MD88</b>	McDonnell Douglas MD-88	MD88 McDonnell Douglas MD-88	FA50 Falcon	
			C550 Cessna C550/Citation II	
			C56X Cessna 560XL/Citation Excel	

Appendix 3- High By-Pass and Low-By pass aircraft at SFO



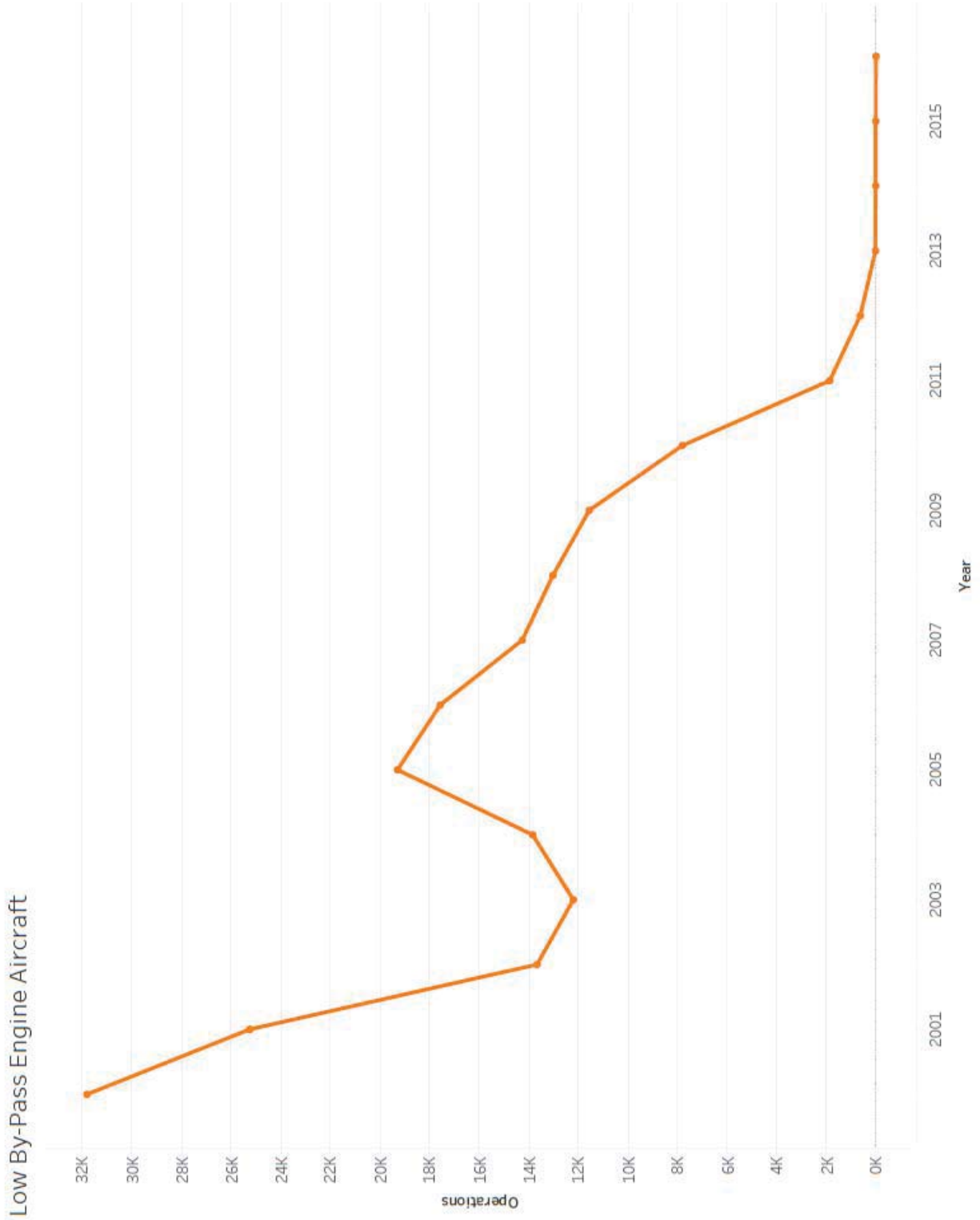
Engine By-Pass  
 High By-Pass  
 Low By-Pass

High By-Pass and Low By-Pass Aircraft at SFO



High By-Pass Aircraft (80.22 %) and Low By-Pass Aircraft (2.84 %) data in this graph accounts for 83.06 % of all SFO operations from January 2000-October 2016.

Engine By-Pass  
Low By-Pass







Aircraft  
Noise  
Terminology  
& Metric

Supplement

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2014

## **Aircraft Noise Terminology & Metric**

To assist in understanding the noise measurement results and the metric used in evaluating airport noise, this supplement provides a brief introduction to various acoustic terminologies used to express sound level. The terms discussed are the decibel (dB), A-weighted decibel (dBA), Maximum Noise Level (L<sub>max</sub>), Sound Exposure Level (SEL) and time-weighted, cumulative metric known as Community Noise Equivalent Level (CNEL).

The **decibel (dB)** is the unit used to represent the change in sound pressure as a direct measurement of changes in amplitudes on array of frequencies. Decibels measure a scale from the threshold of human hearing – 0 dB, 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 10 dB is perceived by our ears as a doubling of noise. Most sounds we experience in our day-to-day lives vary between 30 dB and 100 dB. Figure 1 depicts decibel levels of common sounds.

**A-weighted decibel (dBA)** is sound pressure levels filtered with an “A” weighted filter de-emphasizing level changes that occur at lower frequencies (those below 500 Hertz) and also at very high frequencies above 10,000 Hertz where people generally do not hear as well. The normal frequency range of hearing for most people is from a low of 500 Hertz to a high of 10,000 Hertz. This filter closely matches our ears’ sensitivity to sound. As a result, an aircraft noise event with a higher A-weighted sound level is perceived to be louder than an aircraft noise event with a lower A-weighted sound level. This correlation with our perception of loudness is the reason that A-weighted sound levels are used to evaluate environmental noise sources.

The sound level heard during an arrival or departure of an aircraft varies as a function of the distance from the aircraft to the person hearing the noise and as a function of the direction of the aircraft noise source. As the aircraft approaches the person, the sound level increases and as the aircraft moves away from the person, the sound level decreases. The effect of noise exposure during such an event can be described in terms of either the Maximum Sound Level or the Sound Exposure Level of an individual aircraft noise event.

The **Maximum Sound Level (L<sub>max</sub>)** represents the highest instantaneous noise level heard during a single aircraft overflight. However, it provides no information on the duration (length) of the noise exposure. Thus, two events with the exact L<sub>max</sub> may produce completely different total exposures. While some people will be annoyed by events having shorter duration, majority of people are more likely to be highly annoyed with longer events continuing for extended period of time. To account for differing durations of an event, Sound Exposure Level is used to quantify total noise exposure for a single aircraft overflight.

The **Sound Exposure Level (SEL)** is the total sound energy above an established threshold for a single event considering both intensity and length of the event all compressed into 1 second. The SEL of any noise event is the entire event's total energy expressed in a reference period time as though it had occurred within one second. A noise event having a L<sub>max</sub> of 80 dB and lasting 1 second would have a SEL of 80 dB. But if that event lasted 2 seconds long, the SEL would be 83 dB. Two events with the same intensity but different durations can be differentiated with the longer duration event having a higher SEL. For locations relatively close to an airport, the SEL for most aircraft departures will usually be about 10 decibels higher than the corresponding L<sub>max</sub>. For example, an aircraft departure producing a maximum sound level of 70 dB at a particular location would be expected to produce an SEL value of about 80 dB at the same location. SEL gives us a common basis for comparing noise events that matches our instinctive impression – the higher the SEL, the more annoying it is likely to be. Figure 2 is a graphic representation of a typical aircraft noise event along with these terminologies.

In the example below, the SEL is calculated for an aircraft noise event that has a duration of 5 seconds and a Lmax of 65 dBA. This noise event is numerically equivalent to a SEL of 69.6 dBA.

**Sound Exposure Level Formula:**

$$SEL = 10 * \log_{10} \left( \sum_{i=1}^n 10^{L_i/10} \right)$$

Where SEL = sound exposure level

$L_i$  = sound level for a given one second time period

$n$  = number of seconds during the measurement period

**SEL calculation example:**

The rows below list the 1 second decibel levels and the corresponding energy levels of the 5 seconds duration aircraft noise event. The energy levels are summed together in order to calculate the SEL value of the aircraft noise event.

Seconds	Sound Level	Energy
1	60 dB	1000000.0
2	63 dB	1995262.3
3	65 dB (LMax)	3162277.7
4	63 dB	1995262.3
5	60 dB	1000000.0
	Total Energy	9152802.3
	<b>Aircraft Noise Event's SEL</b>	<b>69.6 dB</b>

The **Community Noise Equivalent Level (CNEL)** metric is used to assess and regulate aircraft noise exposure in communities surrounding airports located in California. Federal Government approved and defined in the California Airport Noise Standards, this cumulative metric represents the average daytime noise level during a 24-hour day and adjusted to an equivalent level to account for increased sensitivity to aircraft noise during evening and nighttime periods relative to the daytime. CNEL applies a 4.77 dBA weighting to all aircraft events occurring during the 3 evening hours from 7:00 p.m. to 9:59:59 p.m. and a 10 dBA weighting to all aircraft events during the 9 nighttime hours from 10:00 p.m. to 6:59:59 a.m.

Aircraft CNEL is then derived using the SELs from all aircraft events for the 24 hour day. The Total CNEL will include all aircraft events as well as other noise events generated in the community during the corresponding time period. Typically, Total CNEL in our environment ranges from a low of 40-45 dBA in very quiet locations to 80-85 dBA immediately adjacent to an active noise source – busy traffic route or active airport. Figure 3 shows representative values of CNEL in typically different environments. Aircraft CNEL greater than 65 dBA CNEL within a residential property line is incompatible to airport operations. CNEL is calculated using the following formula:

$$CNEL = 10 * \log_{10} \left( \left[ \sum_{i=1}^n 10^{SEL_i/10} + \sum_{i=n+1}^m 10^{(SEL_i+4.8)/10} + \sum_{i=m+1}^r 10^{(SEL_i+10)/10} \right] \right) - 49.4$$

Day
Evening
Night

CNEL calculation example showing 10 aircraft noise events in a 24 hour period:

Time of Day	Hour	SEL (dB)	Weighting (dB)	Weighted SEL (dB)	Energy
Night	Midnight	86.1	10	96.1	4073802778.0
Night	1:00 a.m.		10		
Night	2:00 a.m.		10		
Night	3:00 a.m.		10		
Night	4:00 a.m.		10		
Night	5:00 a.m.	90.0	10	100.0	10000000000.0
Night	6:00 a.m.	86.1	10	96.1	4073802778.0
Day	7:00 a.m.		0		
Day	8:00 a.m.	93.6	0	93.6	2290867652.8
Day	9:00 a.m.		0		
Day	10:00 a.m.	82.6	0	82.6	181970085.9
Day	11:00 a.m.		0		
Day	Noon	90.3	0	90.3	1071519305.2
Day	1:00 p.m.		0		
Day	2:00 p.m.		0		
Day	3:00 p.m.		0		
Day	4:00 p.m.		0		
Day	5:00 p.m.	94.8	0	94.8	3019951720.4
Day	6:00 p.m.		0		
Evening	7:00 p.m.		4.77		
Evening	8:00 p.m.		4.77		
Evening	9:00 p.m.	86.1	4.77	90.9	1221799660.2
Night	10:00 p.m.	85.2	10	95.2	3311311214.8
Night	11:00 p.m.	89.5	10	99.5	8912509381.3
				Total Energy	38157534576.7
				<b>Aircraft CNEL</b>	<b>56.4 dB</b>



Figure 1 – Common Sound Levels

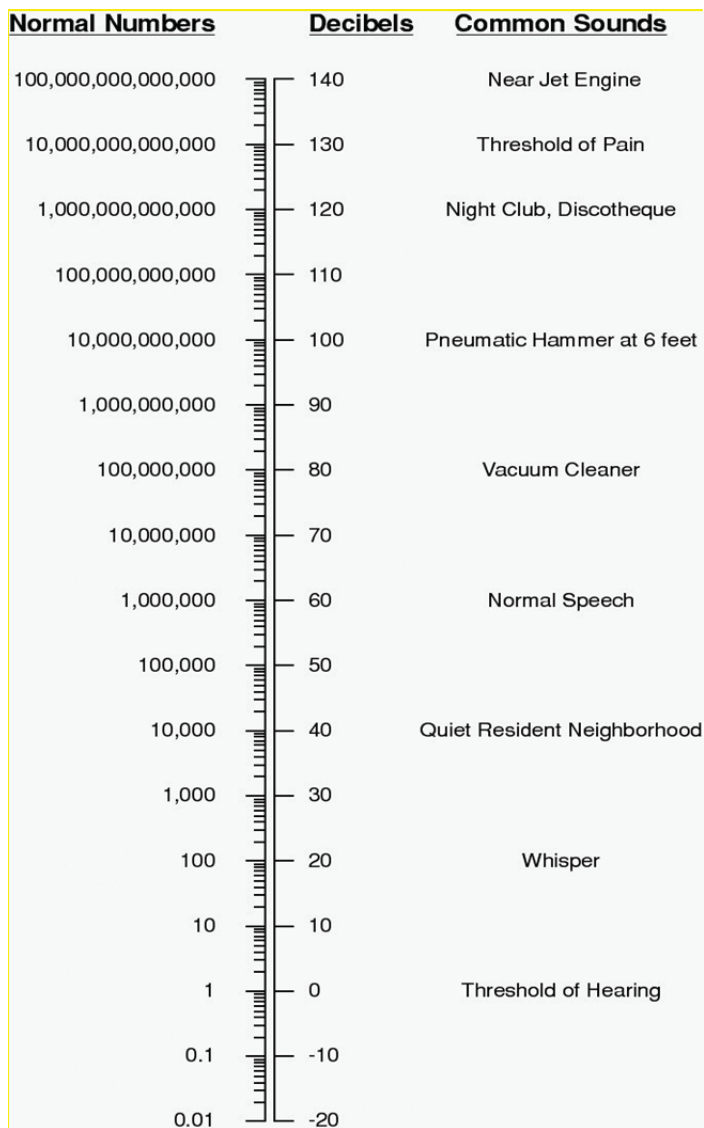


Figure 2 – Typical Aircraft Noise Event

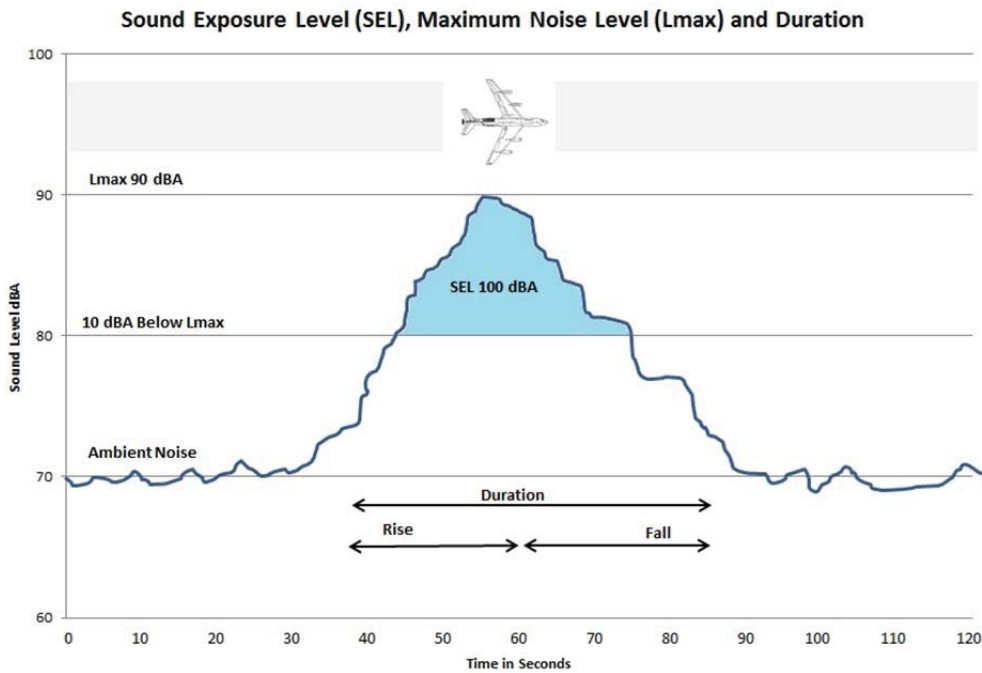
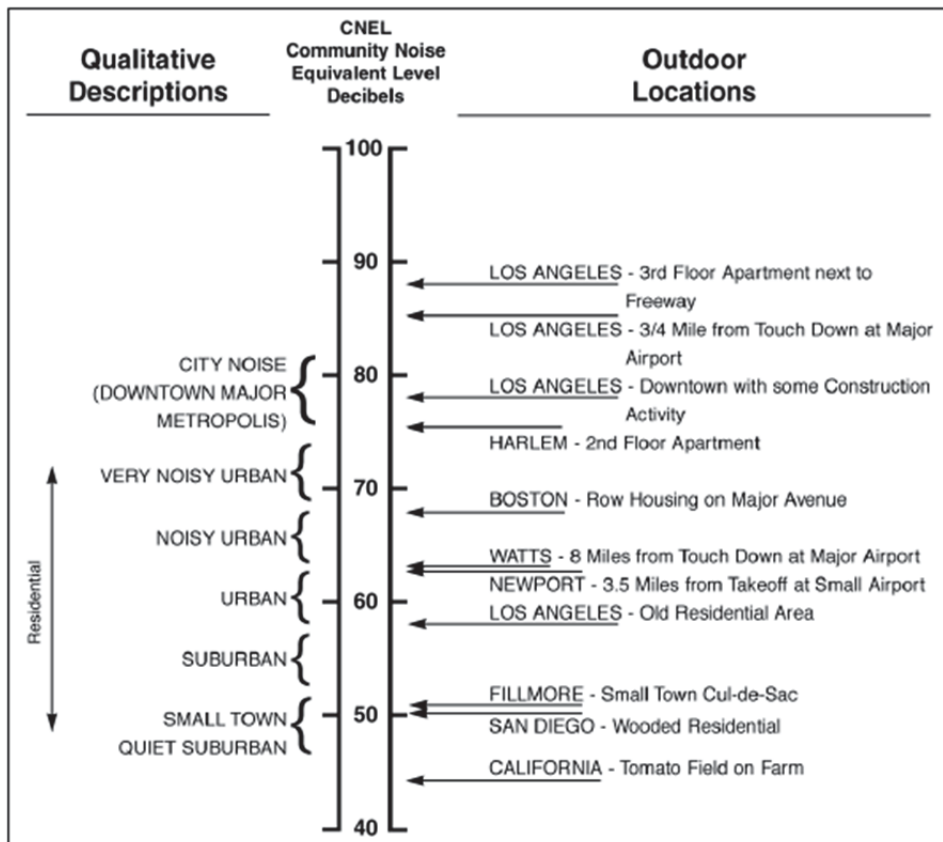


Figure 3 – Representative Cumulative Sound Levels





## Raw Aircraft Noise Event Data for Location 986

December 2016

Raw Aircraft Noise Event Data for Location 986

Event	Max Date	Max Time	SEL (dBA)	Lmax (dBA)	Duration	Operation	Airline	Flight No.	Aircraft Type	Aircraft Cat	A/D Flag	Runway	Airport ID	Other Port
39582539	2016-12-03	1:22:08 AM	69.5	63.1	5	29128906	SIA	SIA1	B77W	J	D	28L	SFO	VHHH
39582540	2016-12-03	8:00:26 AM	74.2	65.8	12	29129220	VRD	VRD1930	A320	J	D	01L	SFO	KLAX
39582541	2016-12-03	8:01:57 AM	72.9	64.8	9	29129240	JBU	JBU434	A321	J	D	01R	SFO	KBOS
39582542	2016-12-03	8:04:27 AM	74.1	65.5	12	29129225	UAL	UAL479	B738	J	D	01L	SFO	KLAX
39582543	2016-12-03	9:57:39 AM	74.1	65.7	11	29130178		N52272	C172	P	A	28L	HWD	
39582545	2016-12-03	11:04:30 AM	69.9	62.9	6	29130224		N4604V	C72R	P	O	NONE		KSCK
39582546	2016-12-03	12:19:07 PM	75.7	67.6	12	29130864		N5207R	C162	U	D	30	SQL	KSQL
39582547	2016-12-03	12:51:37 PM	71.6	65.2	7	29131864		N451DS	DA40	P	D	30	SQL	
39582548	2016-12-03	1:20:19 PM	71.4	64.0	8	29131715		N7383X	C182	P	A	30	HAF	KRHH
39582549	2016-12-03	1:28:04 PM	69.7	63.4	5	29131783	DAL	DAL61	B739	J	D	01R	SFO	KATL
39582550	2016-12-03	2:06:34 PM	70.0	62.6	6	29131927		N2262F	PA28	P	D	30	SQL	KSQL
39582551	2016-12-03	2:14:11 PM	75.9	67.3	16	29132166	AMX	AMX669	B738	J	D	01L	SFO	MMMX
39582553	2016-12-03	2:30:52 PM	72.8	65.0	8	29132311		N4371F	P32R	P	D	30	SQL	
39582554	2016-12-03	2:41:20 PM	76.5	66.0	22	29132261		N80333	C172	P	D	30	SQL	KSQL
39582555	2016-12-03	3:03:15 PM	76.6	68.8	11	29132569		N9968F	C172	P	D	31	PAO	KPAO
39582556	2016-12-03	4:51:53 PM	74.6	64.1	15	29133332		N6521D	C172	P	A	31	PAO	
39582557	2016-12-03	5:17:23 PM	69.8	62.4	6	29133683		N6242F	C172	P	A	30	SQL	DD1
39582558	2016-12-03	5:24:42 PM	70.3	62.5	7	29133429	BYF	BYF44	HELO	H	A	H	SQL	
39582559	2016-12-03	5:28:23 PM	72.5	63.4	13	29133611		N7332K	C172	P	D	31	PAO	KPAO
39582560	2016-12-03	5:39:20 PM	72.3	65.2	11	29133604	SKW	SKW5086	CRJ2	R	D	01L	SFO	KONT
39582561	2016-12-03	5:42:46 PM	67.6	64.3	5	29133551	CKS	CKS566	B744	J	A	28R	SFO	KMEM
39582563	2016-12-03	7:36:26 PM	69.6	62.4	6	29133904	SKW	SKW5555	E170	R	D	01R	SFO	KACV
39582564	2016-12-03	7:37:07 PM	73.5	68.1	6	29133857	UAL	UAL1604	B738	J	A	28L	SFO	PHNL
39582565	2016-12-03	7:54:53 PM	70.2	62.5	7	29134039	UAL	UAL1688	B738	J	D	01R	SFO	KSEA
39582566	2016-12-03	8:27:16 PM	74.1	65.8	12	29134001	UAL	UAL580	B739	J	D	01R	SFO	CVVR
39582567	2016-12-03	8:41:15 PM	77.0	68.9	10	29134101	ASA	ASA247	B739	J	D	01R	SFO	KPDY
39582568	2016-12-03	11:43:54 PM	71.3	62.6	10	29134254	UAL	UAL412	B738	J	D	01L	SFO	MMMX
39582569	2016-12-03	11:51:10 PM	71.6	62.5	10	29134253	QFA	QFA74	B744	J	D	28R	SFO	YSSY
39582570	2016-12-03	11:53:49 PM	75.5	67.0	12	29134203	UAL	UAL1204	B739	J	D	01L	SFO	KIAH
39582603	2016-12-04	1:28:33 AM	74.6	62.6	19	29134264	CCA	CCA984	B77W	J	O	NONE		ZBAA
39582604	2016-12-04	8:18:22 AM	72.4	64.8	8	29134891		N748SP	C172	P	A	31	PAO	
39582605	2016-12-04	9:27:01 AM	76.0	68.7	11	29134730		N2304D	PA46	P	D	31	PAO	KAPC
39582607	2016-12-04	11:29:55 AM	75.1	67.6	11	29135435		N2304D	PA46	P	A	30	SQL	KSTS
39582608	2016-12-04	11:50:06 AM	75.2	68.5	14	29135840		N1004E	C172	P	D	31	PAO	KPAO
39582609	2016-12-04	12:51:58 PM	79.3	71.7	12	29136787	UAL	UAL1083	B739	J	D	01L	SFO	KLAX
39582610	2016-12-04	1:26:54 PM	71.0	63.9	7	29136457		N2304D	PA46	P	A	31	PAO	KAPC
39582619	2016-12-04	3:51:05 PM	70.8	62.9	8	29138209	UAL	UAL1845	B738	J	D	01R	SFO	KDEN
39582620	2016-12-04	3:54:28 PM	73.7	62.6	15	29137710	AAL	AAL486	A321	J	D	01L	SFO	KPHX
39582621	2016-12-04	4:28:42 PM	78.5	70.3	26	29138088	AAL	AAL20	A321	J	D	01R	SFO	KJFK
39582622	2016-12-04	4:31:37 PM	76.6	64.5	30	29138444	UAL	UAL268	B738	J	D	01R	SFO	KORD
39582623	2016-12-04	4:34:17 PM	80.0	67.8	33	29138440	UAL	UAL1838	B738	J	D	01R	SFO	KRDU
39582624	2016-12-04	4:36:39 PM	77.0	68.8	12	29138025	THY	THY79K	B77W	J	A	28L	SFO	LTBA
39582625	2016-12-04	4:39:48 PM	74.2	64.6	14	29138472	UAL	UAL390	B753	J	D	01R	SFO	KORD
39582626	2016-12-04	4:41:13 PM	76.1	64.9	22	29138160	JBU	JBU1516	A321	J	D	01R	SFO	KJFK
39582627	2016-12-04	4:42:05 PM	76.0	67.0	19	29138162		N5148V	C172	P	D	31	PAO	KPAO
39582628	2016-12-04	4:47:35 PM	76.3	66.3	15	29138143	VRD	VRD932	A320	J	D	01L	SFO	KLAX
39582629	2016-12-04	4:47:58 PM	73.6	68.7	6	29138025	THY	THY79K	B77W	J	A	28L	SFO	LTBA
39582630	2016-12-04	4:54:47 PM	81.3	71.2	31	29138176	UAL	UAL444	B739	J	D	01R	SFO	KBOS
39582631	2016-12-04	4:56:04 PM	75.9	67.1	18	29138199	SKW	SKW5216	E170	R	D	01R	SFO	KOMA
39582632	2016-12-04	5:00:22 PM	75.0	67.4	11	29138296	AAL	AAL1045	B738	J	D	01R	SFO	KORD
39582633	2016-12-04	5:03:29 PM	76.0	64.8	20	29138309	VRD	VRD746	A320	J	D	01R	SFO	KSEA
39582634	2016-12-04	5:05:47 PM	74.0	64.4	16	29138162		N5148V	C172	P	D	31	PAO	KPAO
39582635	2016-12-04	5:07:22 PM	75.5	64.6	18	29138311	SWA	SWA289	B738	J	D	01R	SFO	KMKE
39582636	2016-12-04	5:15:44 PM	79.1	67.6	38	29138303	EVA	EVA027	B77W	J	D	28L	SFO	RCTP
39582637	2016-12-04	5:32:50 PM	85.7	76.0	28	29138461	UAL	UAL1288	B738	J	A	28L	SFO	KPHX
39582638	2016-12-04	5:45:59 PM	68.7	62.1	5	29138632	JBU	JBU188	A320	J	D	01L	SFO	KLAX
39582639	2016-12-04	5:52:10 PM	71.0	63.4	8	29138413	AAL	AAL2352	A321	J	D	01R	SFO	KDFW
39582640	2016-12-04	5:55:15 PM	74.6	62.9	20	29138427	SCX	SCX396	B738	J	D	01R	SFO	KMSF
39582641	2016-12-04	5:59:50 PM	75.3	65.1	18	29138377	EJA	EJA368	C680	B	A	28R	SFO	KNSA
39582642	2016-12-04	6:14:24 PM	70.8	62.7	9	29138541	SWA	SWA285	B738	J	D	01R	SFO	KDEN
39582643	2016-12-04	6:17:37 PM	72.4	62.2	12	29138293	DAL	DAL2773	B712	J	D	01L	SFO	KLAX
39582644	2016-12-04	6:21:44 PM	79.8	68.3	30	29138550	JBU	JBU2135	A320	J	D	01L	SFO	KLGB
39582645	2016-12-04	6:27:56 PM	70.0	63.8	5	29138572	UAL	UAL1075	B738	J	D	01R	SFO	KSTL
39582646	2016-12-04	6:38:33 PM	71.8	65.4	6	29138804	ASA	ASA307	B739	J	D	01R	SFO	KSEA
39582647	2016-12-04	6:52:15 PM	77.2	68.1	18	29138631	UAL	N494SP	C172	P	D	31	PAO	KPAO
39582648	2016-12-04	7:06:02 PM	69.5	62.7	7	29138694	FFT	FFT668	A320	J	D	01R	SFO	KDEN
39582649	2016-12-04	7:20:30 PM	70.6	63.5	6	29138732	UAL	UAL766	B738	J	D	01R	SFO	KPDY
39582650	2016-12-04	7:46:02 PM	77.0	65.0	27	29138932	UAL	UAL1524	A320	J	D	01L	SFO	KPHX
39582651	2016-12-04	7:51:11 PM	71.1	62.7	8	29138794	UAL	UAL930	B772	J	D	28L	SFO	EGLL
39582652	2016-12-04	7:55:23 PM	82.2	71.5	30	29138694	FFT	FFT668	A320	J	D	01R	SFO	KDEN
39582653	2016-12-04	8:08:08 PM	75.0	63.9	18	29138689	CPZ	CPZ2327	E170	R	D	01L	SFO	KLAX
39582654	2016-12-04	8:38:48 PM	74.5	67.6	8	29139057	UAL	UAL529	B739	J	D	01R	SFO	KPDY
39582655	2016-12-04	8:39:07 PM	67.8	61.6	6	29139057	UAL	UAL529	B739	J	D	01R	SFO	KPDY
39582656	2016-12-04	8:39:36 PM	78.7	68.1	20	29139057	UAL	UAL529	B739	J	D	01R	SFO	KPDY
39582657	2016-12-04	8:41:11 PM	74.6	66.3	10	29139062	ASA	ASA247	B739	J	D	01R	SFO	KPDY
39582658	2016-12-04	9:11:19 PM	75.7	64.4	21	29138968	UAL	UAL718	B738	J	D	01R	SFO	KSEA
39582659	2016-12-04	9:17:34 PM	74.3	66.0	13	29138981	ASA	ASA223	B739	J	D	01R	SFO	KSEA
39582660	2016-12-04	9:17:55 PM	71.0	63.1	9	29138981	ASA	ASA223	B739	J	D	01R	SFO	KSEA



39582726	2016-12-05	9:25:12 AM	68.2	62.4	6	29139849	UAL	UAL1958	B738	J	D	01R	SFO	KIAH
39582730	2016-12-05	10:33:37 AM	71.8	67.8	5	29141407	AAL	AAL417	A321	J	A	28R	SFO	KDFW
39582740	2016-12-05	10:48:10 AM	73.5	66.0	14	29141418	AAL	AAL9	A321	J	A	28L	SFO	KJFK
39582748	2016-12-05	10:52:55 AM	80.9	68.1	62	29141707	ASA	ASA222	B739	J	D	01R	SFO	MMPR
39582752	2016-12-05	10:58:53 AM	75.8	65.7	22	29141372	LXJ	LXJ327	CL60	B	D	28R	SFO	KSFO
39582754	2016-12-05	10:59:52 AM	75.0	65.1	22	29141318	ACA	JZA579	CRJ9	R	A	28L	SFO	CYYC
39582755	2016-12-05	11:00:04 AM	73.8	68.0	9	29141318	ACA	JZA579	CRJ9	R	A	28L	SFO	CYYC
39582756	2016-12-05	12:02:52 PM	75.5	70.7	15	29141627	SKW	SKW5349	CRJ2	R	A	28L	SFO	KACV
39582758	2016-12-05	12:03:47 PM	77.6	66.8	33	29141630	AAL	AAL15	A321	J	A	28R	SFO	KJFK
39582765	2016-12-05	12:10:27 PM	72.4	67.4	7	29141826	UAL	UAL267	A319	J	D	01R	SFO	KPHL
39582775	2016-12-05	12:22:56 PM	72.6	62.8	14	29141673	SCX	SCX393	B738	J	A	28L	SFO	KMSP
39582778	2016-12-05	12:30:19 PM	73.2	67.0	9	29141923	SWA	SWA1632	B737	J	D	01R	SFO	KDEN
39582780	2016-12-05	12:32:16 PM	69.6	64.7	5	29142024	UAL	UAL1840	A319	J	A	28R	SFO	KDEN
39582792	2016-12-05	2:06:31 PM	74.4	68.5	9	29142360	SKW	SKW359H	CRJ2	R	D	01L	SFO	KBUR
39582799	2016-12-05	2:10:32 PM	70.0	66.1	5	29142331	UAL	UAL857	B789	J	D	28L	SFO	ZSPD
39582809	2016-12-05	6:44:44 PM	89.8	76.7	60	29143690	UAL	UAL1800	B739	J	D	01R	SFO	KORD
39582813	2016-12-05	6:45:33 PM	67.3	64.2	5	29143634	UAL	UAL529	A320	J	A	28L	SFO	KSNA
39582816	2016-12-05	7:21:57 PM	72.2	63.8	8	29144021	UAL	N307G	C172	P	D	30	SQL	SAHE
39582817	2016-12-05	7:27:28 PM	69.6	63.1	6	29143818	UAL	UAL1688	B739	J	D	01R	SFO	KSEA
39582818	2016-12-05	7:41:48 PM	72.4	65.2	7	29144017	SKW	SKW4869	E75L	R	D	01R	SFO	KSEA
39582819	2016-12-05	7:44:47 PM	70.4	62.8	8	29143838	SKW	SKW5622	E170	R	D	01L	SFO	KTUS
39582820	2016-12-05	7:53:29 PM	74.4	66.0	9	29143847	UAL	UAL222	A320	J	D	01L	SFO	KLAX
39582821	2016-12-05	8:43:03 PM	73.5	65.6	9	29143983	UAL	UAL1139	B739	J	D	01R	SFO	KDEN
39582822	2016-12-05	8:51:35 PM	75.2	65.4	16	29144005	ASA	ASA744	B739	J	D	01R	SFO	KSLC
39582823	2016-12-05	9:13:01 PM	72.1	62.2	14	29144069	VOI	VOI927	A320	J	D	01L	SFO	MMMX
39582824	2016-12-05	9:56:02 PM	75.0	68.0	9	29144249	SWA	SWA526	B737	J	D	01L	SFO	KLAS
39582825	2016-12-05	10:04:17 PM	75.2	65.4	17	29144187	UAL	UAL529	B739	J	D	01R	SFO	KPDY
39582826	2016-12-05	10:08:13 PM	78.9	71.9	21	29144188	UAL	UAL2033	B738	J	D	01R	SFO	KBWI
39582827	2016-12-05	10:13:48 PM	68.9	62.8	5	29144192	AAL	AAL1540	B738	J	D	01R	SFO	KMIA
39582828	2016-12-05	10:14:07 PM	68.9	63.1	5	29144206	AAL	AAL434	A321	J	D	01R	SFO	KPHL
39582829	2016-12-05	11:07:21 PM	70.7	62.5	8	29144276	DAL	DAL1658	B753	J	D	01R	SFO	KDTW
39582830	2016-12-05	11:09:33 PM	74.4	67.2	7	29144279	UAL	UAL355	B739	J	D	01R	SFO	KIAD
39582831	2016-12-05	11:22:09 PM	76.3	67.8	16	29144284	UAL	UAL384C	B739	J	D	01R	SFO	KPHL
39582945	2016-12-06	1:22:10 AM	77.7	68.8	15	29144365	AMX	AMX663	B738	J	D	01L	SFO	MMGL
39582954	2016-12-06	8:23:01 AM	67.3	62.0	7	29150330	LXJ	LXJ576	CL30	B	D	01R	SFO	KBJC
39582957	2016-12-06	8:52:43 AM	71.2	64.3	10	29150759	UAL	UAL639	B772	J	D	01R	SFO	KORD
39582958	2016-12-06	8:53:06 AM	73.7	65.4	16	29150759	UAL	UAL639	B772	J	D	01R	SFO	KORD
39582961	2016-12-06	8:54:22 AM	67.1	62.6	6	29150424	SWA	SWA2739	B733	J	D	01L	SFO	KLAX
39582968	2016-12-06	9:01:43 AM	75.0	69.5	12	29150584	SKW	SKW5351	E170	R	D	01R	SFO	KMFR
39582969	2016-12-06	9:03:42 AM	72.9	68.0	5	29150429	UAL	UAL1483	B752	J	A	28L	SFO	KEWR
39582971	2016-12-06	9:05:05 AM	75.4	67.2	15	29150395	UAL	UAL868	A319	J	A	28L	SFO	KAUS
39582972	2016-12-06	9:05:21 AM	70.6	65.6	6	29150395	UAL	UAL868	A319	J	A	28L	SFO	KAUS
39582974	2016-12-06	9:28:17 AM	71.9	65.2	7	29150662	UAL	UAL400	B739	J	D	01R	SFO	KIAD
39582976	2016-12-06	9:34:04 AM	70.3	62.2	10	29150715	VRD	VRD022	A320	J	D	01R	SFO	KJFK
39582978	2016-12-06	9:36:24 AM	71.2	63.7	9	29150700	AAL	AAL1908	A321	J	D	01R	SFO	KCLT
39582979	2016-12-06	9:36:39 AM	69.7	64.2	6	29150724	AAL	AAL2594	B738	J	D	01R	SFO	KORD
39582980	2016-12-06	9:37:46 AM	71.1	65.4	5	29150483	UAL	UAL277	B753	J	A	28L	SFO	KDEN
39582981	2016-12-06	9:38:03 AM	68.9	61.6	8	29150724	AAL	AAL2594	B738	J	D	01R	SFO	KORD
39582982	2016-12-06	9:40:07 AM	71.7	63.6	16	29150727	UAL	UAL414	B772	J	D	01R	SFO	KEWR
39582984	2016-12-06	9:41:02 AM	76.5	66.6	18	29150608	UAL	UAL820	B738	J	A	28L	SFO	MMMX
39582986	2016-12-06	9:44:32 AM	69.3	63.7	5	29145239	VRD	VRD219	A320	J	D	01R	SFO	KPDY
39582987	2016-12-06	9:44:55 AM	73.2	68.4	13	29150710	UAL	UAL1721	B739	J	D	28L	SFO	PHKO
39582989	2016-12-06	10:26:40 AM	75.6	66.6	15	29150947	UAL	N762TB	C421	P	D	30	SQL	KSTS
39582991	2016-12-06	10:43:04 AM	71.2	63.7	9	29151144	UAL	UAL1840	A319	J	A	28R	SFO	KDEN
39582992	2016-12-06	10:43:12 AM	72.8	63.8	15	29151144	UAL	UAL1840	A319	J	A	28R	SFO	KDEN
39582993	2016-12-06	10:43:51 AM	74.0	65.0	15	29150913	SKW	SKW4870	E75L	R	A	28L	SFO	KSEA
39582994	2016-12-06	10:44:06 AM	73.6	69.1	5	29150913	SKW	SKW4870	E75L	R	A	28L	SFO	KSEA
39583004	2016-12-06	10:49:58 AM	70.0	63.5	8	29150942	UAL	UAL708	A320	J	A	28L	SFO	KLAX
39583005	2016-12-06	10:50:07 AM	67.1	61.2	6	29150942	UAL	UAL708	A320	J	A	28L	SFO	KLAX
39583009	2016-12-06	10:53:27 AM	72.1	66.3	10	29150963	VRD	VRD011	A320	J	A	28R	SFO	KJFK
39583087	2016-12-06	11:10:26 AM	72.6	66.3	7	29145353	UAL	UAL1720	A320	J	D	01R	SFO	KATL
39583089	2016-12-06	11:12:25 AM	70.8	62.8	9	29151062	SKW	SKW5452	CRJ2	R	A	28R	SFO	KRDD
39583091	2016-12-06	11:14:54 AM	67.7	62.7	5	29145391	VRD	VRD218	A320	J	D	01R	SFO	KAUS
39583094	2016-12-06	11:17:41 AM	69.7	62.4	7	29145370	UAL	UAL1848	B738	J	D	01R	SFO	KMSY
39583096	2016-12-06	11:18:57 AM	75.2	64.6	23	29151085	EJA	EJA284P	F2TH	B	A	28L	SFO	KLAX
39583098	2016-12-06	11:22:33 AM	69.7	63.2	8	29145398	SKW	SKW5899	E170	R	A	28L	SFO	KRNO
39583100	2016-12-06	11:23:36 AM	72.2	65.3	10	29145473	ETD	ETD182	B77L	J	D	01R	SFO	OMAA
39583102	2016-12-06	11:27:20 AM	69.5	62.0	8	29145471	UAL	UAL1070	B752	J	D	01R	SFO	KEWR
39583108	2016-12-06	11:42:57 AM	78.4	72.1	12	29145549	UAL	UAL309	B739	J	D	01R	SFO	KIAD
39583110	2016-12-06	11:44:39 AM	77.3	70.7	11	29145501	UAL	UAL888	B744	J	D	28L	SFO	ZBAA
39583112	2016-12-06	11:45:39 AM	67.7	62.9	5	29146078	UAL	UAL1513	A319	J	D	01R	SFO	KEUG
39583115	2016-12-06	11:47:35 AM	78.2	73.7	12	29146041	VRD	VRD1742	A320	J	D	01R	SFO	KSEA
39583118	2016-12-06	11:54:21 AM	69.7	64.3	8	29145462	JAL	JAL2	B77W	J	A	28L	SFO	RUTT
39583119	2016-12-06	12:01:15 PM	71.7	66.9	6	29145726	AAL	AAL591	A321	J	D	01R	SFO	KDFW
39583130	2016-12-06	12:16:47 PM	75.8	70.8	9	29145804	AAL	AAL642	A320	J	D	01L	SFO	KPHX
39583131	2016-12-06	12:17:05 PM	69.8	62.0	8	29145804	AAL	AAL642	A320	J	D	01L	SFO	KPHX
39583134	2016-12-06	12:20:30 PM	68.5	62.1	5	29145587	SWA	SWA1243	B737	J	A	28L	SFO	KBUR
39583137	2016-12-06	12:21:54 PM	76.1	63.8	27	29145859	CPA	CPA879	B77W	J	D	28L	SFO	VHHH
39583140	2016-12-06	12:23:54 PM	68.5	61.7	9	29145914	CES	CES590	B77W	J	D	28L	SFO	ZSPD
39583141	2016-12-06	12:24:23 PM	69.0	63.6	5	29145914	CES	CES590	B77W	J	D	28L	SFO	ZSPD
39583143	2016-12-06	12:25:40 PM	71.0	64.2	10	29146064	KLM	KLM281	B789	J	A	28L	SFO	EHAM

39583144	2016-12-06	12:26:23 PM	72.6	65.9	10	29145905	SKW	SKW5454	E170	R	D	01R	SFO	KMCI	
39583148	2016-12-06	12:27:46 PM	74.0	71.1	8	29145876			GLF5	B	D	01R	SFO		
39583149	2016-12-06	12:28:45 PM	68.6	62.0	6	29146077	AAL	AAL433	A321	J	A	28L	SFO	KPHX	
39583150	2016-12-06	12:28:57 PM	68.3	63.2	6	29146077	AAL	AAL433	A321	J	A	28L	SFO	KPHX	
39583151	2016-12-06	12:29:40 PM	67.3	61.6	5	29145918	VRD	VRD204	A320	J	D	01R	SFO	KORD	
39583153	2016-12-06	12:32:03 PM	73.2	67.2	10	29145934	VRD	VRD714	A319	J	D	01R	SFO	KDAL	
39583163	2016-12-06	12:37:43 PM	76.6	65.8	33	29146065	UAL	UAL637	B752	J	A	28L	SFO	KEWR	
39583164	2016-12-06	12:38:12 PM	68.8	62.4	6	29146493	ACA	ACA563	A320	J	D	01R	SFO	CVVR	
39583168	2016-12-06	12:40:00 PM	67.0	62.0	5	29145801	SKW	SKW5337	E170	R	A	28L	SFO	KSNA	
39583169	2016-12-06	12:42:18 PM	68.5	62.5	5	29145975	UAL	UAL1083	B739	J	D	01L	SFO	KLAS	
39583170	2016-12-06	12:44:35 PM	79.1	69.5	25	29145939			N389BS	SR22	P	D	30	SQL	KDVO
39669315	2016-12-06	1:02:59 PM	71.0	66.6	7	29145959	UAL	UAL294	A320	J	A	28L	SFO	KSEA	
39669316	2016-12-06	1:04:16 PM	72.7	65.1	11	29146183	ACA	ACA738	B763	J	D	01R	SFO	CYYZ	
39669319	2016-12-06	1:06:54 PM	69.7	63.5	8	29146187	DAL	DAL2305	B739	J	D	01R	SFO	KMSP	
39669321	2016-12-06	1:07:33 PM	73.8	65.9	12	29145974	AAL	AAL461	A321	J	A	28L	SFO	KCLT	
39669322	2016-12-06	1:07:53 PM	70.5	62.4	10	29145973	SKW	SKW5464	CRJ2	R	A	28L	SFO	KRDM	
39669323	2016-12-06	1:08:13 PM	70.1	61.4	11	29146190	UAL	UAL1950	B738	J	D	01R	SFO	KCLE	
39669324	2016-12-06	1:08:42 PM	74.4	70.3	5	29146186	UAL	UAL497	A320	J	D	01L	SFO	KSAN	
39669326	2016-12-06	1:10:37 PM	68.0	62.4	6	29146224	UAL	UAL424	A320	J	D	01R	SFO	KSEA	
39669329	2016-12-06	1:44:06 PM	78.9	67.9	24	29146413	SKW	SKW5573	E170	R	D	01R	SFO	KDFW	
39669342	2016-12-06	1:56:05 PM	76.0	66.2	19	29146340	DAL	DAL1680	B739	J	A	28R	SFO	KATL	
39669345	2016-12-06	2:06:15 PM	68.2	63.7	6	29146626	UAL	UAL779	B752	J	D	01R	SFO	KEWR	
39669350	2016-12-06	3:38:53 PM	71.2	63.5	8	29147142			N458V	SR22	P	D	31	PAO	
39669351	2016-12-06	4:15:12 PM	72.3	64.3	8	29147247	SWA	SWA2131	B733	J	A	28L	SFO	KSAN	
39669352	2016-12-06	4:52:51 PM	69.1	63.3	5	29147507	UAL	UAL887	A320	J	A	28L	SFO	CVVR	
39669353	2016-12-06	4:58:50 PM	71.0	65.1	6	29147603	UAL	UAL444	B739	J	D	01R	SFO	KBOS	
39669354	2016-12-06	4:59:19 PM	76.2	69.0	18	29147609	EJM	EJM399	CL30	B	A	30L	SIC	KAPC	
39669355	2016-12-06	5:11:07 PM	75.7	68.0	10	29147719	UAL	UAL525	B738	J	D	01L	SFO	KLAX	
39669356	2016-12-06	6:52:31 PM	69.1	62.5	7	29148041	UAL	UAL1800	B739	J	D	01R	SFO	KORD	
39669357	2016-12-06	6:55:43 PM	85.4	80.9	10	29147985	AAL	AAL686	A321	J	A	28L	SFO	KPHX	
39669362	2016-12-06	7:41:23 PM	78.1	68.8	17	29148386	ASA	ASA337	B739	J	D	01R	SFO	KSEA	
39669363	2016-12-06	9:43:19 PM	75.0	66.7	14	29148481	JBU	JBU1716	A321	J	D	01R	SFO	KJFK	
39669364	2016-12-06	9:45:05 PM	74.1	64.7	16	29148470	UAL	UAL2033	B738	J	D	01R	SFO	KBWI	
39669365	2016-12-06	10:04:38 PM	78.1	68.8	15	29148542	AAL	AAL1540	B738	J	D	01R	SFO	KMIA	
39669366	2016-12-06	10:09:35 PM	79.8	73.0	13	29148549	AAL	AAL434	A321	J	D	01R	SFO	KPHL	
39669367	2016-12-06	10:11:47 PM	73.6	63.4	16	29148550	UAL	UAL1835	B739	J	D	01R	SFO	KIAD	
39669368	2016-12-06	10:48:20 PM	77.4	68.8	17	29148593	AAL	AAL898	A321	J	D	01R	SFO	KCLT	
39669369	2016-12-06	10:51:34 PM	74.8	66.8	10	29148588	AAL	AAL18	A321	J	D	01R	SFO	KJFK	
39669370	2016-12-06	11:03:30 PM	69.4	62.4	7	29148620	UAL	UAL380	B752	J	D	01R	SFO	KBOS	
39669371	2016-12-07	3:13:34 AM	76.0	65.2	25	29148742	KAL	KAL214	B744	J	D	10R	SFO	RKSI	
39669376	2016-12-07	8:23:54 AM	67.0	61.6	5	29149316	VRD	VRD174	A320	J	D	01R	SFO	KEWR	
39669377	2016-12-07	8:24:19 AM	72.3	64.9	11	29149316	VRD	VRD174	A320	J	D	01R	SFO	KEWR	
39669381	2016-12-07	8:27:30 AM	77.3	66.8	32	29149302	DAL	DAL2755	B712	J	D	01L	SFO	KLAX	
39669387	2016-12-07	9:24:12 AM	68.2	61.2	7	29149639	VRD	VRD861	A320	J	A	28L	SFO	KDEN	
39669388	2016-12-07	9:25:05 AM	71.6	65.5	9	29149614	UAL	UAL294	A320	J	A	28L	SFO	KSEA	
39669389	2016-12-07	9:25:48 AM	75.0	65.5	18	29149455	SWA	SWA2881	B733	J	D	01L	SFO	KSAN	
39669390	2016-12-07	9:26:28 AM	70.1	65.9	6	29149555	UAL	UAL1175	B738	J	D	28L	SFO	PHNL	
39669393	2016-12-07	9:32:50 AM	75.8	67.8	11	29149848	AAL	AAL2594	B738	J	D	01R	SFO	KORD	
39669394	2016-12-07	9:33:17 AM	73.5	66.6	11	29149373	UAL	UAL759	B753	J	A	28L	SFO	KMCO	
39669395	2016-12-07	9:37:13 AM	76.5	69.7	10	29149390			N48KZ	F900	B	A	28L	SFO	KSAN
39669398	2016-12-07	10:44:40 AM	70.5	62.5	9	29149762	VRD	VRD953	A319	J	A	28L	SFO	KSAN	
39669399	2016-12-07	10:44:55 AM	67.3	61.4	5	29151471	SKW	SKW4870	E75L	R	D	01R	SFO	KSEA	
39669403	2016-12-07	10:47:23 AM	69.2	63.3	5	29149770	UAL	UAL727	A319	J	A	28L	SFO	KPDY	
39669412	2016-12-07	10:55:14 AM	73.3	65.6	16	29149812	CPZ	CPZ6041	E170	R	A	28L	SFO	KLAX	
39669413	2016-12-07	10:55:40 AM	73.9	67.9	8	29151418	SKW	SKW5296	CRJ2	R	D	01R	SFO	CYYJ	
39669414	2016-12-07	10:56:03 AM	70.8	62.2	9	29151418	SKW	SKW5296	CRJ2	R	D	01R	SFO	CYYJ	
39669419	2016-12-07	10:58:32 AM	72.0	63.1	10	29149825	UAL	UAL698	A319	J	A	28L	SFO	KSEA	
39669421	2016-12-07	10:59:24 AM	72.4	64.3	13	29151194	VRD	VRD218	A320	J	D	01R	SFO	KAUS	
39669424	2016-12-07	11:03:54 AM	78.7	70.1	18	29149972			N823FW	RS22	U	A	12	SQL	KDVO
39669427	2016-12-07	11:16:34 AM	75.7	69.0	11	29149934	SWA	SWA3094	B737	J	A	28L	SFO	KSNA	
39669431	2016-12-07	12:05:02 PM	70.4	65.4	5	29151382	UAL	UAL424	B752	J	A	28L	SFO	KIAD	
39669441	2016-12-07	12:23:18 PM	75.0	63.0	23	29151652	UAL	UAL1720	A320	J	D	01R	SFO	KATL	
39669443	2016-12-07	12:25:20 PM	76.4	68.6	10	29151689			N350VB	PA46	P	D	12	SQL	KSTS
39669444	2016-12-07	1:56:05 PM	76.3	66.9	19	29152552	CPZ	CPZ3227	E170	R	D	01L	SFO	KLAX	
39669446	2016-12-07	3:30:14 PM	74.2	64.8	13	29168107	DCM	DCM4157	C550	B	D	30	OAK	KVNY	
39669451	2016-12-07	6:23:10 PM	80.0	78.2	6	29153077	UAL	UAL800	B752	J	A	28L	SFO	KEWR	
39669477	2016-12-08	5:46:35 PM	78.6	71.7	12	29156070	JBU	JBU188	A320	J	D	01L	SFO	KLAS	
39669479	2016-12-09	8:25:39 AM	70.2	65.2	5	29157088	UAL	UAL889	B744	J	A	28R	SFO	ZBAA	
39669483	2016-12-09	10:13:46 AM	71.8	63.4	12	29157564	UAL	UAL1830	A319	J	D	01R	SFO	KBNA	
39669487	2016-12-09	10:43:56 AM	72.4	63.5	15	29157573	DAL	DAL2756	B712	J	A	28L	SFO	KLAX	
39669489	2016-12-09	10:44:59 AM	68.3	62.1	5	29157570	DAL	DAL1401	B739	J	A	28R	SFO	KATL	
39669494	2016-12-09	10:48:10 AM	79.2	71.5	29	29157584	UAL	UAL761	B753	J	A	28R	SFO	KORD	
39669495	2016-12-09	10:48:26 AM	69.6	63.7	5	29157963	AIC	AIC174	B77L	J	D	28L	SFO	VIDP	
39669499	2016-12-09	10:49:57 AM	71.6	65.7	9	29157592	SKW	SKW5982	CRJ2	R	A	28L	SFO	KSBA	
39669515	2016-12-09	12:01:08 PM	71.0	65.1	5	29158209	WOW	WOW162	A333	J	D	28L	SFO	BIKF	
39669516	2016-12-09	12:01:20 PM	66.8	61.4	5	29158209	WOW	WOW162	A333	J	D	28L	SFO	BIKF	
39669520	2016-12-09	12:03:49 PM	71.2	65.4	8	29157901	UAL	UAL708	A320	J	A	28L	SFO	KLAX	
39669526	2016-12-09	12:10:45 PM	75.8	70.4	15	29158271	SKW	SKW5111	CRJ2	R	D	01R	SFO	KOTH	
39669527	2016-12-09	12:11:26 PM	82.9	72.6	67	29158060	UAL	UAL837	B744	J	D	28L	SFO	RJAA	
39669535	2016-12-09	12:22:26 PM	71.6	64.4	8	29158130			N509RP	C550	B	D	01R	SFO	KRNO
39669536	2016-12-09	12:22:33 PM	67.2	61.4	5	29158130			N509RP	C550	B	D	01R	SFO	KRNO

39669541	2016-12-09	12:26:54 PM	71.2	62.6	11	29158137		N722JB	F2TH	B	D	01L	SFO	KPHX
39669542	2016-12-09	12:27:17 PM	73.3	66.1	9	29158137		N722JB	F2TH	B	D	01L	SFO	KPHX
39669544	2016-12-09	12:28:03 PM	69.5	62.4	8	29158145		N793CG	F900	B	D	01R	SFO	KBJC
39669545	2016-12-09	12:28:18 PM	68.3	62.2	5	29158145		N793CG	F900	B	D	01R	SFO	KBJC
39669546	2016-12-09	12:28:32 PM	71.9	64.1	9	29158145		N793CG	F900	B	D	01R	SFO	KBJC
39669557	2016-12-09	12:36:13 PM	67.2	62.1	6	29158032	UAL	UAL662	A320	J	A	28L	SFO	KSAN
39669558	2016-12-09	12:37:52 PM	67.5	61.9	6	29158176	DAL	DAL1583	B752	J	D	01R	SFO	KJFK
39669560	2016-12-09	12:38:55 PM	68.5	62.5	5	29158277	SKW	SKW5201	E170	R	A	28L	SFO	KMFR
39669562	2016-12-09	12:41:30 PM	70.2	61.9	12	29158263	UAL	UAL466	B738	J	A	28L	SFO	KLAX
39669563	2016-12-09	12:43:02 PM	72.8	65.5	11	29158264	UAL	UAL637	B752	J	A	28R	SFO	KEWR
39669567	2016-12-09	12:55:02 PM	69.3	63.3	5	29158504	SKW	SKW5454	E170	R	D	01R	SFO	KMCI
39669572	2016-12-09	2:50:49 PM	70.0	63.7	7	29158697	UAL	UAL207	B739	J	D	01L	SFO	KLAX
39669574	2016-12-09	3:22:30 PM	68.6	61.9	7	29158844		N139HC	A139	H	A	HELI	SFO	KHWD
39669575	2016-12-09	4:20:37 PM	69.3	62.5	8	29159247	VRD	VRD744	A320	J	D	28L	SFO	KSEA
39669576	2016-12-10	11:59:03 AM	68.1	62.7	5	29161288	SWA	SWA5613	B733	J	D	28L	SFO	KLAX
39669577	2016-12-10	4:36:49 PM	74.3	61.9	24	29161931	UAL	UAL312	B739	J	D	01R	SFO	KDFW
39669578	2016-12-10	4:39:49 PM	71.0	65.0	5	29162067	UAL	UAL1947	A320	J	D	01R	SFO	CYVR
39669579	2016-12-10	4:40:02 PM	67.1	61.0	5	29162067	UAL	UAL1947	A320	J	D	01R	SFO	CYVR
39669580	2016-12-10	4:49:25 PM	69.9	63.8	5	29162076	SKW	SKW4876	E75L	R	D	01R	SFO	KSEA
39669581	2016-12-10	5:15:20 PM	74.1	64.4	15	29161988	UAL	UAL720	B753	J	D	01R	SFO	KDEN
39669582	2016-12-10	5:27:50 PM	71.3	62.7	10	29162018	SKW	SKW5786	CRJ2	R	D	01L	SFO	KBUR
39669583	2016-12-10	5:41:52 PM	69.7	61.5	7	29162190	SKW	SKW5790	E170	R	D	01L	SFO	KSNA
39669584	2016-12-10	5:48:09 PM	71.0	63.2	7	29162191	VRD	VRD816	A320	J	D	01R	SFO	KPDY
39669585	2016-12-10	7:35:07 PM	73.5	65.6	9	29162268	ASA	ASA297	B739	J	D	01R	SFO	KSEA
39669586	2016-12-10	8:04:13 PM	71.2	63.2	8	29162310	SKW	SKW5329	E170	R	D	01R	SFO	KSLC
39669587	2016-12-10	8:09:04 PM	70.3	63.7	6	29162308	UAL	UAL222	B739	J	D	01L	SFO	KLAX
39669588	2016-12-10	8:10:20 PM	77.1	66.0	18	29162327	UAL	UAL1688	B738	J	D	01R	SFO	KSEA
39669589	2016-12-10	8:22:22 PM	77.0	65.7	27	29162334	UAL	UAL580	B739	J	D	01R	SFO	CYVR
39669590	2016-12-10	8:49:31 PM	78.4	66.8	24	29162361	VRD	VRD1916	A320	J	D	01L	SFO	KLAS
39669591	2016-12-10	9:24:07 PM	79.5	68.1	22	29162396	ASA	ASA223	B739	J	D	01R	SFO	KSEA
39669592	2016-12-10	9:30:43 PM	71.2	62.8	9	29162402	DAL	DAL2240	B752	J	D	01R	SFO	KJFK
39669593	2016-12-10	9:41:14 PM	78.8	67.9	23	29162481	UAL	UAL1856	B739	J	D	01R	SFO	KEUG
39669595	2016-12-10	10:30:50 PM	75.3	65.7	14	29162454	SKW	SKW426W	E170	R	D	01L	SFO	KSBA
39669596	2016-12-10	10:55:11 PM	70.5	63.2	6	29162470	AAL	AAL18	A321	J	D	01R	SFO	KJFK
39669597	2016-12-10	11:02:35 PM	78.4	67.3	25	29162486	UAL	UAL1844	B738	J	D	01R	SFO	KATL
39669598	2016-12-10	11:04:47 PM	79.5	67.9	31	29162493	UAL	UAL214	B739	J	D	01R	SFO	KORD
39669599	2016-12-10	11:07:36 PM	79.2	69.7	20	29162490	UAL	UAL1145	B739	J	D	01L	SFO	MMUN
39669600	2016-12-10	11:08:01 PM	68.8	61.9	6	29162494	UAL	UAL455	A320	J	D	01L	SFO	KLAS
39669601	2016-12-10	11:10:43 PM	74.7	64.2	18	29162494	UAL	UAL455	A320	J	D	01L	SFO	KLAS
39669602	2016-12-10	11:11:47 PM	75.2	64.9	17	29162488	SKW	SKW5525	E170	R	D	01L	SFO	KLAX
39669603	2016-12-10	11:12:46 PM	80.1	70.6	26	29162491	UAL	UAL355	B739	J	D	01R	SFO	KIAD
39669604	2016-12-10	11:14:41 PM	80.7	71.1	27	29162495	UAL	UAL384	B738	J	D	01R	SFO	KPHL
39669605	2016-12-11	2:49:31 AM	70.5	62.0	10	29162588	AAR	AAR285	B744	J	D	28L	SFO	RKSI
39669606	2016-12-11	6:11:31 AM	68.3	61.6	5	29162634	DAL	DAL240	B739	J	D	01R	SFO	KATL
39669607	2016-12-11	6:11:50 AM	71.7	64.3	9	29162636	ASA	ASA417	B738	J	D	01R	SFO	KSEA
39669608	2016-12-11	7:07:44 AM	67.9	61.9	5	29162700	UAL	UAL2028	B738	J	D	01R	SFO	KDEN
39669609	2016-12-11	7:10:54 AM	73.9	65.2	13	29162714	JBU	JBU16	A321	J	D	01R	SFO	KJFK
39669610	2016-12-11	7:15:42 AM	72.6	63.4	11	29162712	DAL	DAL854	B753	J	D	01R	SFO	KDTW
39669611	2016-12-11	7:43:02 AM	80.2	72.7	17	29162943	UAL	UAL1712	B739	J	D	01R	SFO	KSEA
39669612	2016-12-11	7:47:27 AM	73.6	65.0	9	29162752	SKW	SKW5682	E170	R	D	01L	SFO	KLAX
39669613	2016-12-11	8:02:09 AM	75.5	65.7	17	29162800	JBU	JBU434	A321	J	D	01R	SFO	KBOS
39669614	2016-12-11	8:21:32 AM	69.4	63.3	5	29162858	ASA	ASA383	B739	J	D	01R	SFO	KPDY
39669615	2016-12-11	8:31:18 AM	69.6	63.5	5	29162861	SWA	SWA2128	B737	J	D	01L	SFO	KSAN
39669616	2016-12-11	8:40:37 AM	69.5	62.3	6	29163208	SKW	SKW5437	CRJ2	R	D	01L	SFO	KRDM
39669617	2016-12-11	9:20:20 AM	72.8	64.5	10	29163024		N823FW	SR22	P	D	30	SQL	KDVO
39669618	2016-12-11	10:17:29 AM	78.3	69.8	17	29163557		N92NF	SR22	P	A	30	SQL	KSTS
39669620	2016-12-11	2:04:11 PM	70.3	64.0	5	29165194	UAL	UAL242	B739	J	D	01R	SFO	KBOS
39669621	2016-12-11	2:14:00 PM	81.1	72.5	19	29165258	SKW	SKW315Z	CRJ7	R	D	01R	SFO	KXNA
39669622	2016-12-11	4:08:03 PM	74.2	64.9	13	29166426		N61637	C172	P	O	NONE		
39669623	2016-12-11	4:11:06 PM	73.9	64.6	11	29166213	SKW	SKW303J	CRJ7	R	D	01R	SFO	KPDY
39669624	2016-12-11	4:17:52 PM	79.0	70.2	15	29165994		N446SP	C172	P	O	NONE		KRHH
39669625	2016-12-11	4:19:17 PM	70.9	63.2	7	29165994		N446SP	C172	P	O	NONE		KRHH
39669626	2016-12-11	5:20:26 PM	80.7	71.0	17	29166531	SFD	LN145SU	EC45	H	O	NONE		
39669627	2016-12-11	5:52:09 PM	69.1	62.2	5	29166614	AAL	AAL2352	A321	J	D	01R	SFO	KDFW
39669628	2016-12-11	7:41:18 PM	77.3	66.6	21	29166894	SFD	LN145SU	EC45	H	O	NONE		15CA
39669629	2016-12-11	8:26:38 PM	73.7	65.7	9	29167044	UAL	UAL718	B738	J	D	01R	SFO	KSEA
39669630	2016-12-11	8:57:08 PM	71.5	64.9	7	29167092	ASA	ASA744	B739	J	D	01R	SFO	KSLC
39669631	2016-12-11	9:34:09 PM	74.3	65.7	12	29167184	UAL	UAL1941	B739	J	D	01R	SFO	KSEA
39669632	2016-12-11	10:07:50 PM	73.0	65.3	13	29167231	AAL	AAL1540	B738	J	D	01R	SFO	KMIA
39669633	2016-12-11	10:09:04 PM	70.4	63.0	6	29167235	UAL	UAL2033	B738	J	D	01R	SFO	KBWI
39669634	2016-12-11	10:11:18 PM	80.3	73.5	18	29167248	UAL	UAL1835	B739	J	D	01R	SFO	KIAD
39669635	2016-12-11	10:12:45 PM	77.6	69.0	17	29167257	AAL	AAL434	A321	J	D	01R	SFO	KPHL
39669636	2016-12-11	11:17:45 PM	70.7	63.1	8	29167344	UAL	UAL384	B738	J	D	01R	SFO	KPHL
39669637	2016-12-11	11:27:37 PM	67.4	61.1	5	29167357	UAL	UAL355	B739	J	D	01R	SFO	KIAD
39669638	2016-12-11	11:29:23 PM	70.0	63.4	5	29167363	UAL	UAL522	B739	J	D	01R	SFO	KPDY
39669639	2016-12-12	12:03:42 AM	71.1	64.8	6	29167403	DAL	DAL1658	B753	J	D	01R	SFO	KDTW
39669640	2016-12-12	12:59:07 AM	73.4	65.4	9	29167431	UAL	UAL1200	B738	J	D	01R	SFO	KIAH
39669641	2016-12-12	1:41:21 AM	71.9	63.1	10	29167457	AAL	AAL276	A321	J	D	01R	SFO	KJFK
39669642	2016-12-12	8:18:47 AM	75.0	65.9	12	29167878		N748SP	C172	P	D	31	PAO	KPAO
39669643	2016-12-12	8:23:52 AM	72.0	63.1	13	29167799	VRD	VRD001	A320	J	D	01R	SFO	KDCA
39669645	2016-12-12	8:29:00 AM	73.4	64.2	18	29167859	SKW	SKW4874	E75L	R	D	01R	SFO	KSEA

39669646	2016-12-12	8:29:55 AM	71.1	66.6	6	29167763	UAL	UAL862	B744	J	A	28L	SFO	VHHH
39669647	2016-12-12	8:40:10 AM	72.5	65.0	14	29167849	AAL	AAL208	B738	J	D	01R	SFO	KMIA
39669650	2016-12-12	8:42:30 AM	73.8	66.5	13	29167793	CES	CES589	B77W	J	A	28L	SFO	ZSPD
39669653	2016-12-12	8:47:07 AM	70.4	66.3	6	29167810	ANA	ANA8	B77W	J	A	28L	SFO	RIAA
39669654	2016-12-12	8:47:16 AM	67.1	62.0	5	29167810	ANA	ANA8	B77W	J	A	28L	SFO	RIAA
39669656	2016-12-12	8:55:05 AM	79.3	69.2	22	29167899	UAL	UAL639	B772	J	D	01R	SFO	KORD
39669658	2016-12-12	8:56:22 AM	70.5	65.4	7	29167838	SWA	SWA2789	B737	J	A	28L	SFO	KSNA
39669659	2016-12-12	8:56:53 AM	70.7	63.0	8	29169009	SKW	SKW5470	E170	R	D	01R	SFO	CYYC
39669662	2016-12-12	9:00:13 AM	75.6	68.1	22	29168769	AAL	AAL1908	A321	J	D	01R	SFO	KCLT
39669668	2016-12-12	9:18:17 AM	70.3	62.4	8	29168797	UAL	UAL414	B772	J	D	01R	SFO	KEWR
39669669	2016-12-12	9:18:36 AM	69.6	63.8	6	29168797	UAL	UAL414	B772	J	D	01R	SFO	KEWR
39669674	2016-12-12	9:21:19 AM	68.7	63.8	6	29167904	UAL	UAL404	B789	J	A	28L	SFO	KIAH
39669675	2016-12-12	9:21:53 AM	70.4	64.3	6	29168840	UAL	UAL1958	B738	J	D	01R	SFO	KIAH
39669677	2016-12-12	9:22:41 AM	70.6	66.2	6	29168990	CPZ	CPZ3214	E170	R	A	28L	SFO	KLAX
39669678	2016-12-12	9:22:55 AM	67.8	62.7	5	29168990	CPZ	CPZ3214	E170	R	A	28L	SFO	KLAX
39669679	2016-12-12	9:23:07 AM	73.8	66.6	8	29168990	CPZ	CPZ3214	E170	R	A	28L	SFO	KLAX
39669680	2016-12-12	9:23:30 AM	73.6	64.5	15	29168839	SKW	SKW5017	CRJ2	R	D	01L	SFO	KONT
39669681	2016-12-12	9:29:27 AM	70.5	64.3	7	29168983	SKW	SKW5400	CRJ2	R	A	28L	SFO	KPSP
39669684	2016-12-12	9:35:25 AM	71.6	63.1	12	29168773	SWA	SWA707	B737	J	A	28L	SFO	KSAN
39669685	2016-12-12	9:53:55 AM	70.6	63.7	7	29168855	SKW	SKW5694	E75L	R	A	28R	SFO	KMCI
39669692	2016-12-12	10:40:36 AM	73.0	67.0	8	29169232		N200NP	PC12	T	D	30	SQL	
39669693	2016-12-12	10:43:15 AM	67.0	61.1	6	29169128	SKW	SKW5427	CRJ7	R	A	28R	SFO	KOKC
39669695	2016-12-12	10:44:46 AM	76.1	68.7	10	29169723	UAL	UAL834	B739	J	D	01R	SFO	KSAT
39669698	2016-12-12	10:45:53 AM	70.9	65.2	9	29169142	UAL	UAL984	B788	J	A	28L	SFO	LFPG
39669699	2016-12-12	10:46:12 AM	68.6	62.2	7	29169142	UAL	UAL984	B788	J	A	28L	SFO	LFPG
39669714	2016-12-12	11:02:10 AM	70.9	64.1	8	29169270		N883AM	BE36	P	A	30	SQL	
39669716	2016-12-12	11:15:29 AM	71.5	63.8	11	29169760	UAL	UAL1900	A320	J	D	01L	SFO	KSAN
39669718	2016-12-12	11:17:21 AM	73.3	64.3	14	29169508	UAL	UAL1720	A320	J	D	01R	SFO	KATL
39669719	2016-12-12	11:17:43 AM	71.4	64.6	11	29169493	SKW	SKW739W	E75L	R	D	01L	SFO	KTUS
39669722	2016-12-12	11:21:39 AM	69.6	63.1	6	29169548	AAL	AAL1145	A321	J	D	01R	SFO	KORD
39669725	2016-12-12	11:22:45 AM	71.9	65.6	10	29169300	SKW	SKW5655	CRJ2	R	A	28L	SFO	KBUR
39669726	2016-12-12	11:23:14 AM	71.3	64.7	10	29169300	SKW	SKW5655	CRJ2	R	A	28L	SFO	KBUR
39669732	2016-12-12	11:30:20 AM	72.4	63.3	14	29169732	AAL	AAL9	A321	J	A	28R	SFO	KJFK
39669734	2016-12-12	11:32:40 AM	69.1	63.5	5	29169737	SKW	SKW5543	CRJ7	R	A	28R	SFO	KBOI
39669741	2016-12-12	12:06:25 PM	75.5	65.9	14	29169867	UAL	UAL1214	B752	J	D	01R	SFO	KEWR
39669746	2016-12-12	12:10:20 PM	71.0	62.9	8	29169769	SKW	SKW5188	CRJ2	R	A	28L	SFO	KMRY
39669747	2016-12-12	12:10:31 PM	70.5	66.4	5	29169769	SKW	SKW5188	CRJ2	R	A	28L	SFO	KMRY
39669749	2016-12-12	12:12:46 PM	78.4	69.5	33	29169907	CES	CES590	B77W	J	D	28L	SFO	ZSPD
39669757	2016-12-12	12:23:47 PM	71.0	63.4	9	29169946	DAL	DAL1401	B739	J	D	01R	SFO	KATL
39669761	2016-12-12	12:26:36 PM	69.6	63.2	8	29169963	AAR	AAR211	B772	J	D	28L	SFO	RKSI
39669762	2016-12-12	12:27:24 PM	68.6	63.4	5	29170475	JBU	JBU416	A321	J	D	01R	SFO	KJFK
39669763	2016-12-12	12:27:50 PM	71.2	62.7	9	29170475	JBU	JBU416	A321	J	D	01R	SFO	KJFK
39669764	2016-12-12	12:28:30 PM	72.2	63.8	12	29170172	SKW	SKW4957	E75L	R	A	28L	SFO	KSLC
39669765	2016-12-12	12:28:43 PM	70.2	62.3	10	29170172	SKW	SKW4957	E75L	R	A	28L	SFO	KSLC
39669767	2016-12-12	12:29:36 PM	69.0	61.8	8	29170023	VRD	VRD204	A320	J	D	01R	SFO	KORD
39669771	2016-12-12	12:31:05 PM	72.7	67.4	11	29169998	DAL	DAL1583	B752	J	D	01R	SFO	KJFK
39669778	2016-12-12	12:35:11 PM	69.3	65.1	5	29169979		N495DH	B350	T	D	28R	SFO	KSTS
39669779	2016-12-12	12:35:40 PM	72.7	65.1	11	29169870	LXJ	LXJ406	E545	U	A	28L	SFO	KBUR
39669780	2016-12-12	12:35:53 PM	72.7	66.5	9	29169870	LXJ	LXJ406	E545	U	A	28L	SFO	KBUR
39669785	2016-12-12	12:38:36 PM	76.4	65.1	33	29170016	CPA	CPA879	B77W	J	D	28L	SFO	VHHH
39669786	2016-12-12	12:39:22 PM	68.8	63.4	6	29170448	SKW	SKW4871	E75L	R	D	01R	SFO	KSEA
39669788	2016-12-12	12:39:54 PM	72.0	65.8	8	29169889	SKW	SKW5361	CRJ2	R	A	28L	SFO	KBUR
39669789	2016-12-12	12:40:07 PM	70.2	65.3	5	29169889	SKW	SKW5361	CRJ2	R	A	28L	SFO	KBUR
39669792	2016-12-12	12:55:02 PM	71.8	62.7	14	29169982	VRD	VRD011	A320	J	A	28L	SFO	KSLC
39669793	2016-12-12	12:55:54 PM	67.9	62.8	6	29170109	VRD	VRD866	A320	J	D	01R	SFO	KDEN
39669794	2016-12-12	12:58:31 PM	70.2	63.6	7	29170112	SKW	SKW5005	CRJ2	R	D	01L	SFO	KONT
39669796	2016-12-12	1:00:26 PM	70.8	64.0	9	29170019	SKW	SKW5603	E170	R	A	28L	SFO	KPHX
39669797	2016-12-12	1:00:37 PM	71.8	67.0	5	29170019	SKW	SKW5603	E170	R	A	28L	SFO	KPHX
39669808	2016-12-12	1:33:14 PM	71.4	63.3	12	29170515	VIR	VIR19V	B789	J	A	28L	SFO	EGLL
39669811	2016-12-12	1:34:56 PM	69.0	63.1	7	29170244	UAL	UAL447	B739	J	A	28R	SFO	KLAX
39669813	2016-12-12	1:35:21 PM	70.8	63.1	10	29170397	UAL	UAL809	A319	J	D	01L	SFO	KSNA
39669814	2016-12-12	1:35:36 PM	70.2	64.7	7	29170853	UAL	UAL443	B752	J	D	01R	SFO	KEWR
39669819	2016-12-12	1:39:08 PM	73.3	63.0	15	29170846	SKW	SKW5573	E170	R	D	01R	SFO	KDFW
39669822	2016-12-12	1:40:25 PM	70.6	65.9	7	29170842	UAL	UAL982	B789	J	D	28L	SFO	ZSHC
39669824	2016-12-12	1:41:18 PM	75.4	63.7	29	29170446	SWA	SWA1807	B733	J	D	01R	SFO	KDEN
39669828	2016-12-12	2:06:09 PM	77.6	69.5	15	29170458		N415DP	SR22	P	A	30	SQL	KSTS
39669829	2016-12-12	3:03:43 PM	73.8	65.3	13	29171035		N537CP	SR22	P	D	30	SQL	
39669830	2016-12-12	3:43:01 PM	70.9	62.5	8	29171078	UAL	UAL949	B772	J	A	28L	SFO	EGLL
39669831	2016-12-12	3:44:05 PM	77.9	70.8	11	29171723		N798DS	DA40	P	D	30	SQL	KSQL
39669832	2016-12-12	4:47:49 PM	70.2	63.4	7	29171723		N798DS	DA40	P	D	30	SQL	KSQL
39669833	2016-12-12	6:18:58 PM	77.4	68.1	17	29172165	TWY	TWY426	BE58	P	A	31	PAO	
39669834	2016-12-12	6:44:48 PM	69.6	63.4	5	29172324	UAL	UAL705	B739	J	D	01R	SFO	KORD
39669835	2016-12-12	7:31:46 PM	76.5	69.7	14	29172271	SWA	SWA2059	B737	J	D	01L	SFO	KSNA
39669836	2016-12-12	7:36:15 PM	68.2	63.1	5	29172222	SKW	SKW5791	E170	R	A	28L	SFO	KSNA
39669837	2016-12-12	9:28:33 PM	73.6	63.6	14	29172558	TWY	TWY426	BE58	P	D	31	PAO	KSTS
39669841	2016-12-13	8:30:01 AM	70.9	64.9	8	29173365	SKW	SKW4874	E75L	R	D	01R	SFO	KSEA
39669842	2016-12-13	8:31:34 AM	72.8	66.2	11	29173359	ACA	ACA780	A320	J	D	01R	SFO	CYUL
39669843	2016-12-13	8:36:09 AM	72.2	64.4	14	29173654	ACA	ASA383	B739	J	D	01R	SFO	KPDX
39669845	2016-12-13	9:03:00 AM	70.5	62.7	9	29173369	UAL	UAL868	A319	J	A	28L	SFO	KAUS
39669850	2016-12-13	10:34:06 AM	69.5	62.1	8	29173822	SKW	SKW5809	CRJ7	R	A	28R	SFO	KSNA
39669853	2016-12-13	10:44:53 AM	73.8	69.5	8	29173859	SKW	SKW5655	CRJ2	R	A	28L	SFO	KBUR



39669854	2016-12-13	10:46:07 AM	71.7	64.9	7	29173975	UAL	UAL1689	B738	J	D	01L	SFO	MMSD
39669856	2016-12-13	10:46:57 AM	74.6	63.8	25	29173861	VRD	VRD953	A319	J	A	28L	SFO	KSAN
39669858	2016-12-13	10:48:44 AM	76.0	64.8	28	29173886	UAL	UAL838	B744	J	A	28L	SFO	RIAA
39669859	2016-12-13	10:49:34 AM	78.8	67.2	36	29173991	SKW	SKW5133	CRJ2	R	D	01L	SFO	KONT
39669860	2016-12-13	10:49:49 AM	78.8	70.2	27	29173991	SKW	SKW5133	CRJ2	R	D	01L	SFO	KONT
39669861	2016-12-13	10:50:22 AM	81.0	68.7	49	29173975	UAL	UAL1689	B738	J	D	01L	SFO	MMSD
39669864	2016-12-13	10:53:10 AM	74.5	65.8	16	29173908	UAL	UAL727	A319	J	A	28L	SFO	KPDY
39669866	2016-12-13	10:54:18 AM	70.4	64.4	6	29173915	UAL	UAL34	B772	J	A	28L	SFO	RJBB
39669867	2016-12-13	10:54:33 AM	70.7	63.5	7	29173915	UAL	UAL34	B772	J	A	28L	SFO	RJBB
39669869	2016-12-13	10:57:08 AM	78.0	66.9	40	29174394	SWA	SWA1632	B737	J	D	01R	SFO	KDEN
39669873	2016-12-13	11:09:49 AM	67.2	62.0	5	29174160	VRD	VRD218	A320	J	D	01R	SFO	KAUS
39669874	2016-12-13	11:39:14 AM	73.1	63.7	11	29174298	UAL	UAL1148	B789	J	D	01R	SFO	KIAH
39669876	2016-12-13	12:00:47 PM	69.6	64.8	7	29174294	UAL	UAL424	B752	J	A	28R	SFO	KIAD
39669892	2016-12-13	12:17:42 PM	75.5	67.2	11	29174354		N426QS	GLF4	B	A	28R	SFO	KRST
39669898	2016-12-13	12:27:53 PM	71.4	65.6	8	29174762	SKW	SKW5465	CRJ2	R	A	28L	SFO	KRDM
39669900	2016-12-13	12:29:08 PM	73.2	62.3	20	29174571	VRD	VRD926	A320	J	D	01L	SFO	KLAX
39669901	2016-12-13	12:30:11 PM	67.7	62.1	5	29174732	AAL	AAL15	A321	J	A	28L	SFO	KJFK
39669904	2016-12-13	12:36:36 PM	67.5	61.9	5	29174636	UAL	UAL1750	A319	J	D	01R	SFO	KPDY
39669906	2016-12-13	12:37:53 PM	68.6	62.4	5	29174499	VRD	VRD899	A320	J	A	28L	SFO	KLAX
39669907	2016-12-13	12:39:21 PM	70.4	62.5	9	29174640	AAR	AAR211	B772	J	D	28L	SFO	RKSI
39669908	2016-12-13	12:41:12 PM	69.4	61.9	8	29175094	UAL	UAL1083	B739	J	D	01L	SFO	KLAX
39669910	2016-12-13	12:43:08 PM	67.9	61.3	6	29175082	UAL	UAL624	B772	J	D	01R	SFO	KORD
39669915	2016-12-13	2:09:02 PM	74.0	69.5	9	29175027	VRD	VRD933	A320	J	A	28L	SFO	KLAX
39669917	2016-12-13	2:22:28 PM	68.5	63.2	5	29175301	AAL	AAL259	A321	J	D	01R	SFO	KDFW
39669918	2016-12-13	3:55:28 PM	71.0	64.7	6	29175751	UAL	UAL1845	B738	J	D	01R	SFO	KDEN
39669919	2016-12-13	4:37:10 PM	73.1	64.1	12	29177472		N6334M	C152	P	D	31	PAO	
39669925	2016-12-14	10:23:49 AM	67.8	62.9	5	29177152	EJA	EJA903	C750	B	D	28L	SFO	KLAX
39669927	2016-12-14	10:25:01 AM	71.5	63.6	11	29177163	AAL	AAL36	A321	J	D	01R	SFO	KDFW
39669928	2016-12-14	10:25:13 AM	69.3	63.6	5	29177163	AAL	AAL36	A321	J	D	01R	SFO	KDFW
39669929	2016-12-14	10:25:53 AM	69.4	61.8	10	29177279	SKW	SKW4461	CRJ7	R	A	28R	SFO	KSCL
39669948	2016-12-14	10:49:06 AM	68.5	62.3	5	29177173	SWA	SWA6160	B737	J	A	28R	SFO	KLAX
39669952	2016-12-14	10:51:05 AM	77.5	73.2	12	29177157	ASA	ASA9820	B739	J	A	28L	SFO	KSEA
39669956	2016-12-14	10:53:07 AM	72.5	65.1	11	29177294	SKW	SKW5426	E170	R	A	28L	SFO	KRAP
39669957	2016-12-14	10:53:36 AM	71.5	64.5	11	29177294	SKW	SKW5426	E170	R	A	28L	SFO	KRAP
39669963	2016-12-14	10:56:30 AM	78.1	67.6	28	29177182	VRD	VRD183	A320	J	A	28L	SFO	KEWR
39669964	2016-12-14	10:57:38 AM	72.8	65.6	10	29177189	CMD	CMD1	HELO	H	A	HELI	SFO	
39669965	2016-12-14	10:57:53 AM	71.2	63.6	10	29177189	CMD	CMD1	HELO	H	A	HELI	SFO	
39669966	2016-12-14	10:58:15 AM	68.7	63.8	5	29177189	CMD	CMD1	HELO	H	A	HELI	SFO	
39669970	2016-12-14	11:00:06 AM	73.7	68.5	7	29177189	CMD	CMD1	HELO	H	A	HELI	SFO	
39669971	2016-12-14	11:00:44 AM	84.2	73.9	39	29177189	CMD	CMD1	HELO	H	A	HELI	SFO	
39669972	2016-12-14	12:01:07 PM	69.7	63.6	6	29178892	VRD	VRD896	A320	J	D	28R	SFO	KLAX
39669978	2016-12-14	12:04:44 PM	68.9	64.1	5	29179110	UAL	UAL888	B744	J	D	28L	SFO	ZBAA
39669979	2016-12-14	12:13:30 PM	70.5	64.7	5	29178922	SWA	SWA3399	B733	J	D	28L	SFO	KLAX
39669980	2016-12-14	12:15:33 PM	71.4	62.9	11	29178766	SKW	SKW4871	E75L	R	A	28R	SFO	KSEA
39669982	2016-12-14	12:16:48 PM	72.3	66.4	10	29178908	DAL	DAL1401	B739	J	D	28L	SFO	KATL
39669983	2016-12-14	12:17:25 PM	70.8	63.4	7	29178768	UAL	UAL497	B752	J	A	28R	SFO	KEWR
39669992	2016-12-14	12:22:35 PM	74.0	64.9	16	29178779	AAL	AAL15	A321	J	A	28L	SFO	KJFK
39669999	2016-12-14	1:06:38 PM	69.7	62.3	9	29179212	JBU	JBU416	A321	J	D	28R	SFO	KJFK
39670002	2016-12-14	1:42:00 PM	73.3	64.4	12	29179582	JBU	JBU1435	A320	J	D	28L	SFO	KLGB
39670010	2016-12-14	2:05:04 PM	71.7	66.7	5	29179288	SKW	SKW5015	CRJ2	R	A	28L	SFO	KONT
39670029	2016-12-15	3:31:03 PM	76.6	63.9	29	29182842	SKW	N342SP	L175	B	D	10L	SFO	KVNY
39670061	2016-12-15	5:29:21 PM	86.4	77.6	30	29183067	DAL	DAL939	B739	J	A	19L	SFO	KATL
39670081	2016-12-15	6:56:42 PM	85.4	76.2	36	29183354	REH	REH3	HELO	H	D	HELI	SFO	KCCR
39670096	2016-12-15	9:03:49 PM	70.5	62.3	8	29183636	UAL	UAL1688	B739	J	D	01R	SFO	KSEA
39670097	2016-12-15	9:18:45 PM	73.3	64.7	11	29183650	ASA	ASA223	B738	J	D	01R	SFO	KSEA
39670099	2016-12-15	10:24:03 PM	75.6	66.4	13	29183795	UAL	UAL529	B739	J	D	01R	SFO	KPDY
39670100	2016-12-15	11:07:58 PM	73.3	66.4	8	29183885	AAL	AAL18	A321	J	D	01R	SFO	KJFK
39670101	2016-12-16	12:12:20 AM	69.7	62.5	6	29183978	AMX	AMX665	B738	J	D	01R	SFO	MMMX
39670102	2016-12-16	12:15:30 AM	75.7	65.2	16	29183989	AAL	AAL758	A321	J	D	01R	SFO	KPHL
39670103	2016-12-16	12:16:42 AM	75.4	66.9	10	29183993	UAL	UAL8235	B739	J	D	01R	SFO	KIAD
39670104	2016-12-16	1:32:54 AM	73.5	64.4	14	29184052	UAL	UAL257T	B739	J	D	01R	SFO	KLAX
39670105	2016-12-16	1:37:27 AM	72.3	63.1	10	29184063	DAL	DAL806	A320	J	D	01R	SFO	KMSP
39670106	2016-12-16	1:44:29 AM	69.6	62.2	7	29184064	UAL	UAL1604	B739	J	D	01R	SFO	KMIA
39670107	2016-12-16	2:57:00 AM	70.0	64.0	5	29184104	UAL	UAL1204	B739	J	D	01R	SFO	KIAH
39670108	2016-12-16	6:12:03 AM	70.6	61.9	8	29184197	DAL	DAL240	B739	J	D	01R	SFO	KATL
39670109	2016-12-16	6:21:35 AM	73.2	63.6	14	29184206	AAL	AAL581	A321	J	D	01R	SFO	KCLT
39670110	2016-12-16	7:43:10 AM	73.4	62.9	15	29184383	UAL	UAL1867	B739	J	D	01R	SFO	KSEA
39670111	2016-12-16	7:59:29 AM	70.9	62.1	9	29184460	AAL	AAL704	A321	J	D	01R	SFO	KCLT
39670112	2016-12-16	8:03:59 AM	73.7	67.4	10	29184393		N298Y	PC12	T	A	31	PAO	KSTS
39670113	2016-12-16	8:04:46 AM	69.6	62.9	7	29184469	DAL	DAL1866	B752	J	D	01R	SFO	KATL
39670114	2016-12-16	8:15:16 AM	76.0	66.8	18	29184484	UAL	UAL1267	B739	J	D	01L	SFO	MMPR
39670117	2016-12-16	8:21:43 AM	78.3	67.1	39	29184530		N765WS	GALX	B	D	28R	SFO	KLUK
39670118	2016-12-16	8:24:53 AM	77.8	64.9	42	29184550	SKW	SKW5900	CRJ2	R	D	01R	SFO	KRNO
39670119	2016-12-16	8:25:54 AM	68.4	62.4	5	29184427	UAL	UAL322	A319	J	A	28L	SFO	KNSA
39670122	2016-12-16	8:29:04 AM	69.4	63.9	6	29184635	GTW	GTW363	C680	B	A	28L	SFO	KPDY
39670124	2016-12-16	8:32:22 AM	67.4	61.4	6	29184657	VRD	VRD861	A320	J	A	28L	SFO	KDEN
39670125	2016-12-16	8:41:35 AM	70.8	64.3	6	29184592	AAL	AAL208	B738	J	D	01R	SFO	KMIA
39670132	2016-12-16	10:24:58 AM	73.9	65.4	15	29185114	UAL	UAL516	B739	J	D	28R	SFO	KIAD
39670135	2016-12-16	10:27:11 AM	70.3	61.5	10	29185072	HAL	HAL41	A332	J	D	28L	SFO	PHOG
39670138	2016-12-16	10:29:06 AM	72.5	64.5	14	29185123	UAL	UAL994	B752	J	D	28L	SFO	KEWR
39670145	2016-12-16	10:42:39 AM	68.2	62.1	5	29185183	UAL	UAL2160	B752	J	D	28L	SFO	KLAX



39670146	2016-12-16	10:42:59 AM	69.8	64.8	7	29185183	UAL	UAL2160	B752	J	D	28L	SFO	KLAX
39670147	2016-12-16	10:43:14 AM	72.1	65.6	7	29185208	FFT	FFT1532	A320	J	D	28L	SFO	KATL
39670148	2016-12-16	10:43:28 AM	76.8	68.8	28	29185208	FFT	FFT1532	A320	J	D	28L	SFO	KATL
39670160	2016-12-16	11:01:25 AM	72.4	62.0	13	29185391	SKW	SKW4461	CRJ7	R	D	28R	SFO	KSLC
39670161	2016-12-16	11:02:06 AM	71.8	63.1	10	29185365		N361K	F900	B	D	28R	SFO	PANC
39670162	2016-12-16	11:02:39 AM	67.6	60.8	6	29185301	SKW	SKW5967	E170	R	A	28L	SFO	KSLC
39670178	2016-12-16	12:14:10 PM	77.4	65.6	29	29185579		GLEX	B	A	A	28R	SFO	RJAA
39670197	2016-12-16	12:41:04 PM	69.1	63.8	5	29185865	AAL	AAL1688	A321	J	D	28L	SFO	KDFW
39670198	2016-12-16	12:41:34 PM	72.4	66.5	10	29185865	AAL	AAL1688	A321	J	D	28L	SFO	KDFW
39670201	2016-12-16	12:43:19 PM	70.2	62.5	8	29185947	UAL	UAL2042	B738	J	A	28R	SFO	KDCA
39670203	2016-12-16	12:44:19 PM	68.4	62.7	6	29185694	SKW	SKW5337	CRJ7	R	A	28L	SFO	KSNA
39670204	2016-12-16	12:51:48 PM	66.8	61.7	5	29185892	UAL	UAL1571	B739	J	D	28L	SFO	MMPR
39670208	2016-12-16	1:48:13 PM	67.4	61.4	6	29186120	CMP	CMP208	B738	J	A	28L	SFO	MPTO
39670210	2016-12-16	1:58:14 PM	70.2	63.8	6	29186276	DAL	DAL61	B739	J	D	28L	SFO	KATL
39670212	2016-12-16	2:20:26 PM	70.3	62.8	8	29186454	AAL	AAL116	A321	J	D	28L	SFO	KJFK
39670221	2016-12-16	4:39:38 PM	69.4	62.9	7	29187321	BAW	BAW71F	B772	J	D	28L	SFO	EGLL
39670225	2016-12-16	8:56:07 PM	72.2	62.6	12	29188135	UAL	UAL146	B738	J	D	01R	SFO	KBOS
39670226	2016-12-16	9:20:07 PM	74.7	64.8	13	29188217	ASA	ASA223	B739	J	D	01R	SFO	KSEA
39670228	2016-12-16	10:01:43 PM	70.2	63.6	5	29188312	UAL	UAL1835	B739	J	D	01R	SFO	KIAD
39670229	2016-12-16	10:16:51 PM	71.3	63.8	7	29188327	ASA	ASA304	B739	J	D	01L	SFO	KPSP
39670230	2016-12-16	10:17:03 PM	71.9	65.3	6	29188342	VRD	VRD358	A320	J	D	01R	SFO	KBOS
39670231	2016-12-16	10:23:44 PM	74.0	65.8	11	29188351	UAL	UAL284	B752	J	D	01R	SFO	KEWR
39670232	2016-12-16	10:32:20 PM	82.0	76.2	19	29188519	UAL	UAL480T	B739	J	D	01R	SFO	KPIT
39670233	2016-12-16	10:34:04 PM	74.2	65.2	15	29188522	UAL	UAL2013	B753	J	D	01R	SFO	KBOS
39670234	2016-12-16	10:37:07 PM	75.6	64.5	21	29188521	AAL	AAL434	A321	J	D	01R	SFO	KPHL
39670235	2016-12-16	10:53:48 PM	75.0	65.8	11	29188399	AAL	AAL898	A321	J	D	01R	SFO	KCLT
39670236	2016-12-16	11:00:45 PM	71.1	63.9	6	29188432	JBU	JBU1716	A321	J	D	01R	SFO	KJFK
39670237	2016-12-16	11:00:57 PM	70.7	66.0	5	29188432	JBU	JBU1716	A321	J	D	01R	SFO	KJFK
39670238	2016-12-16	11:05:02 PM	71.8	62.1	10	29188417	UAL	UAL917	B772	J	D	28L	SFO	NZAA
39670239	2016-12-16	11:05:20 PM	67.0	61.3	6	29188429	SWA	SWA190	B733	J	D	01L	SFO	KLAS
39670240	2016-12-16	11:13:00 PM	76.3	67.5	20	29188430	UAL	UAL194	B738	J	D	01L	SFO	KSAN
39670241	2016-12-16	11:30:51 PM	67.6	61.5	5	29188466	CPA	CPA873	B77W	J	D	28L	SFO	VHHH
39670242	2016-12-17	1:30:28 AM	72.0	63.8	10	29188621	UAL	UAL1197	B739	J	D	01L	SFO	KIAH
39670244	2016-12-17	8:28:55 AM	71.7	66.2	5	29188992		N56338	M20P	P	D	28L	HWD	KDVO
39670245	2016-12-17	9:57:04 AM	79.6	69.2	24	29189963		N16770	B06	U	D	H	SIC	
39670246	2016-12-17	10:55:55 AM	71.9	63.2	10	29189789		N5507D	BE35	P	A	30	SQL	
39670247	2016-12-17	12:40:38 PM	67.2	60.9	5	29191468	VRD	VRD270	A320	J	D	01R	SFO	MMPR
39670248	2016-12-17	12:43:11 PM	72.9	64.5	11	29190874		N8505P	C172	P	D	31	PAO	KHAF
39670249	2016-12-17	1:01:19 PM	73.8	66.4	10	29192187		N2895X	C177	P	O	NONE		KLVK
39670251	2016-12-17	3:19:42 PM	75.4	68.5	8	29192089	SKW	SKW5726	CRJ2	R	A	28L	SFO	KPSP
39670252	2016-12-17	3:31:23 PM	75.2	71.6	11	29192281	XOJ	XOJ406	CL30	B	A	28R	SFO	KSBA
39670253	2016-12-17	3:33:17 PM	75.7	65.4	20	29192367		N3799Q	BE35	P	A	30L	SIC	
39670256	2016-12-17	7:14:59 PM	76.7	65.5	23	29193500	UAL	UAL1279	B738	J	A	28L	SFO	KBOS
39670257	2016-12-17	7:45:50 PM	72.0	64.2	8	29193632	ASA	ASA297	B739	J	D	01R	SFO	KSEA
39670258	2016-12-17	7:52:48 PM	70.6	62.4	9	29193648	SCX	SCX396	B738	J	D	01R	SFO	KMSP
39670259	2016-12-17	8:11:46 PM	69.1	62.7	5	29193719	UAL	UAL681	B739	J	D	01L	SFO	KLAS
39670262	2016-12-17	8:43:14 PM	76.8	68.9	18	29193781	JBU	JBU1516	A321	J	D	01R	SFO	KJFK
39670263	2016-12-17	9:50:30 PM	70.3	63.4	6	29193891	UAL	UAL2033	B739	J	D	01R	SFO	KBWI
39670264	2016-12-17	9:50:51 PM	69.8	63.1	7	29193885	CPZ	CPZ6080	E170	R	D	01L	SFO	KLAX
39670265	2016-12-17	10:01:39 PM	74.7	65.9	11	29193931	AAL	AAL1540	B738	J	D	01L	SFO	KMIA
39670266	2016-12-17	10:03:16 PM	74.7	66.1	11	29193929	UAL	UAL1610	B738	J	D	01L	SFO	KFLL
39670267	2016-12-17	10:16:53 PM	71.6	63.0	9	29193954	AAL	AAL434	A321	J	D	01R	SFO	KPHL
39670268	2016-12-17	10:17:12 PM	71.0	63.2	8	29193954	AAL	AAL434	A321	J	D	01R	SFO	KPHL
39670269	2016-12-18	6:18:14 AM	71.2	63.1	8	29194280	AAL	AAL581	A321	J	D	01R	SFO	KCLT
39670270	2016-12-18	6:42:41 AM	73.5	65.9	8	29194335	DAL	DAL854	B739	J	D	01R	SFO	KDTW
39670271	2016-12-18	6:55:22 AM	76.9	69.3	14	29194331	UAL	UAL271	B739	J	D	01L	SFO	KLAX
39670272	2016-12-18	7:04:51 AM	69.6	62.4	6	29194356	UAL	UAL616	B753	J	D	01R	SFO	KORD
39670273	2016-12-18	7:12:52 AM	70.2	64.2	5	29194374	AAL	AAL150	B738	J	D	01R	SFO	KORD
39670274	2016-12-18	7:30:21 AM	69.6	62.2	8	29194596	JBU	JBU16	A321	J	D	01R	SFO	KJFK
39670275	2016-12-18	7:54:18 AM	71.0	62.4	9	29194429	UAL	UAL408	B772	J	D	01R	SFO	KIAD
39670276	2016-12-18	8:02:16 AM	71.2	63.3	9	29194473	JBU	JBU434	A321	J	D	01R	SFO	KBOS
39670277	2016-12-18	10:43:28 AM	74.7	67.5	11	29195175		N380SP	C172	P	D	30	SQL	KSQL
39670279	2016-12-18	11:22:24 AM	75.5	65.5	16	29195436	SKW	SKW898K	CRJ2	R	D	01R	SFO	KPSC
39670281	2016-12-18	3:37:05 PM	78.5	70.4	13	29197522		N934TR	C172	P	D	30	HAF	KRHV
39670282	2016-12-18	5:55:46 PM	72.0	63.2	9	29198202		N67384	C152	P	O	NONE		KRHV
39670283	2016-12-18	10:09:00 PM	75.6	64.6	18	29198856	SWA	SWA388	B733	J	D	01L	SFO	KLAX
39670284	2016-12-18	10:51:02 PM	68.7	62.5	5	29199043	SKW	SKW426W	E75L	R	D	01L	SFO	KSBA
39670285	2016-12-18	11:56:58 PM	71.2	63.5	8	29199100	QFA	QFA74	B744	J	D	28L	SFO	YSSY
39670286	2016-12-19	12:12:00 AM	73.5	63.8	17	29199051	UAL	UAL917	B772	J	D	28R	SFO	NZAA
39670287	2016-12-19	12:12:16 AM	68.1	61.2	6	29199051	UAL	UAL917	B772	J	D	28R	SFO	NZAA
39670288	2016-12-19	12:18:18 AM	74.3	64.3	15	29199065	CAL	CAL003	B77W	J	D	28L	SFO	RCTP
39670289	2016-12-19	12:49:20 AM	72.1	64.0	9	29199091	UAL	UAL680	B739	J	D	01R	SFO	KORD
39670290	2016-12-19	6:57:11 AM	69.1	61.9	7	29199251	ETD	ETD183	B77L	J	A	28R	SFO	OMAA
39670291	2016-12-19	8:25:05 AM	75.4	66.4	18	29199629	UAL	UAL1831	B738	J	A	28L	SFO	KLAX
39670292	2016-12-19	8:25:26 AM	71.9	63.4	11	29199561	ACA	ACA758	A320	J	D	01R	SFO	CYYZ
39670293	2016-12-19	8:26:02 AM	71.6	64.8	8	29199561	ACA	ACA758	A320	J	D	01R	SFO	CYYZ
39670295	2016-12-19	8:27:47 AM	69.1	62.5	7	29199827	PXT	PXT525	C25B	B	D	01R	SFO	KASE
39670296	2016-12-19	8:29:34 AM	68.0	62.1	6	29199546	SKW	SKW5987	E170	R	D	01L	SFO	KPHX
39670297	2016-12-19	8:29:51 AM	74.1	66.0	17	29199578	CPZ	CPZ5721	E170	R	D	01R	SFO	KSEA
39670298	2016-12-19	8:31:21 AM	67.3	61.7	5	29199858	SKW	SKW400L	CRJ7	R	D	01R	SFO	KASE
39670299	2016-12-19	8:36:55 AM	68.2	62.0	6	29199574	SKW	SKW5279	CRJ2	R	D	01L	SFO	KBUR

39670302	2016-12-19	8:42:57 AM	69.1	62.1	7	29199500	ASA	ASA222	B738	J	A	28L	SFO	KSEA
39670303	2016-12-19	8:45:33 AM	70.7	62.9	9	29199511	VRD	VRD022	A320	J	A	28L	SFO	KPDJ
39670306	2016-12-19	8:52:51 AM	71.7	64.4	8	29199537	SKW	SKW5982	E75L	R	A	28L	SFO	KSBA
39670307	2016-12-19	8:54:42 AM	73.4	66.4	11	29199542	VRD	VRD751	A320	J	A	28L	SFO	KSEA
39670308	2016-12-19	8:54:57 AM	74.8	67.1	9	29199542	VRD	VRD751	A320	J	A	28L	SFO	KSEA
39670310	2016-12-19	8:56:58 AM	71.6	63.0	12	29199635	UAL	UAL1251	A319	J	D	01R	SFO	KSLC
39670312	2016-12-19	8:58:28 AM	70.5	66.5	9	29199555	SWA	SWA2789	B737	J	A	28L	SFO	KSNA
39670315	2016-12-19	9:21:48 AM	70.7	62.2	10	29199692	N414LC	C414		P	A	12	SQL	
39670316	2016-12-19	9:25:17 AM	65.8	61.0	5	29199792	UAL	UAL618	B738	J	D	01R	SFO	KSEA
39670317	2016-12-19	10:05:02 AM	73.6	66.0	9	29199994	VRD	VRD340	A320	J	D	01R	SFO	KFLF
39670321	2016-12-19	10:32:23 AM	68.9	64.0	6	29200573	SKW	SKW898K	CRJ2	R	D	01R	SFO	KPSC
39670324	2016-12-19	10:40:53 AM	65.4	60.8	6	29200029	SKW	SKW5809	E170	R	A	28L	SFO	KSNA
39670327	2016-12-19	10:45:35 AM	67.7	61.7	5	29200577	UAL	UAL1689	A320	J	D	28L	SFO	MMSD
39670328	2016-12-19	10:46:01 AM	71.8	65.7	10	29200577	UAL	UAL1689	A320	J	D	28L	SFO	MMSD
39670332	2016-12-19	10:49:01 AM	70.4	63.3	7	29200071	CCA	CCA985	B748	J	A	28L	SFO	ZBAA
39670334	2016-12-19	10:49:44 AM	68.6	61.6	6	29200214	CPZ	CPZ5750	E170	R	D	01R	SFO	KSEA
39670335	2016-12-19	10:50:10 AM	71.7	64.9	8	29200214	CPZ	CPZ5750	E170	R	D	01R	SFO	KSEA
39670339	2016-12-19	10:52:41 AM	76.5	65.9	28	29200092	CPA	CPA870	B77W	J	A	28L	SFO	VHHH
39670342	2016-12-19	10:55:57 AM	72.4	66.1	10	29200113	UAL	UAL892	B744	J	A	28L	SFO	RKSI
39670345	2016-12-19	10:58:44 AM	74.3	64.4	17	29200240	AIC	AIC174	B77L	J	D	28L	SFO	VIDP
39670346	2016-12-19	10:59:06 AM	77.3	69.9	17	29200282	DAL	DAL2758	B712	J	A	28R	SFO	KLAX
39670350	2016-12-19	12:00:44 PM	75.1	66.3	12	29200995		N92977	C206	P	D	30	SQL	KSTS
39670354	2016-12-19	12:05:13 PM	76.7	68.0	23	29200766	VRD	VRD276	A320	J	D	01L	SFO	MMSD
39670355	2016-12-19	12:05:38 PM	67.9	61.2	5	29200766	VRD	VRD276	A320	J	D	01L	SFO	MMSD
39670359	2016-12-19	12:10:14 PM	72.3	61.9	16	29200603	SKW	SKW5267	E170	R	A	28L	SFO	KLAX
39670362	2016-12-19	12:12:28 PM	79.7	68.5	46	29200796	UAL	UAL404	A320	J	D	01L	SFO	KPHX
39670363	2016-12-19	12:12:38 PM	74.3	67.7	10	29200796	UAL	UAL404	A320	J	D	01L	SFO	KPHX
39670364	2016-12-19	12:13:10 PM	75.9	64.6	28	29201070	UAL	UAL535	B752	J	D	01R	SFO	KEWR
39670367	2016-12-19	12:14:56 PM	71.6	63.4	13	29200640	SKW	SKW5201	CRJ2	R	A	28L	SFO	KMFR
39670368	2016-12-19	12:16:06 PM	73.4	63.7	14	29201065	UAL	UAL662	A319	J	D	01R	SFO	KSLC
39670369	2016-12-19	12:16:45 PM	79.2	65.3	59	29200870	SKW	SKW5956	E170	R	D	01R	SFO	KMSP
39670372	2016-12-19	12:18:20 PM	72.7	65.6	11	29200802	KAL	KAL024	B748	J	D	28L	SFO	RKSI
39670373	2016-12-19	12:18:39 PM	72.1	66.1	9	29200802	KAL	KAL024	B748	J	D	28L	SFO	RKSI
39670374	2016-12-19	12:18:57 PM	76.8	65.4	31	29200849	DAL	DAL61	B739	J	D	01R	SFO	KATL
39670375	2016-12-19	12:19:30 PM	70.4	63.4	7	29200849	DAL	DAL61	B739	J	D	01R	SFO	KATL
39670380	2016-12-19	12:21:44 PM	76.4	66.7	27	29201073	EJA	EJA629	C56X	B	D	01R	SFO	KASE
39670382	2016-12-19	12:24:38 PM	72.0	62.6	14	29201028	AFR	AFR084	B77W	J	A	28L	SFO	LFPG
39670384	2016-12-19	12:26:59 PM	71.5	62.8	10	29200730	AAL	AAL433	A321	J	A	28L	SFO	KPHX
39670385	2016-12-19	12:27:38 PM	69.5	63.2	7	29200877	AAL	AAL931	B738	J	D	01R	SFO	KMIA
39670387	2016-12-19	12:29:01 PM	73.0	65.6	13	29201041	UAL	UAL35	B772	J	D	28L	SFO	RUBB
39670390	2016-12-19	12:31:01 PM	71.8	63.2	14	29200871	DAL	DAL2763	B712	J	D	01L	SFO	KLAX
39670391	2016-12-19	12:31:28 PM	68.4	62.3	6	29200929	KLM	KLM281	B789	J	A	28L	SFO	EHAM
39670395	2016-12-19	12:34:25 PM	72.4	65.1	10	29201345	SKW	SKW4871	E75L	R	D	01R	SFO	KSEA
39670399	2016-12-19	12:35:53 PM	74.5	67.1	15	29200997	SKW	SKW5359	CRJ7	R	A	28R	SFO	KBOI
39670400	2016-12-19	12:36:18 PM	70.2	64.9	7	29200922	JCT	JCT4	FA50	B	D	01R	SFO	KBOS
39670401	2016-12-19	12:36:34 PM	70.2	63.0	10	29201374	SWA	SWA3094	B737	J	D	01L	SFO	KPHX
39670405	2016-12-19	12:39:37 PM	79.8	67.3	61	29201078	VRD	VRD927	A320	J	A	28L	SFO	KLAX
39670407	2016-12-19	2:07:40 PM	77.3	66.7	21	29201363		N92977	C206	P	A	30	SQL	KSTS
39670408	2016-12-19	2:08:02 PM	71.2	62.5	11	29201615	SKW	SKW5192	E170	R	D	01R	SFO	KBOI
39670409	2016-12-19	2:09:11 PM	73.2	64.3	14	29201336	EVA	EVA018	B77W	J	A	28L	SFO	RCTP
39670410	2016-12-19	2:09:31 PM	68.3	62.1	5	29201336	EVA	EVA018	B77W	J	A	28L	SFO	RCTP
39670411	2016-12-19	2:10:24 PM	72.3	64.7	10	29201556	AAL	AAL2207	A321	J	D	01R	SFO	KDFW
39670412	2016-12-19	2:11:02 PM	74.6	65.5	23	29201556	AAL	AAL2207	A321	J	D	01R	SFO	KDFW
39670415	2016-12-19	2:12:19 PM	75.9	70.2	12	29201356	VRD	VRD933	A320	J	A	28L	SFO	KLAX
39670416	2016-12-19	2:12:59 PM	70.4	65.6	7	29201630	UAL	UAL698	B739	J	D	01R	SFO	KORD
39670423	2016-12-19	2:18:02 PM	71.6	66.4	7	29201638	UAL	UAL779	B752	J	D	01R	SFO	KEWR
39670426	2016-12-19	2:19:33 PM	71.2	64.9	9	29201642	AAL	AAL259	A321	J	D	01R	SFO	KDFW
39670427	2016-12-19	2:19:48 PM	72.8	68.1	7	29201838	BAW	BAW11M	B772	J	A	28L	SFO	EGLL
39670428	2016-12-19	2:20:05 PM	75.7	65.8	29	29201838	BAW	BAW11M	B772	J	A	28L	SFO	EGLL
39670429	2016-12-19	2:20:49 PM	69.1	64.6	6	29201386	DAL	DAL1151	A320	J	A	28R	SFO	KMSP
39670433	2016-12-19	3:13:13 PM	71.7	64.8	10	29201762	SWA	SWA1298	B737	J	A	28L	SFO	KSNA
39670435	2016-12-19	3:16:23 PM	68.3	63.6	5	29202025	SWA	SWA1569	B738	J	D	01R	SFO	KMDW
39670436	2016-12-19	3:19:18 PM	76.0	64.5	33	29202062	AFR	AFR083	B77W	J	D	28L	SFO	LFPG
39670437	2016-12-19	3:56:43 PM	72.7	67.7	6	29202207	SKW	SKW5160	CRJ2	R	D	01L	SFO	KONT
39670438	2016-12-19	3:59:56 PM	72.3	62.5	12	29202096	AAL	AAL478	A320	J	A	28L	SFO	KPHX
39670444	2016-12-19	4:58:07 PM	67.0	61.2	5	29202578	UAL	UAL517	B739	J	D	01R	SFO	KIAD
39670448	2016-12-19	8:37:34 PM	68.2	61.5	5	29203327	ANZ	ANZ7	B772	J	D	28L	SFO	NZAA
39670450	2016-12-20	12:27:18 AM	72.3	65.9	6	29203758	SCX	SCX398	B738	J	D	01R	SFO	KMSP
39670451	2016-12-20	12:44:33 AM	72.5	64.6	8	29203764	UAL	UAL412	B738	J	D	01L	SFO	MMMX
39670454	2016-12-20	7:31:43 AM	72.8	64.9	11	29204067	UAL	UAL1867	B739	J	D	01R	SFO	KSEA
39670455	2016-12-20	7:44:37 AM	68.7	62.8	5	29204095	DAL	DAL1866	B739	J	D	01R	SFO	KATL
39670456	2016-12-20	8:09:59 AM	74.1	65.6	13	29204188	DAL	DAL1106	B739	J	D	01R	SFO	KMSP
39670457	2016-12-20	8:13:54 AM	69.7	63.7	5	29204181	VRD	VRD1930	A320	J	D	01L	SFO	KLAX
39670458	2016-12-20	8:16:06 AM	73.1	66.1	11	29204193	DAL	AAL1164	A321	J	D	01R	SFO	KDFW
39670459	2016-12-20	8:18:52 AM	73.0	64.1	9	29204201	AAL	AAL704	A321	J	D	01R	SFO	KCLT
39670460	2016-12-20	8:27:08 AM	72.2	63.3	13	29204156	UAL	UAL550	A320	J	A	28L	SFO	KORD
39670461	2016-12-20	8:27:20 AM	68.7	61.9	6	29204221	UAL	UAL205	B739	J	D	01R	SFO	KPDJ
39670464	2016-12-20	8:28:49 AM	73.0	65.0	12	29204261	SKW	SKW5766	CRJ2	R	D	01R	SFO	KRDD
39670465	2016-12-20	8:29:07 AM	73.0	63.5	15	29204261	SKW	SKW5766	CRJ2	R	D	01R	SFO	KRDD
39670466	2016-12-20	8:29:46 AM	69.5	61.4	9	29204224	SKW	SKW5987	E170	R	D	01L	SFO	KPHX
39670467	2016-12-20	8:29:55 AM	69.4	62.3	7	29204224	SKW	SKW5987	E170	R	D	01L	SFO	KPHX

39670468	2016-12-20	8:30:11 AM	69.9	65.2	5	29204256	ASA	ASA383	B738	J	D	01R	SFO	KPDX
39670469	2016-12-20	8:30:32 AM	71.3	63.4	11	29204256	ASA	ASA383	B738	J	D	01R	SFO	KPDX
39670470	2016-12-20	8:31:20 AM	75.4	71.1	6	29204160	UAL	UAL500	A320	J	A	28R	SFO	KIND
39670471	2016-12-20	8:32:15 AM	68.6	63.7	5	29204262	SKW	SKW400L	CRJ7	R	D	01R	SFO	KASE
39670473	2016-12-20	8:33:08 AM	72.1	65.4	11	29204273	DAL	DAL418	B763	J	D	01R	SFO	KJFK
39670474	2016-12-20	8:33:33 AM	75.1	64.7	20	29204273	DAL	DAL418	B763	J	D	01R	SFO	KJFK
39670477	2016-12-20	8:35:21 AM	73.4	65.5	11	29204164	UAL	UAL414	B739	J	A	28L	SFO	KLAX
39670478	2016-12-20	8:44:10 AM	67.7	61.4	5	29204619	HAL	HAL11	A332	J	D	01L	SFO	PHNL
39670482	2016-12-20	10:43:33 AM	68.5	64.0	5	29205000	SKW	SKW5967	E170	R	A	28L	SFO	KSLC
39670484	2016-12-20	10:45:25 AM	76.2	65.6	31	29204805	ACA	ACA560	A320	J	A	28L	SFO	CYVR
39670485	2016-12-20	10:45:40 AM	68.6	62.5	6	29204805	ACA	ACA560	A320	J	A	28L	SFO	CYVR
39670489	2016-12-20	10:47:58 AM	78.2	65.9	29	29204815	UAL	UAL492	B739	J	A	28R	SFO	KIAD
39670499	2016-12-20	10:52:47 AM	71.4	63.7	11	29204839	SKW	SKW5026	CRJ2	R	A	28R	SFO	KSMF
39670500	2016-12-20	10:53:05 AM	68.4	63.0	5	29204968	SKW	SKW5334	E170	R	D	01R	SFO	KSAT
39670506	2016-12-20	10:57:24 AM	72.7	64.2	14	29204865	AAL	AAL403	A320	J	A	28R	SFO	KPHX
39670508	2016-12-20	10:58:10 AM	71.0	63.0	9	29204977	UAL	UAL624	B772	J	D	01R	SFO	KORD
39670510	2016-12-20	11:06:41 AM	76.5	67.2	18	29204926	AMX	AMX668	B738	J	A	28L	SFO	MMMX
39670512	2016-12-20	11:33:07 AM	68.9	63.2	6	29205825	SWA	SWA1632	B737	J	D	01R	SFO	KDEN
39670514	2016-12-20	12:02:02 PM	74.6	65.9	12	29205316	SKW	SKW5465	CRJ2	R	A	28R	SFO	KRDM
39670515	2016-12-20	12:02:42 PM	69.6	63.2	6	29205567	AAL	AAL931	B738	J	D	01R	SFO	KMIA
39670518	2016-12-20	12:04:39 PM	69.9	63.2	7	29205462	AAL	AAL461	A321	J	A	28R	SFO	KCLT
39670520	2016-12-20	12:05:52 PM	69.5	63.3	5	29205619	GAJ	GAJ806	B350	T	D	01R	SFO	KMEV
39670526	2016-12-20	12:10:39 PM	73.7	62.5	21	29205564	CPA	CPA879	B77W	J	D	28L	SFO	VHHH
39670527	2016-12-20	12:11:03 PM	75.1	68.2	18	29205597	JBU	JBU416	A321	J	D	01R	SFO	KJFK
39670530	2016-12-20	12:12:35 PM	74.4	69.2	10	29205627	UAL	UAL358	A320	J	D	01L	SFO	KLAS
39670531	2016-12-20	12:12:57 PM	75.8	66.9	23	29205627	UAL	UAL358	A320	J	D	01L	SFO	KLAS
39670535	2016-12-20	12:14:28 PM	69.2	62.9	7	29205365	SKW	SKW5201	CRJ2	R	A	28R	SFO	KMFR
39670536	2016-12-20	12:14:47 PM	70.1	64.2	7	29205634	UAL	UAL606	A320	J	D	01R	SFO	KSTL
39670539	2016-12-20	12:16:59 PM	72.1	66.7	8	29205599	KAL	KAL024	B748	J	D	28L	SFO	RKSI
39670545	2016-12-20	12:22:37 PM	74.7	67.9	14	29205682	UAL	UAL153	B738	J	D	01R	SFO	KIAH
39670547	2016-12-20	12:28:33 PM	68.8	63.9	6	29205853	UAL	UAL1437	B739	J	A	28R	SFO	KIAH
39670550	2016-12-20	2:20:19 PM	70.0	64.0	6	29206233	EVA	EVA018	B77W	J	A	28L	SFO	RCTP
39670551	2016-12-20	2:36:40 PM	71.3	62.9	9	29206595	VRD	VRD1178	A320	J	D	01R	SFO	KEWR
39670552	2016-12-20	2:39:34 PM	72.0	65.5	6	29206405	SKW	SKW5726	CRJ2	R	A	28L	SFO	KPSR
39670553	2016-12-20	3:34:47 PM	79.1	70.4	21	29206881	CPA	CPA892	B77W	J	A	28L	SFO	VHHH
39670554	2016-12-20	3:38:27 PM	69.8	66.2	6	29206998	UAL	UAL207	B739	J	D	01L	SFO	KLAX
39670555	2016-12-20	4:51:05 PM	74.5	66.1	14	29207733	BAW	BAW71F	B772	J	D	28L	SFO	EGLL
39670556	2016-12-20	4:59:48 PM	78.9	68.2	19	29207539	UAL	UAL1723	B739	J	D	28L	SFO	PHKO
39670559	2016-12-20	6:46:17 PM	69.4	62.2	6	29207927	UAL	UAL1292	B739	J	D	01R	SFO	KORD
39670560	2016-12-20	6:57:51 PM	77.0	68.0	16	29208123		N2407N	C172	P	D	31	PAO	KSTS
39670564	2016-12-20	9:19:25 PM	71.2	62.8	10	29208319	AAL	AAL1986	A321	J	D	01L	SFO	KPHX
39670565	2016-12-20	9:32:03 PM	74.7	66.0	13	29208348	UAL	UAL1610	B738	J	D	01R	SFO	KFLL
39670567	2016-12-20	9:58:33 PM	76.5	67.0	19	29208404	DAL	DAL1193	B739	J	D	01R	SFO	KATL
39670568	2016-12-20	10:19:55 PM	75.1	65.0	13	29208468	UAL	UAL284	B752	J	D	01R	SFO	KEWR
39670569	2016-12-20	10:21:36 PM	72.5	63.9	10	29208476	UAL	UAL571	A320	J	D	01R	SFO	KSEA
39670570	2016-12-20	10:25:42 PM	77.9	67.8	20	29208480	AAL	AAL434	A321	J	D	01R	SFO	KPHL
39670573	2016-12-20	10:47:09 PM	73.1	65.2	15	29208538	AAL	AAL898	A321	J	D	01R	SFO	KCLT

## Appendix 1 – Aircraft Noise Event Data Field Names and Description

<b>Field Name</b>	<b>Description</b>
Event	The unique identifier assigned to a noise event.
Max Date	Noise event's maximum level date.
Max Time	Noise event's maximum level time.
SEL	Sound Exposure Level (dBA) of the noise event.
LMax	Maximum sound level of the noise event.
Duration	The length of the noise event.
Operation	Unique number assigned to identify individual flight track.
Airline	3-letter FAA code name, for example: AAL = American Airlines.
Flight No.	Flight number of an aircraft.
Aircraft Type	Aircraft designator code, for example: B744.
AC Cat.	Aircraft Category, the type of aircraft designated by letter, such as Jet, Turboprop, Regional etc.
A/D Flag	Arrival, Departure, Overflight.
Runway	Runway where aircraft activity occurred.
Airport ID	Airport where operation occurred.
Other Port	Destination/origin city for flights arriving/departing from a local airport.

Appendix 2 – Aircraft Type Reference Sheet

Wide Body Jet (wide enough for two passenger aisles)	Narrow Body Jet (wide enough for one passenger aisles)	Business Aircraft (transportation for small groups of people)	General Aviation Aircraft (Generally small, propeller-driven aircraft)
A330 Airbus A330	A319 Airbus A319	B350 Beechcraft King Air 350	C172 Cessna 172 Skyhawk
A332 Airbus A330-200	A320 Airbus A320	BE20 Beechcraft 200 King Air	C182 Cessna C182 Skylane
A333 Airbus A330-300	A321 Airbus A321	C25B Cessna Citation CJ3	C414 Cessna C414
A388 Airbus A380-800	B712 Boeing 717-200	C680 Cessna 680 Citation Sovereign	DA40 Diamond DA-40
B744 Boeing 747-400	B733 Boeing 737-300	C750 Cessna 750 Citation X	PA46 Piper Malibu/Mirage
B748 Boeing 747-8	B737 Boeing 737-700	CL30 Bombardier Challenger 300	P32R Piper Cherokee Six
B763 Boeing 767-300	B738 Boeing 737-800	CL35 Bombardier Challenger 350	
B772 Boeing 777-200	B739 Boeing 737-900	CL60 Bombardier Challenger 600	<b>Helicopter</b>
B773 Boeing 777-300	B752 Boeing 757-200	F2TH Dassault Falcon 2000	(Generally small, propeller-driven aircraft)
B77L Boeing 777-200LR	B753 Boeing 757-300	GALX Gulfstream 200	B206 Bell 206 Long Ranger
B77W Boeing 777-300ER	CRJ2 Bombardier CRJ200	GLEX Bombardier Global Express (twin-jet)	HELO Helicopter
B788 Boeing 787-8	CRJ7 Bombardier CRJ700	GLF4 Gulfstream 4	
B789 Boeing 787-9	CRJ9 Canadair/Bombardier CRJ-900	GLF5 Gulfstream 5	
	E170 Embraer EMB 170	H25B Raytheon/Hawker 800	
	E545 Embraer Legacy 450	LJ75 Learjet 75	
	E75L Embraer E175	PRM1 Beechcraft Raytheon 390 Premier1	
	MD88 McDonnell Douglas MD-88	FA50 Falcon	
		C550 Cessna C550/Citation II	
		C56X Cessna 560XL/Citation Excel	



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# Airport Noise Report



A weekly update on litigation, regulations, and technological developments

Volume 29, Number 2

January 20, 2017

## NASA

### NASA RESEARCH IS THE KEY TO FUTURE OF AIR TRANSPORTATION, SHIN TELLS TRB

In the future, aircraft will consume half as much fuel compared to today, generate one-fourth the emissions they do now, fly so quietly that airport neighbors won't hear annoying noise, and fly passengers at supersonic speeds while burning biofuels, Jaiwon Shin, NASA's associate administrator for aeronautics research, told an audience of more than 700 transportation professionals on Jan. 11.

Advanced drones, personal air vehicles, and air taxis on demand are in the very possible future that NASA's aeronautical innovators are making progress toward every day, he said.

Shin was the featured speaker at the prestigious Chairman's Luncheon at the Transportation Research Board (TRB) annual meeting, which was held Jan. 8-12 at the Walter E. Washington Convention Center in Washington, DC.

TRB, a unit of the National Academies of Sciences, Engineering, and Medicine, provides independent, objective analysis and advice to the nation, and conducts other activities to solve complex problems and inform public policy decisions.

*(Continued on p. 6)*

## NASA

### PROTOTYPE AIR TRAFFIC TOOL IS READY FOR AIRBORNE DEMONSTRATION, NASA SAYS

*[Following is a Jan. 11 NASA News Feature by Jim Banke of NASA's Aeronautics Research Mission Directorate.]*

It's time to fly.

After years of research and laboratory work, a full airborne demonstration of new technology and procedures aimed at improving air traffic flow into busy airports is on schedule to take off this month over Washington State.

The system is called Flight Deck Interval Management, or FIM, and its key benefit is that it will help air traffic controllers and pilots more precisely manage and safely shorten the time, or interval, between airplanes landing on a runway.

Flight tests of the cockpit technology will begin as early as Jan. 20 and involve a trio of aircraft required to give FIM a workout by flying multiple runs of three categories of traffic scenarios, with tests possible through as late as Feb. 28.

Final preparations for the demonstration are underway, with all planning sessions and dress rehearsals on the ground complete, and the participating aircraft and flight crew will be deploying to Seattle within the week.

*(Continued on p. 7)*

## *In This Issue...*

**NASA ...** 'We are standing on the verge of a new era in aviation,' NASA Associate Administrator for Aeronautics Research Jaiwon Shin tells TRB in speech at Chairman's luncheon - p. 5

**... NASA doing full airborne demonstration of prototype air traffic tool that will improve air traffic flow into busy airports - p. 5**

**Aircraft Tugs ...** FAA accepts Wheeltug's certification plans for its aircraft electric drive system for B737NG aircraft - p. 6

**Denver Int'l ...** FAA recognizes DEN with a 2016 Regional Administrator Aviation Partnership Award for airport's work with FAA on NextGen, drones - p. 6

**UK ...** Heathrow Airport, HACAN anti-noise community group jointly support establishment of an Independent Aviation Noise Authority in the UK to oversee efforts to reduce aircraft noise impact - p. 7

**NASA, from p. 5**

Shin discussed both the behind-the-scenes contributions most of the flying public never sees – such as NASA’s work with the Federal Aviation Administration to improve air traffic control efficiency – and visible innovations, such as drag-reducing winglets.

Looking ahead, Shin said that one of the most exciting things NASA is working on is New Aviation Horizons, a 10-year research initiative that is centered on the introduction of several experimental X-planes. This new initiative will help agency researchers bring 2050 technologies to 2030 aviation.

“NASA’s new X-planes are needed to overcome the physical limits of the current tube and wing aircraft configuration. New aircraft designs will allow us to fully capitalize on the latest research technologies,” Shin said.

Shin also highlighted the dramatic rise in the use of unmanned aerial vehicles.

“I believe we are standing on the verge of a new era in aviation that will cause the merging of the aviation, highway and railway sectors, due primarily to the explosive growth of unmanned aerial systems,” Shin said. “There are literally thousands of applications for these new aircraft and every industry is finding new uses for them every day.”

No matter where all of this research and innovation leads, Shin said the pursuit is critical to ensure the United States retains its global leadership in aeronautics against the increasing number of countries investing in aviation at an increasing pace.

**Aircraft Tugs****FAA ACCEPTS PLANS FOR 737NG WHEELTUG CERTIFICATION**

Gibraltar-based WheelTug Ltd. announced Jan. 10 that the FAA has accepted the company’s certification plans for the WheelTug® aircraft electric drive system for Boeing 737NG aircraft.

The WheelTug system enables an airplane to taxi forward and backward, using small electric motors in its nose wheels rather than jet engines or a tow tug.

The FAA Seattle Aircraft Certification Office has approved the Project Specific Certification Plans for the WheelTug system.

These plans detail how WheelTug will comply with all relevant regulations in order to be granted a Supplemental Type Certificate. The STC is a key document for aircraft operation, and once granted, WheelTug can be installed on aircraft.

WheelTug will first be available for the Boeing 737NG family of aircraft; entry into service is expected in late 2018. Versions for other aircraft types are also planned.

WheelTug’s order book already totals almost 1,000 systems for aircraft from 22 airlines worldwide.

WheelTug says the tug will benefit airlines by well over \$1 million per airplane per year, reduce fuel consumption and emissions at airports, and save up to 20 minutes in ground time between flights.

Additionally, WheelTug will enable airplanes to parallel park at terminal gates; using two doors for narrow-body boarding and deplaning will allow for even more expedited travel.

“The WheelTug system represents the most significant improvement in aircraft ground handling in decades. It will allow airlines to reduce overall time on the ground. This greater time certainty will permit airlines to improve schedule reliability as well as fleet productivity. WheelTug will also reduce noise, emissions, and safety risks,” the company said.

**Denver Int’l****AIRPORT GETS FAA AWARD FOR WORK ON NEXT-GEN, UAS**

The FAA has recognized Denver International Airport (DEN) with a 2016 Regional Administrator Aviation Partnership Award for the airport’s partnership and work with the federal agency’s NextGen and Unmanned Aircraft Systems (UAS) programs.

The airport has been at the forefront of developing, testing, and implementing NextGen flight procedures since 2010, DEN officials said. They noted that Denver International was the first commercial airport to design “a truly comprehensive plan of Area Navigation (RNAV) from the beginning that allows aircraft to fly more predictable and smoother approaches into Denver that reduce fuel consumption and residential noise.”

Airport officials said they continue to work closely with the FAA’s Metroplex program on designing even more advanced NextGen procedures in Denver.

The FAA award also recognizes DEN for its commitment to the FAA’s UAS program, which seeks to safely integrate remotely piloted aircraft into the nation’s airspace system.

Last fall, DEN partnered with the FAA to evaluate emerging technology that could one day help airports detect UAS that could be hazardous to aircraft. The airport also implemented a regional working group made up of representatives from local airports, the FAA and regional law enforcement agencies to help explore procedures, rules and best practices for managing drone activity near commercial airports.

“When Denver International Airport opened in 1995, it was the first airport to achieve a triple-simultaneous landing in bad weather, representing the apex of airport design and technology at the time,” said Denver International CEO Kim Day.

“Because of our strong partnership with the FAA, we continue to be on the cutting edge of aviation technology more than two decades later, and are poised to achieve the first triple-simultaneous landing using NextGen technology. I am

grateful to FAA Administrator Michael Huerta, the FAA's Northwest Mountain Region team and the entire FAA Denver Airport District Office for their ongoing collaboration."

## UK

### HEATHROW, HACAN SUPPORT INDEPENDENT NOISE AUTHORITY

London Heathrow Airport and the community anti-noise group HACAN told UK Transport Secretary Chris Grayling in a recent letter that they jointly support creation of an Independent Aviation Noise Authority (IANA) to oversee efforts to reduce aircraft noise in communities around Heathrow.

The UK Airports Commission first proposed establishing an independent noise authority in its final report recommending construction of a new runway at Heathrow.

The Airports Commission felt the commission was needed "in particular to help address the considerable lack of trust that remains between communities close to the UK's airports and the airports themselves."

The UK Government has since said it supports the introduction of the IANA with a UK Department of Transport consultation seeking public comment on the role and scope of the noise authority to follow early this year.

Heathrow and HACAN agree that the IANA's main roles should be to provide an impartial source of expert advice on noise, coordinate independent research, adjudicate on noise complaints that can't be managed locally, and ensure that communities have access to information about noise and how airports are managing issues.

"It is well-known we don't agree with Heathrow on everything but on this issue we are speaking with one voice, said HACAN Chair John Stewart. "A strong, independent noise authority can bring reassurance to local communities but can also encourage airports to take their noise responsibilities seriously."

Added John Holland-Kaye, Heathrow's Chief Executive, "We want to be a good neighbor and reduce the impact of aircraft noise on our local communities – something on which we agree with HACAN. An independent aviation noise authority has an important role to play in building trust that we are meeting our commitments."

In a joint discussion paper on IANA issued on Dec. 12, 2016, Heathrow and HACAN presented points of common agreement and identified "some pitfalls that we agree need to be avoided when establishing an IANA."

#### Guiding Principles

Heathrow and HACAN agreed on the following guiding principles for IANA:

- It should be independent of government, the aviation industry, local authorities, NGOs and community organizations. Credibility among noise affected communities and the industry as well as political neutrality are key;

- It should have functions which airlines, airports, community organizations, local authorities, the Civil Aviation Authority (CAA), and Government all feel aid them in their work. It needs to be effective in building trust and mutual understanding between airports (and airlines, air navigation service providers and other industry stakeholders) and their noise affected communities;

- It should recognize Government policies on aircraft noise, including the application of the ICAO balanced approach to aircraft noise management. It should also be cognizant of operational and environmental trade-offs such as safety, air quality and greenhouse gas emissions; and

- It should be a permanent body rather than one focused on a single project or issue.

However, Heathrow and HACAN differed on how many UK airports an IANA should cover. Heathrow said it recognizes that other UK airports do not see the value of an IANA as a national body, so it believes that IANA should initially start as a body focused on Heathrow, with a review after two years to evaluate progress and whether it should be expanded to all UK airports.

HACAN, on the other hand, said it feels strongly that the IANA should be national in scope from the outset.

In terms of pitfalls to be avoided, Heathrow and HACAN agreed that IANA should not be a policy-making body, should not function as the "noise police," should not take the lead in major research or noise surveys (although a project management role could be appropriate); should not be an arm of the CAA or Department of Transport; and should not be a "crisis-management" body.

The joint Heathrow/HACAN position document on an independent aviation noise authority can be downloaded from Heathrow Media Centre. Go to <http://mediacentre.heathrow.com/pressrelease/details/81/Corporate-operational-24/8054>

Click on document on right side of page.

#### NASA, from p. 5

A flight readiness review that will lead to a final "go" for the tests to begin is scheduled for Jan. 19.

"All the pilots that are going to be flying the FIM operations have gone through the training modules and simulations. The equipment is all set and we're ready to go," said Sheri Brown, ATD-1 project manager at NASA's Langley Research Center in Virginia.

ATD-1 is short for Air Traffic Management Technology Demonstration-1, a coordinated effort involving NASA, the Federal Aviation Administration (FAA), and industry to develop and evaluate new technologies and procedures related to aircraft scheduling and airport arrivals.

The research is intended to help airplanes spend less time in the air, save money on fuel, and reduce engine emissions – all the while improving schedule efficiency to help passengers arrive at their destination on time and avoid missing connecting flights.

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FIM is the final piece of a suite of aircraft arrival technology developed under ATD-1.

Two other NASA-developed technologies from ATD-1 – Traffic Management Advisor with Terminal Metering and Controller Managed Spacing – together were delivered to the FAA in 2014 as a single tool known as Terminal Sequencing and Spacing (TSAS).

Information provided to air traffic controllers from TSAS will be combined with NASA-developed software that is at the heart of FIM. The result is guidance that directs pilots to fly at a certain speed and maintain a more precise spacing with an aircraft flying ahead of them all the way down to the runway.

“It’s a very simple ‘follow the leader’ operation that is easy to execute by the flight crew,” Brown said.

The flight test will take place about 120 miles due east of Seattle over Grant County International Airport. All anticipated flight operations have been fully coordinated ahead of time with all involved FAA air traffic control facilities.

During the course of the flight tests, researchers hope to complete some 80 runs involving three major flight scenarios: flying at a cruise altitude of 35,000 feet, descending from cruise altitude all the way down to the airport, and making a final approach beginning about 15 minutes before touchdown.

The plan is to fly about five-and-a-half hours each weekday, testing up to five test scenarios during each daily sortie.

“We can adjust the plan as needed based on weather, any technical problems we might encounter or if we are delayed by other air traffic as we fly to and from our Seattle-based home fields,” said Brian Baxley, NASA’s flight test lead stationed at Langley.

The trio of aircraft involved in this ATD-1 shakedown of FIM includes a Boeing 737 provided by United Airlines and two airplanes provided by Honeywell. One will be a Boeing 757 while the second will be a business jet, either a Dassault Falcon 900 or an Embraer 170.

Honeywell’s aircraft will base out of Boeing Field in Seattle, while the United aircraft will call Seattle-Tacoma International Airport home between test flights.

The Honeywell 757 and United 737 will be equipped with the FIM system in its cockpits, where its pilots will “follow the leader” during test runs behind the Honeywell business jet, which will provide its speed and position information to the other aircraft.

If all goes well with the demonstration, the entire FIM system – including software and hardware – will be turned over to the FAA by the fall of 2017, where the FAA will continue to evaluate and test it before making a decision to certify its use.

## AIRPORT NOISE REPORT

Anne H. Kohut, Publisher

Published 44 times a year at 43978 Urbancrest Ct., Ashburn, Va. 20147; Phone: (703) 729-4867; FAX: (703) 729-4528.  
e-mail: editor@airportnoisereport.com; Price \$850.

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## 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 overflight.

### **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

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