SFO COMMUNITY ROUNDTABLE

Meeting Agenda
Regular Meeting

Meeting No. 347
Wednesday, December 6, 2023 - 7:00 p.m.
VIA HYBRID ACCESS

David J. Chetcuti Community Room
450 Poplar Ave | Millbrae, CA 94030
*see attached venue map & parking

Public may also join the virtual webinar:
https://smcgov.zoom.us/j/96002459320
Or Dial in:
US: +1(669)900-6833 Webinar ID: 960 0245 9320

This meeting of the San Francisco Airport Community Roundtable will be in person at the above-mentioned address. Members of the public will be able to participate in the meeting remotely via the Zoom platform or in person at 450 Poplar Avenue, Millbrae, CA 94030. For information regarding how to participate in the meeting, either in person or remotely, please refer to instructions at the end of the agenda.

HYBRID PUBLIC PARTICIPATION:
List of attendees (using zoom sign-in credentials) will be displayed periodically throughout the meeting.

Public Comment
*Written public comments can be emailed to SFORoundtable@smcgov.org and should include specific agenda item to which you are commenting.
*Spoken public comments will also be accepted during the meeting in-person or via Zoom on Items NOT on the Agenda and for each Regular Agenda Item and at the end of Presentations, at the option of the speaker.

**Please see instructions for written and spoken comments at the end of this agenda.

ADA Requests
Individuals who require 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 packet or other writings that may be distributed at the meeting, should contact staff as early as possible but no later than 10:00am the day before the meeting at SFORoundtable@smcgov.org Notification in advance of the meeting will enable Staff to make reasonable arrangements to ensure accessibility to this meeting, the materials related to it, and your ability to comment.

AGENDA

Call to Order / Roll Call / Declaration of a Quorum Present
Sam Hindi, Roundtable Chairperson

Public Comment on Items NOT on the Agenda
Speakers are limited to two minutes. Roundtable members cannot discuss or take action on any matter raised under this item.

Action to set Agenda and to Approve Consent Items
Sam Hindi, Roundtable Chairperson

CONSENT AGENDA

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

1. Approval of Draft Minutes p. 9

    a. October 4, 2023 Regular Meeting

2. Airport Director's Reports p.13

    a. September 2023
    b. October 2023

3. Fiscal Year to Date Budget Actuals Update p.27

REGULAR AGENDA

p.28

4. *ACTION:* Adopt the Technical Working Group (TWG) recommendation to support the continued processing of the SFO Ground Based Augmentation System (GBAS) Group 2A Innovative Procedures to include: GLS CAT II 28R/ ARCHI, GLAS CAT II 28R/EDDYY, GLS CAT II 19L/UPEND, GLS SB 19L/COGGR, GLS DB1 28R/ DBAYY, and GLS OW2 28R/EDDYY.
Sam Hindi, Roundtable Chairperson
Jason Stoddard, Airspace Analyst, HMMH, Consultant to the SFO Roundtable
Paul Hannah, SFO Consultant, Chief Airspace and Flight Operations Engineer
Attachment: *PowerPoint: SFO GBS Project Update, Innovative Procedure Timeline and Latest Community Requests, November 15,2023*
Attachment: HMMH Memo: Review of SFO GLS Group 2A Innovative Approach Procedures
Attachment: HMMH PowerPoint: Review of Proposed GLS Group 2A Innovative Approach Procedures at SFO

PRESENTATIONS

Public Comment on Presentation items will be taken after the last item under presentations.

5. Chairman's Update
    Sam Hindi, Roundtable Chairperson

6. Airport Director Update
   Ivar Satero, Airport Director

   a. FY 2020 & FY 2021 Economic Impact Study of San Francisco International Airport p.65
      Kevin Kone, IAP, Assistant Chief Financial Officer and Acting Airport Controller
      Attachment: PowerPoint FY 2020 & FY 2021 Economic Impact Study of San Francisco International Airport
      Attachment: Executive Summary: FY 2020 & FY 2021 Economic Impact Study of San Francisco International Airport

   b. Aircraft Noise Office Update
      Bert Ganoung, Aircraft Noise Office Manager

7. Subcommittee Updates

   a. Technical Working Group Subcommittee on November 15, 2023 p.87
      Sam Hindi, TWG Subcommittee Chairperson
      Attachment: Subcommittee Agenda

MEETING CLOSURE

8. Member Communications / Announcements
   Roundtable Members and Staff

9. Adjourn
   Sam Hindi, Roundtable Chairperson

Information Only

i. HMMH FAA IFP Information Gateway Review – September 2023 p.90
ii. HMMH FAA IFP Information Gateway Review – November 2023
(October 2023 - no applicable data)

****Instructions for Public Comment during Meeting**

During the meeting, members of the public may address the Membership as follows:

Written Comments:
Written public comments may be emailed in advance of the meeting. Please read the following instructions carefully:

1. Your written comment should be emailed to sforoundtable@smcgov.org
2. Your email should include the specific agenda item on which you are commenting.
3. Members of the public are limited to one comment per agenda item.
4. The length of the emailed comment should be commensurate with two minutes customarily allowed for verbal comments, which is approximately 250-300 words.
5. If your emailed comment is received by 5:00 pm on the day before the meeting, it will be provided to the Roundtable and made publicly available on the agenda website under the specific item to which comment pertains. The Roundtable will make every effort to read emails received after that time but cannot guarantee such emails will be read during the meeting, although such emails will still be included in the administrative record.

Spoken Comments:

In-person Participation:

1. If you wish to speak to the Membership, please fill out a speaker's slip located at the entrance. If you have anything you wish distributed to the Membership and included in the official record, please hand it to the Clerk who will distribute the information to the Membership and Staff.

Via Teleconference (Zoom):

1. The meeting may be accessed through Zoom online at https://smcgov.zoom.us/j/96002459320 The webinar ID: 960 0245 9320. The meeting may also be accessed via telephone by dialing in +1-669-900-6833, entering webinar ID then press #. Members of the public can also attend this meeting physically at the David J. Chetcuti Community Room, 450 Poplar Ave | Millbrae, CA 94030.

2. You may download the Zoom client or connect to the meeting using the internet browser. If you are using your browser, make sure you are using current, up-to-date browser: Chrome 30+, Firefox 27+, Microsoft Edge 12+, Safari 7+. Certain functionality may be disabled in older browsers including Internet Explorer.
3. You will be asked to enter an email address and name. We request that you identify yourself by name as this will be visible online and will be used to notify you that it is your turn to speak.
4. When the Chairperson calls for the item on which you wish you speak click on "raise-hand" icon. You will then be called on and unmuted to speak.

***Additional Information**:

For any questions or concerns regarding Zoom, including troubleshooting, privacy, or security settings, please contact Zoom directly.

Note: Public records that relate to any item on the open session Agenda (Consent and Regular Agendas) for a Regular Airport/Community Roundtable Meeting are available for public inspection. Those records that are distributed less than 72 hours prior to a Regular Meeting are available for public inspection at the same time they are distributed to all Roundtable Members, or a majority of the Members of the Roundtable. The Roundtable has designated the San Mateo County Planning & Building Department, at 455 County Center, 2nd Floor Redwood City, California 94063, for the purpose of making those public records available for inspection. The documents are also available on the Roundtable website at: www.sforoundtable.org.

SFO COMMUNITY ROUNDTABLE

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 in-person or via Zoom.

- For written comments you may email your comments ahead of time to sforoundtable@smcgov.org.
- To speak during the meeting in-person, submit a speaker slip to staff.
- To speak during the meeting via Zoom, you may use "raise-hand."
- The Roundtable Staff will call your name and allow you to speak. Full instructions in agenda below.

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. Video file of meeting will posted to website once available. 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 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.

SFO COMMUNITY ROUNDTABLE

About the Roundtable

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 24 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 2023, 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 450 Poplar Avenue, Millbrae, California unless otherwise noted. Meetings are also broadcast via Zoom to encourage public participation.** 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.

POLICY STATEMENT

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

> **"The Airport/Community Roundtable members, as a group, when considering and taking actions to mitigate noise, will not knowingly or deliberately support, encourage, or adopt actions, rules, regulations or policies, that result in the "shifting" of aircraft noise from one community to another, when related to aircraft operations at San Francisco International Airport."**
> *(Source: Roundtable Resolution No. 93-01)*

FEDERAL PREEMPTION, RE: AIRCRAFT FLIGHT PATTERNS

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

> "No state or political subdivision thereof and no interstate agency or other political agency of two or more states shall enact or enforce any law, rule, regulation, standard, or other provision having the force and effect of law, relating to rates, routes, or services of any air carrier having authority under subchapter IV of this chapter to provide air transportation."
> *(Source: 49 U.S.C. A. Section 1302(a)(1)).*

SFO Roundtable Regular Meetings &

SFO Roundtable Ground-Based Noise Subcommittee Meetings

David J. Chetcuti Community Room

450 Poplar Avenue, Millbrae

SFO COMMUNITY ROUNDTABLE

PARKING: 1. Library parking lot (Poplar Street) adjacent to the Chetcuti Room

2. Parking lot on Library Avenue

3. City Hall parking lot (some restrictions) Take outdoor stairs up to Chetcuti Room

4. Nearby neighborhood on-street parking

ENTRANCE: Chetcuti building has its main entrance at left side of the front of the building.

SFO COMMUNITY ROUNDTABLE

Member Roster

March 2023

CITY AND COUNTY OF SAN FRANCISCO BOARD OF SUPERVISORS
Vacant

CITY AND COUNTY OF SAN FRANCISCO MAYOR'S OFFICE
Alexandra Sweet, (Appointed)

CITY AND COUNTY OF SAN FRANCISCO AIRPORT COMMISSION REPRESENTATIVE
Ivar Satero, Airport Director (Appointed)
Alternate: Doug Yakel, Public Information Officer

COUNTY OF SAN MATEO BOARD OF SUPERVISORS
Dave Pine
Alternate: Warren Slocum

CITY/COUNTY ASSOCIATION OF GOVERNMENTS AIRPORT LAND USE COMMITTEE (ALUC)
Carol Ford (Appointed)

TOWN OF ATHERTON
Stacy Holland
Alternate: Diana Hawkins-Manelian

CITY OF BELMONT
Robin Pang-Maganaris
Alternate: Davina Hurt

CITY OF BRISBANE
Terry O'Connell
Alternate: Madison Davis

CITY OF BURLINGAME
Ricardo Ortiz
Alternate: Peter Stevenson

TOWN OF COLMA
John Goodwin
Alternate: Joanne del Rosario

CITY OF DALY CITY
Pamela DiGiovanni
Alternate: Rod Daus-Magbual

CITY OF EAST PALO ALTO
Vacant
Alternate: Antonio Lopez

CITY OF FOSTER CITY
Sam Hindi
Alternate: Jon Froomin

CITY OF HALF MOON BAY
Harvey Rarback
Alternate: Deborah Ruddock

TOWN OF HILLSBOROUGH
Alvin Royse
Alternate: Christine Krolik

CITY OF MENLO PARK
Cecilia Taylor
Alternate: Drew Combs

CITY OF MILLBRAE
Ann Schneider
Alternate: Angelina Cahalan

CITY OF PACIFICA
Christine Boles
Alternate: Sue Vaterlaus

TOWN OF PORTOLA VALLEY
Judith Hasko
Alternate: Craig Hughes

CITY OF REDWOOD CITY
Alicia Aguirre
Alternate: Elmer Martinez Saballos

CITY OF SAN BRUNO
Sandy Alvarez
Alternate: Tom Hamilton

CITY OF SAN CARLOS
Pranita Venkatesh
Alternate: John Dugan

CITY OF SAN MATEO
Rob Newsom
Alternate: Lisa Diaz Nash

CITY OF SOUTH SAN FRANCISCO
Mark Addiego
Alternate: Mark Nagales

TOWN OF WOODSIDE
Paul Goeld
Alternate: Vacant

ROUNDTABLE ADVISORY MEMBERS

AIRLINES/FLIGHT OPERATIONS
Chief Pilot Lawrence Ellis, United Airlines

FEDERAL AVIATION ADMINISTRATION
Erik Amend, Acting Regional Administrator
Faviola Garcia, Deputy Regional Administrator
Carlette Young, Office of Regional Administrator
Joseph Bert, Team Manager, Western Service Center

ROUNDTABLE STAFF
Kathleen Wentworth, Roundtable Coordinator
Angela Montes, Roundtable Administrative Secretary
Gene Reindel, Technical Consultant (HMMH)

SFO AIRPORT NOISE OFFICE STAFF
Nupur Sinha, Director of Planning & Environmental Affairs
Bert Ganoung, Aircraft Noise Office Manager

SFO Airport/Community Roundtable
Meeting No. 346 Minutes
Wednesday, October 4, 2023

Call to Order / Roll Call / Declaration of a Quorum Present (0:0:13)

Roundtable Chairperson, Sam Hindi, called the Regular Meeting of the SFO Airport/Community Roundtable to order, at approximately 7:01 p.m., at the David J. Chetcuti Community Room, 450 Poplar Avenue, Millbrae, CA and also via Zoom, Kathleen Wentworth called the roll. A quorum (at least 13 Regular Members) was present as follows:

REGULAR MEMBERS PRESENT
Ivar Satero – City and County of San Francisco Airport Commission
Carol Ford – C/CAG Airport Land Use Committee (ALUC)
Diana Hawkins-Manelian (Alternate) -- Town of Atherton
Robin Pang-Maganaris – City of Belmont
John Goodwin -- Town of Colma
Pamela DiGiovanni – City of Daly City
Sam Hindi – City of Foster City
Alvin Royse – Town of Hillsborough
Cecilia Taylor -- City of Menlo Park
Ann Schneider – City of Millbrae
Christine Boles – City of Pacifica
Kaia Eakin – City of Redwood City
Pranita Venkatesh – City of San Carlos
Rob Newsom – City of San Mateo
Mark Addiego – City of South San Francisco
Paul Goeld – Town of Woodside

REGULAR MEMBERS ABSENT
City and County of San Francisco Board of Supervisors
City and County of San Francisco Mayor's Office
City and County of San Mateo Board of Supervisors
City of Brisbane
City of Burlingame
City of East Palo Alto
City of Half Moon Bay
Town of Portola Valley
City of San Bruno

ROUNDTABLE STAFF
Kathleen Wentworth – Roundtable Coordinator
Angela Montes Cardenas – Roundtable Administrative Secretary
Eugene Reindel – Roundtable Technical Consultant, HMMH
Jason Stoddard – Airspace Analyst, HMMH
Lisa Aozasa – County of San Mateo, Deputy Community Development Director

ADDITIONAL ATTENDEES PRESENT
Linda Wolin – Chief of Staff to Supervisor Dave Pine

SAN FRANCISCO INTERNATIONAL AIRPORT STAFF
Nupur Sinha, Director, Planning and Environmental Affairs
Doug Yakel, Chief Information Officer
Bert Ganoung, Noise Office Manager
David Ong, Aircraft Noise Systems Manager
Anthony Carpeneti, Noise Abatement Specialist
Christian Valdes, Senior Managing Consultant, SFO GBAS Program

FAA STAFF
Faviola Garcia, Deputy Regional Administrator
Joe Bert, Team Manager, Western Service Center

Chairman Hindi recognized that the meeting is taking place on the ancestral homeland of Ramaytush Ohlone.

Public Comments for Items NOT on the Agenda (00:05:45)

Chairman Hindi opened public comments.

Darlene Yapley – Palo Alto (00:07:05)

Chairman Hindi closed public comments.

Action to set Agenda and to Approve Consent Items 1-3 (00:09:42)

Chairman Hindi opened and closed public comments for consent items, no comments were received.

Kaia Eakin **MOVED** to set the agenda and to approve consent items 1, 2 & 3. The motion was seconded by Pamela DiGiovanni and **CARRIED**, roll call vote passed. (00:11:35)

4. FAA Update on NIITE/HUSSH - SFO Nighttime Noise Abatement Departure Procedure (00:13:13) FAA Western Team Manager Joe Bert reported that the FAA was still looking into the possible expansion of the hours of the NIITE/HUSSH with a data review internally with Air Traffic and then would reach out to the SFO team and later to industry and would thereafter report back to the Roundtable.

5. NCT – NorCal TRACON – Northern California Terminal Radar Approach Control (00:15:06)

Jason Stoddard, HMMH Airspace Analyst, presented on the NorCal TRACON radar facility. He explained the role of this facility in the National Airspace System and provided an overview of the operational framework within which flights operate under NorCal TRACON control. Questions for presenter were made by Member Schneider and Member Taylor.

6. Chairman's Update (00:36:54)

Chairman Hindi gave a verbal update to the Membership. He announced that Roundtable Administrative Secretary Angela Montes would be leaving the Roundtable October 6th. He thanked her for her years of service to the Roundtable and congratulated her on her promotion.

He further updated the membership that we are still awaiting FPPC approval and reports would not be due until after that approval. He also noted the upcoming tour to the FAA TRACON Facility urged members to attend.

Chair Hindi asked Vice-Chair Al Royse to provide an update on the FAA Reauthorization. Mr. Royse reported on the status in Congress and the uncertainty around the expiration of funding for the FAA on November 17th.

7. Airport Director Update (00:41:57)

Mr. Satero gave a verbal update to the Membership. He noted that SFO passenger traffic is now at about 89% of 2019 pre-Covid levels while airplane operations are at about 80% of 2019 levels. International flights have recovered to about 97% of 2019 levels. He also reported on new and resuming flights. In addition, he commented on the Air Taxi World Congress currently at the SFO Grand Hyatt and noted the importance of learning about these new entrants. Finally, he announced a maintenance closure of Runway 28L from January 16, 2024, until just before Memorial Day and after re-opening for the summer, there would be a follow-up closure for six weeks beginning after Labor Day.

a. **Noise Office Update** (00:47:28)

Mr. Ganoung gave a verbal update to the Membership. He reported that the SFO Noise Office website has updated the Ground Based Augmentation System (GBAS) section with the most recent Community Flight Procedure Packets (CFPPs) and population data; GBAS questions and answers have been updated, and GBAS concepts that have advanced to CFPPs are also on the website. Mr. Ganoung also reported on the statistics for the Noise Insulation Programs – Repair & Replacement Initiative and Second Chance Initiative.
Member Schneider requested information on the insulation program related to the presentation.

8. Aircraft Noise Terminology Tutorial: Continued questions and discussion (0:50:47)

Chair Hindi noted that this was time for any questions remaining from the Noise Terminology study session presented earlier in the evening. In response to Vice-Chair Royse's question, assurance was given that the presentation would be part of the Roundtable learning section of the Roundtable website.

9. Subcommittee Updates (00:51:54)

a. Technical Working Group on August 29, 2023
Chair Hindi reported that the Technical Working Group met; SFO Consultant Paul Hannah provided a GBAS update and much of the meeting was focused on the presentation by SFO Aircraft Noise Office Manager Bert Ganoung on the Airport Director's Report, SFO runway layout, arrivals and departures. Subcommittee meeting may be viewed here.

b. Portable Noise Monitor Placement Ad-Hoc on September 22, 2023 (00:53:30)
Cecilia Taylor, PNMP Ad-Hoc Subcommittee Chairperson, reported that the subcommittee reviewed prior noise monitor placement criteria and received a report from SFO Bert Ganoung on the portable noise monitors. Conversation ensued with members relating to the use of some of these monitors. Subcommittee meeting may be viewed here.

Public Comments on Presentation Items 4-9 (01:56:35)

Chairman Hindi opened public comment.

Marie-Jo Fremont – Palo Alto (01:56:53)
Darlene Yapley – Palo Alto (01:59:11)

Chairman Hindi closed public comment.

9. Member Communications/Announcements (01:02:28)

Member Pam DiGiovanni suggested that tonight's meeting be adjourned in memory of Senator Dianne Feinstein.

10. Adjourn (01:02:57)

Chairman Hindi adjourned the meeting in honor of Senator Dianne Feinstein.

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

Airport Director's Report

Presented at the December 6, 2023
Airport/Community Roundtable
Meeting

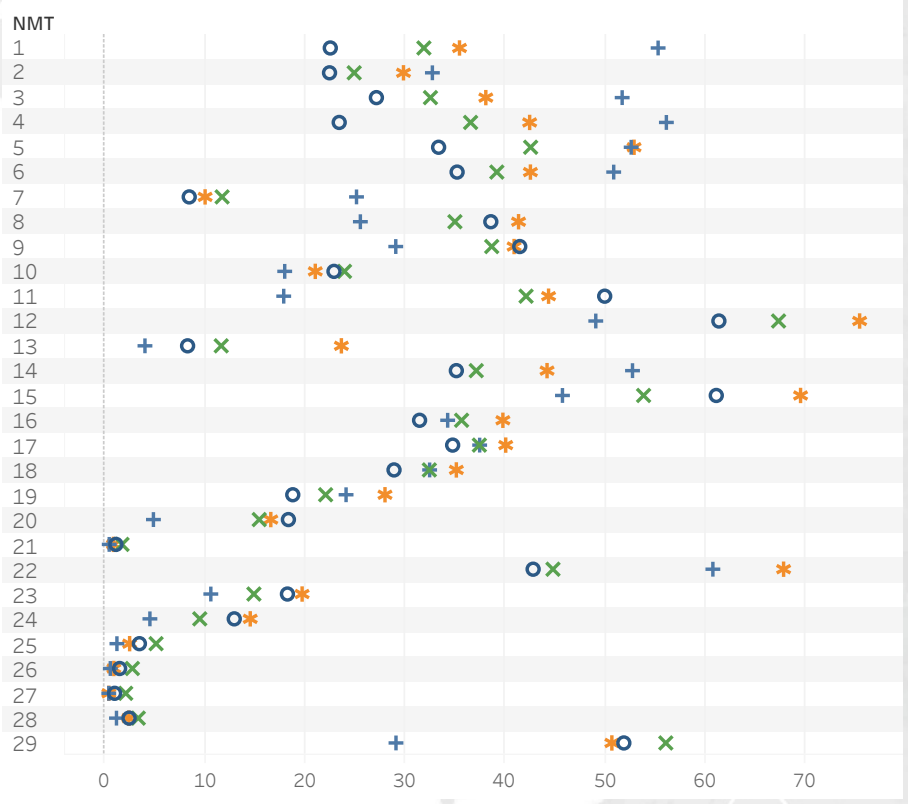
Aircraft Noise Office
September 2023

SFO San Francisco International Airport

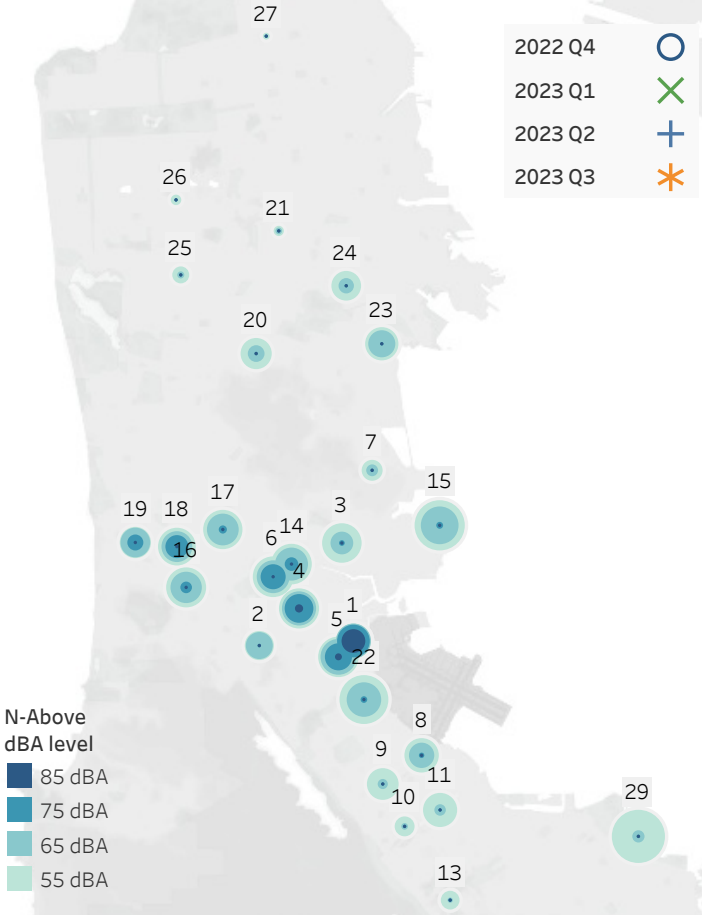
Aircraft Noise Levels Summary

September 2023

Nighttime N-Above 55 dBA Daily Average

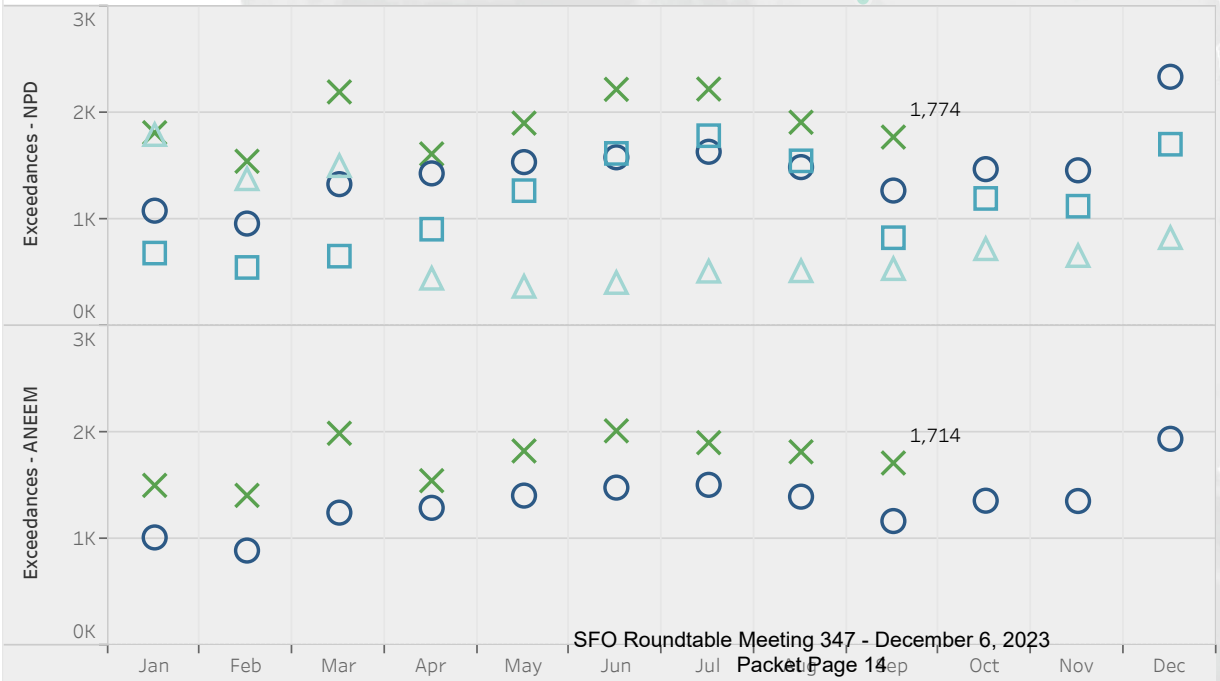


The chart above depicts the average daily N-Above 55dBA SFO aircraft noise events per NMT during nighttime hours (10pm-7am) compared to the previous 4 quarters. Values are derived from the ANEEM algorithm.



The map displays the N-Above counts at each NMT by N-Above Noise Level based on SFO aircraft noise events. Darker circles represent louder noise events and larger circles represent a larger number of noise events relative to the N-Above noise level. Values are derived from the ANEEM algorythm.

Significant Exceedances



Significant Exceedances (right) displayes a total count of SFO aircraft noise events that produced a noise level higher than the maximum allowable decibel value established for a particular monitoring site.

Aircraft Noise Levels Details

September 2023

		ANOMS						ANEEM			
		Aircraft				Community		Aircraft			
NMT	City	Noise Events (AVG Day)	CNEL (dBA)	SEL (dBA)	LMax (dBA)	CNEL (dBA)	Ambient Level (dBA)	Noise Events (AVG Day)	CNEL (dBA)	SEL (dBA)	LMax (dBA)
1	San Bruno	148	73	94	83	66	54	146	73	94	83
2	San Bruno	88	56	80	69	63	50	102	57	81	68
3	SSF	65	54	80	68	59	43	220	55	76	63
4	SSF	135	68	90	78	58	43	205	67	88	72
5	San Bruno	135	66	88	77	60	45	202	66	87	72
6	SSF	126	65	87	76	56	42	211	64	85	69
7	Brisbane	22	48	78	68	57	46	72	49	75	62
8	Millbrae	8	49	84	73	64	49	144	54	77	66
9	Millbrae	7	38	77	65	57	40	148	49	71	59
10	Burlingame	4	36	77	65	56	41	59	45	72	60
11	Burlingame	6	37	76	65	56	41	169	50	71	59
12	Foster City	375	62	82	71	57	41	454	63	81	69
13	Hillsborough	2	31	77	65	56	42	54	45	71	59
14	SSF	125	60	83	71	57	42	211	61	81	67
15	SSF	161	60	82	70	58	44	309	59	79	66
16	SSF	107	59	83	71	58	41	208	59	80	66
17	SSF	116	59	82	70	57	43	191	59	80	67
18	Daly City	110	64	87	76	57	42	184	64	85	70
19	Pacifica	98	60	84	73	56	39	116	60	83	71
20	Daly City	91	50	77	65	59	41	141	50	75	63
21	San Francisco	31	43	75	64	60	51	20	42	75	65
22	San Bruno	83	56	81	71	60	44	296	58	77	65
23	San Francisco	87	53	79	69	58	45	166	54	78	65
24	San Francisco	65	48	76	65	57	43	143	50	74	62
25	San Francisco	18	41	77	65	56	40	50	42	72	61
26	San Francisco	6	37	77	65	57	43	26	40	73	60
27	San Francisco	6	39	79	66	57	43	21	40	74	62
28	Redwood City	7	38	76	64	52	38	29	40	71	59
29	San Mateo	86	49	77	64	58	45	364	53	72	60

Noise Monitor's CNEL values (above) are derived from actual measured events and are used to validate the 65dBA CNEL noise footprint. Aircraft monthly CNELs from both ANOMS NPD and ANEEM algorithms for each monitor site are provided with daily average aircraft counts, the average Sound Exposure Level (SEL), and average Maximum Level (LMax). Noise levels from other noise sources in the community calculated by ANOMS is provided as Community CNEL. Ambient Level is represented by the LA90 noise value which is the noise level exceeded at the monitor for 90% of the time.

SFO N-Above NPD

NMT	Min:Max LMax	55 dBA	60 dBA	65 dBA	70 dBA	75 dBA	80 dBA
1	66:100	4,401	4,401	4,401	4,223	3,817	3,108
2	60:82	2,686	2,686	2,394	850	33	1
3	62:89	1,873	1,873	1,580	465	140	35
4	61:95	4,060	4,060	3,968	3,506	2,922	1,721
5	63:89	3,999	3,999	3,979	3,546	2,605	1,214
6	61:88	3,773	3,773	3,688	3,249	2,269	689
7	61:79	571	571	459	155	14	0
8	68:86	228	228	228	201	59	9
9	60:76	79	78	25	9	1	0
10	59:77	65	62	24	8	2	0
11	60:74	53	51	18	4	0	0
12	63:87	11,436	11,436	11,363	7,651	756	31
13	60:75	16	15	7	3	1	0
14	61:87	3,754	3,754	3,604	2,259	662	24
15	61:102	4,850	4,850	4,613	2,107	190	19
16	62:82	3,223	3,223	3,123	2,078	476	3
17	61:81	3,471	3,471	3,318	1,824	240	8
18	64:89	3,178	3,178	3,175	2,824	1,882	490
19	65:83	2,952	2,952	2,951	2,324	906	36
20	59:89	2,574	2,534	1,152	253	93	15
21	59:78	503	482	161	21	2	0
22	64:86	2,457	2,457	2,445	1,442	163	13
23	63:89	2,531	2,531	2,400	770	44	7
24	59:83	1,651	1,646	845	61	12	3
25	58:81	435	409	190	49	8	1
26	60:76	105	103	44	6	1	0
27	61:80	36	36	21	3	1	0
28	59:80	143	138	40	11	3	0
29	59:81	2,724	2,638	678	227	47	6

SFO N-Above ANEEM

NMT	Min:Max LMax	55 dBA	60 dbA	65 dBA	70 dBA	75 dBA	80 dBA
1	58:100	4,345	4,344	4,322	4,177	3,789	3,093
2	55:94	3,001	2,973	2,576	822	24	1
3	53:86	5,527	4,296	1,830	413	115	22
4	53:95	5,692	5,231	4,131	3,501	2,920	1,716
5	54:89	5,811	5,516	4,543	3,604	2,602	1,213
6	53:88	5,865	5,070	3,811	3,180	2,221	680
7	53:79	1,550	1,108	494	150	13	0
8	53:88	4,187	3,852	2,270	573	105	16
9	53:79	3,561	1,480	362	81	15	0
10	53:77	1,401	709	158	31	5	0
11	53:79	4,123	1,622	466	91	7	0
12	53:85	13,560	12,606	11,350	7,566	708	15
13	53:70	1,242	491	100	2	0	0
14	53:83	5,825	5,303	3,853	2,268	656	21
15	53:83	8,930	7,600	5,041	2,056	166	7
16	53:87	5,662	4,684	3,479	2,143	476	3
17	53:81	5,465	5,005	3,572	1,814	235	8
18	53:89	5,045	4,341	3,365	2,816	1,873	487
19	53:83	3,464	3,387	3,106	2,324	906	37
20	53:82	3,438	2,829	990	110	15	2
21	60:75	367	366	157	18	1	0
22	53:81	8,459	6,831	4,220	1,700	156	6
23	54:84	3,918	3,648	2,595	770	33	3
24	53:77	3,116	2,425	834	55	7	0
25	53:79	1,017	600	176	25	1	0
26	53:72	388	205	45	6	0	0
27	53:80	161	111	29	2	1	0
28	53:70	534	214	25	0	0	0
29	53:75	10,739	5,508	532	53	2	0

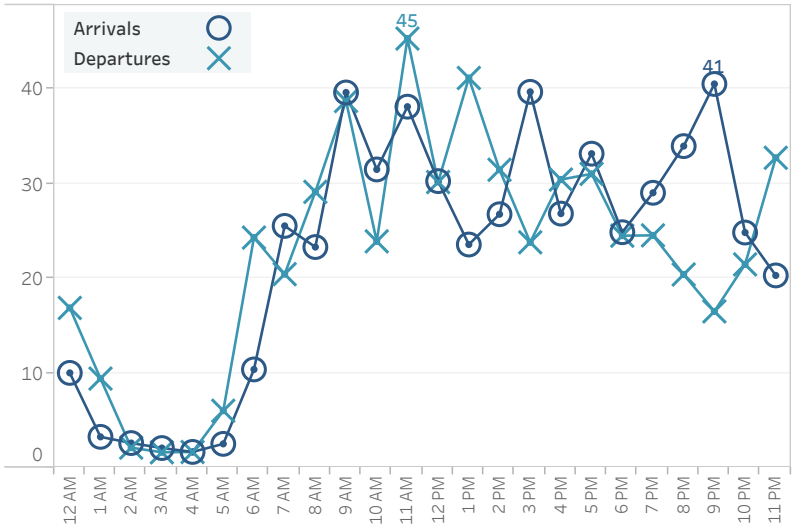
Noise Monitor N-Above values (above) are derived from actual measured events and assigned to aircraft overflights using both ANOMS NPD and ANEEM algorithms. N-Above represents the count of events where the peak noise (LMax) reached above the designated dBA value. Note, the charts on this page represent only SFO aircraft-related noise events.

Operations

September 2023

Monthly Ops	AVG Daily Ops	12 Month AVG	YOY Growth
32,721	1,091	31,016	7%

September 2023 Average Day (Hourly)



Major Arrival and Departure Routes (West Flow)

West Flow is depicted in the above image and is a predominate flow at SFO.

West Flow
100%

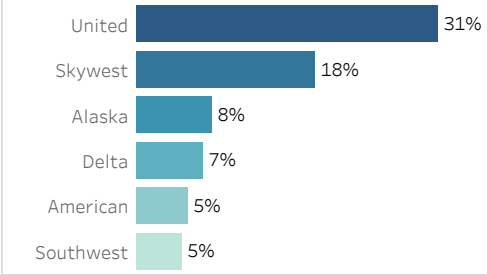
Arrival Route	
1. BDEGA	31%
2. DYAMD	37%
3. SERFR	26%
4. PIRAT	6%

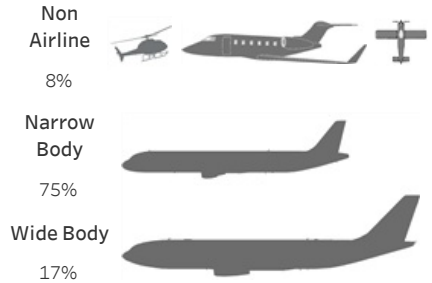
Departure Route	
A. GAP	23%
B. SSTIK	27%
C. NIITE	11%
D. TRUKN RWY 01	36%
D. TRUKN RWY 28	4%

Top Destinations		
Los Angeles	JFK	Seattle
6%	4%	4%

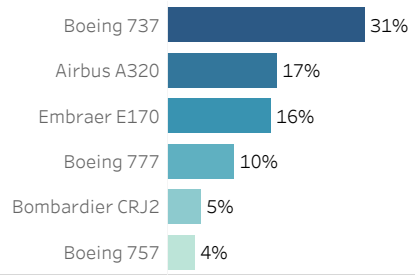
Down the Bay vs Peninsula	
1.1 Down the Bay Visual	32%
1.2 BDEGA Arrival	68%

Airlines with the Most Operations

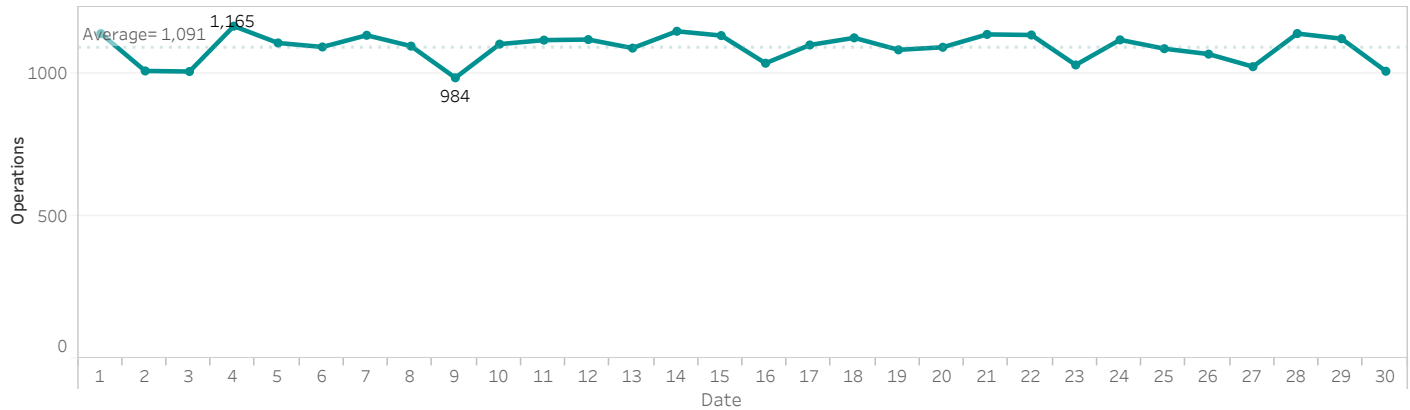




Most Utilized Aircraft Types



Daily Aircraft Operations



Runway Usage and Nighttime Operations

Leftmost Runway Utilization table shows percent of runway usage for arrivals and departures by runway based on air carrier operations using jet, regional jet, and turboprop aircraft. Late Night Preferential Runway Use table depicts departure runway usage between 1am - 6am for jet aircraft for the whole month (top) and during nighttime hours only (bottom). Percentages [%] are rounded to the nearest whole number.

Runway Utilization

	Arrivals	Departures
01 L/R		76% 11,456
10 L/R		0% 3
28 L/R	100% 15,090	24% 3,655

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

	Departures
10 L/R	1% 3
01 L/R	49% 273
28 L/R	50% 277

Runway Utilization

Arrivals

28L	28R
40%	60%

Night (10pm-7am)

25%	75%

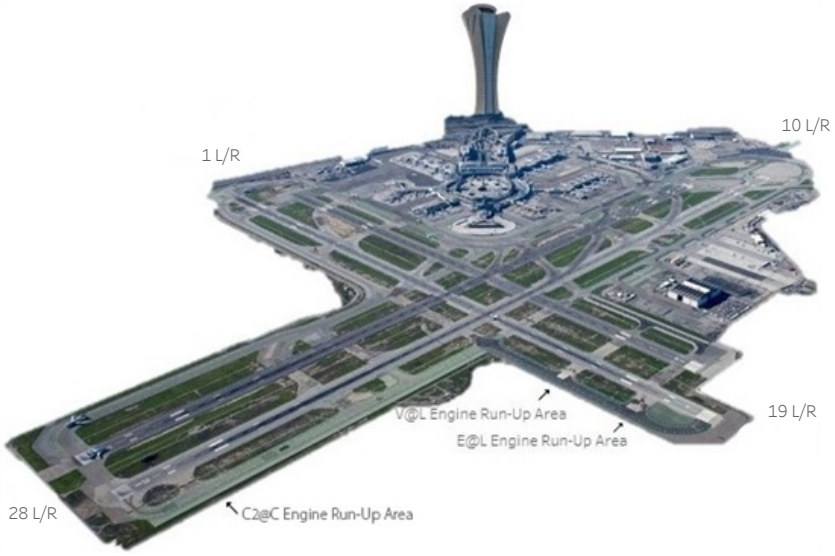
Nighttime Power Run-Ups

10pm-7am

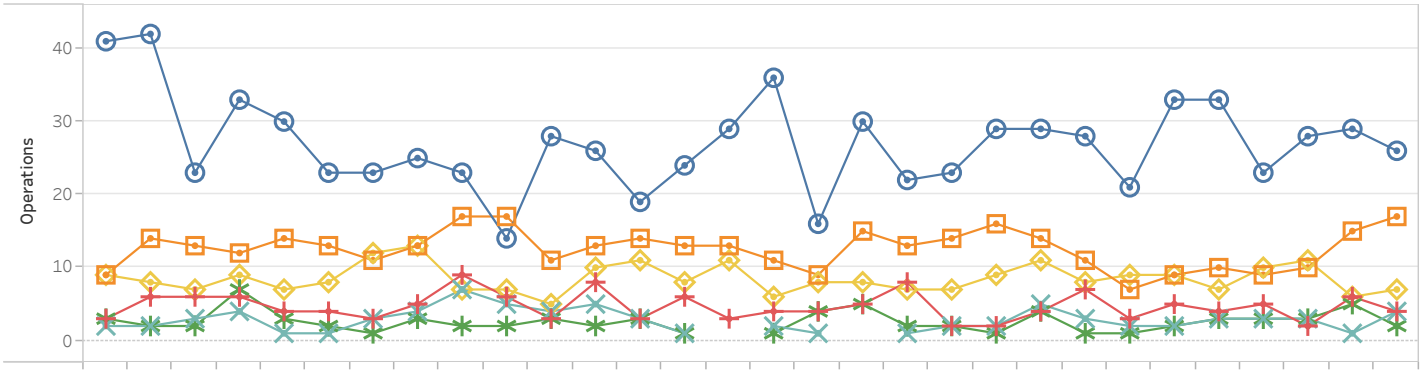
American Airlines	3
JetBlue Airlines	1
United Airlines	13

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

Designated Power Runup locations are 19 L/R depicted on the airfield map (right) with airlines nighttime power runup counts shown above.



Hourly Nighttime Operations



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
12 AM	41	42	23	33	30	23	23	25	23	14	28	26	19	24	29	36	16	30	22	23	29	29	28	21	33	33	23	28	29	26
1 AM	9	14	13	12	14	13	11	13	17	17	11	13	14	13	13	11	9	15	13	14	16	14	11	7	9	10	9	10	15	17
2 AM	3	6	6	6	4	4	3	5	9	6	3	8	3	6	3	4	4	5	8	2	2	4	7	3	5	4	5	2	6	4
3 AM	2	2	3	4	1	1	3	4	7	5	4	5	3	1		2	1		1	2	2	5	3	2	2	3	3	3	1	4
4 AM	3	2	2	7	3	2	1	3	2	2	3	2	3	1		1	4	5	2	2	1	4	1	1	2	3	3	3	5	2
5 AM	9	8	7	9	7	8	12	13	7	7	5	10	11	8	11	6	8	8	7	7	9	11	8	9	9	7	10	11	6	7

Noise Reports

		Noise Reporters	Noise Reports
Roundtable	Atherton	2	156
	Belmont	3	17
	Brisbane	19	406
	Burlingame	2	2
	Daly City	10	1,202
	El Granada	1	362
	Emerald Hills	8	281
	Foster City	12	340
	Half Moon Bay	1	1
	Hillsborough	1	55
	Menlo Park	13	1,377
	Millbrae	2	20
	Montara	1	349
	Pacifica	21	1,727
	Portola Valley	33	9,923
	Redwood City	5	372
	San Bruno	11	35
	San Carlos	2	5
	San Francisco	22	3,373
	San Mateo	5	512
	South San Francisco	14	258
	Woodside	9	2,078
Other	Alameda	6	439
	Aptos	2	8
	Berkeley	3	884
	Boulder Creek	2	8
	Capitola	1	30
	Castro Valley	1	21
	Cupertino	1	94
	Felton	3	63
	Fremont	1	170
	Lafayette	1	6
	Los Altos	52	7,363
	Los Altos Hills	10	1,339
	Los Gatos	33	5,228
	Moraga	3	70
	Mountain View	18	3,523
	Newark	1	3
	Oakland	8	3,907
	Orinda	1	184
	Palo Alto	119	22,481
	Richmond	3	174
	San Jose	1	2
	Santa Cruz	41	8,523
	Scotts Valley	26	3,789
	Soquel	23	3,354
	Stanford	3	595
	Sunnyvale	3	716
	Union City	1	503
	Watsonville	1	77
Grand Total		**565**	**86,405**

Reporters Annual AVG
522

Reports Annual AVG
85,577

New Reporters
40

New Reporters Top City
South San Francisco

Furthest Report
64 miles

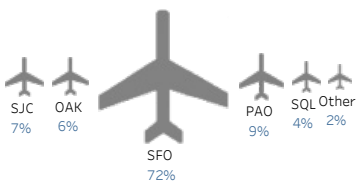
Reports per SFO Operation
3

Top Aircraft Types
B737
A320
E75L

Top Flight Numbers
KAL214
JBU536
TAI560

Notes:
Address validation Relies on USPS-provided ZIP Code look up table and USPS-specified default city values.

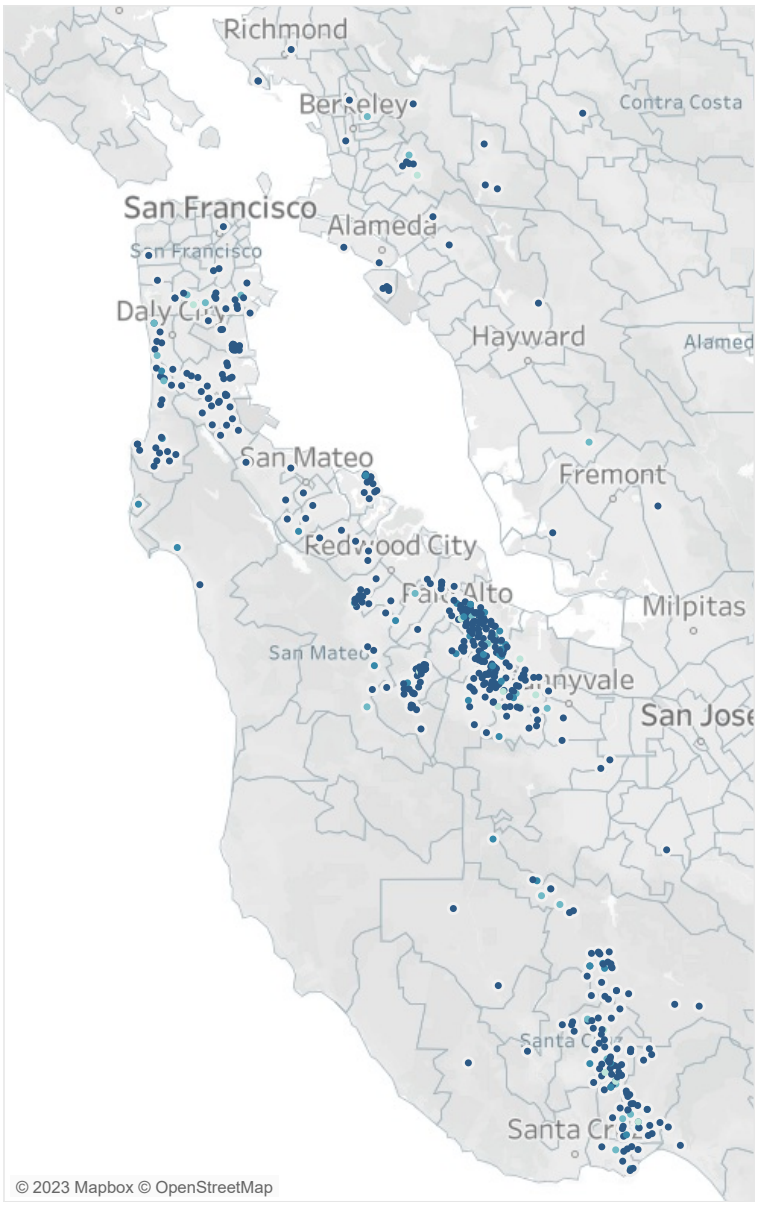
Noise Reports by Airport



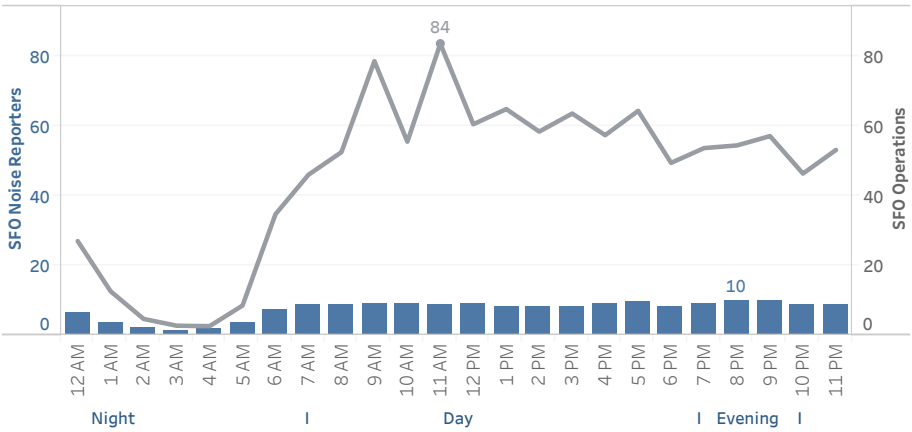
99% of noise reports correlate to a flight origin/destination airport.

Noise Reporters Location Map

September 2023

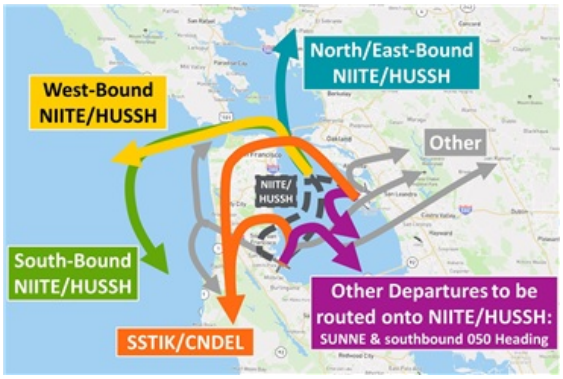


Hourly Noise Reporters (Average Day in a Month)

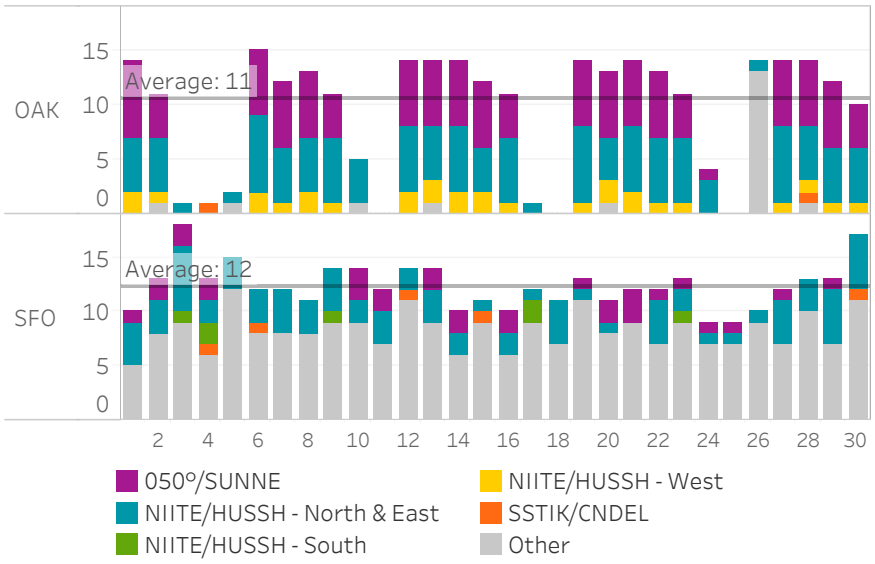


Source: SFO Intl Airport Noise Monitoring System

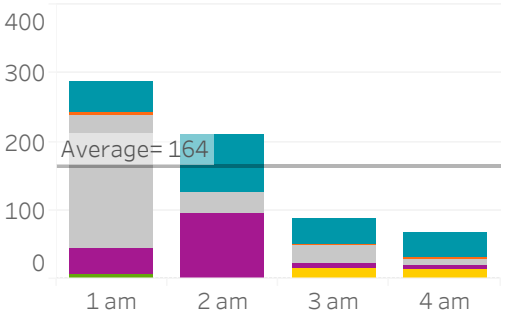
NIITE to GOBBS 1 am to 5 am (September 2023)



Count of Departures per Night



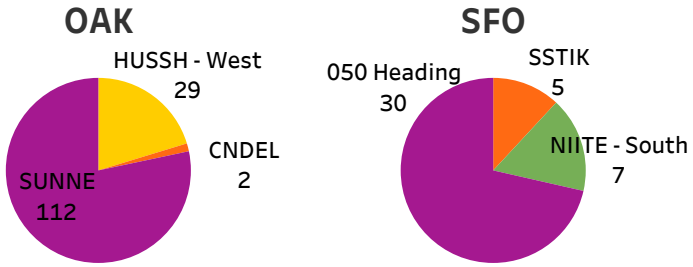
Average Total Departures per Hour



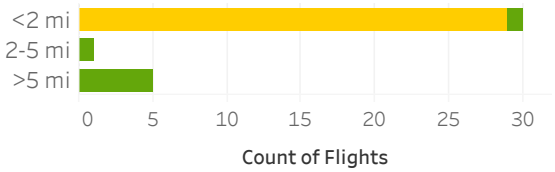
Departure Runway Usage

OAK		SFO					
12	30	01L	01R	10L	10R	28L	28R
5%	95%	14%	15%	1%	0%	48%	22%

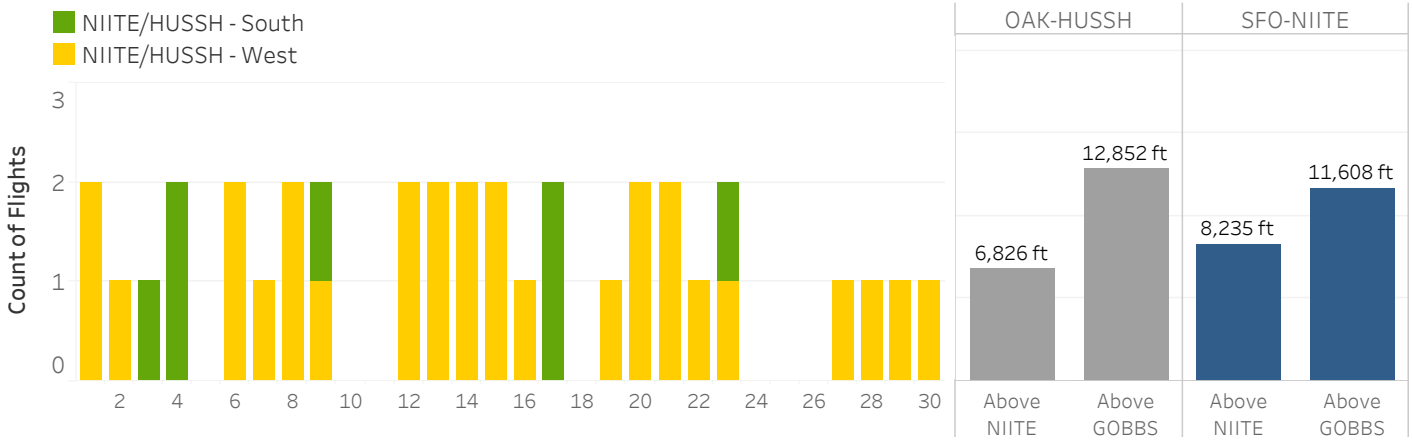
CNDEL and SSTIK Departures vs HUSSH and NIITE



How Close are Aircraft Flying to GOBBS?



Average Altitude at NIITE and GOBBS



Airport Director's Report

Presented at the December 6, 2023
Airport/Community Roundtable Meeting

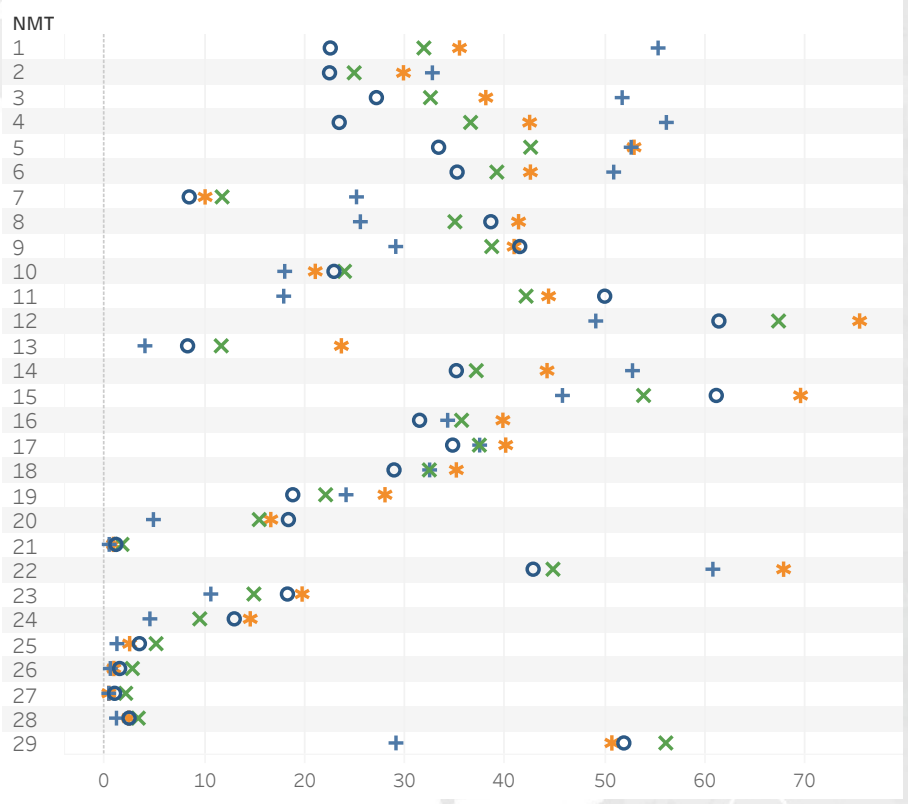
Aircraft Noise Office
October 2023

SFO San Francisco International Airport

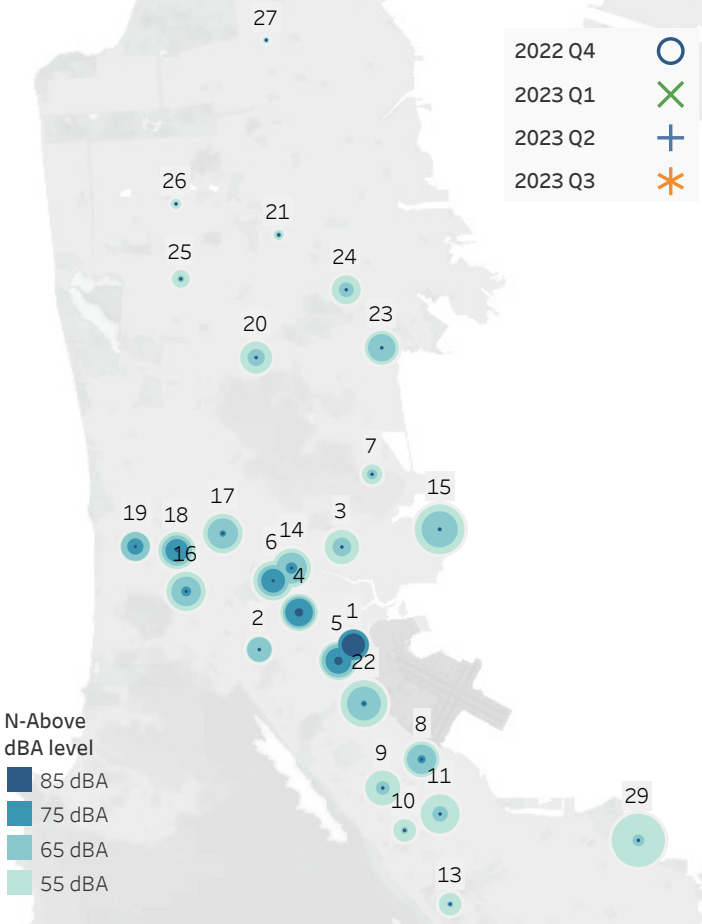
Aircraft Noise Levels Summary

October 2023

Nighttime N-Above 55 dBA Daily Average

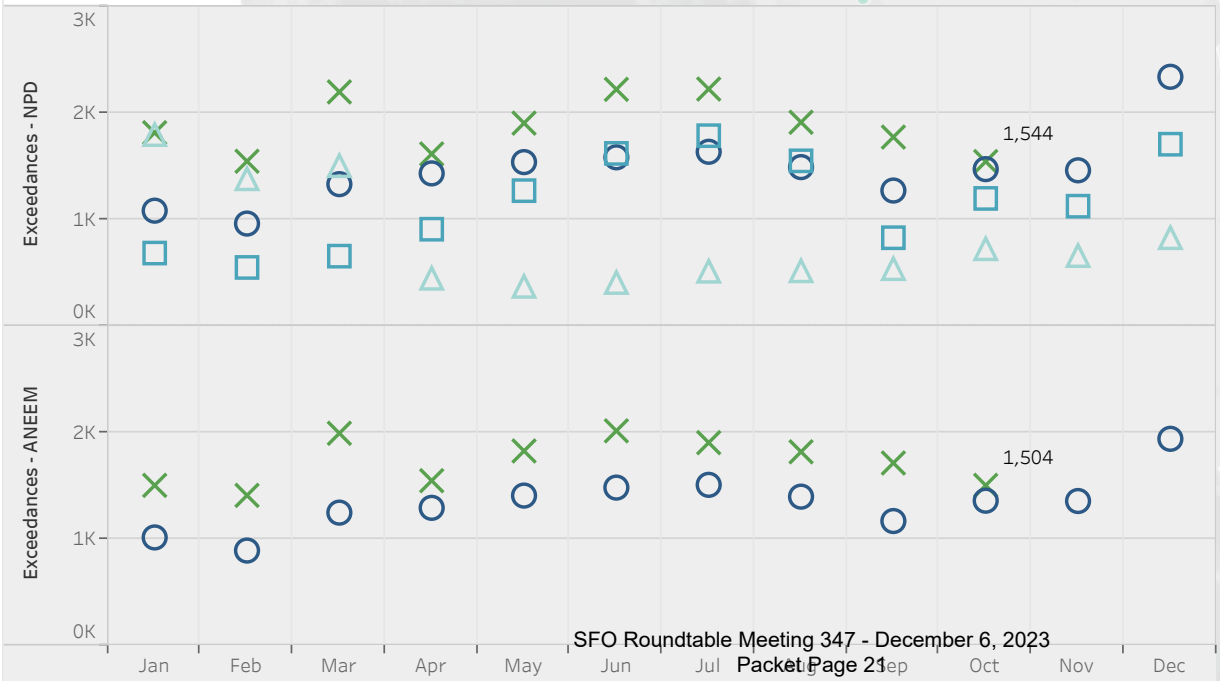


The chart above depicts the average daily N-Above 55dBA SFO aircraft noise events per NMT during nighttime hours (10pm-7am) compared to the previous 4 quarters. Values are derived from the ANEEM algorithm.



The map displays the N-Above counts at each NMT by N-Above Noise Level based on SFO aircraft noise events. Darker circles represent louder noise events and larger circles represent a larger number of noise events relative to the N-Above noise level. Values are derived from the ANEEM algorithm.

Significant Exceedances



Significant Exceedances (right) displayes a total count of SFO aircraft noise events that produced a noise level higher than the maximum allowable decibel value established for a particular monitoring site.

Aircraft Noise Levels Details

October 2023

		ANOMS						ANEEM			
		Aircraft				Community		Aircraft			
NMT	City	Noise Events (AVG Day)	CNEL (dBA)	SEL (dBA)	LMax (dBA)	CNEL (dBA)	Ambient Level (dBA)	Noise Events (AVG Day)	CNEL (dBA)	SEL (dBA)	LMax (dBA)
1	San Bruno	121	72	95	84	67	56	117	72	95	85
2	San Bruno	89	56	80	68	63	51	79	55	81	68
3	SSF	48	51	79	67	61	47	161	53	75	63
4	SSF	120	67	90	78	59	46	171	67	88	73
5	San Bruno	113	66	89	77	61	48	175	66	87	72
6	SSF	113	64	87	75	56	42	194	64	85	69
7	Brisbane	18	47	78	67	57	45	69	49	74	61
8	Millbrae	22	56	85	73	66	51	148	58	79	67
9	Millbrae	8	40	76	64	58	43	158	53	73	61
10	Burlingame	4	37	78	65	57	42	72	47	72	60
11	Burlingame	8	39	77	64	58	43	199	53	73	60
12	Foster City	332	61	82	71	57	42	410	62	81	69
13	Hillsborough	2	31	75	64	56	41	76	46	71	58
14	SSF	108	59	83	71	58	44	189	60	81	67
15	SSF	157	58	81	69	58	44	295	58	79	65
16	SSF	98	59	83	71	58	41	190	59	80	66
17	SSF	107	58	82	70	57	43	189	59	80	66
18	Daly City	100	63	87	76	58	44	165	63	85	70
19	Pacifica	90	60	84	73	56	40	104	60	84	72
20	Daly City	99	51	77	65	60	42	143	51	75	63
21	San Francisco	28	43	75	63	60	52	18	42	75	64
22	San Bruno	71	56	81	70	63	47	262	59	78	65
23	San Francisco	94	53	79	68	59	47	161	54	78	66
24	San Francisco	69	49	76	65	59	47	126	50	75	63
25	San Francisco	16	41	77	65	55	41	55	42	71	60
26	San Francisco	5	37	78	66	58	42	23	40	73	60
27	San Francisco	8	41	80	67	64	44	23	41	75	63
28	Redwood City	7	37	76	64	52	39	27	39	71	59
29	San Mateo	77	49	78	64	57	42	343	52	72	60

Noise Monitor's CNEL values (above) are derived from actual measured events and are used to validate the 65dBA CNEL noise footprint. Aircraft monthly CNELs from both ANOMS NPD and ANEEM algorithms for each monitor site are provided with daily average aircraft counts, the average Sound Exposure Level (SEL), and average Maximum Level (LMax). Noise levels from other noise sources in the community calculated by ANOMS is provided as Community CNEL. Ambient Level is represented by the LA90 noise value which is the noise level exceeded at the monitor for 90% of the time.

SFO N-Above NPD

NMT	Min:Max LMax	55 dBA	60 dBA	65 dBA	70 dBA	75 dBA	80 dBA
1	65:98	3,717	3,717	3,717	3,547	3,309	2,773
2	61:87	2,787	2,787	2,325	715	35	9
3	62:87	1,378	1,378	1,045	223	60	15
4	61:93	3,688	3,688	3,584	3,199	2,716	1,637
5	63:90	3,460	3,460	3,425	3,094	2,400	1,221
6	62:90	3,495	3,495	3,382	2,956	2,032	517
7	61:77	439	439	334	96	8	0
8	68:88	702	702	702	609	179	29
9	59:79	102	95	32	5	2	0
10	60:73	45	42	14	3	0	0
11	60:77	62	61	33	1	1	0
12	63:88	10,480	10,480	10,385	6,453	528	20
13	60:67	17	15	6	0	0	0
14	61:86	3,332	3,332	3,176	1,969	471	19
15	61:90	4,868	4,868	4,327	1,529	92	16
16	61:94	3,056	3,056	2,934	1,895	364	4
17	61:83	3,329	3,329	3,064	1,614	159	4
18	64:87	3,106	3,106	3,096	2,749	1,890	517
19	65:85	2,784	2,784	2,784	2,234	949	38
20	59:86	2,904	2,812	1,225	293	95	17
21	59:84	492	460	120	11	1	1
22	64:85	2,164	2,164	2,151	1,238	128	5
23	63:88	2,804	2,804	2,557	695	51	12
24	59:85	1,806	1,789	773	68	11	1
25	58:79	395	364	157	44	4	0
26	60:77	93	91	40	8	2	0
27	60:77	54	53	30	13	3	0
28	59:80	141	129	41	11	3	0
29	58:87	2,546	2,426	689	237	80	6

SFO N-Above ANEEM

Min:Max LMax	55 dBA	60 dbA	65 dBA	70 dBA	75 dBA	80 dBA
55:98	3,569	3,567	3,561	3,496	3,283	2,755
57:79	2,388	2,374	2,088	657	13	0
53:84	4,166	3,281	1,235	165	31	4
54:94	4,888	4,545	3,675	3,178	2,700	1,631
53:90	5,195	4,943	3,976	3,136	2,390	1,214
53:90	5,505	4,605	3,476	2,939	2,021	513
53:77	1,400	849	355	93	7	0
54:88	4,462	4,291	3,060	1,115	243	29
53:80	4,281	2,302	657	160	27	0
53:78	1,813	912	165	31	8	0
53:80	5,380	2,820	847	180	20	2
53:83	12,631	11,556	10,348	6,369	481	11
53:72	1,793	706	128	3	0	0
53:86	5,352	4,799	3,391	1,964	462	17
53:82	8,775	7,274	4,617	1,498	66	5
53:79	5,417	4,296	3,100	1,894	354	0
53:83	5,490	4,786	3,263	1,581	153	3
53:87	4,892	4,254	3,262	2,743	1,883	513
54:85	3,208	3,148	2,884	2,218	940	36
53:81	3,630	2,848	1,038	132	19	2
60:84	364	363	119	10	1	1
53:84	7,759	6,636	4,057	1,593	136	2
55:82	4,058	3,876	2,664	684	35	3
53:80	2,964	2,448	769	59	4	0
53:78	1,112	597	172	17	2	0
53:77	362	192	41	5	2	0
54:76	154	105	35	12	2	0
53:70	420	156	22	1	0	0
53:77	10,221	4,516	487	51	3	0

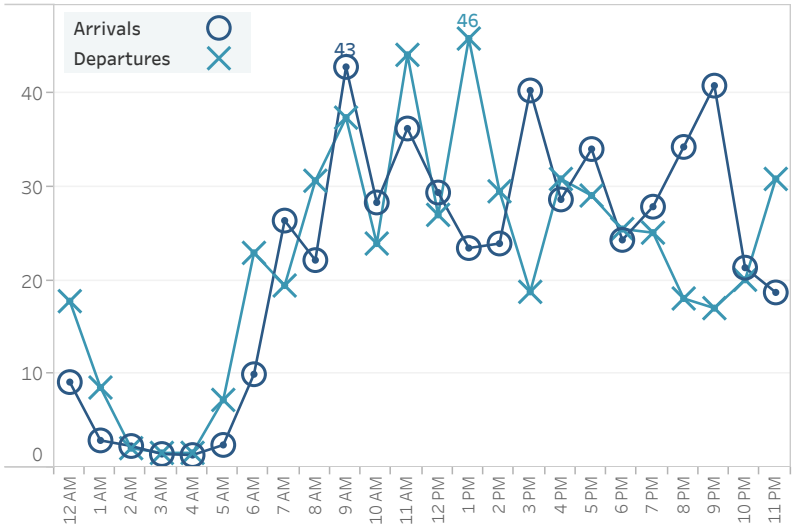
Noise Monitor N-Above values (above) are derived from actual measured events and assigned to aircraft overflights using both ANOMS NPD and ANEEM algorithms. N-Above represents the count of events where the peak noise (LMax) reached above the designated dBA value. Note, the charts on this page represent only SFO aircraft-related noise events.

Operations

October 2023

Monthly Ops	AVG Daily Ops	12 Month AVG	YOY Growth
33,039	1,066	31,191	6%

October 2023 Average Day (Hourly)



Major Arrival and Departure Routes (West Flow)

West Flow is depicted in the above image and is a predominate flow at SFO.

West Flow
100%

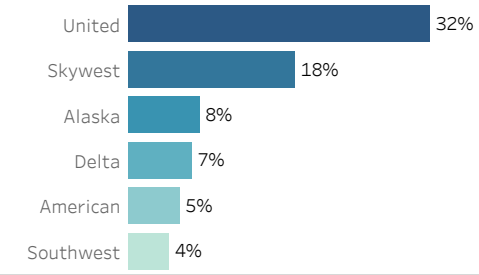
Arrival Route	
1. BDEGA	29%
2. DYAMD	38%
3. SERFR	27%
4. PIRAT	6%

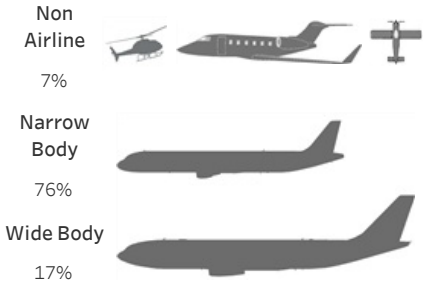
Departure Route	
A. GAP	21%
B. SSTIK	29%
C. NIITE	11%
D. TRUKN RWY 01	38%
D. TRUKN RWY 28	1%

Top Destinations		
Los Angeles	JFK	Las Vegas
7%	4%	4%

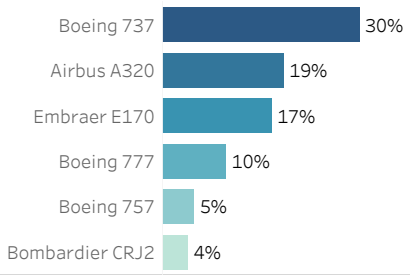
Down the Bay vs Peninsula	
1.1 Down the Bay Visual	35%
1.2 BDEGA Arrival	65%

Airlines with the Most Operations

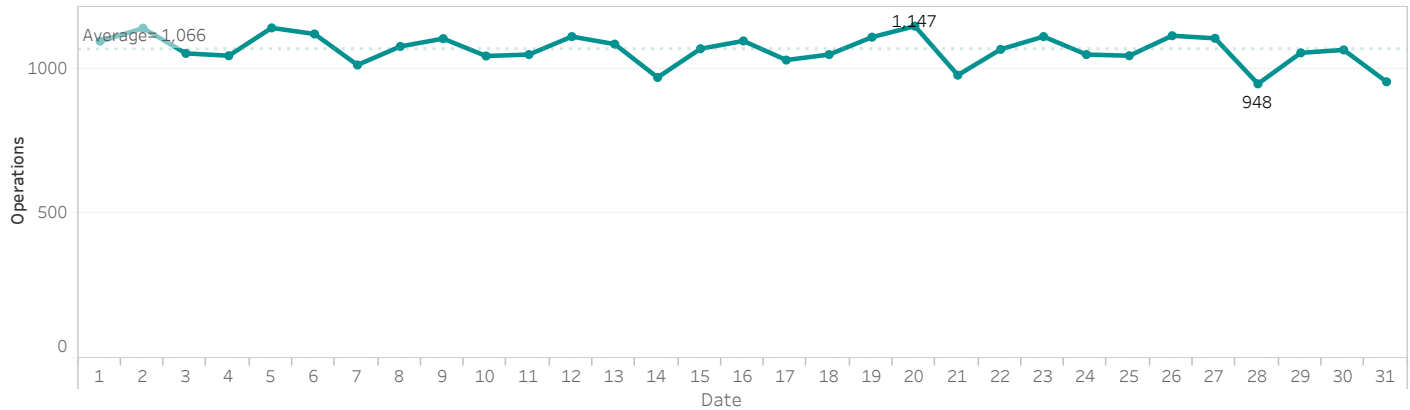




Most Utilized Aircraft Types



Daily Aircraft Operations



Runway Usage and Nighttime Operations

Leftmost Runway Utilization table shows percent of runway usage for arrivals and departures by runway based on air carrier operations using jet, regional jet, and turboprop aircraft. Late Night Preferential Runway Use table depicts departure runway usage between 1am - 6am for jet aircraft for the whole month (top) and during nighttime hours only (bottom). Percentages [%] are rounded to the nearest whole number.

Runway Utilization

	Arrivals	Departures
01 L/R		81% 12,456
10 L/R		0% 1
28 L/R	100% 15,347	19% 2,908

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

	Departures
10 L/R	0% 1
01 L/R	55% 328
28 L/R	45% 272

Runway Utilization

Arrivals

28L	28R
38%	62%

Night (10pm-7am)

18%	82%

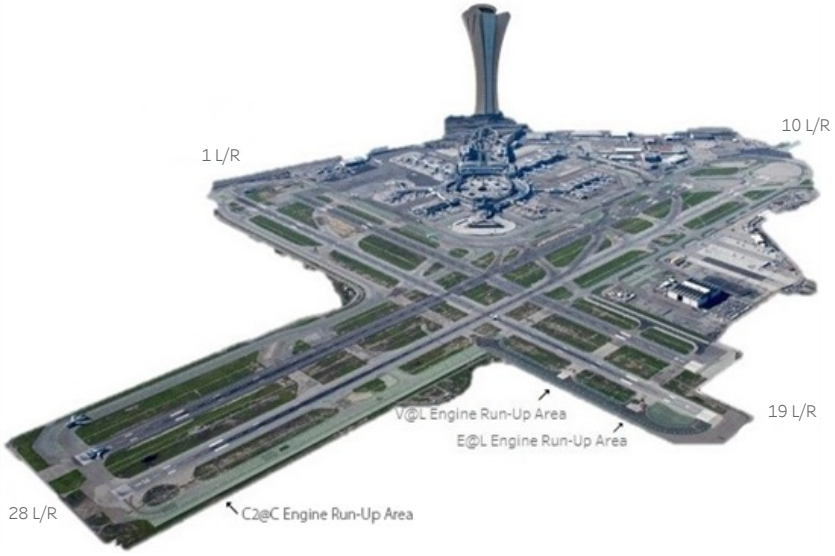
Nighttime Power Run-Ups

10pm-7am

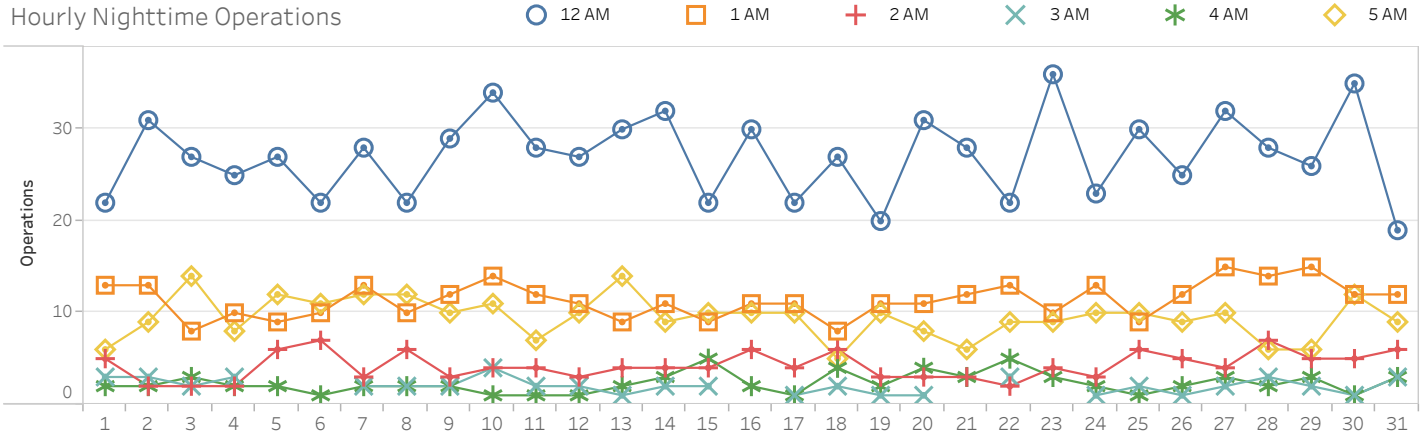
Alaska Airlines	1
American Airlines	3
United Airlines	8

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

Designated Power Runup locations are 19 L/R depicted on the airfield map (right) with airlines nighttime power runup counts shown above.



Hourly Nighttime Operations



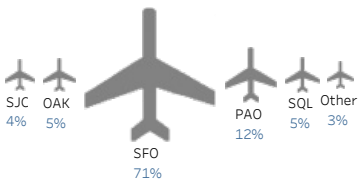
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
12 AM	22	31	27	25	27	22	28	22	29	34	28	27	30	32	22	30	22	27	20	31	28	22	36	23	30	25	32	28	26	35	19
1 AM	13	13	8	10	9	10	13	10	12	14	12	11	9	11	9	11	11	8	11	11	12	13	10	13	9	12	15	14	15	12	12
2 AM	5	2	2	2	6	7	3	6	3	4	4	3	4	4	4	6	4	6	3	3	3	2	4	3	6	5	4	7	5	5	6
3 AM	3	3	2	3			2	2	2	4	2	2	1	2	2		1	2	1	1		3		1	2	1	2	3	2	1	3
4 AM	2	2	3	2	2	1	2	2	2	1	1	1	2	3	5	2	1	4	2	4	3	5	3	2	1	2	3	2	3	1	3
5 AM	6	9	14	8	12	11	12	12	10	11	7	10	14	9	10	10	10	5	10	8	6	9	9	10	10	9	10	6	6	12	9

Noise Reports

		Noise Reporters	Noise Reports
Roundtable	Atherton	3	57
	Belmont	3	23
	Brisbane	15	231
	Burlingame	2	2
	Daly City	10	1,284
	East Palo Alto	1	2
	El Granada	1	332
	Emerald Hills	5	716
	Foster City	7	263
	Hillsborough	1	34
	Menlo Park	16	1,210
	Millbrae	4	57
	Montara	1	567
	Pacifica	13	951
	Portola Valley	31	14,781
	Redwood City	6	340
	San Bruno	9	207
	San Carlos	1	1
	San Francisco	28	2,587
	San Mateo	6	444
	South San Francisco	10	319
	Woodside	7	1,928
Other	Alameda	5	91
	Aptos	1	8
	Berkeley	3	784
	Boulder Creek	1	2
	Capitola	1	38
	Castro Valley	1	19
	Cupertino	1	54
	Felton	3	95
	Fremont	2	118
	La Honda	1	1
	Los Altos	55	7,538
	Los Altos Hills	10	1,099
	Los Gatos	35	4,927
	Moraga	3	102
	Mountain View	13	3,135
	Newark	1	1
	Oakland	8	2,640
	Orinda	1	45
	Palo Alto	107	21,683
	Richmond	3	153
	Santa Cruz	42	8,806
	Scotts Valley	25	3,944
	Soquel	25	3,621
	Stanford	3	477
	Sunnyvale	2	516
	Union City	1	181
	Watsonville	1	68
Grand Total		**534**	**86,482**

Notes:
Address validation Relies on USPS-provided ZIP Code look up table and USPS-specified default city values.

Noise Reports by Airport



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

Reporters Annual AVG
521

Reports Annual AVG
85,009

New Reporters
28

New Reporters Top City
San Francisco

Furthest Report
64 Miles

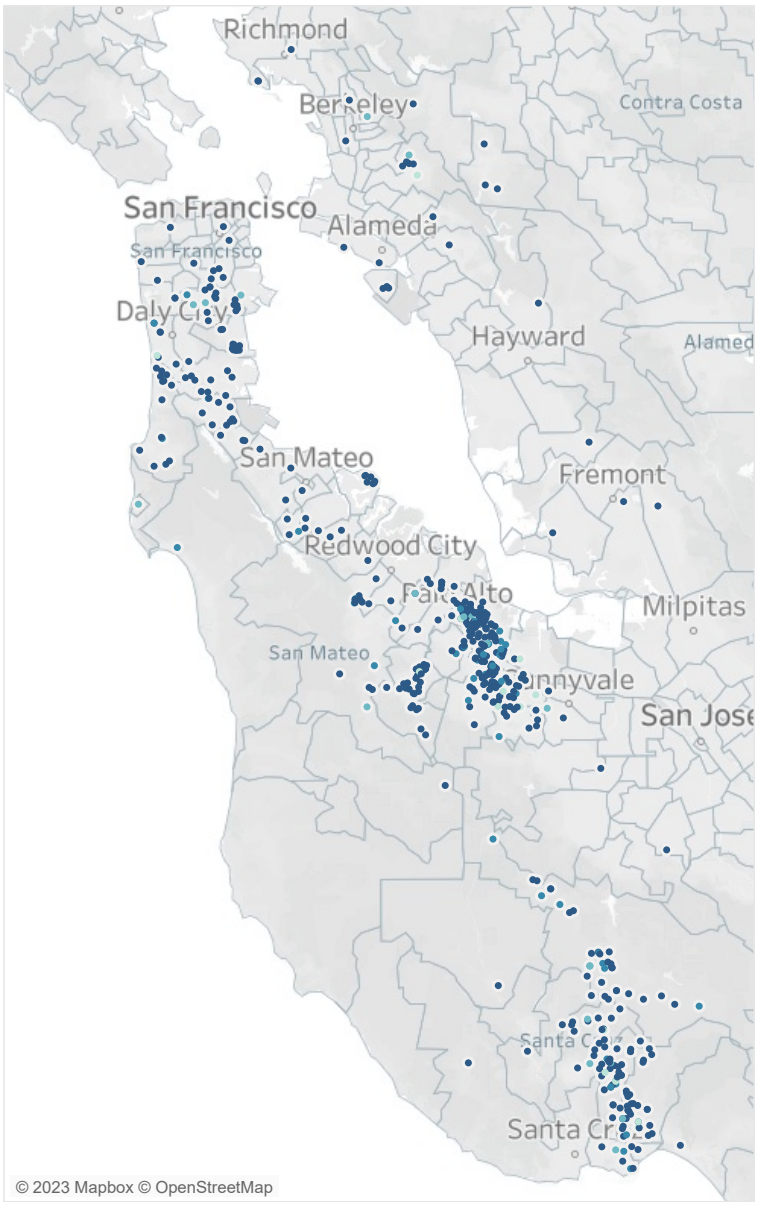
Reports per SFO Operation
3

Top Aircraft Types
B737
A320
E75L

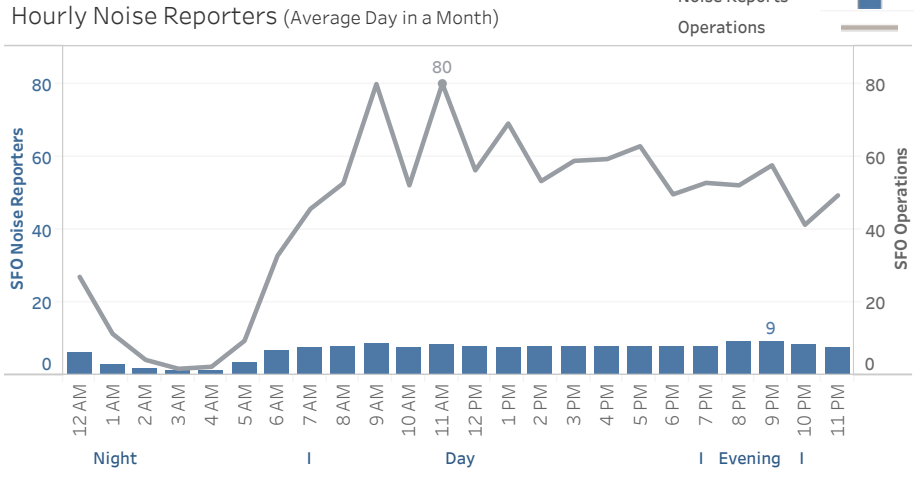
Top Flight Numbers
KAL214
AMX664
TAI560

Noise Reporters Location Map

October 2023

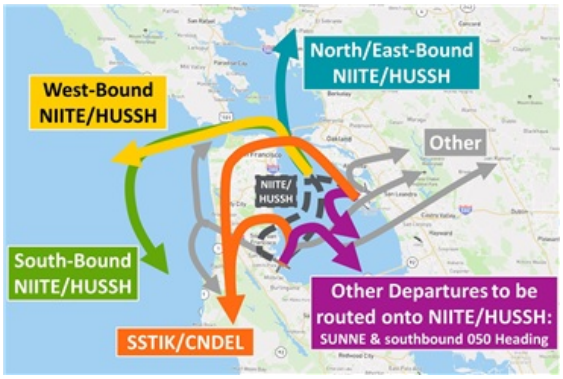


Hourly Noise Reporters (Average Day in a Month)

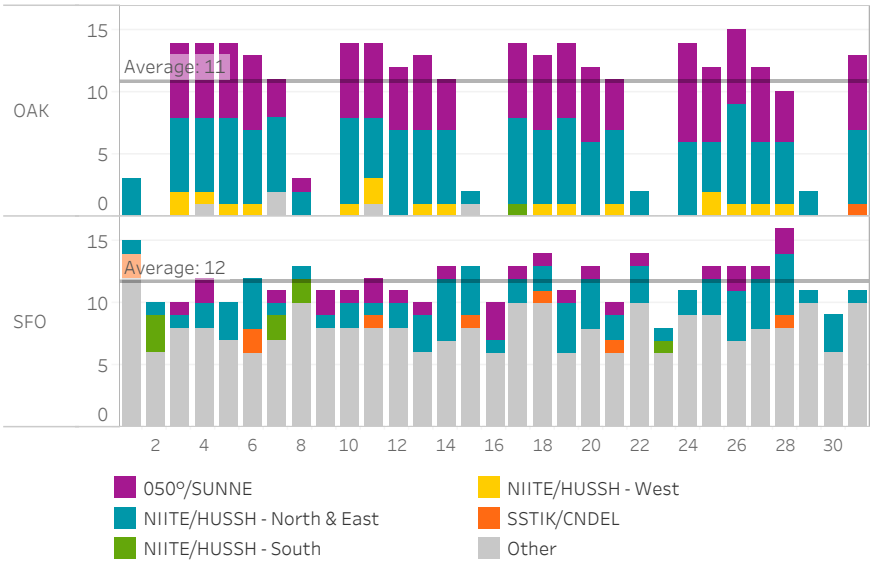


Source: SFO Intl Airport Noise Monitoring System

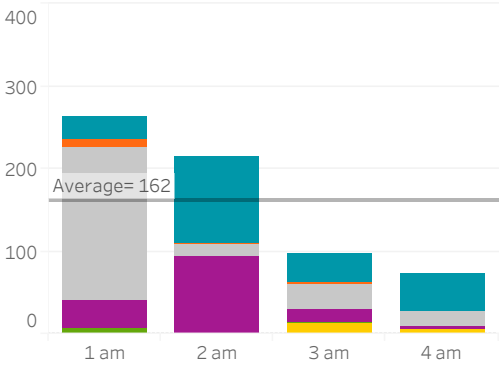
NIITE to GOBBS 1 am to 5 am (October 2023)



Count of Departures per Night



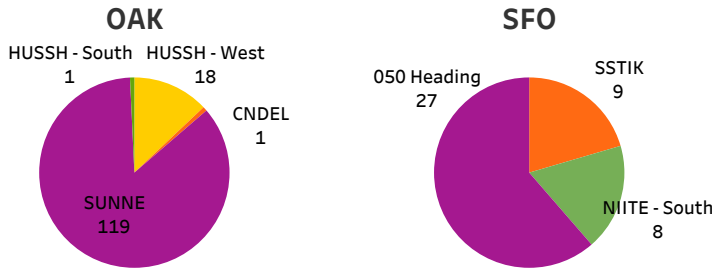
Average Total Departures per Hour



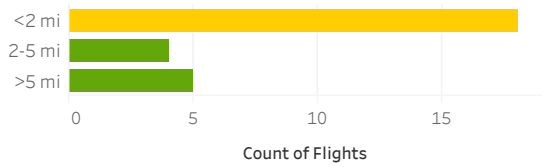
Departure Runway Usage

OAK		SFO				
12	30	01L	01R	10L	28L	28R
1%	99%	7%	23%	0%	43%	26%

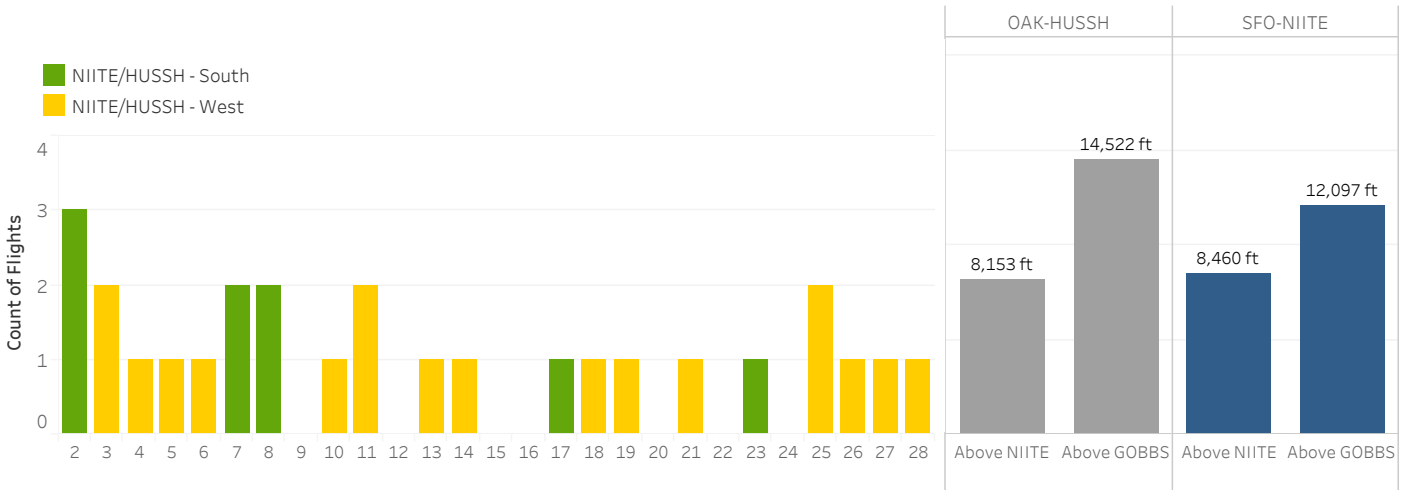
CNDEL and SSTIK Departures vs HUSSH and NIITE



How Close are Aircraft Flying to GOBBS?



Average Altitude at NIITE and GOBBS



	As of 10/31/2023		
A	**SOURCES**	**2023-24**	**2023-24 as of 10/31/23**
	Revenue	BUDGET	ACTUAL
	San Francisco Airport Commission	$ 220,000	
	Roundtable Membership	$ 43,500	$ 33,000
	*In Kind Contributions**		
		$ 263,500	**$ 33,000**
	Other Sources	BUDGET	
	Fund Balance Contribution	$ 9,490	
	SOURCES TOTAL	**$ 272,990**	
B	**EXPENSES**	**2023-24**	
	Staffing & Coordination	BUDGET	ACTUAL
	County of San Mateo Coordination Services	$ 155,000	$ 42,868
	Roundtable Aviation Technical Consultant	$ 90,000	$ 18,139
		$ 245,000	**$ 61,007**
	ADMINISTRATION / OPERATIONS	BUDGET	
	Meeting Rooms * In-Kind		
	Postage / Printing	$ 1,500	
	Website	$ 1,800	
	Data Storage & Conference Services	$ 990	
	Miscellaneous Office Expenses/Equipment	$ 3,000	$ 139
	Video Services	$ 8,000	$ 1,471
		$ 15,290	**$ 1,610**
	PROJECTS, PROGRAMS, & OTHER	BUDGET	
	Noise Conferences Attendance, Coordinator	$ 1,500	
	Noise Conferences Attendance, Members	$ 3,000	$ 150
	TRACON Field Trip(s)	$ 950	
	Airport Noise Report subscription	$ 2,500	$ 2,500
	N.O.I.S.E. Membership	$ 4,300	
	Fly Quiet Awards	$ 450	
	Special Study	$ -	
		$ 12,700	**$ 2,650**
	EXPENSES TOTAL	**$ 272,990**	**$ 65,267**
	YEAR END BALANCE	PROPOSED	
		$ -	
C	**UNCOMMITTED FUNDS**	**2023-24**	
		PROPOSED	
	Fund Balance	$ 411,863	
	Contingency Reserve	$ 40,000	
	UNCOMMITTED FUNDS TOTAL	**$ 451,863**	
	*Meeting venues in-kind contributions from Millbrae, Foster City, Hillsborough and the County of San Mateo.		

SFO GBAS Project Update

Innovative Procedure Timeline and Latest Community Requests

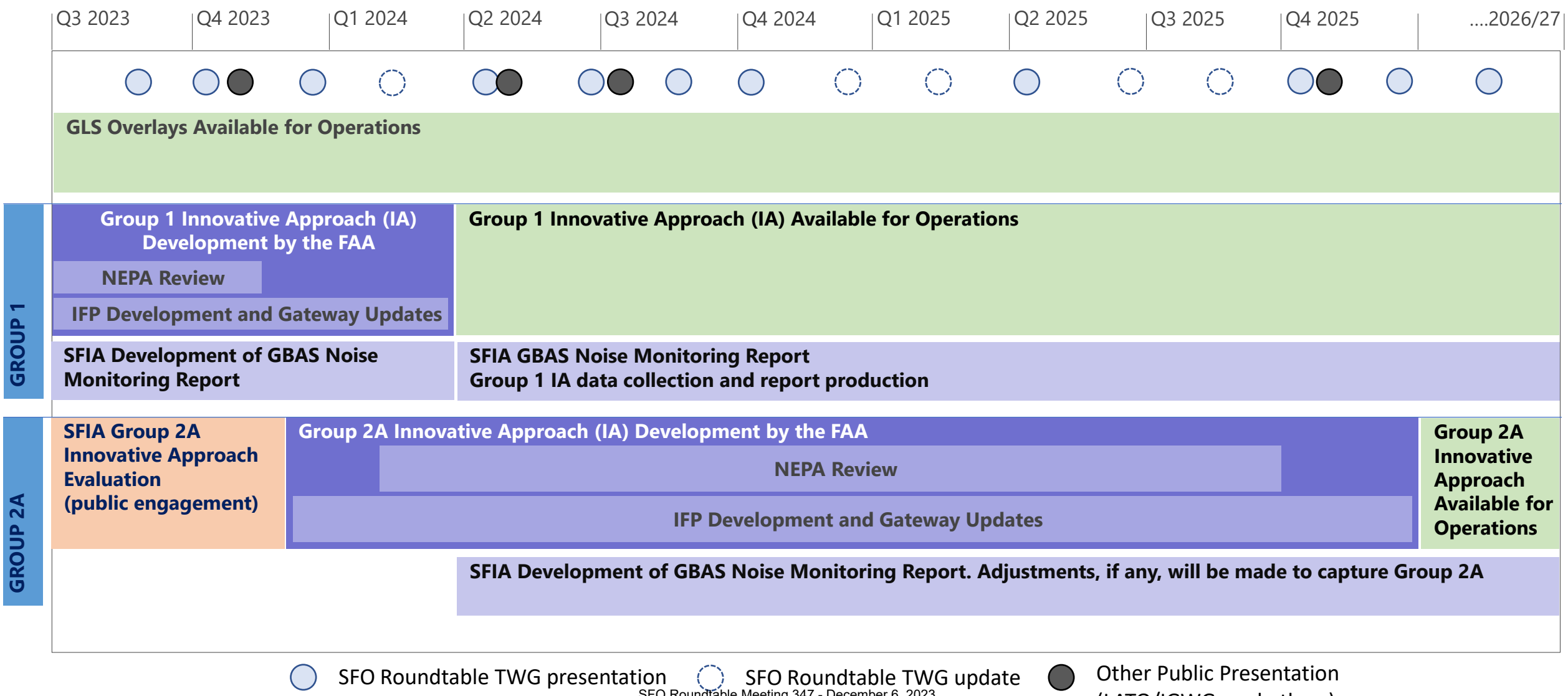
November 15, 2023

SFO

Topics Covered

1. Timeline for Group 1 and Group 2A GLS Procedures
2. Overview of roundtable and community Group 2A requests
3. Next Steps

SFIA GLS Procedure Development Schedule and Planned Outreach



Group 1 Innovative GLS Approaches and Noise Monitoring

Group 1 Innovative GLS Procedures Rwys 10L/10R

Group 1 GLS Updates in the IFP Gateway: 21MAR24

GLS RWY 10L, ORIG	SAN FRANCISCO INTL	SFO (KSFO)	SAN FRANCISCO, CA	3/21/2024	Pending		Email FAA
GLS RWY 10R, ORIG	SAN FRANCISCO INTL	SFO (KSFO)	SAN FRANCISCO, CA	3/21/2024	Pending		Email FAA
RNAV (GPS) RWY 10L, AMDT 3	SAN FRANCISCO INTL	SFO (KSFO)	SAN FRANCISCO, CA	3/21/2024	Pending		Email FAA
RNAV (GPS) Y RWY 10R, AMDT 3	SAN FRANCISCO INTL	SFO (KSFO)	SAN FRANCISCO, CA	3/21/2024	Pending		Email FAA
RNAV (RNP) Z RWY 10R, AMDT 3	SAN FRANCISCO INTL	SFO (KSFO)	SAN FRANCISCO, CA	3/21/2024	Pending		Email FAA

FAA IFP Gateway SFO IFP Production Plan 23AUG23

GLS Rwy 10L approach is designed with a 3.00° final approach course offset (north of the runway centerline) to achieve the lowest precision approach minimums

FAA/NATCA and Airlines, have decided to align RNAV (GPS) Rwy 10L approach to match the offset GLS approaches

GLS Rwy 10R, RNAV (GPS) Y Rwy 10R and RNAV (RNP) Z Rwy 10R are being postponed to a later date

Group 1 Innovative GLS Procedures Rwys 28L/28R

Group 1 GLS Updates in the IFP Gateway: 21MAR24

GLS T RWY 28R, ORIG	SAN FRANCISCO INTL	SFO (KSFO)	SAN FRANCISCO, CA	3/21/2024	Pending		Email FAA
GLS W RWY 28R, ORIG	SAN FRANCISCO INTL	SFO (KSFO)	SAN FRANCISCO, CA	3/21/2024	Pending		Email FAA
GLS X RWY 28R, ORIG	SAN FRANCISCO INTL	SFO (KSFO)	SAN FRANCISCO, CA	3/21/2024	Pending		Email FAA
GLS Y RWY 28L, ORIG	SAN FRANCISCO INTL	SFO (KSFO)	SAN FRANCISCO, CA	3/21/2024	Pending		Email FAA
GLS Y RWY 28R, ORIG	SAN FRANCISCO INTL	SFO (KSFO)	SAN FRANCISCO, CA	3/21/2024	Pending		Email FAA
GLS Z RWY 28L, ORIG	SAN FRANCISCO INTL	SFO (KSFO)	SAN FRANCISCO, CA	3/21/2024	Pending		Email FAA
GLS Z RWY 28R, ORIG	SAN FRANCISCO INTL	SFO (KSFO)	SAN FRANCISCO, CA	3/21/2024	Pending		Email FAA

← GLS-BVE Rwy 28R

← GLS-DB Rwy 28R

← GLS-BV Rwy 28R

← GLS-TT Rwy 28L

← GLS-TT Rwy 28R

← GLS Rwy 28L*

← GLS Rwy 28R*

*GLS Z Rwy 28L/28R procedures are identical to existing GLS Rwy 28L/28R. When a runway has multiple approach procedures of a common navigation method, an alphabetical character is used to help differentiate them (e.g. RNAV(GPS) X RWY 28R, RNAV(RNP) Y RWY 28R, RNAV(GPS) Z RWY 28R)

FAA IFP Gateway SFO IFP Production Plan 23AUG23

Group 1 Innovative GLS Procedures Rwys 28L/28R

Group 1 GLS Updates in the IFP Gateway: 26DEC24

GLS U RWY 28R, ORIG	SAN FRANCISCO INTL	SFO (KSFO)	SAN FRANCISCO, CA	12/26/2024	Pending		Email FAA
RNAV (RNP) Y RWY 28R, AMDT 6	SAN FRANCISCO INTL	SFO (KSFO)	SAN FRANCISCO, CA	12/26/2024	Pending		Email FAA

← GLS-R Rwy 28R

Additional criteria/FAA software changes (TARGETs) are required to accommodate the proposed GLS U (formerly GLS R concept)

Procedure publication has slipped to 26DEC24 and will involve small modification to the RNAV (RNP) Y Rwy 28R to ensure that common waypoints (lateral) are used

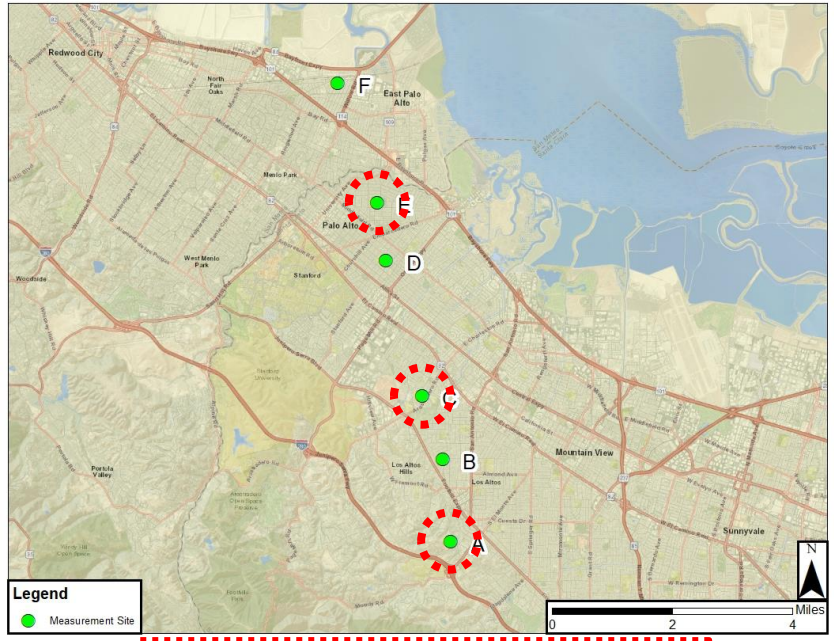
FAA IFP Gateway SFO IFP Production Plan 23AUG23

Group 1 Monitoring Following FAA Implementation (MAR24)

SFO is currently evaluating quarterly monitoring and reporting practices to be implemented upon FAA publication of Group 1 Innovative Approaches

Key Considerations:

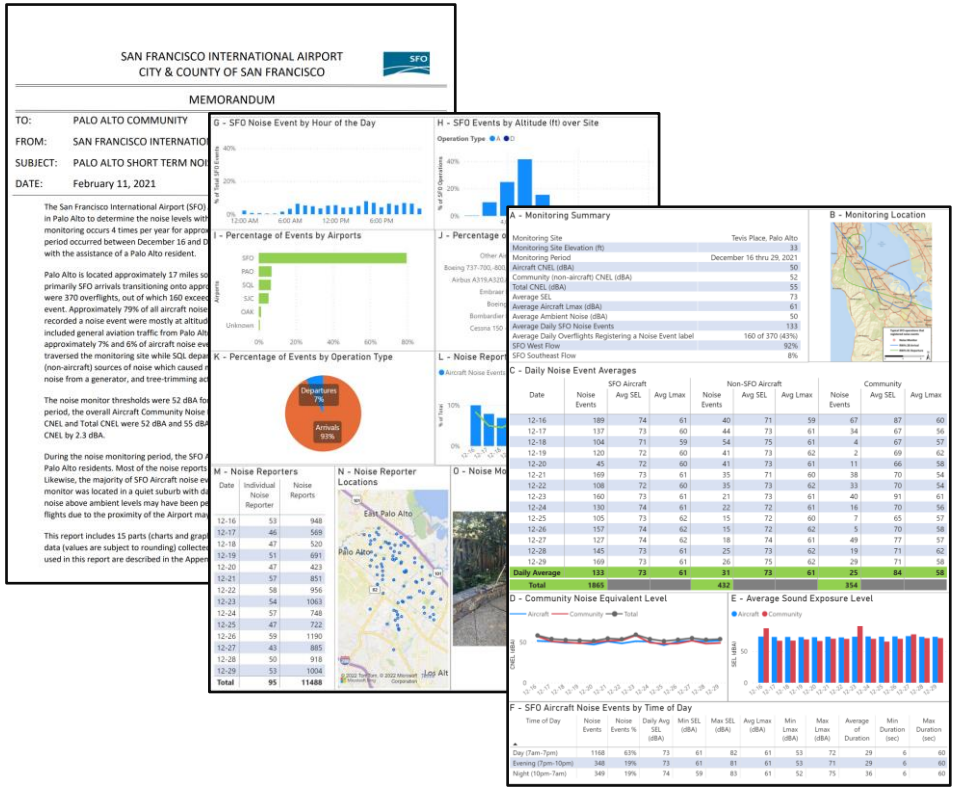
- 3 temporary noise monitoring locations (A, C, E) , supplemented by permanent monitor site 12 data (Foster City)
- SFO GBAS Project team is working with FAA on how SFO will be informed about GBAS usage and specific GLS procedure utilization
- SFO will actively investigate GLS approaches that do not perform as expected
- SFO's noise reduction goal is for Group 1 GLS approaches to maintain average noise levels at each noise monitor that are lower than non-GLS approaches
- Similar to the GBAS Noise Measurement Report, the GLS Noise Monitoring Report will include Lmax and SEL noise levels, altitude, speed of GLS approaches and comparable non-GLS approaches and describe whether the GLS approaches are meeting the Airport's expectations



Areas considered for Temporary noise monitors

Reporting on Innovative Group 1 GLS Approaches

Roundtable Portable Monitoring


SAN FRANCISCO INTERNATIONAL AIRPORT
CITY & COUNTY OF SAN FRANCISCO

MEMORANDUM

TO: PALO ALTO COMMUNITY

FROM: SAN FRANCISCO INTERNATIO

SUBJECT: PALO ALTO SHORT TERM NOI

DATE: February 11, 2021

The San Francisco International Airport (SFO)
in Palo Alto to determine the noise levels wit
monitoring occurs 4 times per year for approx
period occurred between December 16 and D
with the assistance of a Palo Alto resident.

Palo Alto is located approximately 17 miles so
primarily SFO arrivals transitioning onto appr
were 370 overflights, out of which 160 exceed
event. Approximately 79% of all aircraft noise
recorded a noise event were mostly at altitud
included general aviation traffic from Palo Alt
approximately 7% and 6% of aircraft noise ex
traversed the monitoring site while SQL depar
(non-aircraft) sources of noise which caused r
noise from a generator, and tree-trimming ac

The noise monitor thresholds were 52 dBA fo
period, the overall Aircraft Community Noise
CNEL and Total CNEL were 52 dBA and 55 dB
CNEL by 2.3 dBA.

During the noise monitoring period, the SFO A
Palo Alto residents. Most of the noise reports
Likewise, the majority of SFO Aircraft noise ev
monitor was located in a quiet suburb with du
noise above ambient levels may have been pe
flights due to the proximity of the Airport ma

This report includes 15 parts (charts and graph
data (values are subject to rounding) collecte
used in this report are described in the Appen

G - SFO Noise Event by Hour of the Day

H - SFO Events by Altitude (ft) over Site

I - Percentage of Events by Airports

J - Percentage

K - Percentage of Events by Operation Type

L - Noise Report

M - Noise Reporters

N - Noise Reporter Locations

O - Noise Mo

A - Monitoring Summary

Monitoring Site	Tevis Place, Palo Alto
Monitoring Site Elevation (ft)	33
Monitoring Period	December 16 thru 29, 2021
Aircraft CNEL (dBA)	50
Community (non-aircraft) CNEL (dBA)	52
Total CNEL (dBA)	55
Average SEL	73
Average Aircraft Lmax (dBA)	61
Average Ambient Noise (dBA)	50
Average Daily SFO Noise Events	133
Average Daily Overflights Registering a Noise Event label	160 of 370 (43%)
SFO West Flow	92%
SFO Southeast Flow	8%

B - Monitoring Location

C - Daily Noise Event Averages

Date	SFO Aircraft Noise Events	SFO Aircraft Avg SEL	SFO Aircraft Avg Lmax	Non-SFO Aircraft Noise Events	Non-SFO Aircraft Avg SEL	Non-SFO Aircraft Avg Lmax	Community Noise Events	Community Avg SEL	Community Avg Lmax
12-16	189	74	61	40	71	59	67	87	60
12-17	137	73	60	44	73	61	34	67	56
12-18	104	71	59	54	75	61	4	67	57
12-19	120	72	60	41	73	62	2	69	62
12-20	45	72	60	41	73	61	11	66	58
12-21	169	73	61	35	71	60	38	70	54
12-22	108	72	60	35	73	62	33	70	54
12-23	160	73	61	21	73	61	40	91	61
12-24	130	74	61	22	72	61	16	70	56
12-25	105	73	62	15	72	60	7	65	57
12-26	157	74	62	15	72	62	5	70	58
12-27	127	74	62	18	74	61	49	77	57
12-28	145	73	61	25	73	62	19	71	62
12-29	169	73	61	26	75	62	29	71	58
Daily Average	133	73	61	31	73	61	25	84	58
Total	1865			432			354		

D - Community Noise Equivalent Level

E - Average Sound Exposure Level

F - SFO Aircraft Noise Events by Time of Day

Time of Day	Noise Events	Noise Events %	Daily Avg SEL (dBA)	Min SEL (dBA)	Max SEL (dBA)	Avg Lmax (dBA)	Min Lmax (dBA)	Max Lmax (dBA)	Average of Duration	Min Duration (sec)	Max Duration (sec)
Day (7am-7pm)	1168	63%	73	61	82	61	53	72	29	6	60
Evening (7pm-10pm)	348	19%	73	61	81	61	53	71	29	6	60
Night (10pm-7am)	349	19%	74	59	83	61	52	75	36	6	60

GBAS Noise Measurement Report


GBAS Noise Measurement Report

Group 1 Innovative Approach Procedures

March 2022

PREPARED BY
San Francisco International Airport

H – Noise Levels of the Most Frequent Aircraft

Site A Aircraft / Events	Site A Avg SEL (dB)	Site A Avg Lmax (dB)	Site A Duration (s)	Site B Aircraft / Events	Site B Avg SEL (dB)	Site B Avg Lmax (dB)	Site B Duration (s)	Site C Aircraft / Events	Site C Avg SEL (dB)	Site C Avg Lmax (dB)	Site C Duration (s)
E75L / 266	67	54	37	E75L / 317	66	53	40	E75L / 341	67	53	40
A320 / 219	69	56	40	A320 / 244	69	56	38	A320 / 270	70	57	39
B738 / 158	70	57	41	CRJ2 / 182	64	50	40	B738 / 224	70	56	40

I – Noise Levels of Loudest SFO Aircraft Arrival Events*

Site A Aircraft / Date / Time	Site A SEL (dB)	Site A Lmax (dB)	Site A Duration (s)	Site B Aircraft / Date / Time	Site B SEL (dB)	Site B Lmax (dB)	Site B Duration (s)	Site C Aircraft / Date / Time	Site C SEL (dB)	Site C Lmax (dB)	Site C Duration (s)
B748 / 12/16/2021 0:39	82	74	59	B748 / 12/16/2021 0:39	83	74	69	B748 / 12/16/2021 0:39	84	76	59
B748 / 12/7/2021 0:38	82	70	62	B748 / 12/7/2021 0:38	82	70	66	B748 / 12/12/2021 0:13	83	73	58
B748 / 12/12/2021 0:13	81	71	38	B748 / 12/12/2021 0:13	82	72	56	B744 / 12/8/2021 0:38	82	72	52

*Noise events in **BOLD** were made up of simultaneous aircraft noise and community noise.

J – Comparison of Existing and GLS Approach Procedures (Boeing 737

Approach Type	Number of Arrivals	Site A Avg SEL / Lmax (dB)	Site A Avg Altitude (ft)	Site A Avg Speed (kts)	Site B Avg SEL / Lmax (dB)	Site B Avg Altitude (ft)	Site B Avg Speed (kts)	Site C Avg SEL / Lmax (dB)	Site C Avg Altitude (ft)	Site C (kts)	Site C Lmax (dB)	Site C (ft)	Site C (kts)	Site C Lmax (dB)	Site C (ft)	Site C (kts)
Non-GLS Approaches	5	71/58	6,206	236	72/59	5,957	236	72/60	5,656	236	75/64	5,062	219	75/63	4,827	214
Test RNAV Approaches	4	68/56	5,900	252	68/55	5,799	253	68/55	5,505	254	71/59	4,912	251	71/59	4,673	245
Test GLS Approaches	3	66/54	5,883	252	67/54	5,833	251	67/54	5,625	253	72/57	5,199	238	72/57	5,010	232

Appendix A

Test Approach Noise Events

Site	Date/Time	Procedure	SEL (dB)	Lmax (dB)	Duration (s)
A	12/2/2021 18:40	RNAV (GPS) RWY 28L	68.4	55	51
A	12/2/2021 18:57	GLS-A RWY 28L	65.4	52.7	37
A	12/2/2021 19:19	RNAV (GPS) Z RWY 28R	65	53.1	32
A	12/2/2021 19:38	GLS-A RWY 28R	65.8	52.9	57
A	12/16/2021 6:35	RNAV (RNP) Y RWY 28R	69.4	57.7	36
A	12/16/2021 6:53	RNAV (GPS) RWY 28L	69.3	58.7	31
A	12/16/2021 7:10	GLS-R RWY 28R	66.7	55.5	30
A	12/16/2021 7:28	GLS-A RWY 28L	67.6	55.9	41
B	12/2/2021 18:40	RNAV (GPS) RWY 28L	65.4	52	57
B	12/2/2021 18:57	GLS-A RWY 28L	65.4	51.3	56
B	12/2/2021 19:19	RNAV (GPS) Z RWY 28R	64.1	50.9	35
B	12/2/2021 19:39	GLS-A RWY 28R	64.9	51.6	57
B	12/16/2021 6:35	RNAV (RNP) Y RWY 28R	69.5	58.5	36
B	12/16/2021 6:54	RNAV (GPS) RWY 28L	69.3	57.7	32
B	12/16/2021 7:10	GLS-R RWY 28R	69.9	57.7	42
B	12/16/2021 7:28	GLS-A RWY 28L	68.4	55.5	53
C	12/2/2021 18:40	RNAV (GPS) RWY 28L	64.7	52.6	44
C	12/2/2021 18:57	GLS-A RWY 28L	64.3	51.1	61
C	12/2/2021 19:19	RNAV (GPS) Z RWY 28R	64.9	51.8	49
C	12/2/2021 19:39	GLS-A RWY 28R	64.2	51.5	48
C	12/16/2021 6:35	RNAV (RNP) Y RWY 28R	68.2	57.5	26
C	12/16/2021 6:54	RNAV (GPS) RWY 28L	70.1	58.4	33
C	12/16/2021 7:10	GLS-R RWY 28R	70.4	59.3	34
C	12/16/2021 7:28	GLS-A RWY 28L	68.8	57.6	35
D	12/2/2021 18:41	RNAV (GPS) RWY 28L	68.6	58.3	33
D	12/2/2021 18:57	GLS-A RWY 28L	65.3	52.2	45
D	12/2/2021 19:19	RNAV (GPS) Z RWY 28R	70.1	57.2	46
D	12/2/2021 19:39	GLS-A RWY 28R	65.2	52.7	45
D	12/16/2021 6:36	RNAV (RNP) Y RWY 28R	70.5	59.5	32
D	12/16/2021 6:54	RNAV (GPS) RWY 28L	72.1	60.7	32
D	12/16/2021 7:11	GLS-R RWY 28R	75.8	65.2	35
D	12/16/2021 7:29	GLS-A RWY 28L	70.1	56.1	54
E	12/2/2021 18:41	RNAV (GPS) RWY 28L	66.4	55.5	29
E	12/2/2021 18:58	GLS-A RWY 28L	65.1	53	26
E	12/2/2021 19:20	RNAV (GPS) Z RWY 28R	72.8	63.6	34
E	12/2/2021 19:40	GLS-A RWY 28R	64.5	53.1	26
E	12/16/2021 6:36	RNAV (RNP) Y RWY 28R	70.5	58.1	31

GBAS Noise Monitoring Report

Additional Noise Information

Flight performance and comparison to procedures

- Flight track maps
- Altitude and speed at various points along the flight path

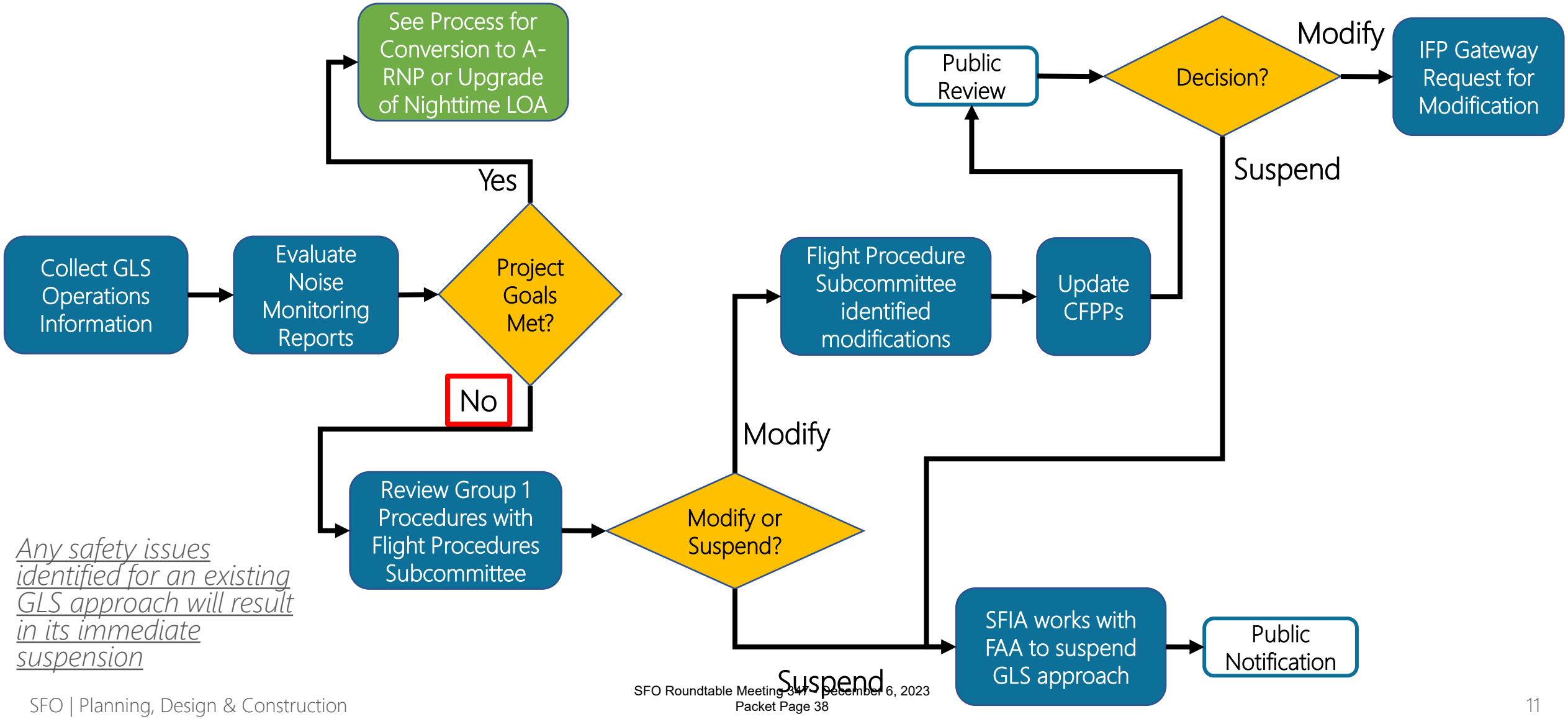
Noise metrics

- Average and individual Sound Exposure Level (SEL), Maximum Sound Level (Lmax) to compare procedures
- Aircraft and community Community Noise Equivalent Level (CNEL), Average Ambient Noise Level, Number of Events Above (NA)
- Percentage of events by Aircraft Types, Operation Types, noise complaints/reports

Include all single GLS arrival events at noise monitors

Compliance with Project Goals and status of consideration for conversion to A-RNP

Process for Reviewing Non-Performing GLS Procedures



Any safety issues identified for an existing GLS approach will result in its immediate suspension

Group 2A Innovative GLS Approaches

Group 2A Concepts

SFIA GBAS Flight Procedures Subcommittee has developed the following Group 2A GLS concept approaches for public evaluation

1. GLS CAT II Rwy 28R** – Addition of CAT II minimums to current GLS overlay approach on Rwy 28R
2. GLS CAT II Rwy 19L – Addition of CAT II minimums to current GLS overlay approach on Rwy 19L
3. GLS SB Rwy 19L - New approach to Rwy 19L which overlays vector path used heavily by NCT during Southeast Flow
4. GLS DB1 Rwy 28R – SFO Roundtable suggested procedure
5. GLS OW1 Rwy 28R – SFO Roundtable suggested procedure
6. GLS OW2 Rwy 28R – SFO Roundtable suggested procedure

Pick Either 5. or 6.

**GLS CAT II Rwy 28R CFPPs divided into ARCHI and EDDYY transition

SFO GBAS Website

https://noise.flysfo.com/noise-efforts/ground-based-augmentation/innovative-approach-procedures/

3. GLS SB Rwy 19L

GLS SB Rwy 19L

Provide a precision instrument approach procedure to replicate a vector track used by NCT during visual simultaneous approach operations in Southeast Flow

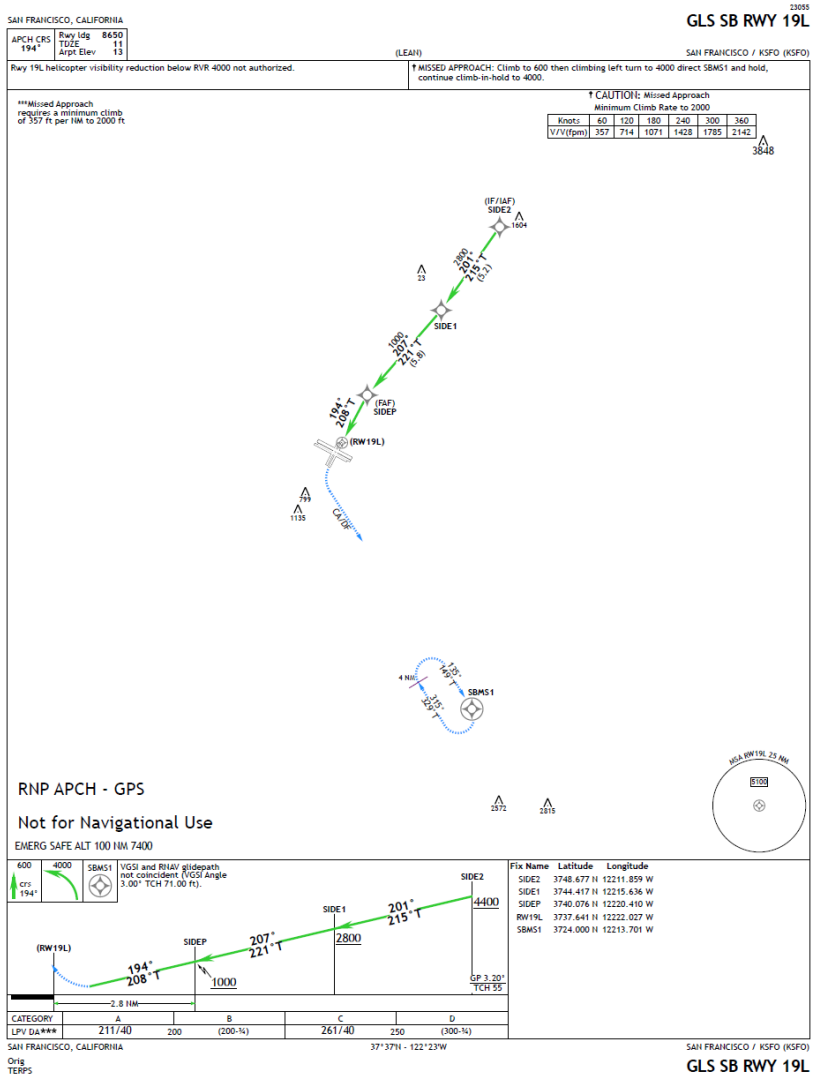
Procedure would only be used during Southeast Flow and VMC

- This will not be a part of the 7110.308 CSPR operations
- Approach will originate via vectors from COGGR (ALWYS STAR)

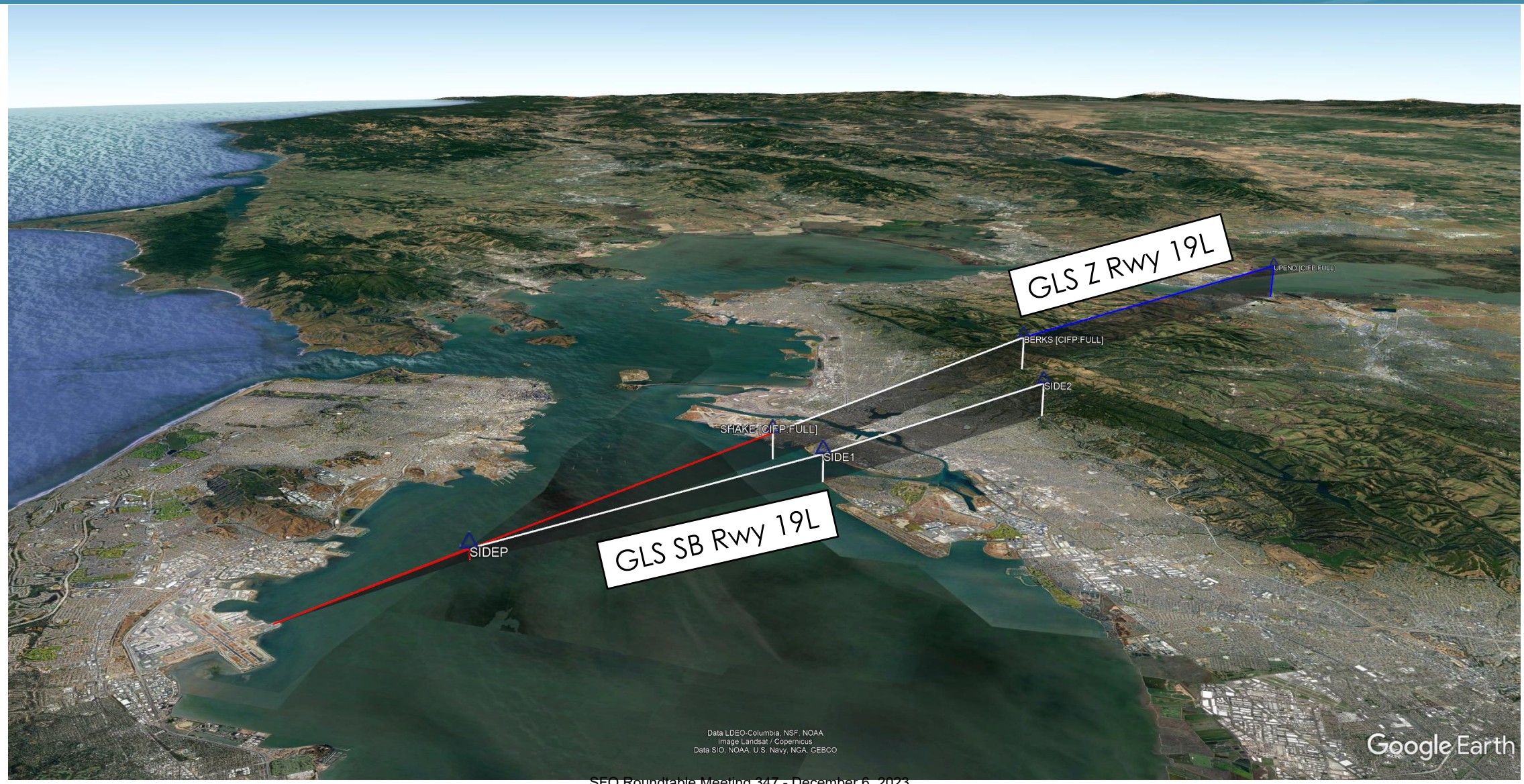
Altitudes were designed to

- Separate aircraft landing at OAK on runway 12
- Minimize noise for East Bay residents

SFIA GBAS Project Team plans to review this approach with the OAK Noise Forum



3. GLS SB Rwy 19L Comparison with GLS Z Rwy 19L



4. GLS DB1 Rwy 28R

GLS DB1 Rwy 28R

SFO Roundtable suggested procedure that provides an additional “Down the Bay” track with more aggressive residential avoidance

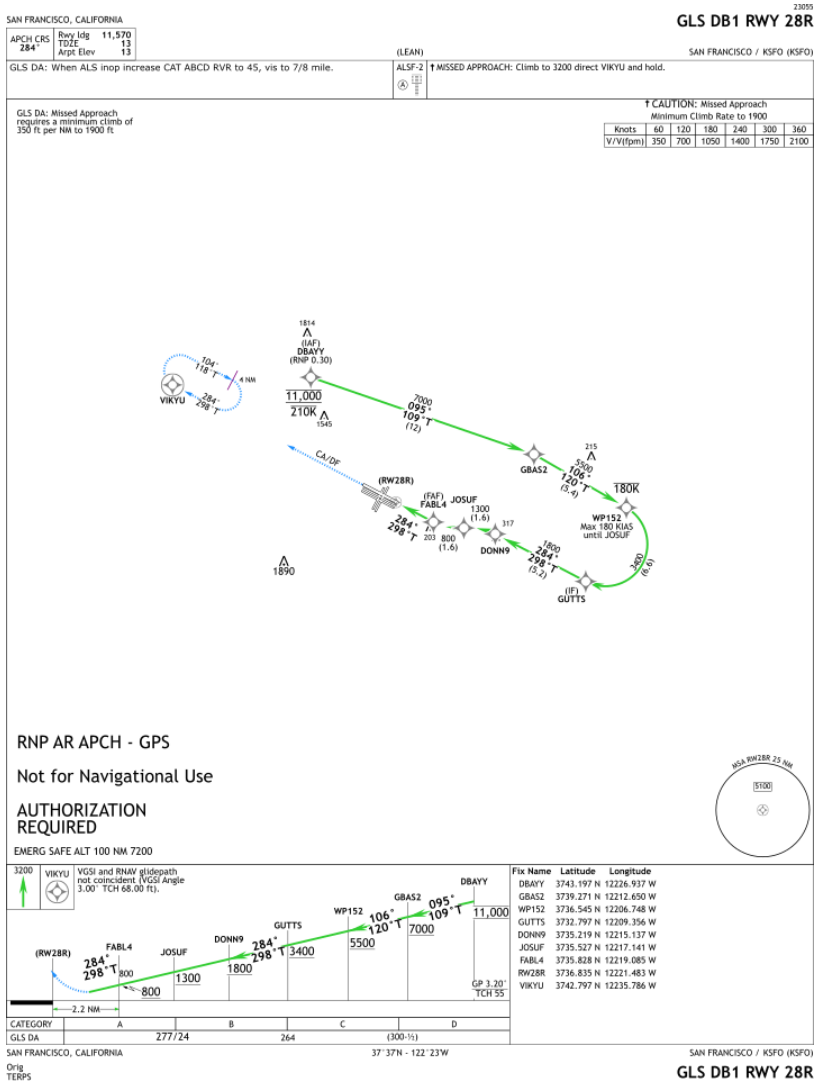
Procedure is intended be used by NCT 24/7/365 up to CAT I conditions

Altitudes and speed restrictions were designed to

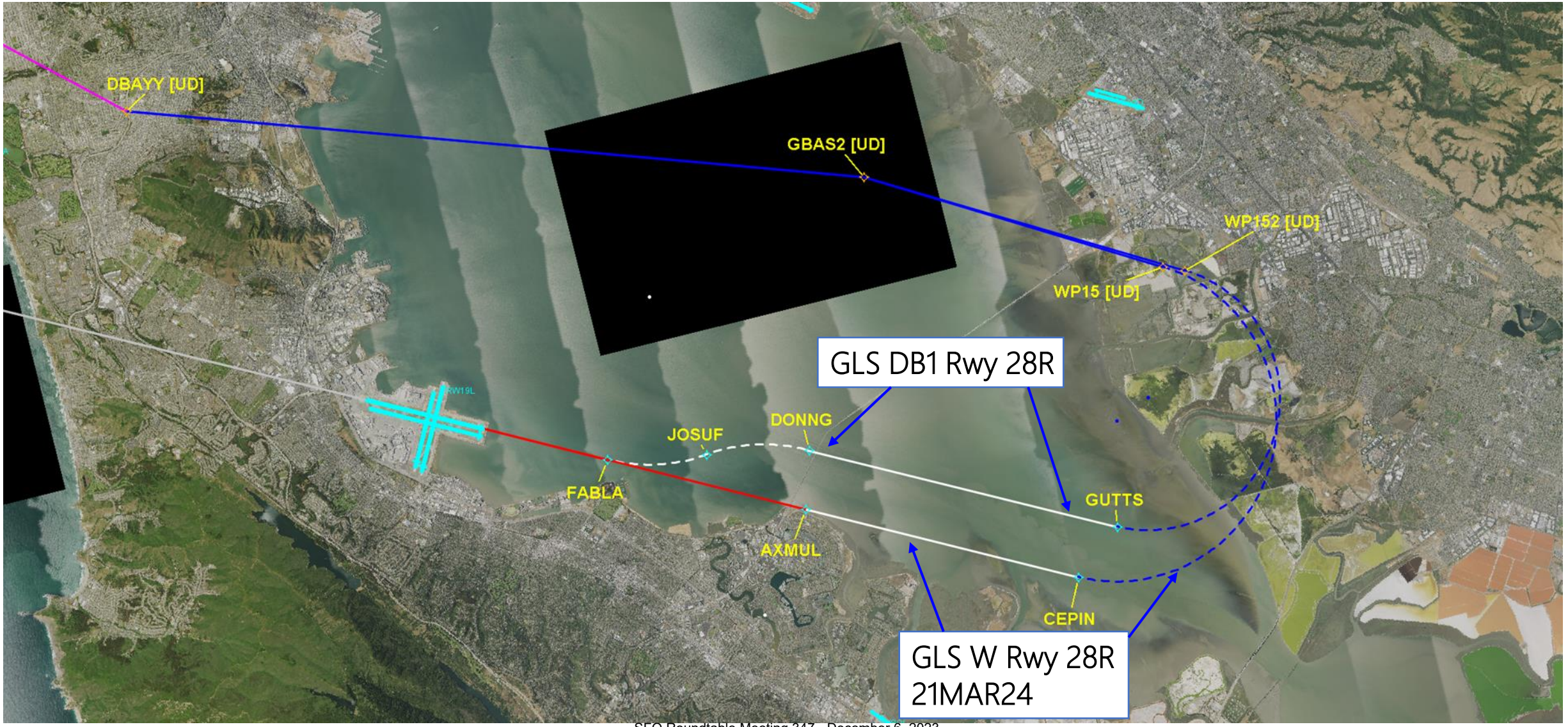
- Mimic the same GLS-W (Down the Bay) path
- Connect to the current RNP-Y / GLS U Rwy 28R approach
- 180 KIAS Restriction intended to reduce the required bank to 20 Degrees

SFIA GBAS Project Team plans to review this approach with the OAK Noise Forum

This would not be a replacement of the GLS-DB Rwy 28R



GLS DB1 Rwy 28R vs GLS W Rwy 28R



5. GLS OW1 Rwy 28R

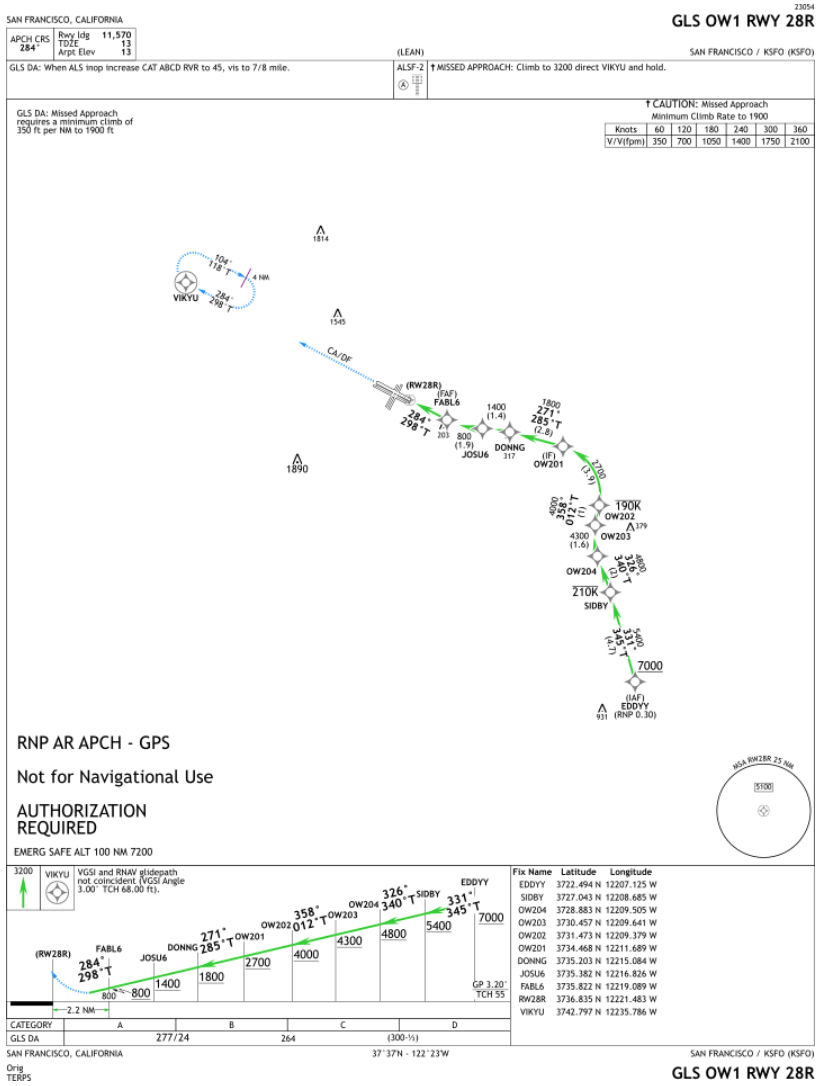
GLS OW1 Rwy 28R

SFO Roundtable suggested procedure that creates possibility for noise reduction by increasing over water usage for flights originating from EDDYY

Procedure is intended be used by NCT only at nighttime up to CAT I conditions (22:00 – 07:00 L)

Altitudes and speed restrictions were designed to

- Avoid creating any “new” ground tracks over residential areas
- Avoid turning until crossing Highway 84
- Increase overwater usage
- Maximize altitude at EDDYY
- Speed Restrictions required to achieve turns



6. GLS OW2 Rwy 28R

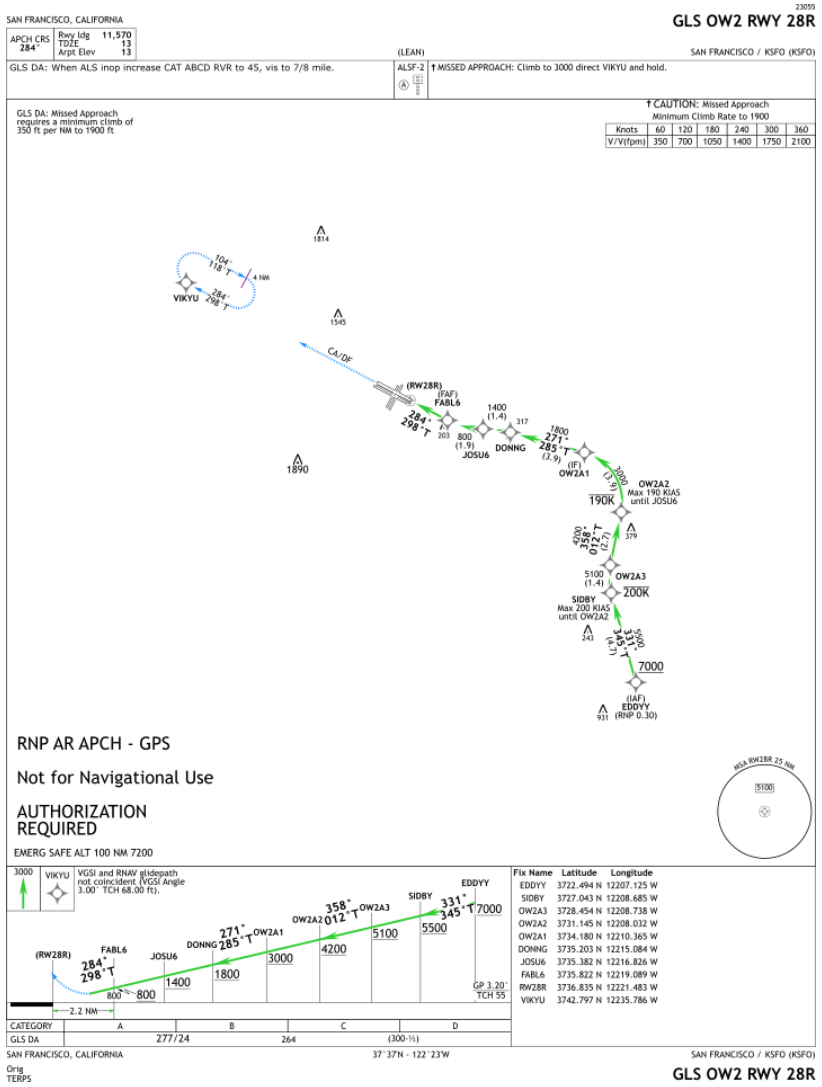
GLS OW2 Rwy 28R

SFO Roundtable suggested procedure that creates possibility for noise reduction by increasing over water usage for flights originating from EDDYY

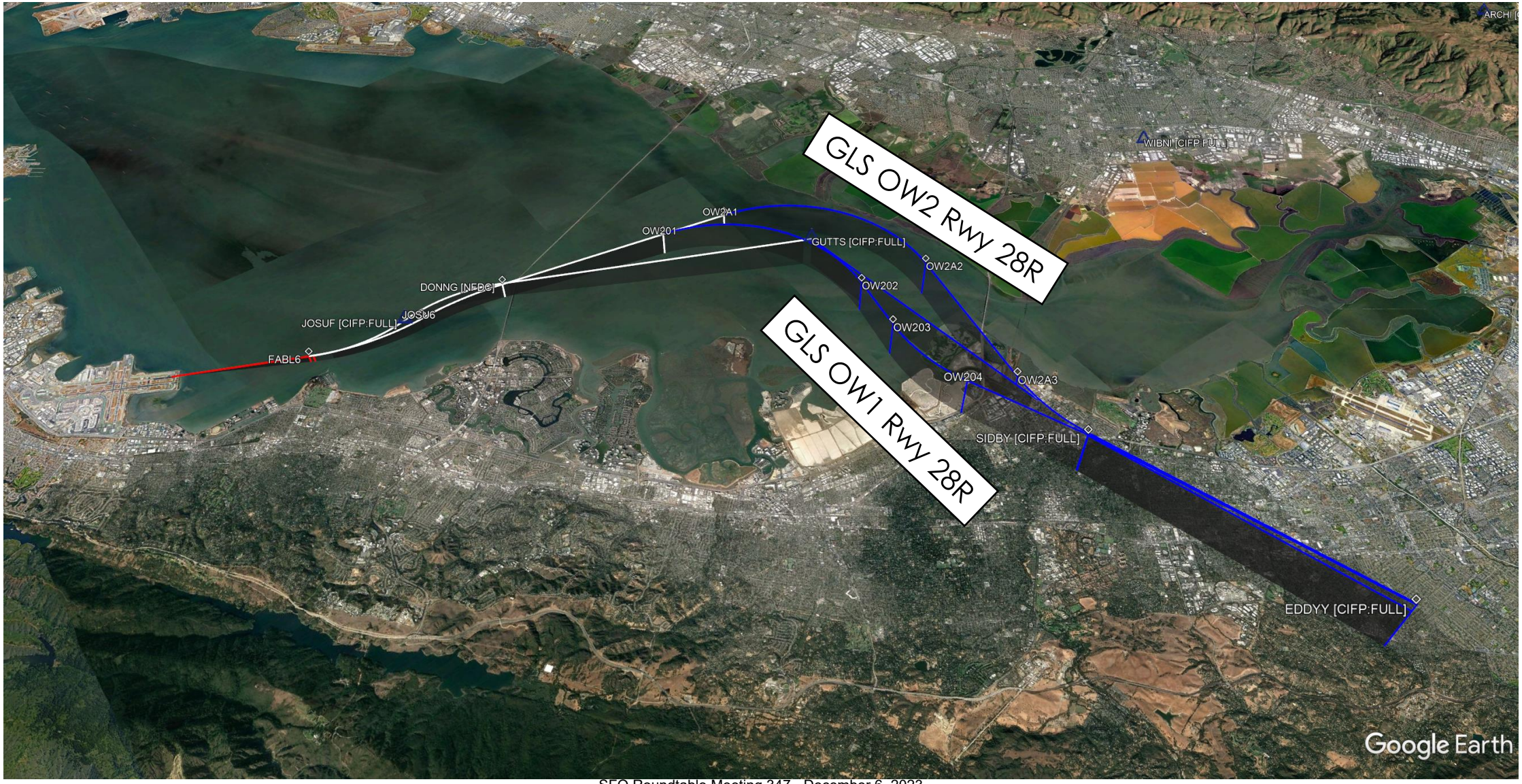
Procedure is intended be used by NCT only at nighttime up to CAT I conditions (22:00 – 07:00 L)

Altitudes and speed restrictions were designed to

- Avoid creating any “new” ground tracks over residential areas
- Turn aircraft parallel to Dumbarton Bridge
- Increase overwater usage
- Maximize altitude at EDDYY
- Speed Restrictions required to achieve turns



GLS OW1, OW2 and R Rwy 28R Comparison



GLS OW1 and GLS OW2 Rwy 28R

Both GLS OW1 and OW2 Rwy 28R

Have higher altitudes over residential areas when compared to existing approaches

Have lower initial approach speeds which are less likely to require the use of speed brakes or early flap deployment

Turn aircraft over the Bay before configuring for landing (landing gear and landing flap deployment)

Small Differences

AEDT calculated noise reduction suggests that both procedures may reduce noise, but GLS OW2 has more potential to reduce noise over residential areas when compared to GLS OW1

GLS OW1 is very similar to GLS-U Rwy 28R while GLS OW2 approximates the maximum practical over the Bay path for approaches starting at EDDYY

We are seeking feedback from the SFO Roundtable on which of these procedures to take forward: Either GLS OW1 *or* GLS OW2

Next Steps

GBAS Project Team is seeking approval from SFO Roundtable and members of the public on which Group 2A CFPPs to submit to the FAA by 28DEC2023

Similar to Group 1 procedures, Group 2A procedures will be monitored for noise and evaluated for increased utilization opportunities either during additional times of day or two other runways if possible

As a reminder, either the GLS-OW1 or GLS-OW2 may be requested for FAA development, but not both procedures

Questions?

SFO

SFO.GBAS@flysfo.com

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MEMORANDUM

To:	SFO Community Roundtable Technical Working Group
From:	Jason R. Stoddard, Senior Airspace Analyst Sarah C. Yenson, Principal Consultant Eugene M. Reindel, Vice President
Date:	November 9, 2023
Subject:	Review of SFO GLS Group 2A Innovative Approach Procedures
Reference:	HMMH Project Number 312310

HMMH reviewed the following seven draft GLS Innovative Approach Procedures for San Francisco International Airport (SFO) as per the request received on October 13, 2023.

- Group 2A
  - GLS-CAT II 28R | ARCHI
  - GLS-CAT II 28R | EDDYY
  - GLS-CAT II 28R | UPEND
  - GLS-SB 19L | COGGR
  - GLS-DB1 28R | DBAYY
  - GLS-OW1 28R | EDDYY
  - GLS-OW2 28R | EDDYY

The intent of our review was to analyze the overall net noise impact of the procedures when compared to either previously developed GLS procedures, existing procedures currently in use (ILS), or known ATC vectoring paths. For this analysis, HMMH reviewed the GBAS Innovative Approach Procedures documentation provided on SFO's noise website (https://noise.flysfo.com/noise-efforts/ground-based-augmentation/innovative-approach-procedures/), as well as existing aviation sectional charts, terminal procedure publications (TPPs) and satellite imagery for reference.

HMMH did not perform a rigorous technical analysis for these draft procedures, nor did we review aircraft performance characteristics. Our review focused on the possible change in single-even noise levels (SEL) from aircraft on the proposed procedures when compared with previously developed GLS procedures, existing procedures or known ATC vectors. As a rule of thumb, single-event noise levels that change by less than 1 dB are not perceptible, single-event noise levels that change between 1 and 3db are barely noticeable, changes between 3 and 5 dB are generally noticeable, and changes of greater than 5db are quite noticeable and can be perceived as twice as loud or half as loud. HMMH accepts any change of less than 1 dB as being no perceptible change. A shifting of noise may occur when a flight path is moved laterally, so our review included an assessment of the effect of lateral shifts in the proposed procedures when comparing to existing or previously developed procedures.

Group 2A: GLS-CAT II 28R| ARCHII, EDDYY, UPEND transitions

The GLS-CAT II 28R procedures from ARCHII, EDDYY and UPEND have all been selected to include Category II approaches in addition to the standard Category I. CAT II approaches follow all the same altitudes and flight path as CAT I approaches, however the decision height (DH) can be reduced to less than 200ft (60m) but not lower than 100ft (30m). CAT II approaches also reduce the runway visual range (RVR) required to less than 2400ft (800m) but not less than 1200ft (350m). Aircraft flying a CAT II

approach as opposed to the CAT I version of the approach should exhibit no perceptible change to anyone outside the cockpit. HMMH supports the continued development of the GLS-CAT II 28R approaches as they provide additional flexibility to ATC and pilots, while being transparent from a noise perspective for surrounding communities.

Group 2A: GLS-SB 19L | COGGR

The GLS-SB RWY 19L procedure is an overlay of an existing ATC Vector arrival frequently used during southeast flow operations which flies over the East Bay communities. This procedure is not aimed at noise reduction, but does hope to achieve ILS redundancy, increased efficiency and reduced delays which may impact the broader noise environment in a positive way.

As the GLS-SB 19L is based on existing ATC vectors, we did not have noise data to compare the approach to for accurate SEL changes. The path of the GLS-SB 19L approach is shifted slightly from the predominant path used by ATC between WP SIDE2 and WP SIDE1, which is located over East Bay communities. This may cause a slight shift in the SEL contours for some residents in the East Bay and the overall change should be minimal. HMMH supports the continued development of the GLS-SB 19L | COGGR approach and suggests further analysis into the effects on East Bay residents.

Group 2A: GLS-DB1 28R | DBAYY

The GLS-DB1 RWY 28R procedure is an alternative to the GLS-DB RWY 28R procedure proposed in Group 1 of the GBAS IA's, which flies over the northern peninsula and southern East Bay communities. This procedure aims to achieve noise reduction, increase usage of over water procedures, ILS redundancy, increase efficiency and reduction of delays.

This approach uses a very similar flight path until the 180 degree turn back toward RWY 28R. After the turn, the GLS-DB1 28R maintains a ground track over water, as opposed to the previous GLS-DB approach which is not entirely over water. Throughout Narrowbody 1&2 type aircraft as well as Widebody 1&2 type aircraft, reduction in overall SEL contours was seen over land, thus positively impacting the communities of San Carlos, Foster City, Hayward park and surrounding areas. HMMH supports the continued development of the GLS-DB1 28R | DBAYY due to the positive shift of the SEL contours when compared to the original GLS-DB 28R approach.

Group 2A: GLS-OW1 28R | EDDYY

GLS-OW1 RWY 28R procedure is an alternative to the GLS-U RWY 28R procedure (also known as GLS-R RWY 28R) proposed in Group 1 of the GBAS IA's, which flies over South Bay communities. If requested for development, this noise abatement procedure will only be available between 22:00 – 07:00 local time.

This procedure was compared to the GLS-U RWY 28R as well as the ILS or LOC RWY 28R. The proposed GLS-OW1 procedure is both higher and slower than the approaches it was compared to. This was done with the intention of reducing overall noise impacts, but the slower speed may have a negative impact on SEL calculations. SEL uses both magnitude and duration in its calculation, and due to the longer duration caused by slower speeds some communities may experience an increase in SEL levels. While most of these increases are in the imperceptible to slightly perceptible range, they are all seen with the comparison to the GLS-U RWY 28R. When comparing the GLS-OW1 to the existing ILS or LOC RWY 28R, the effect is almost entirely positive, with only a few communities experiencing a negative change around the 50dB SEL contour.

Group 2A: GLS-OW2 28R | EDDYY

The GLS-OW2 RWY 28R procedure is an alternative to the GLS-U RWY 28R procedure (also known as GLS-R RWY 28R) proposed in Group 1 of the GBAS IA's, which flies over South Bay communities. If requested for development, this noise abatement procedure will only be available between 22:00 – 07:00 local time.

The GLS-OW2 RWY 28R procedure is very similar to its OW1 counterpart but maintains a slightly higher altitude and slightly slower speed than the OW1 approach. It also includes a wider turn towards the runway, moving the ground track further into the bay.

When compared to the GLS-U RWY 28R, the OW2 performs well and shows mostly positive changes for communities south of SFO. These positive changes diminish slightly as the approach is performed by a widebody type aircraft as opposed to a narrowbody aircraft. Widebody aircraft performing this procedure may impact the lower SEL contours and push them further into East Bay communities.

In comparison to the ILS or LOC RWY 28R approach, the GLS-OW2 shows significant positive change for residents surrounding the airport. If the procedure is performed by a widebody 2 type aircraft, there is potential for increased SEL events for some East Bay communities.

Group 2A: GLS-OW1 vs. GLS-OW2

Both the GLS-OW1 and GLS-OW2 approaches to RWY 28R have been proposed as nighttime only procedures. Additionally, only one of the two approaches can be recommended for further development. While both approaches share similar noise profiles and initial utility, the GLS-OW2 RWY 28R approach may provide additional utility in a Multiple Airport Route Separation (MARS) and Time-Based Flow Management (TBFM) as it is a slightly slower approach and takes a more indirect path to the runway. This would allow ATC to accomplish safe separation based on approach assignment, rather than traditional means, such as vectoring and altitude adjustments. Considering this possibility, we believe the GLS-OW2 approach to be the best candidate for further development.

Summary

HMMH concurs with the assessments regarding the single-event noise levels associated with the analyses for the applicable GBAS procedures in this document. The documentation for these procedures does not capture the expected change in usage from the existing procedures to the proposed GBAS procedures. If the expected usage of the procedure goes up as a result of GBAS implementation, the cumulative exposure may increase. We do not believe this is an expectation on any of the procedures we evaluated.

HMMH suggests further analysis and discussion regarding the potential impact implementation of these procedures may have on some East Bay communities. All other aspects of the proposed group 2A procedures appear to have been well developed and show promise for noise reduction, increased efficiency and delay reduction.

Review of Proposed GLS Group 2A Innovative Approach Procedures at SFO

November 15, 2023

Background

- Per request of SFO Roundtable, HMMH reviewed seven (7) proposed GLS Innovative Approach Procedures at SFO
  - Group 2A:
    - GLS CAT II 28R|ARCHI
    - GLS CAT II 28R|EDDYY
    - GLS CAT II 19L|UPEND
    - GLS-SB 19L|COGGR
    - GLS-DB1 28R|DBAYY
    - GLS-OW1 28R|EDDYY
    - GLS-OW2 28R|EDDYY
- Purpose of review
  - Affirm the Airport's assertions regarding changes to noise
  - Advise Roundtable on procedure acceptance

Review Methodology

- Conducted a basic review using
  - GBAS Innovative Approach Procedure documentation from Airport website
  - Satellite imagery and estimated population centers
  - Aviation sectional charts and instrument procedure charts
  - Additional documentation from Airport including comparisons to previously developed GLS procedures, existing ILS procedures and historical ATC vectoring paths.
- Noise may shift when flight paths move laterally, so this review included assessments of lateral shifts as proposed in the procedures.
- We did not conduct a rigorous technical review nor an analysis of aircraft performance characteristics or procedures.
- This review focused on the possible change in single-event noise levels from aircraft on the proposed procedures as compared to the existing procedures or previously developed GLS procedures.

Generally, changes to single-event noise levels are perceptible to the ear as follows:

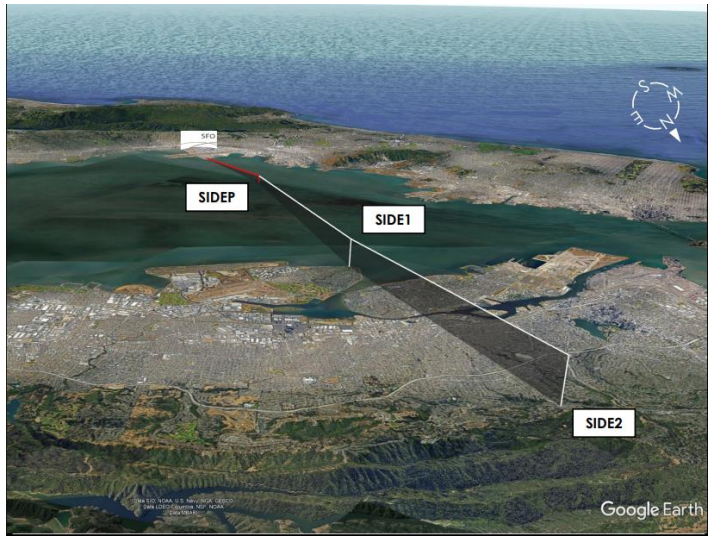
- < 1 dB: not perceptible
- 1 – 3 dB: barely noticeable
- 3 – 5 dB: noticeable
- > 5 dB: very noticeable; usually experienced as twice as loud or half as loud
- HMMH considers changes of < 1 dB as no perceptible change.

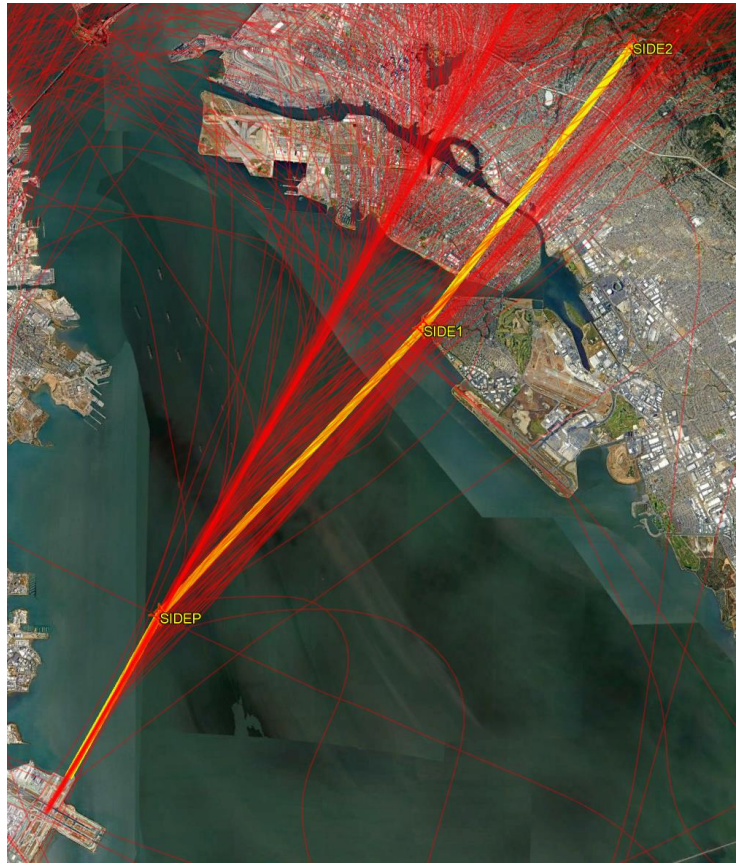
GLS-CATII 28R (ARCHI & EDDYY) 19L (UPEND)

- The addition of CAT II minimums allows aircraft equipped with the proper personnel and equipment to reduce their decision height (DH) and Runway Visual Range (RVR).
- This should be transparent to the community, and not have any detrimental effect to the existing noise environment.

Group 2A: GLS-SB 19L|COGGR

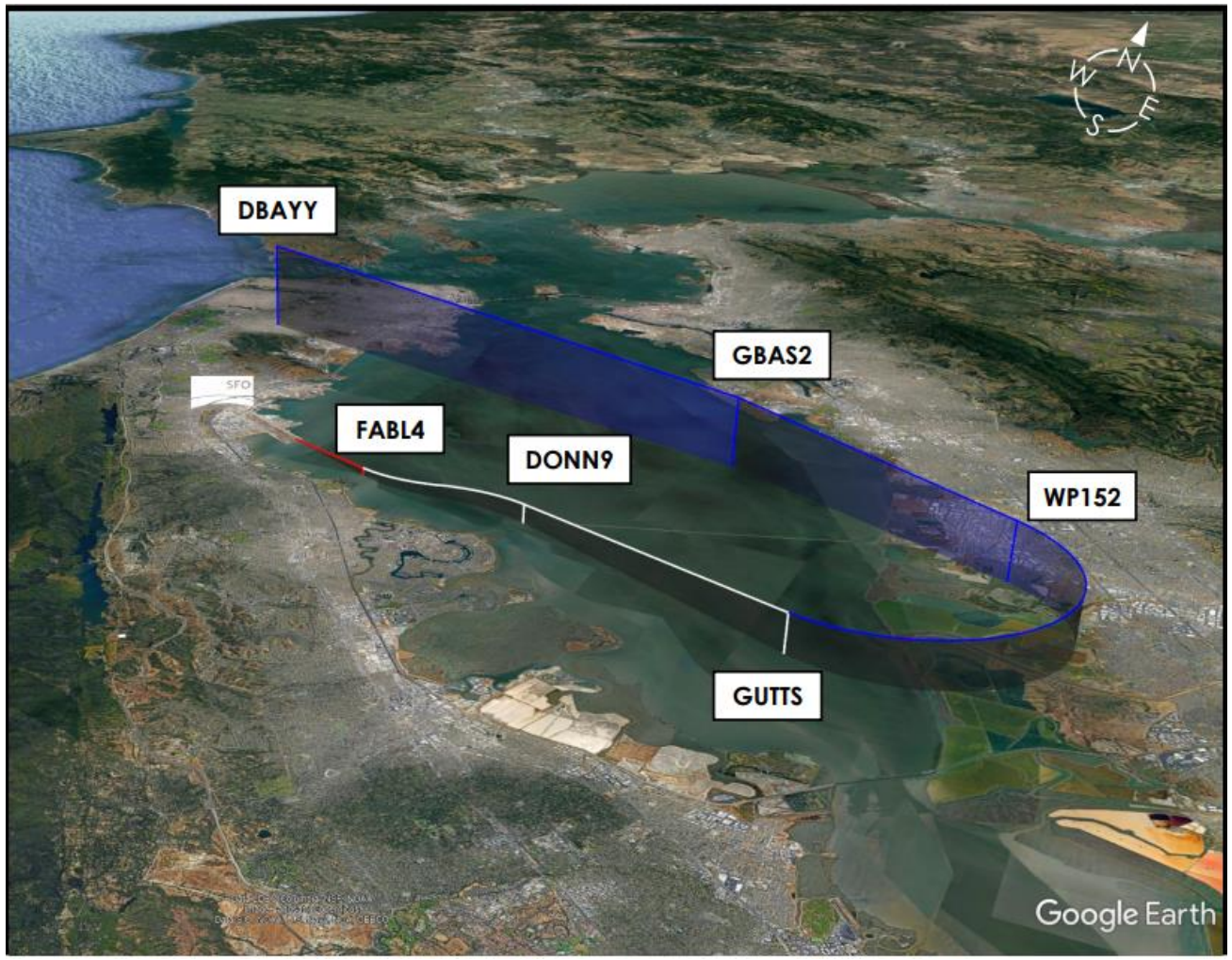
- Proceduralizes vectors issued by ATC for aircraft arriving from the northeast to the Runway 19L.
- Historical arrivals to SFO Runway 19L are consistent with the proposed flight path of the GLS-SB 19L
- Slight lateral shift to northwest between WP SIDE2 and SIDE1
- No change in current single-event noise levels would be expected for South Bay residents





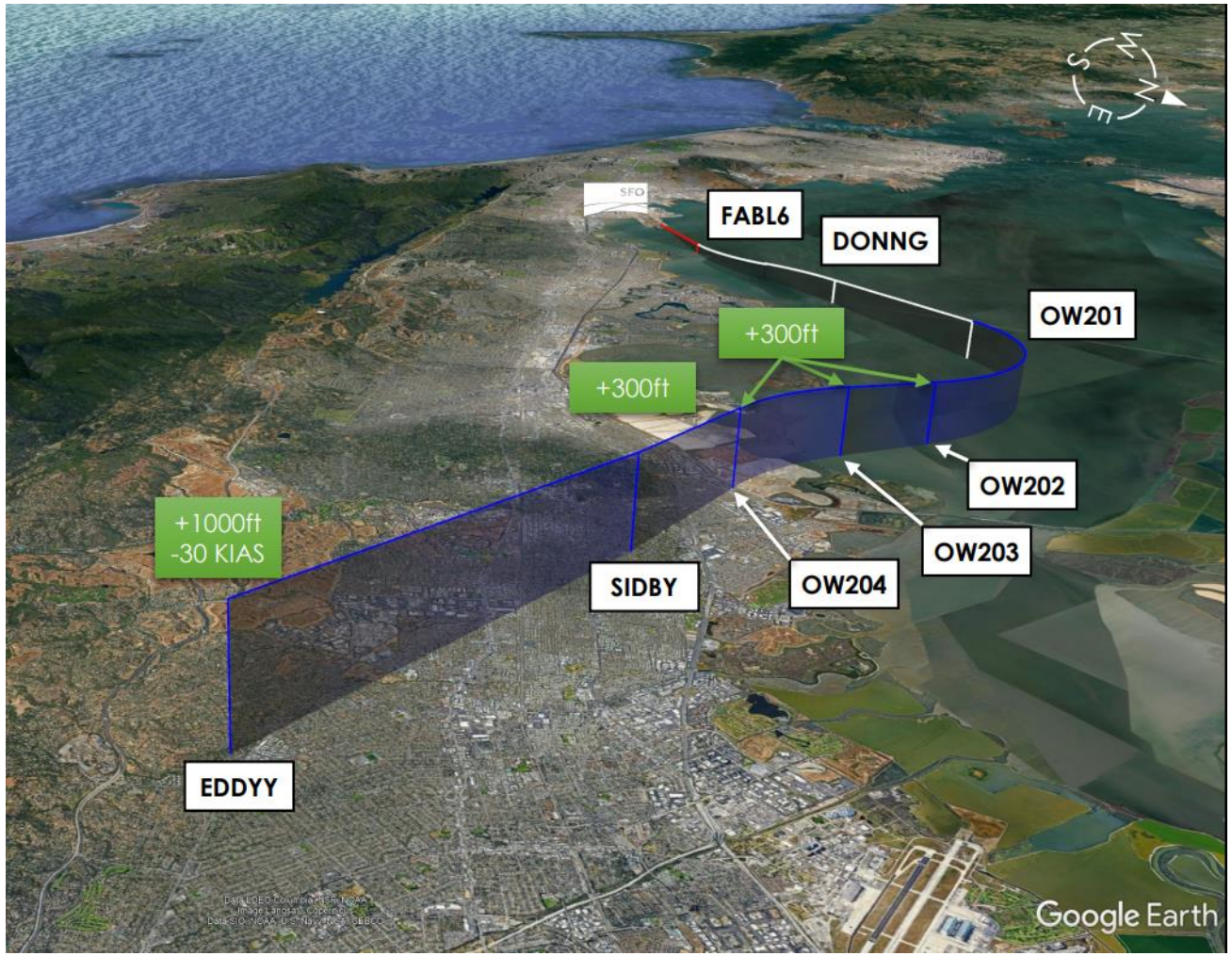
Group 2A: GLS-DB1 28R|DBAYY

- Based originally on historical ATC vectoring paths, and on the Group 1 GLS-DB Runway 28R|DBAYY
- Paths are consistent until WP152, where the updated procedure aims to keep aircraft within the lateral confines of the bay.
- Potential decrease in SEL levels for communities south of proposed flight path when compared to the Group 1 GLS-DB Runway28R | DBAYY
- Primary noise benefits to residents of San Carlos, Foster City, Hayward Park and neighboring communities with benefits expanding south for widebody aircraft



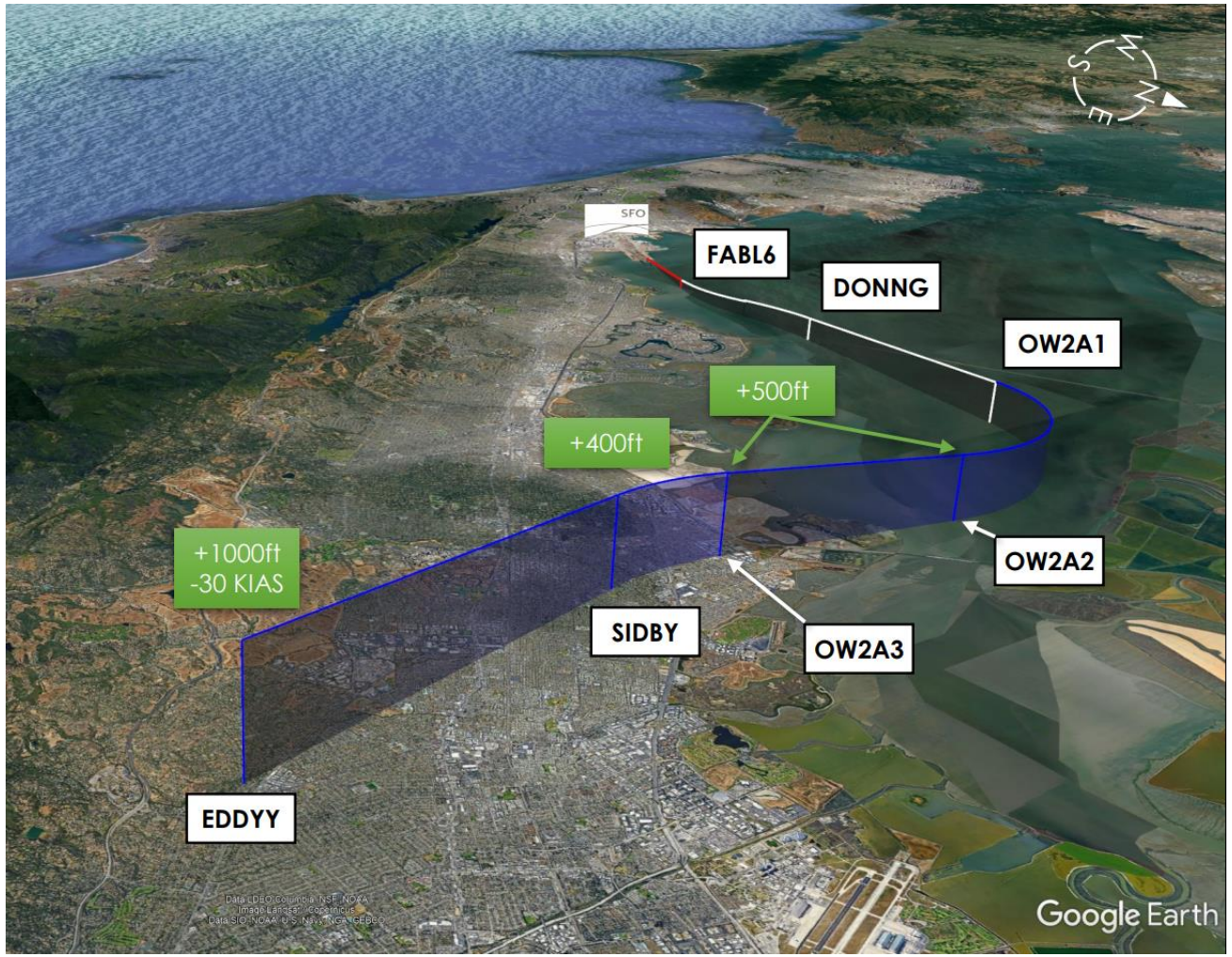
Group 2A: GLS-OW1 28R (Nighttime only)

- Higher initial altitudes compared to GLS-U 28R and ILS 28R may help improve noise impacts
- Slower speed through approach compared to GLS-U 28R and ILS 28R
- Ground track is consistent with GLS-U 28R and ILS 28R until the Palo Alto area, where the GLS-OW1 stays west of previous paths at a higher altitude
- In comparison with the GLS-U 28R, residents in vicinity of Menlo Park, North Fair Oaks, and Redwood city (expanding west as the aircraft moves to widebody) may see and increase in SEL noise events, due to the slower speed and more westerly track of the approach
- In contrast to the GLS-U 28R comparison, the GLS-OW1 shows net positive noise effects across all aircraft body types when compared to the ILS 28R



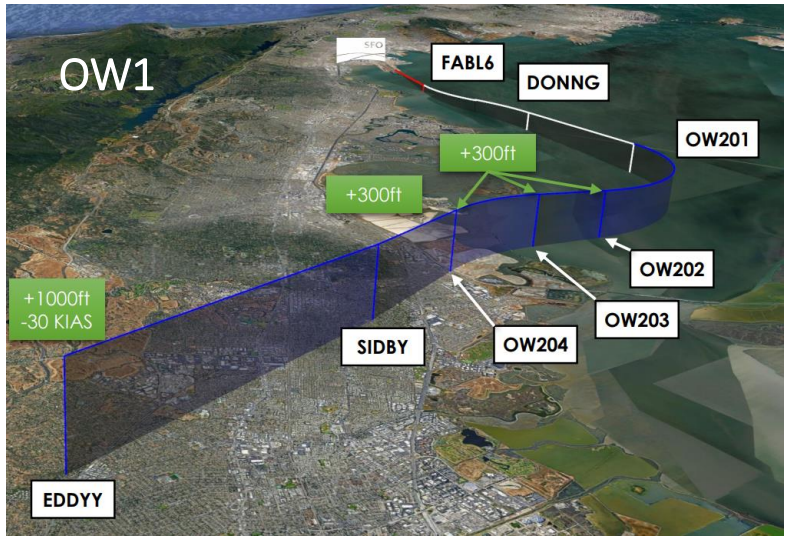
Group 2A: GLS-OW2 28R (Nighttime only)

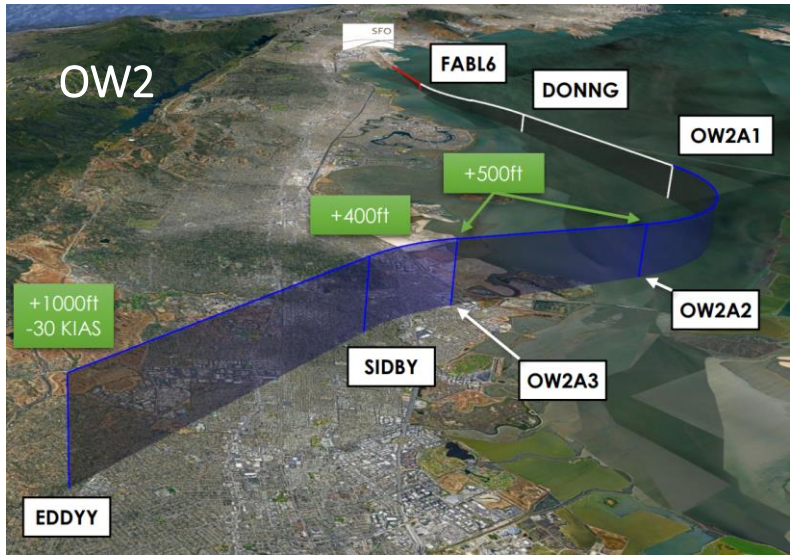
- GLS-OW2 28R is performed at a higher altitude and slower speed when compared to the GLS-U 28R and ILS 28R
- Ground track of the OW2 approach is consistent with GLS-U and ILS 28R until WP SIDBY (Palo Alto area), then taking the middle path and heading towards Ravenswood Point
- Greater overall noise reduction for communities from Palo Alto to Redwood City when compared to ILS
- May offer greater utility to ATC in a future where separation may be established via approach assignment



Group 2A: GLS-OW1 28R | EDDY – vs. GLS OW2 28R | EDDYY

- Only one GLS-OW procedure will be recommended to the GBAS team for further development
- Potential considerations for recommendation of either GLS-OW procedure include use of Multiple Airport Route Separation (MARS) and Time-Based Flow Management (TBFM) whereby separation can be accomplished via approach assignment rather than traditional vectors for spacing.
- Both approaches have similar net noise effects, while GLS-OW2 may provide greater utility to ATC in the future
- OW2 approach is slightly higher and slightly slower than the OW1 approach
- Equal initial utility to ATC in terms of ability to use





Summary

- HMMH agrees with Airport's conclusions regarding expected changes to noise as a result of the proposed Innovative GLS Approach Procedures
- We suggest the Roundtable support the Airport's implementation of the following GBAS procedures:
  - Group 2A:
    - GLS-CAT II 28R|ARCHI
    - GLS-CATII 28R|EDDYY
    - GLS-CATII 19L|UPEND
    - GLS-DB1 28R|DBAYY
    - GLS-SB 19L|COGGR
- GLS OW1 and OW2 28R approaches have similar noise effects, however OW2 may provide broader utility for ATC in a MARS/TBFM enabled environment

GLS Innovative Approach Procedure documentation can be viewed at

https://noise.flysfo.com/noise-efforts/ground-based-augmentation/innovative-approach-procedures/

FY 2020 & FY 2021 Economic Impact Study of San Francisco International Airport

Summary Presentation prepared by EBP

In Association with:

The Bay Area Council Economic Institute

Corey, Canapary & Galanis

ICF International

Defining the Economic Role of SFO in the Bay Area

Tracing the Economic Contribution of SFO

- **SFO as a Job Center**
- **Facilitating Visitors**
- **Moving Cargo**

Telling the Story of Three Time Periods

- **FY 2018 – The previous study baseline**
- **FY 2020 – Prior to and the onset of COVID 19**
- **FY 2021 - COVID 19 & the beginnings of recovery**

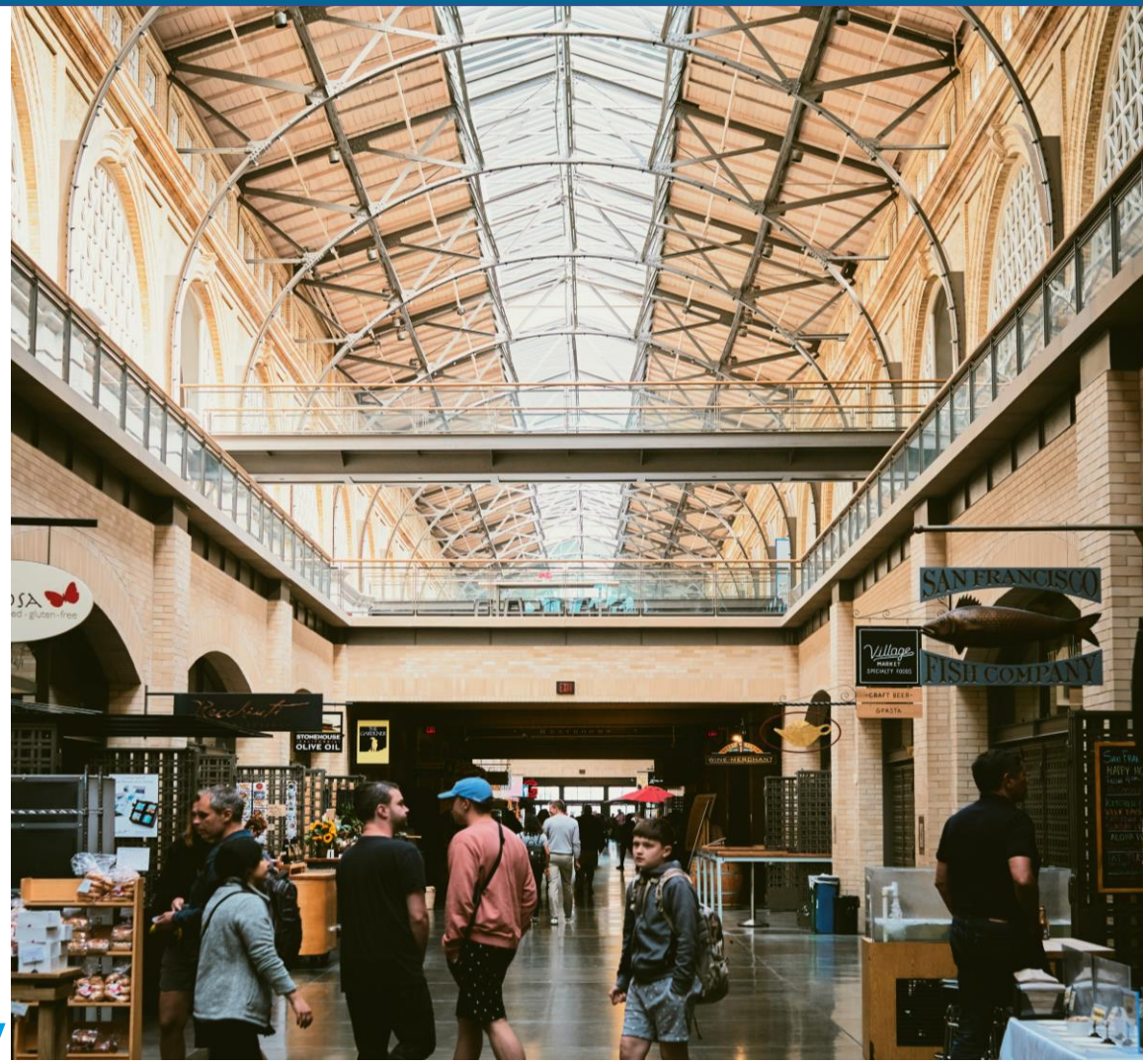
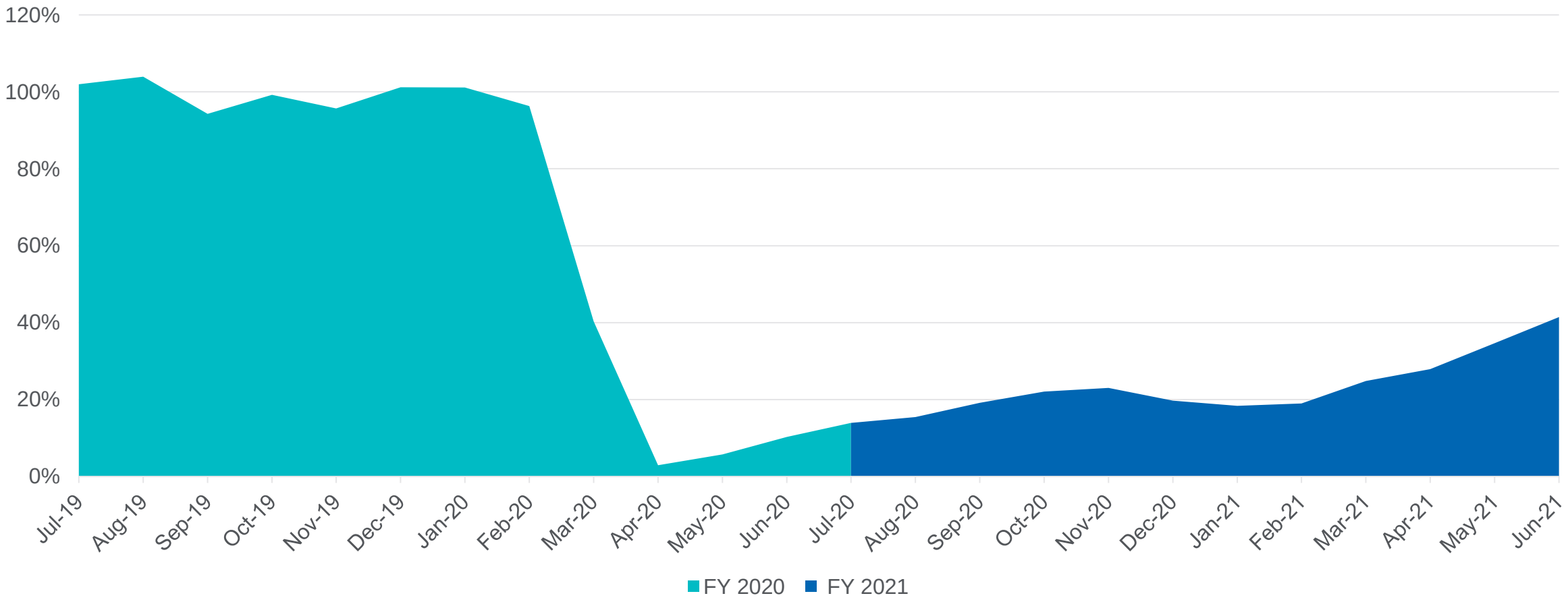


Photo courtesy of Bay Area Council Economic Institute

SFO

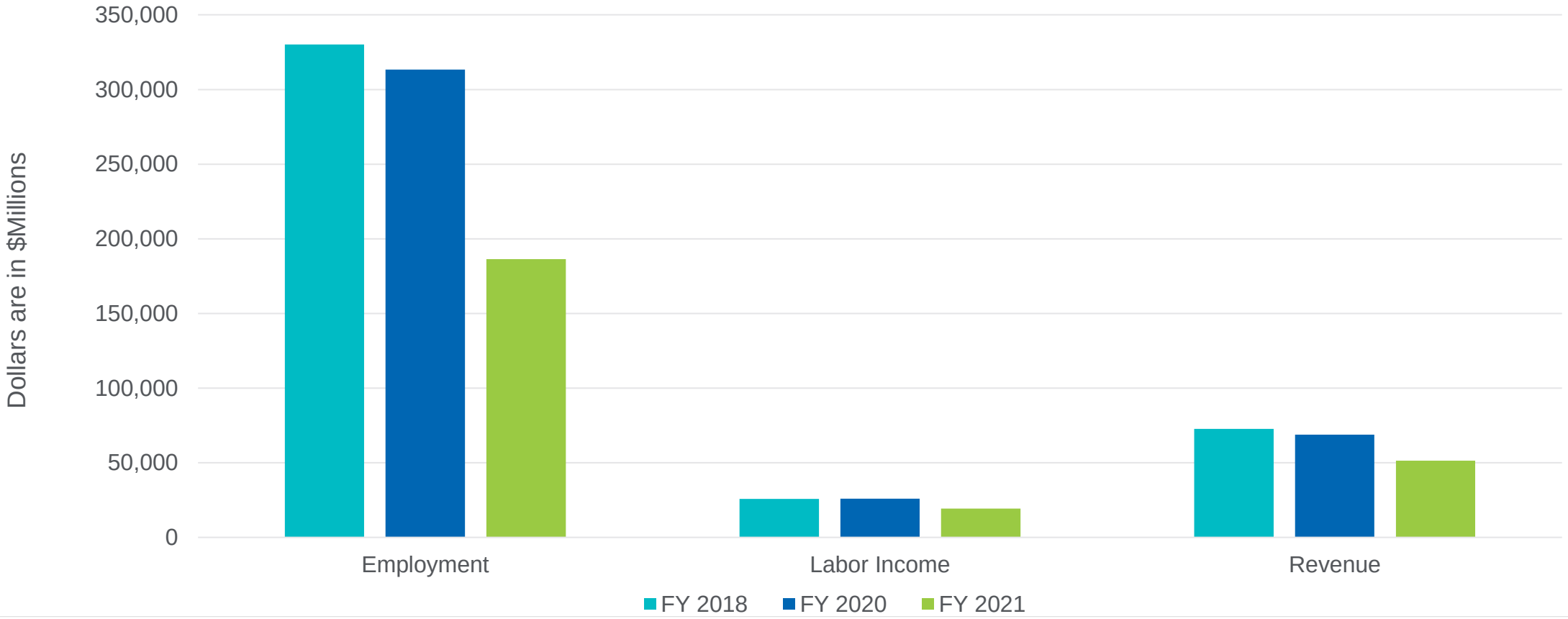
Enplaned and Deplaned Passengers at SFO in FY 2020 & FY 2021 Compared to FY 2018 (2018 = 100%)



SFO

Economic Impacts of SFO

Economic Contribution of SFO to the Bay Area Before and During COVID-19 – Totals include Multipliers* for the Bay Area



* Multiplier impacts include the value of goods and services purchased in the Bay Area by directly affected businesses and income spending in the Bay Area by workers who earn wages from directly affected businesses and suppliers.

SFO

Detailed FY 2021 Impacts

Impact Type	Employment	Labor Income $ Billions	Revenue $ Billions	Revenue Change vs FY 2018
On-Airport Activity	28,459	$3.0	$6.1	-43%
Air Cargo	43,798	$6.7	$20.4	6%
Visitor Spending	16,868	$0.9	$2.0	-84%
Direct Impact Total	89,125	$10.6	$28.6	-33%
Suppliers of Goods and Services	42,969	$4.5	$11.3	-22%
Re-spending of Income	54,238	$4.1	$11.6	-26%
Total Impact	**186,332**	**$19.3**	**$51.5**	**-29%**

Dollars are rounded to 2021 billions. Columns may not add due to rounding.

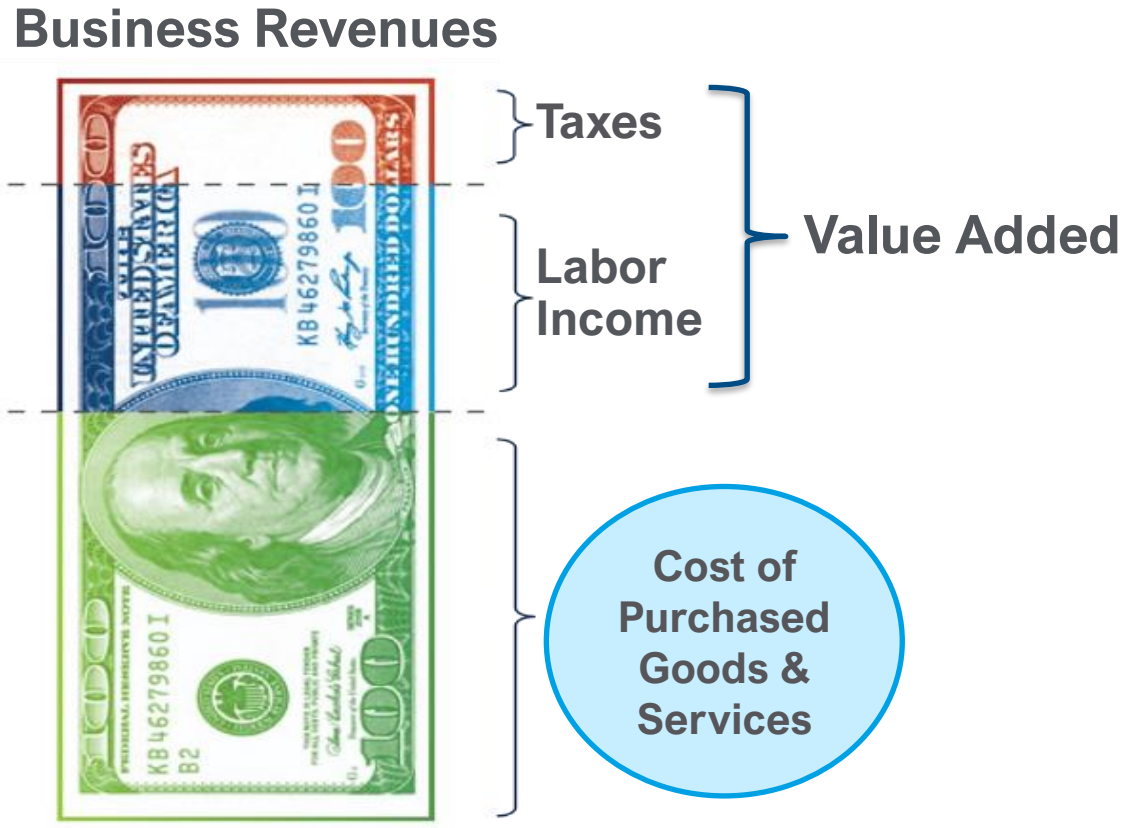
SFO

Value Added

Note: Value added has not been presented in previous SFO economic impact studies

The value of a product or service minus the value of purchased materials & services used in production

Impact Type	FY 2020	FY 2021
Direct On-Airport Activity	$6.9	$3.9
Direct Air Cargo (Air Reliant Business Support)	$9.0	$11.5
Direct Visitor Spending	$8.7	$1.3
Direct Impact Total	**$24.5**	**$16.7**
Indirect - Suppliers of Goods & Services	$8.3	$6.9
Induced - Re-spending of Wages	$9.6	$7.8
Total Impact	**$42.4**	**$31.3**

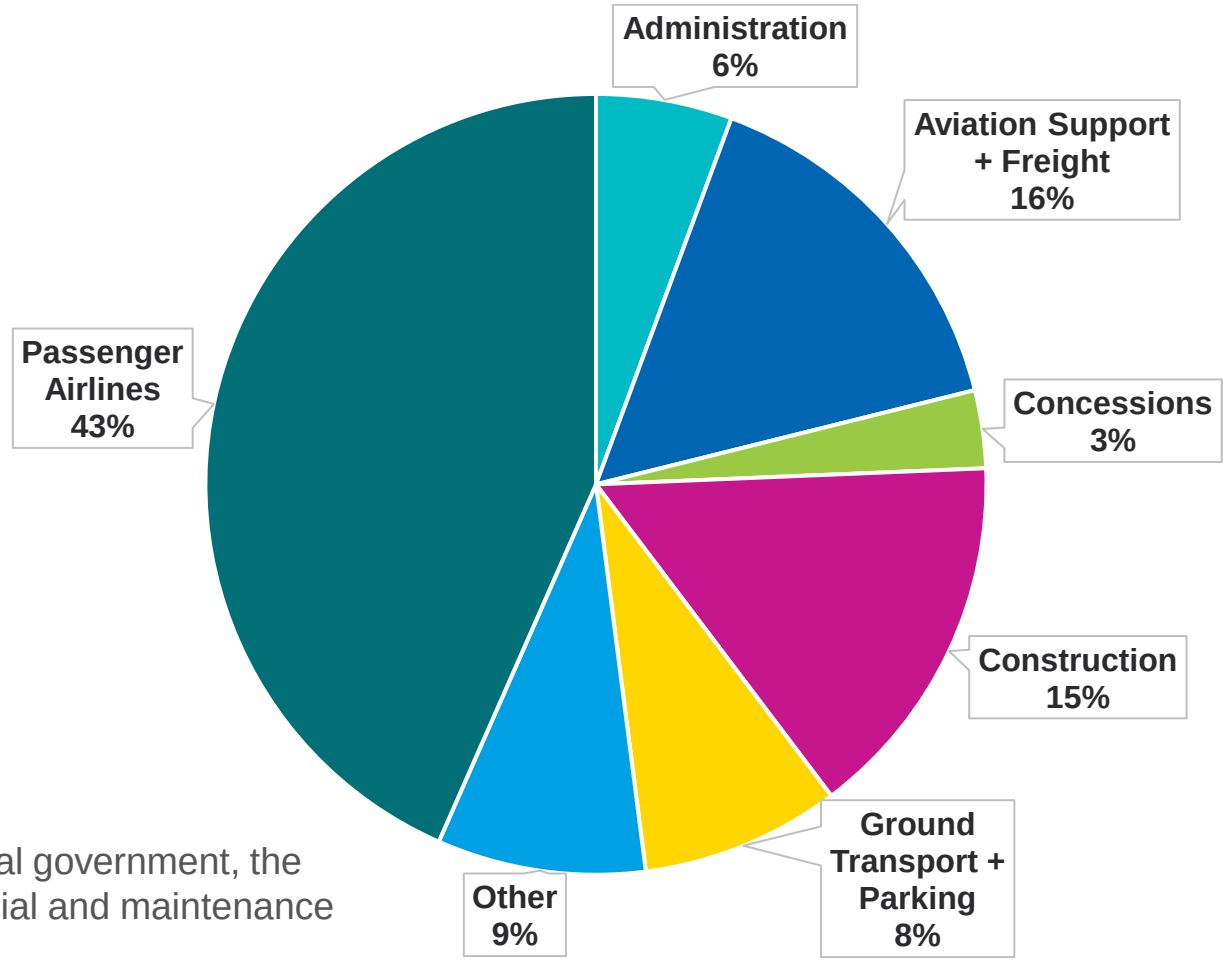


Dollars are rounded to the nearest billion in 2021 value.
Columns may not add due to rounding.

SFO

Distribution of On-Airport Direct Employment for FY 2021

By major function, based on 28,459 jobs on SFO, a 38% decline from FY18

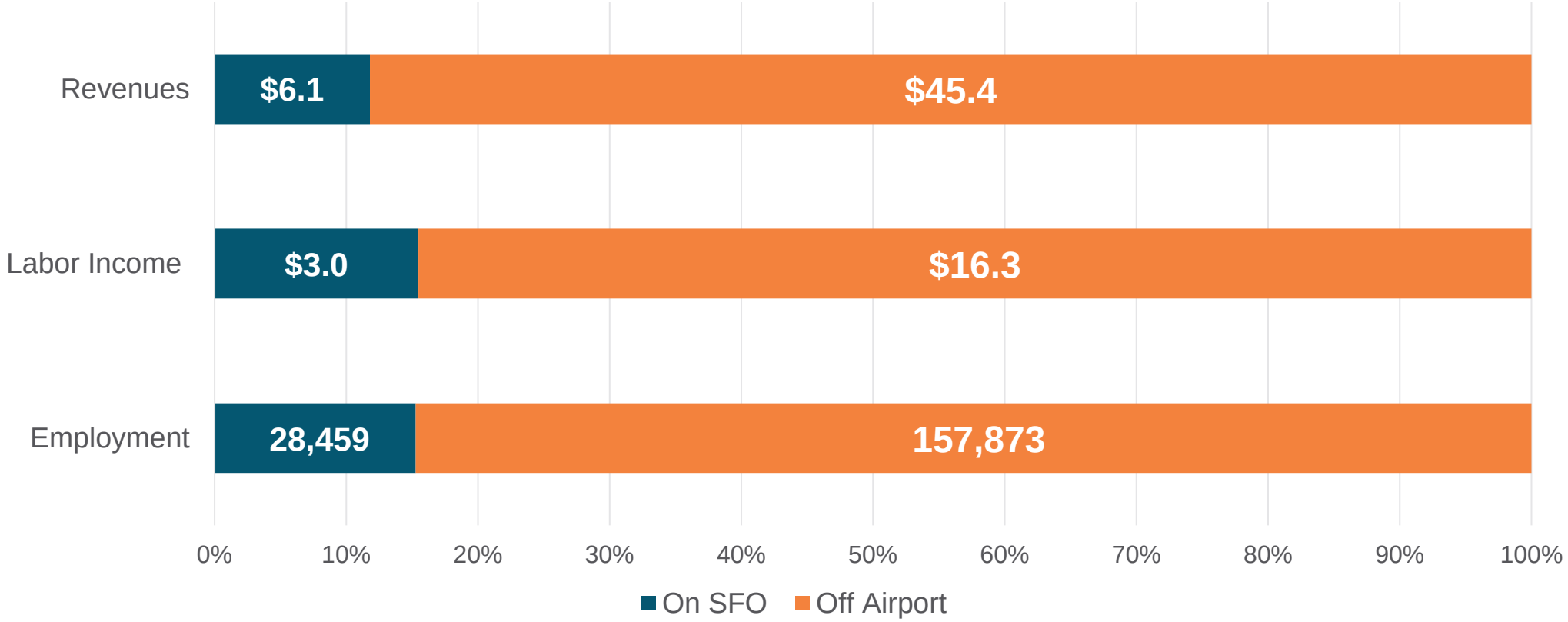


"Other" includes non-profits, the federal government, the Grand Hyatt hotel, security and janitorial and maintenance building services.

Sources: Airport Tenant Survey; interviews with Airport administration; and U.S. Department of Commerce data provided by IMPLAN.

SFO

Economic Footprint On-Airport and Off-Airport, FY 2021



On SFO includes airport administration, airport tenants, construction and commercial ground transportation that transport passengers and employees to/from the airport. Dollars are in 2021 billions.

Sources: SFO, SFO Visitor Spending Survey and Tenant Survey, Bay Area Council Economic Institute.

SFO

Visitors Arriving At SFO

FY 2018, FY 2020 and FY 2021

Metric	FY 2018	FY 2020	FY 2021
Total O&D Enplanements (millions)	21.9	21.5	5.1
Total Visitors (millions)	11.2	10.4	2.2
Percentages			
Visitors as % of O&D Enplanements	51%	48%	44%
Percent of Visitors From CA	13%	22%	34%
Percent of Visitors from Other Domestic Origins	57%	49%	53%
Percent of Visitors from International Origins	30%	29%	14%

Sources: FAA data aggregated by ICF and Airline Data, Inc.

Photo courtesy of Bay Area Council Economic Institute

SFO

Spending by Visitor Trip Before and During COVID-19

Sector	FY 2018 Visitor Survey	FY 2020, Q1-Q3 BACEI Estimate	FY 2020, Q4 BACEI Estimate	FY 2021 Visitor Survey
Entertainment	$149	$151	$38	$108
Local Transportation	$234	$237	$118	$110
Lodging	$509	$516	$256	$329
Restaurant	$209	$212	$158	$206
Retail	$169	$171	$85	$140
Total	**$1,270**	**$1,287**	**$654**	**$894**

Sources: 2018 and 2021 visitor spending surveys conducted for SFO; estimates for FY 2020, Q1- Q3 (July 2019 - March 2020) and FY2020, Q4 (April 2020 – June 2020) developed by Bay Area Council Economic Institute (BACEI).

SFO

Off-airport Visitor Spending from Visitor Arrivals Via SFO, FY 2020 and FY 2021(Within and Outside the Bay Area)

FY 2020
($ in Millions)

Effects	Employment	Labor Income	Revenue
Direct	103,968	$6,090	$13,271
Indirect	15,601	$1,453	$3,500
Induced	21,513	$1,668	$4,613
Total	141,083	$9,211	$21,385
% of Totals vs FY 2018	**86%**	**104%**	**98%**

FY 2021
($ in Millions)

Effects	Employment	Labor Income	Revenue
Direct	16,868	$940	$2,019
Indirect	3,349	$260	$709
Induced	2,377	$226	$538
Total	22,594	$1,426	$3,266
% of Totals vs FY 2018	**14%**	**16%**	**15%**

Note: Dollars are rounded to the nearest million. Columns may not add due to rounding. Sources: 2018 and 2021/2022 visitor spending surveys conducted for SFO, Airline Data, Inc.

SFO

Economic Contribution of Air Cargo Transported through SFO to the Bay Area Economy for FY 2021

Effect	Employment	Labor Income	Revenue
Direct	43,798	$6.7	$20.5
Indirect	32,129	$3.5	$8.7
Induced	40,071	$3.0	$8.6
Total	**115,998**	**$13.2**	**$37.8**
% change vs FY 2018	**30%**	**25%**	**14%**

Dollars in 2021 billions. Columns may not add due to rounding.

Note: Direct effects indicate the dependence of Bay Area industries on commodities that flow through SFO. Indirect impacts are due to supplier sales in the Bay Area generated from the direct revenue and induced impacts are generated from direct and indirect labor income being spent in the region.

Photo courtesy of Bay Area Council Economic Institute

SFO

Commodity Movement Through SFO (FY 2021 in 2021 $M)

International

Import	Value ($M)	Percent	Export	Value ($M)	Percent
Electronics	$6,654	75%	Electronics	$5,952	50%
Precision instruments	$524	6%	Machinery	$2,736	23%
Machinery	$482	5%	Precision instruments	$1,595	13%
All Imports	**$8,879**	**100%**	**All Exports**	**$12,000**	**100%**

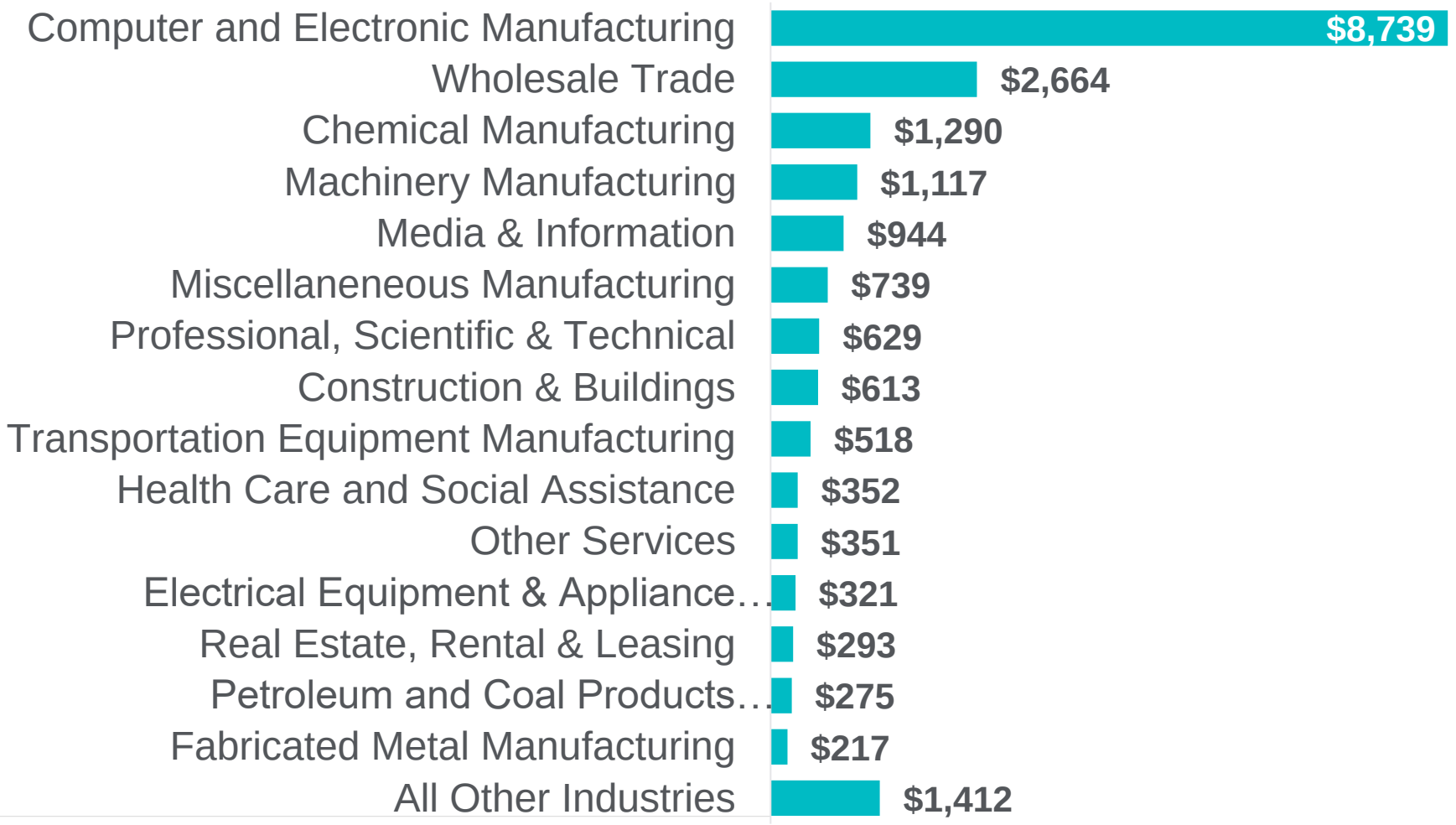
Domestic

Inbound	Value ($M)	Percent	Outbound	Value ($M)	Percent
Electronics	$892	52%	Electronics	$2,616	62%
Precision instruments	$319	18%	Precision instruments	$564	13%
Pharmaceuticals	$94	5%	Pharmaceuticals	$397	9%
All Inbound Domestic	**$1,728**	**100%**	**All Outbound Domestic**	**$4,228**	**100%**

SFO

Industries in the Bay Area Directly Supported by Air Cargo, FY2021

Direct Revenues in 2021 $M



SFO

Thank you

ECONOMIC IMPACT STUDY OF

SAN FRANCISCO INTERNATIONAL AIRPORT

FY2020 & FY2021 IMPACT AND INITIAL RECOVERY FROM COVID-19

PREPARED FOR

CITY AND COUNTY OF SAN FRANCISCO

SAN FRANCISCO AIRPORT COMMISSION

PREPARED BY

EBP

IN ASSOCIATION WITH

ICF INTERNATIONAL

COREY, CANAPARY & GALANIS

AND THE BAY AREA COUNCIL ECONOMIC INSTITUTE

SFO San Francisco International Airport

EXECUTIVE SUMMARY

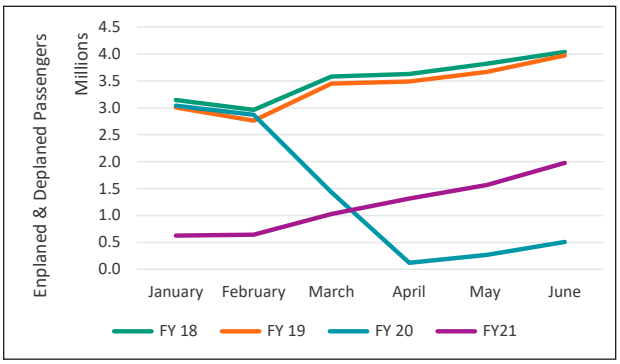
This study examines the economic impacts of San Francisco International Airport (SFO or "the Airport") in the nine-county Bay Area of Alameda, Contra Costa, Marin, Napa, San Mateo, San Francisco, Santa Clara, Solano, and Sonoma Counties. The previous study evaluated the economic impacts in Fiscal Year (FY) 2018, (the "2018 study"). While airport economic impact studies traditionally convey single-year snapshots, this study covers FY 2020 and FY 2021. The two-year focus of this study shows how the COVID-19 pandemic affected SFO's contribution to the Bay Area economy.

PANDEMIC EFFECT ON AVIATION ACTIVITY AT SFO

PASSENGER VOLUMES

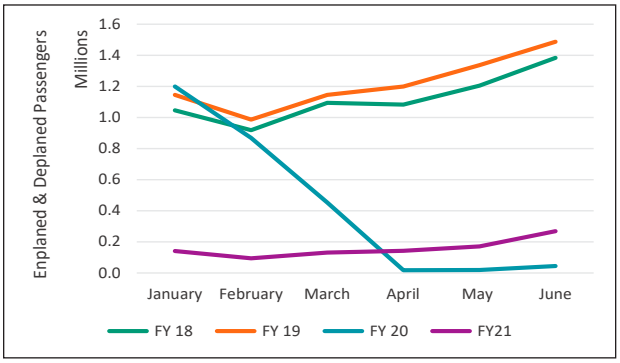
The economic impacts of airports are products of aviation activity. COVID-19 began depressing international air traffic moving through SFO in February 2020 and domestic traffic in the following month. Using the 2018 study as the baseline, by April of 2020, passenger volume stood at 3% of April 2018 levels. In aggregate, passenger volumes in the fourth quarter of FY 2020 (April 1, 2020 - June 30, 2020) accounted for 6% of FY 2018 volumes in the same period, including 2% of international and 8% of domestic passenger volumes. By the fourth quarter of FY 2021, passenger volumes had partially rebounded to 36% of FY 2018 levels. Passenger volumes began to rebound in FY 2021, showing fourth quarter levels at 16% of international and 42% of domestic passengers compared to the same period in 2018. Table 1 displays the number of passengers enplaning and deplaning at SFO from April through June during fiscal years 2018, 2019, 2020 and 2021.

FIGURE 1. DECLINE OF DOMESTIC PASSENGER VOLUME AT SFO IN THE PANDEMIC YEARS, FY 2020, AND FY 2021



Source: *https://www.flysfo.com/about/media/facts-statistics*

FIGURE 2. DECLINE OF INTERNATIONAL AIR TRAFFIC AT SFO IN PANDEMIC YEARS, FY 2020, AND FY 2021



Source: *https://www.flysfo.com/about/media/facts-statistics*

TABLE 1. APRIL – JUNE PASSENGER VOLUMES, FY 2018 - FY 2021

PASSENGER TYPE	FY 2018	FY 2019	FY 2020	FY 2021	PERCENT OF FY 2018	
					2020	2021
Domestic	11,486,588	11,124,423	900,991	4,859,380	8%	42%
International	3,670,669	4,024,241	79,515	580,948	2%	16%
Total	**15,157,257**	**15,148,664**	**980,506**	**5,440,328**	**6%**	**36%**

Source: *https://www.flysfo.com/about/media/facts-statistics*

Figures 1 and 2 illustrate steep traffic declines in January-June FY 2020 and a slight rebound in FY 2021 compared to FY 2018 and FY 2019.

Shutdowns and social distancing due to the pandemic, coupled with the sharp downturn in passenger volume, led to a severe reduction in the economic impacts of SFO by depressing demand for airport terminal concessions, car rentals, and ground transportation. As a result, on-airport direct jobs, off-airport indirect and induced spending, and visitor spending plummeted from FY 2018 levels.

AIR CARGO MOVEMENT

In both FYs 2020 and 2021, total cargo tonnage moved through SFO was 11% lower than in FY 2018. However, Table 2 shows that by FY 2021, domestic cargo grew by 16% over FY 2018 tonnage, while international tonnage fell by 24%.

In FY 2021, air cargo shipped through SFO directly supported over 43,000 jobs in the Bay Area.

TABLE 2. SFO METRIC TONS INCOMING AND OUTGOING, FY 2018 – FY 2022

METRIC TONS			
YEAR	DOMESTIC	INTERNATIONAL	TOTAL
FY 2018	164,166	324,360	488,526
FY 2019	161,928	335,545	497,473
FY 2020	157,079	278,808	435,887
FY 2021	190,376	245,294	435,670
Change 2020/2018	-4%	-14%	-11%
Change 2021/2018	16%	-24%	-11%
Change 2021/2020	21%	-12%	0%

Source: *https://www.flysfo.com/about/media/facts-statistics*

The overall cargo tonnage moved through SFO in FY 2021 matched that of FY 2020. A 21% rise in domestic cargo balanced a 12% reduction in international tonnage.[1]

ECONOMIC CONTRIBUTION OF SFO AIR CARGO SERVICES TO THE BAY AREA ECONOMY

Bay Area businesses rely on air cargo services at SFO.[2] Businesses may use imported commodities from outside the Bay Area as intermediate inputs, or households may consume them directly. Air cargo services at SFO allow regional businesses to shop nationally and globally for the best prices for products. Commodities produced in the region and flown out of the state and generate income for the region's economy from long-distance sales that otherwise might be inaccessible. Incoming commodities with destinations outside the Bay Area and outgoing commodities from SFO that originate outside the region are not part of this analysis.

By enabling Bay Area businesses to receive inputs to production and ship goods to market, air cargo services at SFO supported $16 billion and $20.5 billion of revenues for businesses in the nine-county Bay Area during FY 2020 and FY 2021, respectively. In FY 2021, air cargo shipped through SFO directly supported over 43,000 jobs in the Bay Area from which workers earned $6.66 billion in labor income.

TOTAL ECONOMIC CONTRIBUTION OF SFO TO THE BAY AREA

The total economic contribution of SFO to the Bay Area is the sum of the business revenues directly

1 *Despite the 12% decline in international tonnage from FY 2020 to FY 2021, the value of international cargo increased by 9% over the year in nominal terms and 6.5% in real terms. The source for the value of international goods movement is the U.S. Census Bureau Foreign Trade Division, assembled by WiserTrade (www.wisertrade.org).*

2 *The economic impacts of cargo movement through the Airport are represented in revenues and jobs generated from freight handling, freight airlines, trucking and other direct interactions with air cargo at SFO.*

generated by operations, spending by Airport users, additional business revenues associated with orders to business suppliers, and re-spending of worker income. At each of these levels (direct effects, supplier orders, and income re-spending), portions of business revenues are used for payrolls to support jobs.

During FY 2021, in the face of the COVID-19 pandemic, SFO was responsible for $51.5 billion in business revenue throughout the Bay Area, more than 186,000 jobs and $19 billion in labor income. In FY 2018, SFO contributed $72.7 billion in business

During FY 2021 SFO was responsible more than 186,000 jobs, $19 billion in labor income and $51.5 billion in business revenue throughout the Bay Area in the face of the pandemic.

TABLE 3. ECONOMIC IMPACTS OF SFO IN THE BAY AREA, FYS 2018, 2020 AND 2021

	IMPACT TYPE	EMPLOYMENT	LABOR INCOME	REVENUE
FY 2018	On-Airport Economic Activity	46,102	$3,871,000,000	$10,686,000,000
	Air Cargo (Air-Reliant Business Activity)	28,756	$5,079,000,000	$19,254,000,000
	Visitor Spending	113,253	$5,130,000,000	$12,568,000,000
	Direct Impact Total	188,111	$14,079,000,000	$42,508,000,000
	Suppliers of Goods and Services	56,130	$5,727,000,000	$14,395,000,000
	Re-spending of Income	85,974	$6,018,000,000	$15,802,000,000
	Total Impact	**330,215**	**$25,824,000,000**	**$72,706,000,000**
	IMPACT TYPE	EMPLOYMENT	LABOR INCOME	REVENUE
FY 2020	On-Airport Activity	43,435	$4,114,693,000	$10,879,836,000
	Air Cargo (Air-Reliant Business Activity)	34,142	$5,198,174,000	$15,977,374,000
	Visitor Spending	103,968	$6,090,281,000	$13,271,351,000
	Direct Impact total	181,545	$15,403,148,000	$40,128,561,000
	Suppliers of Goods and Services	59,459	$5,442,008,000	$14,091,714,000
	Re-spending of Income	72,283	$5,064,931,000	$14,672,479,000
	Total Impact	**313,287**	**$25,910,088,000**	**$68,892,754,000**
	IMPACT TYPE	EMPLOYMENT	LABOR INCOME	REVENUE
FY 2021	On-Airport Activity	28,459	$2,982,783,000	$6,079,614,000
	Air Cargo (Air-Reliant Business Activity)	43,798	$6,658,798,000	$20,474,256,000
	Visitor Spending	16,868	$940,489,000	$2,018,817,000
	Direct Impact total	89,125	$10,582,070,000	$28,572,687,000
	Suppliers of Goods and Services	42,969	$4,545,517,000	$11,287,699,000
	Re-spending of Income	54,238	$4,131,721,000	$11,626,340,000
	Total Impact	**186,332**	**$19,259,308,000**	**$51,486,726,000**

Note: *Dollar values are 2018 for the FY 2018 study, and 2021 for results of FY 2020 and FY 2021*

In FY 2020, including nine months before the impacts of COVID, SFO supported 313,000 jobs, $26 billion in labor income and $69 billion in in business revenue.

revenues, which in turn supported about 330,000 jobs in the Bay Area that paid workers almost $26 billion in labor income (wages and benefits). The total impacts of SFO on the Bay Area in fiscal years 2018, 2020 and 2021 are summarized in Table 3.

The economic activities generated by SFO also return significant tax revenues to the nine Bay Area counties, the State of California, and the nation (i.e., federal aviation taxes). State and local tax revenues linked to operations at SFO totaled $3.2 billion in FY 2020 and almost $1.9 billion in FY 2021. SFO also generated more than $1.3 billion in federal tax revenues in FY 2020 and $1.1 billion in FY 2021, which were largely driven by international air cargo customs revenues.

ECONOMIC IMPACTS ON SFO AND ACROSS THE BAY AREA

Business-related activities on the SFO grounds include the administration of the airport, airfield and building construction and maintenance, air transportation and supporting services, as well as passenger terminal concessions serving passengers to enable visitor arrivals and air cargo transport. The term "economic engine" applies because the operation of the airport, including administration and tenants, generates impacts that support the economies of each of the nine counties in the Bay Area. Business-related activities associated with SFO come from these three key sources:

1. Businesses and government agencies on-airport buy goods and services from businesses located throughout the Bay Area (indirect effects), providing sales and supporting additional employment in the region. Moreover, workers on-airport and the employees of these business suppliers spend the wages they earn as an after-effect of the airport creating more revenue and jobs in the region (induced effects).[3]
2. Visitor spending supports hospitality sectors across the Bay Area, including lodging, restaurants and drinking establishments, entertainment venues, retail and local transportation. All indirect and induced effects stimulated by visitor spending are "off-airport" as well.

Approximately 28,500 jobs were on-airport in FY 2021 and SFO generated almost 158,000 off-airport jobs across the Bay Area in FY 2021.

3 *Occasionally exceptions can be identified. For example, spending of airport-based employees may include eating lunch at terminal restaurants. Also, airport tenants may be in each other's supply chain. An example of this is an airplane cleaning service located on-airport. However, the indirect and induced effects generated by on-airport activities is overwhelmingly off-airport.*

TABLE 4. IMPACTS GENERATED BY SFO ON-AIRPORT GROUNDS AND OFF-AIRPORT IN THE BAY AREA

IMPACT	FY 2020		FY 2021	
	ON-SFO	OFF-AIRPORT	ON-SFO	OFF-AIRPORT
Revenue ($ billions)	$10.9	$58.0	$6.1	$45.4
Labor Income ($ billions)	$4.1	$21.8	$3.0	$16.3
Employment	43,435	269,853	28,479	157,873

Note: *Dollar values are billions of 2021 dollars.*

3. Air cargo services on-airport connect Bay Area manufacturers to national and global suppliers and customers. The industries that rely on cargo services are found off-airport, largely in Santa Clara and Alameda Counties. As with visitor spending, resulting indirect and induced impacts are also off-airport.

In total, more than 80% of impacts supporting businesses and industries were located off-airport across Bay Area communities in both FY 2020 and FY 2021 (Table 4). The proportions of total revenue, labor revenue and income impacts off-airport in FY 2021 are slightly higher than in FY 2020. In FY 2021, 88% of business revenue attributable to the Airport accrued off-airport. This change is primarily due to growth in the reliance of Bay Area businesses on the Airport's air cargo services balanced against the collapse in visitors and visitor spending caused by the pandemic. In general, ratios of business revenues and labor income per job in manufacturing industries that rely on air cargo are significantly higher than those in the regional hospitality sector.

APPROACH TO THE ECONOMIC ANALYSIS

Findings in this economic study were developed using multiple sources of data, which are summarized in Table 5.

See the main report and the technical appendix for more detailed information on data collection and modeling for this analysis.

In FY 2020, including nine months before the impacts of COVID, there were 43,000 jobs on-airport while 270,000 were elsewhere in the Bay Area.

TABLE 5. APPROACH AND SOURCES FOR ECONOMIC IMPACTS

ECONOMIC MEASURE	SOURCE
On-Airport	A rigorous airfield airport tenant survey was conducted by Corey, Canapary & Galanis Research (CCGR), and data were provided by SFO.
Visitor Spending	CCGR also developed and managed a visitor-intercept survey effort to establish trip purpose and determine levels and patterns of visitor spending at the Airport. The Bay Area Economic Institute worked with EBP to adjust those findings (and those of the previous study for FY 2018) to estimate spending levels in FY 2020 and FY 2021.
Business Dependence on Air Cargo	EBP applied data from SFO, in conjunction with international data from the U.S. Census Bureau's Foreign Trade Division (packaged by WISERTrade) and domestic freight data from the Federal Highway Administration's Freight Analysis Framework to evaluate the role of air cargo shipments in the Bay Area economy.
Direct, Indirect and Induced Effects Across all Measures	EBP adapted the IMPLAN modeling package to the nine-county Bay Area region to determine the Airport's direct, indirect (purchases of goods and services), and induced (business sales generated by workers spending their income on consumer purchases) impacts, using a blending of the calendar year 2019 and 2020 models (the latest model years available at the time of analysis).

PREPARED FOR

CITY AND COUNTY OF SAN FRANCISCO
SAN FRANCISCO AIRPORT COMMISSION

PREPARED BY

EBP

IN ASSOCIATION WITH

ICF INTERNATIONAL
COREY, CANAPARY & GALANIS
AND THE BAY AREA COUNCIL ECONOMIC INSTITUTE

Meeting Announcement

Technical Working Group

Wednesday, November 15, 2023
3:30 p.m. – 5:00 p.m.
VIA HYBRID ACCESS

Foster City Council Chambers Conference Room
620 Foster City Blvd. – Foster City, CA 94404

Public may also join the webinar:
https://smcgov.zoom.us/j/93523059657
Or Dial-in:
US: +(669)900-6833 Webinar ID: 935 2305 9657

This meeting of the Technical Working Group (TWG) will be in person at the above-mentioned address. Members of the public will be able to participate in the meeting remotely via the Zoom platform or in person at 620 Foster City Boulevard, Foster City, CA 94404. For information regarding how to participate in the meeting, either in person or remotely, please refer to instructions at the end of the agenda.

HYBRID PUBLIC PARTICIPATION:
List of attendees (using zoom sign-in credentials) will be displayed periodically throughout the meeting.

The TWG Subcommittee meeting may be accessed through the above-mentioned Zoom webinar. Members of the public may also attend this meeting physically in the Foster City Council Chambers Conference Room at 620 Foster City Blvd. Foster City, CA 94404.
*Written public comments can be emailed to SFORoundtable@smcgov.org and should include the specific agenda item to which you are commenting.
*Spoken public comments will also be accepted during the meeting in-person or via Zoom on Items NOT on the Agenda and for each Agenda Item at the option of the speaker.

**Please see instructions for written and spoken comments at the end of this agenda.

ADA Requests
Individuals who require 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 packet or other writings that may be distributed at the meeting, should contact SFO Roundtable Staff at SFORoundtable@smcgov.org as early as possible but no later than 10:00am the day before the meeting at Notification in advance of the meeting will enable Staff to make reasonable arrangements to ensure accessibility to this meeting, the materials related to it, and your ability to comment.

AGENDA

Call to Order

Public Comment on Items NOT on the Agenda

REGULAR AGENDA

1. **SFO Ground Based Augmentation System (GBAS) Group 2A Innovative Procedures**

   a. **SFO GBAS Project Update–Innovative Procedure Timeline and Latest Community Requests**
   Paul Hannah, SFO Consultant, Chief Airspace and Flight Operations Engineer
   Attachment: SFO GBAS Project Update - Innovative Procedure Timeline and Latest Community Requests

   b. **Review of Proposed GLS Group 2A Innovative Approach Procedures at SFO**
   Jason Stoddard, Airspace Analyst, HHMMH, Consultants to the SFO Roundtable
   Attachment: SFO GLS 2A HMMH Review Memo
   Attachment: Review of Proposed GLS Group 2A Innovative Approach Procedures at SFO

   c. **Questions - Roundtable Members**
   Sam Hindi, Chairman, SFO Roundtable
   Paul Hannah, SFO Consultant, Chief Airspace and Flight Operations Engineer
   Jason Stoddard, Airspace Analyst, HHMMH, Consultants to the SFO Roundtable

   d. **Discussion by Roundtable Members**
   Sam Hindi, Chairman, SFO Roundtable

2. **Flight Procedures, Flight Tracks & Airport Director's Report Data**
   Bert Ganoung, SFO, Aircraft Noise Office Manager
   Attachment: Airport Director's Report, SFO Layout, Arrivals & Departures Presentation

3. **Adjourn**

****Instructions for Public Comment during Videoconference Meeting**

During the TWG Subcommittee hybrid meeting, members of the public may address the Membership as follows:

Written Comments:
Written public comments may be emailed in advance of the meeting. Please read the following instructions carefully:
1. Your written comment should be emailed to SFORoundtable@smcgov.org
2. Your email should include the specific agenda item on which you are commenting.
3. Members of the public are limited to one comment per agenda item.
4. The length of the emailed comment should be commensurate with two minutes customarily allowed for verbal comments, which is approximately 250-300 words.
5. If your emailed comment is received by 5:00 pm on the day before the meeting, it will be provided to the Roundtable and made publicly available on the agenda website under the specific item to which comment pertains. The Roundtable will make every effort to read emails received after that time but cannot guarantee

such emails will be read during the meeting, although such emails will still be included in the administrative record.

Spoken Comments:

In-person Participation:

1. If you wish to speak to the Membership, please fill out a speaker's slip located at the entrance. If you have anything you wish distributed to the Membership and included in the official record, please hand it to the Clerk who will distribute the information to the Membership and Staff.

Via Teleconference (Zoom):

1. The TWG Subcommittee meeting may be accessed through Zoom online at https://smcgov.zoom.us/j/93523059657 Webinar ID: 935 2305 9657 . The meeting may also be accessed via telephone by dialing in +1-669-900-6833, entering webinar ID 935 2305 9657 then press #.
2. Members of the public can also attend this meeting physically in the Foster City Council Chambers Conference Room at 620 Foster City Blvd, Foster City, CA 94404.
3. You may download the Zoom client or connect to the meeting using the internet browser. If you are using your browser, make sure you are using current, up-to-date browser: Chrome 30+, Firefox 27+, Microsoft Edge 12+, Safari 7+. Certain functionality may be disabled in older browsers including Internet Explorer.
4. You will be asked to enter an email address and name. We request that you identify yourself by name as this will be visible online and will be used to notify you that it is your turn to speak.
5. When the Chairperson calls for the item on which you wish you speak click on "raise-hand" icon. You will then be called on and unmuted to speak.

***Additional Information**:

For any questions or concerns regarding Zoom, including troubleshooting, privacy, or security settings, please contact Zoom directly.

HMMH
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MEMORANDUM

To:	SFO Community Roundtable Members and Interested Parties
From:	Jason R. Stoddard, Senior Airspace Analyst Eugene M. Reindel, Vice President
Date:	November 16, 2023
Subject:	Federal Aviation Administration (FAA) Instrument Flight Procedures (IFP) Information Gateway Review
Reference:	HMMH Project Number 312310

At the request of the Roundtable, Harris Miller Miller & Hanson Inc. (HMMH) is monitoring and reviewing updates to procedures published onto the FAA's IFP Information Gateway in the regions of San Francisco International Airport (SFO), Metropolitan Oakland International Airport (OAK), and Norman Y. Mineta San Jose International Airport (SJC).

After analyzing the documents posted, HMMH determines proposed changes and the reason for the changes. The FAA IFP Information Gateway did not publish any updates for SFO, OAK or SJC this cycle. There is currently one open comment period. The next publication is expected on November 30, 2023.

Important Terms and Items:

- FAA Stage Definitions
  1. FPT: Procedures are coordinated with Air Traffic, Tech Ops and Airports for feasibility, preparation, and priority (FPO)
  2. DEV: Development of the procedures
  3. FC: FAA Flight Inspection of the developed procedures
  4. PIT: Production Integration Team (TS)
  5. CHARTING: Procedures at Arnav Products Charting for publication (NACO)

- FAA Status Definitions
  1. At Flight Check: At Flight Inspection for procedure validation
  2. Awaiting Publication: At Arnav Products Charting for publication
  3. Complete: Procedure development action finished
  4. On Hold: Procedure waiting data/information to allow it to proceed/continue to next stage
  5. Pending: Procedure development work on-going
  6. Published: Procedure charted and published
  7. Under Development: Procedure is being worked on by the FAA
  8. Terminated: Procedure/project terminated

- Glossary
  - RNAV: Area Navigation
  - IAP: Instrument Approach procedure
  - STAR: Standard Terminal Arrival Route
  - SID: Standard Instrument Departure
  - GPS: Global Positioning System
  - ILS: Instrument Landing System
  - LOC: Localizer

Updates:

- None

Open Comment Periods:

- ILS or LOC RWY 19L AMDT 23
  - Comment period ends November 16, 2023
    The following changes are expected:
    - Missed approach instructions changed from "Climb to 980 then climbing left turn to 4000 on SFO VOR/DME R-135 to PTRLA INT/SFO 15.75 DME and hold. *Missed approach requires minimum climb of 322 feet per NM to 2800" to "Climb to 1100 then climbing left turn to 4000 direct to PRTLA and hold. *Missed approach requires minimum climb of 357 feet per NM to 2000"
    - Alternate missed approach instructions were removed.
    - Additional administrative remarks were added that are not expected to change flight paths or altitudes.
    - Comparison instrument approach procedure charts can be found on page 3 of this memo.

  - Concerns can be submitted via https://www.faa.gov/air_traffic/flight_info/aeronav/aero_data/Aeronautical_Inquiries/?event=email.contact&details=General%20Comments

Next Publication: We expect the following procedures to be published in the November 30, 2023 publication:

- SFO GLS RWY 19R AMDT 1
  - Scheduled Publication Date updated to November 30, 2023
- SFO GLS RWY 19L AMDT 1
  - Scheduled Publication Date updated to November 30, 2023
- SFO ILS OR LOC RWY 19L AMDT 23
  - Scheduled Publication Date updated to November 30, 2023
- SFO RNAV (GPS) RWY 19L AMDT 4
  - Scheduled Publication Date updated to November 30, 2023
- SFO RNAV (GPS) Y RWY 19R AMDT 4
  - Scheduled Publication Date updated to November 30, 2023
- SFO RNAV (GPS) Z RWY 19R ORIG
  - Scheduled Publication Date updated to November 30, 2023

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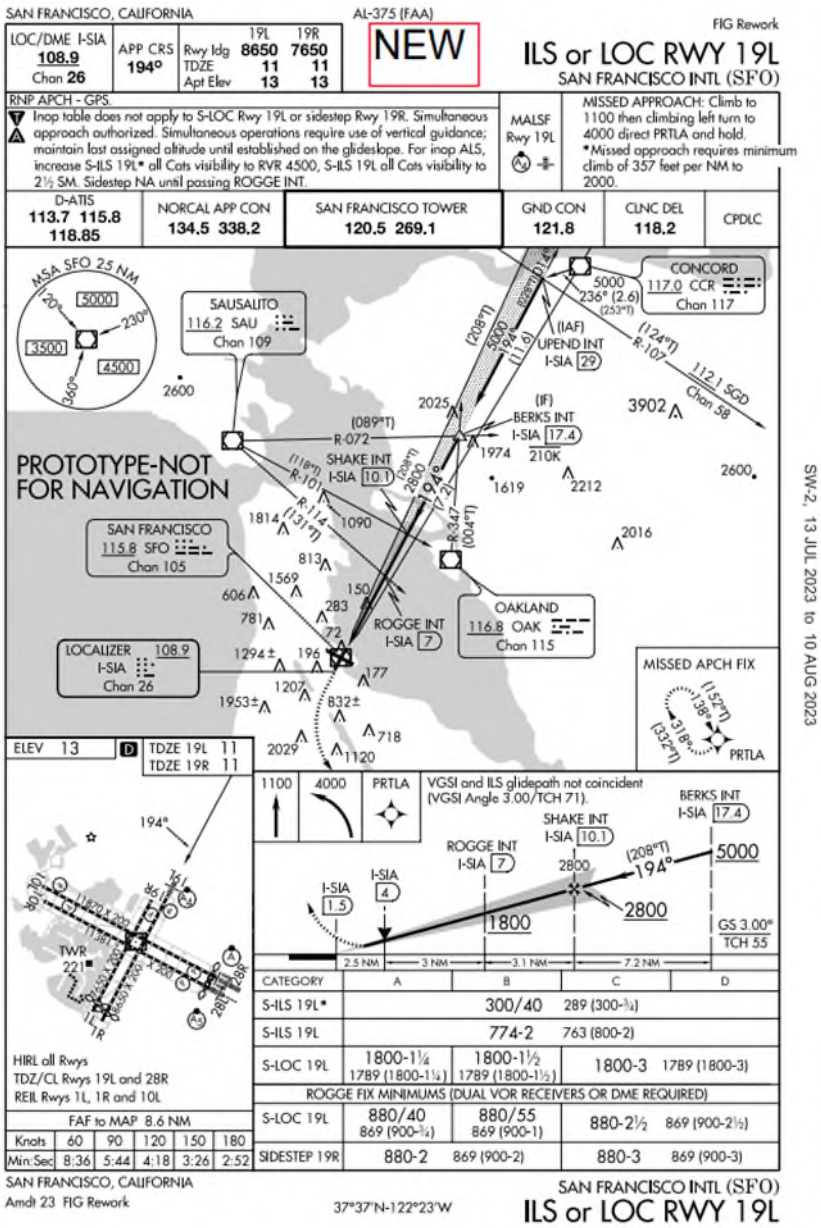

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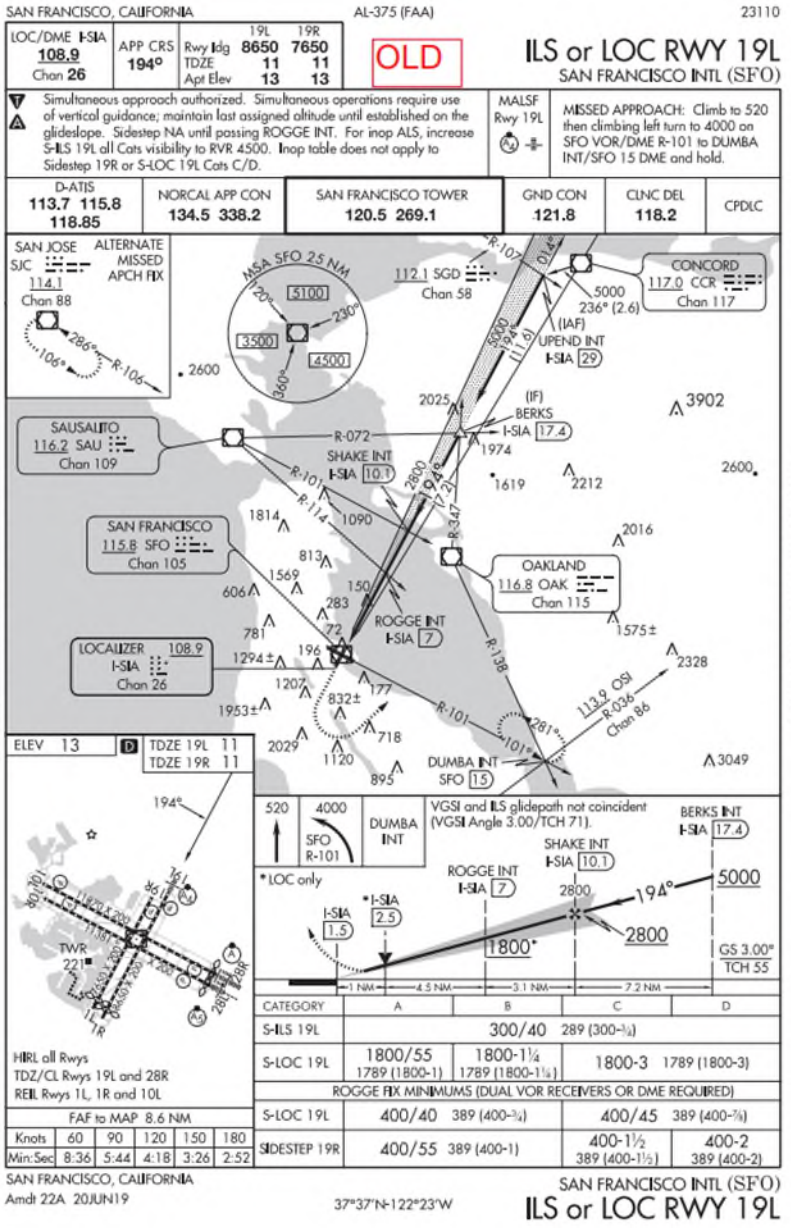

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