ATTACHMENTS

SFO Roundtable letter dated _____.

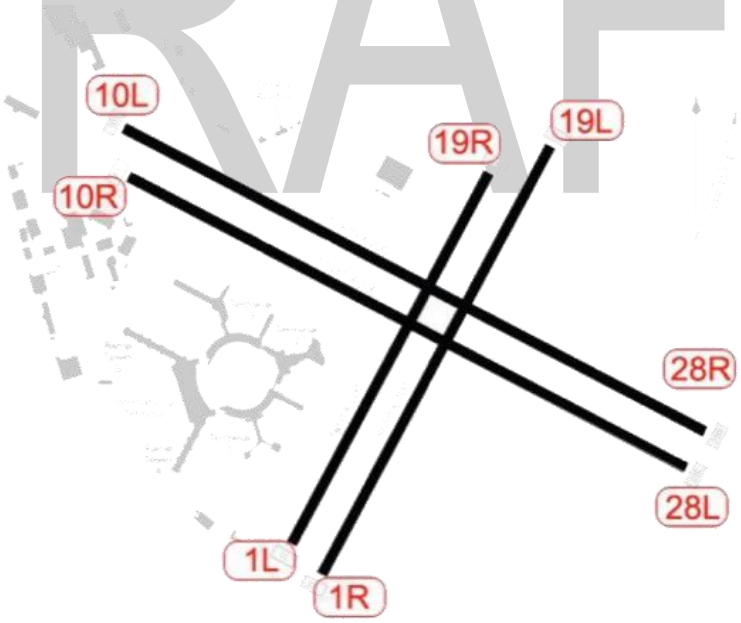
INTRODUCTION

This attachment to the Roundtable's response to the FAA Initiative is to expand on information in the letter to the FAA, detailing specific procedure operations as they fly today and any changes the Roundtable is requesting.
Each of the "Attachments" has the following sections:

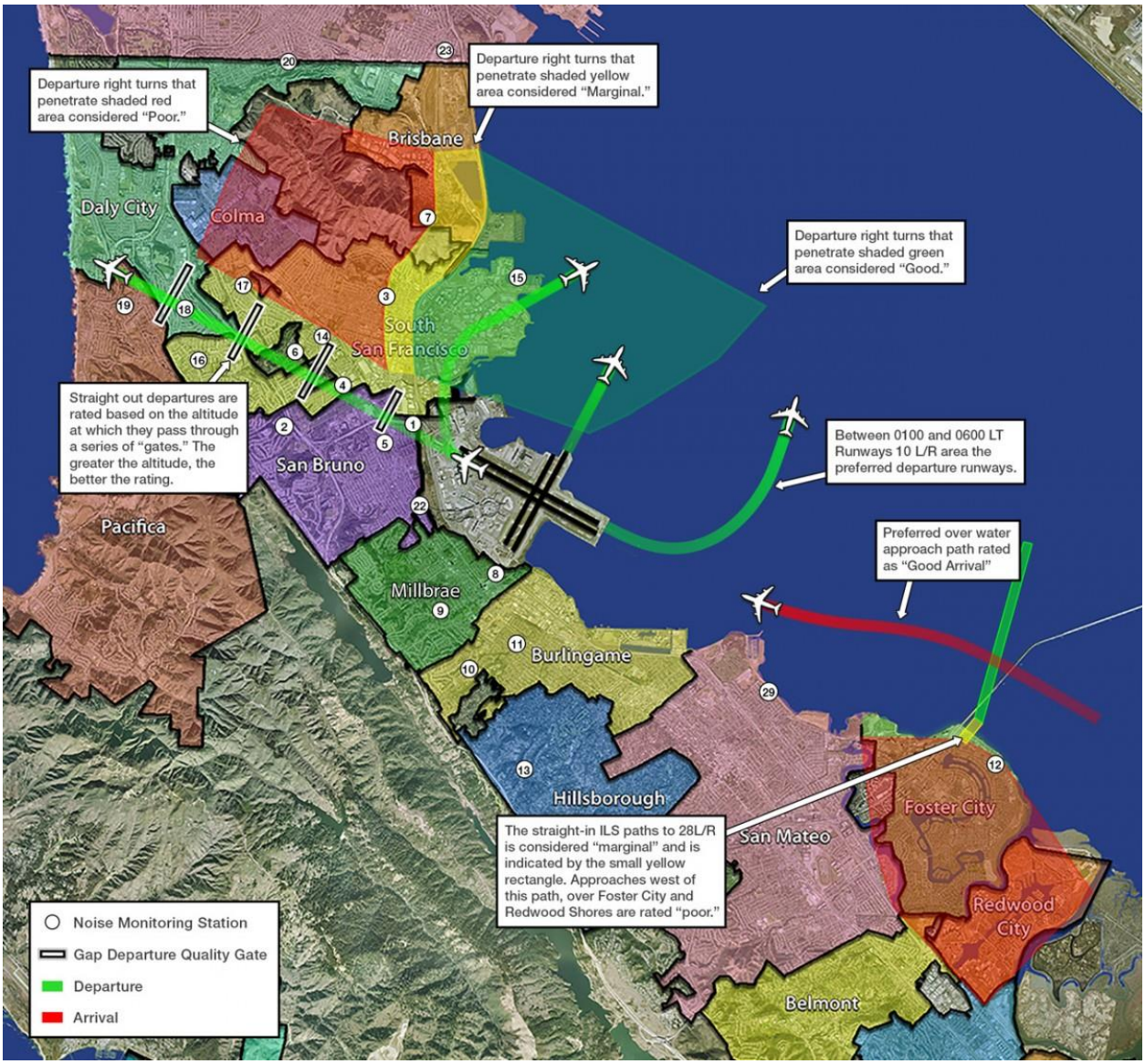
- **Description** – details the procedure(s) as they are flown today
- **Primarily Impacted Cities** – notes the cities that are most directly under the flight path(s) of the procedures being described.
- **Noise Issues** – the primary existing noise issues due to the procedure.
- **Roundtable Requests (Short Term, Long Term)** – details what mitigation efforts the Roundtable is requesting the FAA implement either in the short or long term, depending on the detail of the request.
- **Collaboration** – requests the appropriate agencies to work on each mitigation effort. Initial Requested FAA Research – if applicable, requests the FAA research specific operational items related to the mitigation efforts.

DRAFT

There are two airport diagrams shown here; the first one shows the runways with each runway end labeled, and the second is SFO's Fly Quiet map that shows the general parameters of the Fly Quiet program in a graphic format.



Runways at SFO

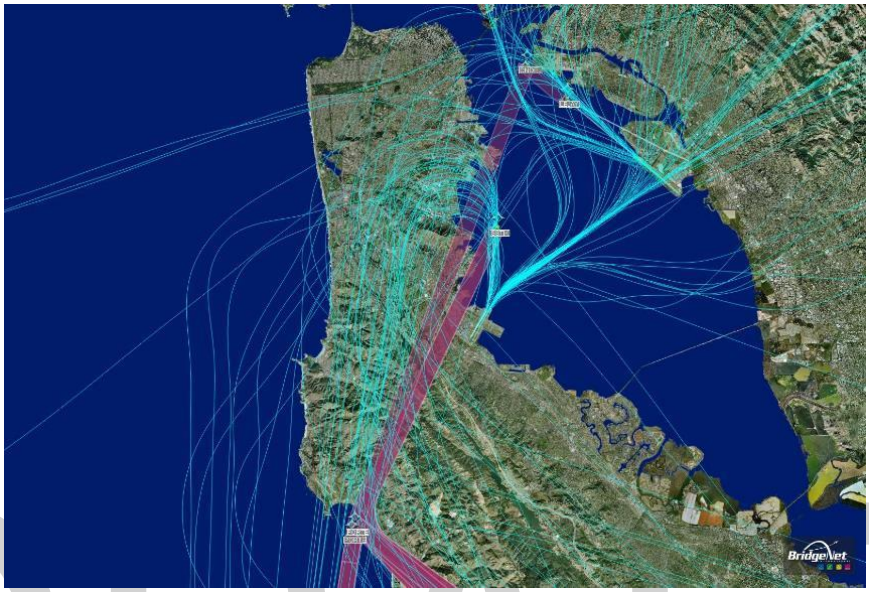


SFO Noise Abatement Office Fly Quiet Program Illustration

In this document, the following abbreviations are used:

- **Mean Sea Level (MSL)** – refers to an aircraft altitude in relation to its location above the average level of the earth's surface.
- **Above Ground Level (AGL)** – refer to an aircraft altitude in relation to its location relative to the ground below.
- **Nautical Miles (NM)** – the length of a mile used for navigation purposes. All references to miles in this document refer to nautical miles.

PROCEDURE: SSTIK	**ADJUSTMENTS:** 1.a.ii, 1.b.i, 1.b.ii, 1.b.iii, 2.a.ii(b)



SSTIK Departure, SFO and CNDEL Departures, OAK

DRAFT

DESCRIPTION: The SSTIK RNAV departure is used by aircraft departing SFO Runways 1L and 1R. After takeoff, the aircraft flies north a short distance over the Bay, then flies over the SSTIK waypoint, located east of the City of Brisbane marina. For southbound destinations, after SSTIK, the aircraft then typically makes a left turn to head south to the PORTE waypoint, located just south of the Half Moon Bay airport.

This procedure replaced the conventional navigation PORTE departure. The new SSTIK waypoint is located approximately 1 nautical mile south of the SEPDY waypoint that is associated with the PORTE procedure; SEPDY is located east of the Baylands Soil Processing facilities. The SSTIK waypoint is closer to downtown Brisbane than SEPDY.

PRIMARILY IMPACTED CITIES: Brisbane, Daly City, Pacifica, San Bruno, San Francisco, South San Francisco.

NOISE ISSUES: The San Francisco Bay area is an area rich in diverse topography. The topography of San Bruno Mountain State Park amplifies noise impacts for Brisbane, due to its elevation relative to the City of Brisbane, and from low flying planes that are vectored. Similarly, topography of the coastal range, including Milagra and Sweeny ridges, amplifies noise impacts for Pacifica residents from aircraft flying toward the PORTE waypoint. Planes flying at low altitudes negatively affect all impacted cities.

SFO ROUNDTABLE REQUESTS:

Short Term

Modifications to the SSTIK departure:

1. Move SSTIK waypoint north and east as much as feasible to allow maximum altitude gain before turning west to fly over land.
2. Determine the necessity for one or more additional waypoints on land after SSTIK to provide lateral path guidance to airplanes to reduce noise impact.
3. Create an additional waypoint over the ocean to guide aircraft over water to PORTE.

Improved utilization of existing flight path and procedures:

1. In the existing procedure, use the Bay and ocean for overflight as much as possible.
2. In the existing procedure, utilize existing areas of compatible land use for overflight.
3. Avoid issuing any vectors to aircraft for as long as feasible but no earlier than when an aircraft is actually over SSTIK, which allows additional altitude gain to reduce noise impacts.
4. Avoid vectoring aircraft down the Peninsula direct to waypoints beyond PORTE.
5. Determine if a reduced climb airspeed can be assigned until reaching 3,000 MSL or other higher altitude; a slower airspeed will allow the aircraft to climb to a higher altitude in a shorter distance before overflying noise-sensitive land uses. Determine if the minimum required altitude for ATC to initiate a left turn can be raised.

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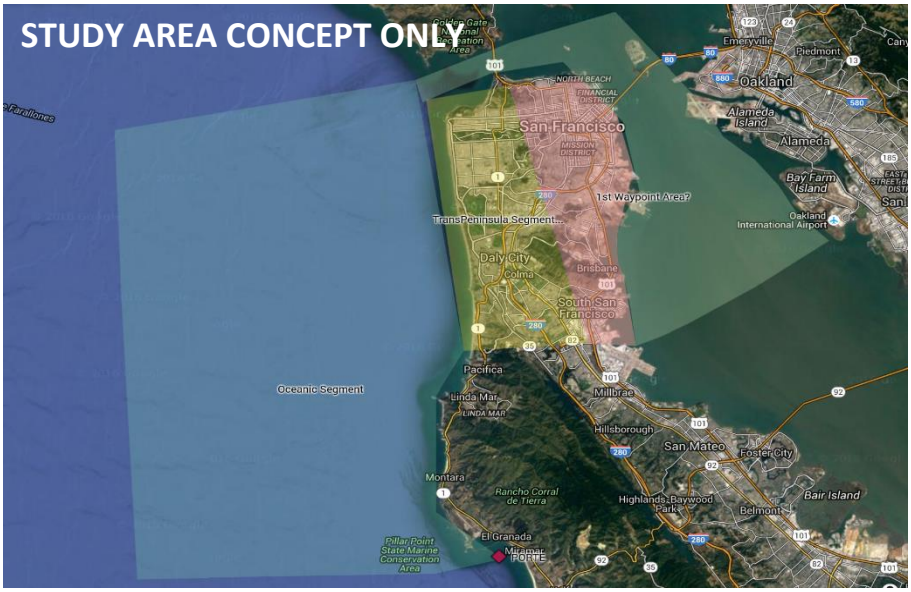
Longer Term



SSTIK Procedure Concept

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Design a new transition from the vicinity of SSTIK waypoint to PORTE waypoint or to a waypoint further south along the coast. It is suggested that the lateral path for this transition be researched and studied by dividing the lateral path into four or more suggested segments as follows and as depicted on the above graphic:

a. Green segment: Takeoff to SSTIK (or a revised location of SSTIK) or an additional Bay waypoint.
b. Pink segment: This would be the first waypoint area, eastern portion of San Francisco and the north Peninsula.
c. Yellow segment: This would be the possible second waypoint area, western portion of San Francisco and the north Peninsula.
d. Blue segment: This would be the second or third waypoint location, Pacific Ocean coastline to PORTE intersection or to a waypoint south of PORTE – remaining significantly offshore over the Pacific Ocean for the entirety of this ocean segment.

COLLABORATION:

1. Work with the FAA to find an appropriate location for moving the SSTIK waypoint east and north of its current location so planes can fly over the Bay for a longer period of time, and thus increase altitude before heading west and flying over residential areas.
2. Work with the FAA with modeling or other tools to determine the effects of different waypoint options.

3. Explore feasibility of creating a waypoint to help guide planes over compatible land use areas when they reach land (the peninsula) as well as an additional waypoint over the ocean.
4. Work with our local FAA officials to reduce vectoring and allow planes to fly the charted procedures when safety is not an issue. Work with local FAA officials and airlines to encourage higher altitudes when flying over noise-sensitive land uses and the use of non-residential areas where feasible.
5. To monitor success, provide a monthly report indicating percentage of flights that achieve these stated goals; also provide data using a ¼ mile point of closest approach for the SSTIK and PORTE waypoints.
6. Extensive long term collaboration will be required to initiate and develop the process of creating a new southbound destination transition from the SSTIK waypoint.

REQUESTED INITIAL FAA RESEARCH:

1. **FAA is requested to work with SFO Roundtable members and staff to assess options for a SSTIK revised location and a transition over land as well as additional waypoints over land and the ocean to provide lateral aircraft path guidance.**

2. **FAA is requested to research the extent to which aircraft on CNDEL southbound vectors are impeding the ability of SSTIK departures to climb and turn *at* the STTIK waypoint rather than being vectored to turn left *before* SSTIK, crossing over noise-sensitive land uses at altitudes lower than if the aircraft turned over the waypoint.**

3. **FAA is requested to research and determine any conflicting airspace issues within the green segment (see map above) which would not be available for the location of a new SSTIK waypoint.**

4. **The SFO Roundtable requests comprehensive FAA data on flight paths and altitudes of flights flying the SSTIK departure since its inception, as well as similar data from comparable historical departures that previously served the same kind of departure as the SSTIK with southbound destinations i.e. PORTE and OFFSHORE. (regardless of whether they complete the departure path.) The *Initiative* appendix presented data for a short period; the Roundtable is asking for an expanded analysis of the flight tracks.**

5. **Preliminary to the creation of a new SSTIK transition for southbound destinations, it is requested that the FAA research and determine any conflicting airspace issues within each of the color segments (see map above) which would not be available for airplane flight at altitudes compatible with a new SSTIK departure transition for southbound destinations.**

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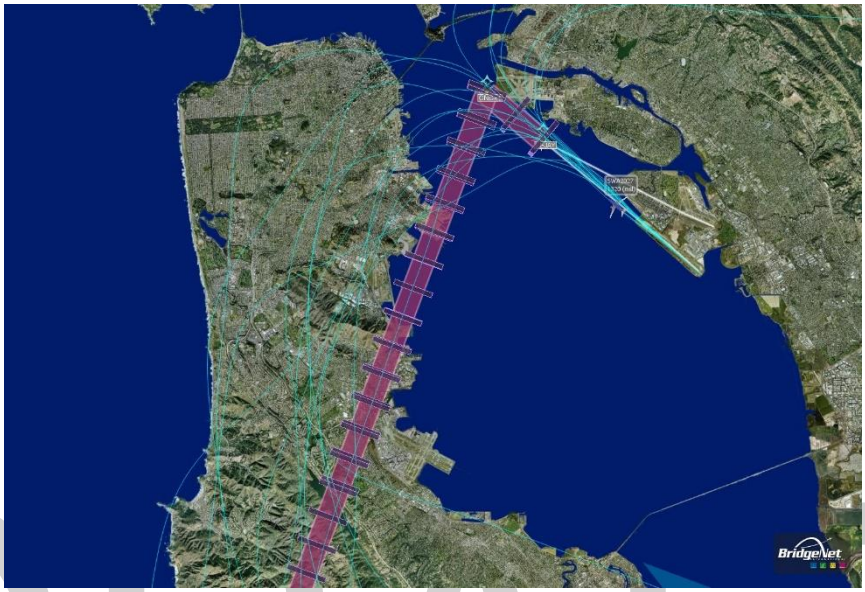
PROCEDURE: CNDEL	**ADJUSTMENTS:** 1.a.ii, 1.b.ii, 2.a.ii(b)



CNDEL Departure Flight Tracks

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DESCRIPTION: The CNDEL RNAV departure is typically used by aircraft departing Runway 30 at Oakland International Airport (OAK). After takeoff, the aircraft flies north a short distance over the Bay, then flies over the LEJAY and CNDEL waypoints, west of the USS Hornet and the old naval air station Alameda, respectively. After the CNDEL waypoint, the CNDEL departure procedure directs the aircraft to turn left to the PORTE waypoint located just south of Half Moon Bay airport.

For southbound destinations, aircraft will often be vectored prior to the CNDEL waypoint, at the LEJAY waypoint. *FAA Initiative Phase 1, Appendix B* notes that 46% of CNDEL departures are on the procedure; this assumes 54% of aircraft flying the CNDEL departure are vectored. Many of these flights turn south or southwest over the Bay or towards southern portions of the City of San Francisco and cities in northern San Mateo County. Often, this vectoring places CNDEL and SSTIK flights in a position to compete for the same airspace.

Occasionally aircraft will fly over the Golden Gate Bridge, then turn to the south. Also, aircraft will occasionally be vectored over the SFO VOR navigational aid on the airport, then over Millbrae and Burlingame towards the PORTE waypoint or waypoints downstream on their flight plan.

This procedure replaced the conventional navigation SKYLINE and COAST departures.

PRIMARILY IMPACTED CITIES: Brisbane, Burlingame, Daly City, Millbrae, Pacifica, San Bruno, San Francisco, South San Francisco.

NOISE ISSUES: The San Francisco Bay area is an area rich in diverse topography. This impacts how cities under the departure path experience aircraft noise; there are numerous ridges and peaks leading to valleys that experience aircraft noise differently that if it was all flat land. Between aircraft crossing the peninsula from the Bay to the ocean, San Bruno Mountain State Park amplifies noise impacts for Brisbane, due to its elevation relative to the City of Brisbane. For cities closer to the coast, the topography of the coastal range, including Milagra and Sweeny ridges, amplifies noise impacts for Pacifica residents from aircraft flying toward the PORTE waypoint. Planes flying at low altitudes negatively affect all impacted cities.

SFO ROUNDTABLE REQUESTS

As stated earlier, this procedure should be flown as charted and reduce the number of aircraft vectored. Based on a month of data from July 2015, FAA *Initiative Phase 1, Appendix B* notes that 46% of CNDEL departures are on the procedure; this assumes 54% of aircraft flying the CNDEL departure are vectored. The Roundtable requests the FAA to use this as a baseline to compare conditions in the future when reporting back to this body regarding decreasing vector traffic.

DRAFT

Short Term

1. In the existing procedure, fly the planes on the charted CNDEL departure so that they fly over the CNDEL waypoint and reduce impacts with SSTIK coming from SFO to reduce vectoring of both procedures, utilizing the Bay to gain altitude before flying over populated areas.
2. Use the Bay and Pacific Ocean for overflight as much as possible. From the CNDEL waypoint, direct aircraft to a waypoint in the Pacific Ocean – potentially to GOBBS.
3. Use the GOBBS waypoint, located in the ocean, during nighttime hours to reduce overflights of the Peninsula.
4. In the existing procedure, avoid vectoring aircraft for non-safety reasons prior to the CNDEL waypoint.
5. When feasible, consider delaying the assignment of southbound vectors until the aircraft has reached the ocean to reduce aircraft flying down the Peninsula. Avoid vectoring aircraft over San Francisco and over the Peninsula direct to PORTE or direct to waypoints beyond PORTE.

Longer Term

1. The SFO Roundtable requests that the FAA design a transition for the CNDEL procedure that uses compatible land uses for overflights, namely over bodies of water to enable aircraft to gain altitude before flying over noise-sensitive land uses.

2. Determine if the actual flight tracks of aircraft after CNDEL waypoint could be "contained" to a more controlled area (perhaps by an additional waypoint) that would decrease potential conflicts with the SSTIK departure airspace.

COLLABORATION:

1. Work with our local Northern California FAA air traffic officials to reduce vectoring and allow planes to fly the charted procedures when safety is not an issue.
2. Work with the FAA with modeling or other tools to determine the effects of dispersal of aircraft on the CNDEL departure and what the most effective dispersal would be, so one community does not receive a disproportionate amount of overflights.
3. Work with local FAA officials and airlines to encourage higher altitudes when flying over noise-sensitive land uses and the use of compatible land use areas where feasible.
4. Work with local FAA officials and airlines to encourage flight paths which use the Bay, ocean and other compatible land use areas and to minimize altitude constraints to allow aircraft to climb unrestricted.
5. To monitor success, provide a monthly report indicating percentage of flights that achieve these stated goals; also provide data using a ¼ mile PSA for the CNDEL and Pacific Ocean waypoints.

DRAFT

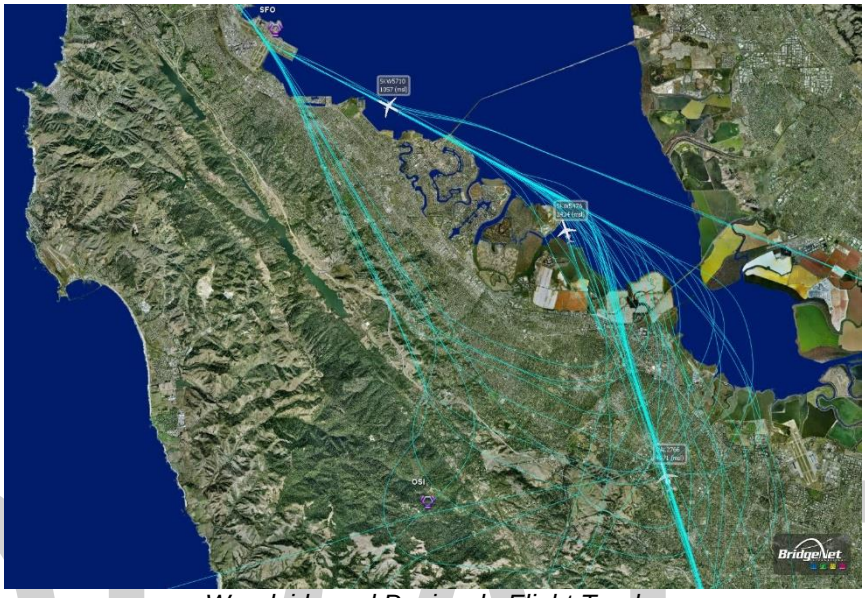
REQUESTED INITIAL FAA RESEARCH:

1. **The SFO Roundtable requests comprehensive FAA data on flight paths and altitudes of flights flying the CNDEL departures since its inception, as well as similar data from comparable historical departures that previously served the same kind of departure as the CNDEL from Runway 30 (previously Runway 29) with southbound and westbound destinations.**

2. **The SFO Roundtable requests that the FAA work with the Roundtable to explore options for other noise friendlier departure paths for flights using the OAK CNDEL departure, especially for CNDEL southbound flights. Such options might include (but are not limited to) flight over the waters of the Bay to the Pacific Ocean or flight over the Bay to SFO and then over the Peninsula (primarily Millbrae and Burlingame) to PORTE or flydown the Bay as far south as feasible, or other options that may become known.**

3. **For whichever noise friendlier options may be deemed feasible, the SFO Roundtable requests that the FAA provide appropriate noise modeling studies and other research to assist the SFO Roundtable in considering all factors in making any recommendation.**

PROCEDURE: Woodside VORTAC	**ADJUSTMENT:** 2.a.i.



Woodside and Peninsula Flight Tracks

DRAFT

DESCRIPTION: Aircraft fly in the vicinity of the Woodside VORTAC, a ground-based navigational aid, to arrive at SFO and OAK; this discussion will focus on aircraft arriving at SFO. Aircraft fly over the Woodside VOR area when arriving from the ocean as well as vectored aircraft from the south.

OCEANIC ARRIVALS: Aircraft that fly over this area from the ocean are typically flying a course and altitude as assigned by ATC. A minority of these oceanic flights are cleared via the Ocean Tailored Arrival (OTA), an optimized profile descent using idle power and crossing Woodside VOR at approximately 6,000' MSL. Oceanic arrivals not on the Ocean Tailored Arrival (OTA) that are assigned to cross Woodside VOR at or above 8,000' MSL when traffic permits. The SFO Noise Abatement Office tracks airline adherence to this procedure on a weekly basis to determine if aircraft crossed the Woodside VOR above 7,700' MSL (because of instrument tolerances an altitude at or above 7,700' is considered to be in compliance with the 8,000' requirement).[1]

SERFR AND OTHER ARRIVALS FROM THE SOUTH: Approximately half of the aircraft that fly over this area from the south, typically on the SERFR arrival, are vectored off course to achieve and maintain required separation distance from other aircraft until the aircraft can be sequenced in line for approach and landing at SFO.

BDEGA AND OTHER ARRIVALS FROM THE NORTH: Aircraft arriving from the north on the BDEGA arrival are instructed to proceed on one of two paths – an east downwind which overflies the Bay ("down the Bay") or a west downwind flying over SFO

[1] http://www.flysfo.com/community-environment/noise-abatement/reports-and-resources/woodside-vor

then southeast down the length of the Peninsula before making a “U-turn” or teardrop turn toward SFO. Vectoring is sometimes utilized when needed to achieve and maintain required separation distance from other aircraft until the aircraft can be sequenced in line for approach and landing at SFO.

PRIMARILY IMPACTED CITIES: Woodside, Portola Valley, and the surrounding area as well as numerous Mid-Peninsula Cities.

NOISE ISSUES: As with the previous procedures, it is important to note the topographic variety in the Bay Area. The areas in the south Peninsula overflown by these procedures are located on large, wooded lots that have low ambient noise levels similar to what can be found in a national park setting. There are also peaks in the area that rise to 2,000’ MSL, including the area around the Woodside VOR that is populated. In the early morning and late night hours, aircraft noise is especially prevalent given the low ambient noise levels.

SFO ROUNDTABLE REQUESTS:

Short Term

1. For daytime BDEGA and other arrivals from the north, the Roundtable requests that the FAA use all available opportunities to assign arrivals from the north to an east downwind “down the Bay.”
2. During the FAA-defined nighttime hours of 10 pm – 7 am, every effort should be made to use the Bay for 100% of the arrivals from the north, using the east downwind or the “down the Bay” procedure.
3. Vectored Traffic: The SFO Roundtable would like to work with the FAA to identify areas of compatible land uses for vector traffic, including appropriate open spaces to the west of Skyline Blvd.
4. Vectored Traffic: The SFO Roundtable would like to work with the FAA to analyze vectored traffic altitudes to determine if aircraft could be kept at higher altitudes, particularly over higher terrain.

Long Term

1. BDEGA Arrivals from the North: The SFO Roundtable requests reinstatement of BDEGA FINSH transition in order to facilitate increased use of the east downwind (“down the Bay”) to Runway 28R. The BDEGA ONE arrival originally had two transitions from CORKK waypoint – one transition to BRIXX for the west downwind and one transition to FNISH (in the middle of the Bay) for the east downwind. The current BDEGA TWO arrival no longer shows the FNISH transition.

DRAFT

COLLABORATION:

1. Work with the FAA to ensure that procedures stay over compatible land uses as much as feasible during the day. The goal during the nighttime hours is to avoid flight over noise-sensitive land uses as much as feasible, even if it means a few additional track miles.
2. Work with local elected officials from the towns, cities, and County to determine the locations of the most appropriate land uses for vector traffic.
3. Work with the FAA, elected officials, and airline representatives and dispatchers to request that during the night time hours, airlines file oceanic flight plans that follow the path of BDEGA arrival for an FAA assigned east downwind for Runway 28R (down the Bay procedure) instead of flying over the peninsula.

REQUESTED FAA RESEARCH:

1. **Determine if the BDEGA transition to FINSH can be reinstated. If so, determine a timeline for this revised procedure to be included for publication.**

2. **The SFO Roundtable requests that the FAA research to compare the previous Golden Gate arrival with the current BDEGA arrival to determine what changes have been made in actual flight tracks with regard to location of lateral paths, narrowing of path and concentration of aircraft. The previous Golden Gate arrival directed aircraft to fly a 140° *heading* after SFO/BRIXX, but the BDEGA directs aircraft to fly a 140° *track* after BRIXX. While this change seems minor, flying a track instead of a heading, it would result in a much more concentrated invariable path, contrasted with using a heading, which, depending on the direction and velocity of wind could create somewhat dispersed paths.**

3. **The SFO Roundtable requests that the FAA report on the usage of the west downwind versus the east downwind over the past five years, using the percentage and number of aircraft going down the Peninsula and down the Bay. The analysis should report the reason for any change in increased use of the west downwind leg, which places aircraft over the Peninsula, versus decreased use of the Bay for the east downwind leg.**

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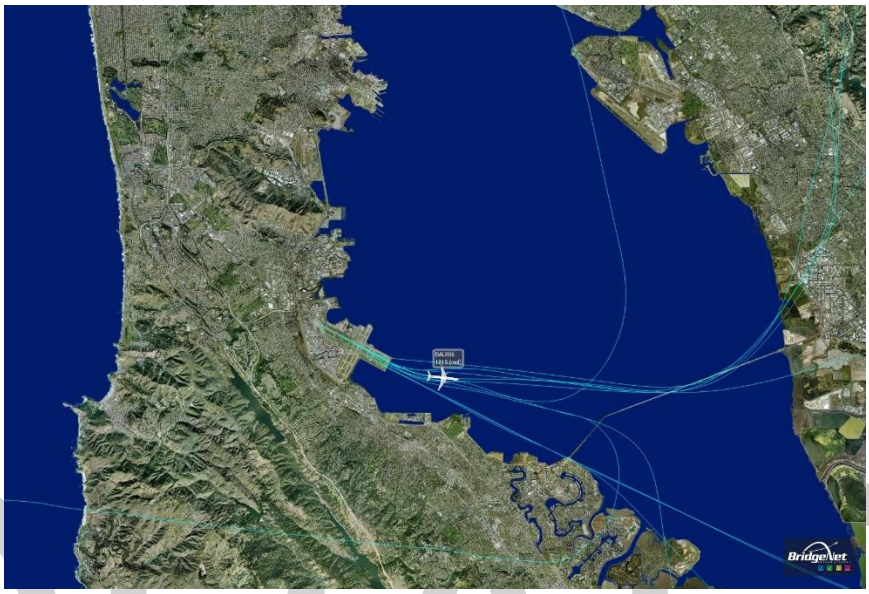
PROCEDURE: Opposite Direction Operations	**ADJUSTMENTS:** 2.e.i., 2.e.ii., 2.e.iii., 2.g.i., 2.g.ii.



Runway 10L/R Radar Flight Tracks

DRAFT

DESCRIPTION: SFO has had a long-standing nighttime preferential runway use program in place. This program's goal is to utilize the Bay as much as possible for nighttime procedures to keep aircraft over compatible land uses and not fly over populated areas. For SFO, this means use of the Bay for arrivals and departures as much as possible. The preferred nighttime runway use is to depart to the east from Runway 10 L/R over the Bay, and arrive from the west on Runway 28 L/R, which is the typical arrival runway. This type of operation is called Opposite Direction Operations (ODO) when aircraft depart and arrive over the same flight path but at different points in time.

The ability to use opposite direction operations is limited. Its use is largely dependent on three factors: wind direction and velocity, performance capabilities of the aircraft (primarily whether it can safely takeoff with even a small amount of tailwind or needs a headwind), and the availability of the air traffic control-monitored safety margin – to maintain the legally mandated separation between the airplane taking off on Runway 10 L/R and any inbound aircraft planning to land on Runway 28 L/R.

ODO regulations have changed over the years since the inception of SFO's nighttime preferential runway use program. It is more regulated and the arriving and departing aircraft must have more distance between them to use ODO. These regulations, combined with weather patterns and aircraft performance determine if ODO can be used.

ODO procedures were not replaced with a new procedure in the Metroplex document.

PRIMARILY IMPACTED CITIES: Daly City, Pacifica, San Bruno, San Francisco, South San Francisco.

NOISE ISSUES: The San Francisco Bay area is an area rich in diverse topography. This impacts how cities under the departure path experience aircraft noise; there are numerous ridges and peaks leading to valleys that experience aircraft noise differently than if it was all flat land, including San Bruno Mountain close to the airport and Sweeny and Milagra ridges closer to the ocean. At night, some aircraft that require a longer runway that aren't on an ODO departure typically depart "out the gap" on Runway 28 L/R (i.e. straight out), flying west over numerous densely populated cities. These aircraft include those that are flying long distances to Asia and are large, fully loaded wide body aircraft. The ability to utilize Runway 10 L/R more will greatly alleviate thousands of residents being disturbed by Runway 28 gap departures in the middle of the night.

SFO ROUNDTABLE REQUESTS:

DRAFT

Short Term

1. The SFO Roundtable requests that, during the nighttime hours and traffic permitting, TRACON use a longstanding TRACON procedure for aircraft taking off on Runway 10 L/R by vectoring them north up the Bay (using an approximate 330°heading) and then, if westbound, vectoring them to the Pacific Ocean. The following excerpts from presentations and TRACON documents show the existing precedent for using this type of procedure.

   SFO Tower Noise Abatement Primer (4/3/13) presented to SFO Roundtable Training:
   "330 and 050 heading on mid-shift"

   NCT 7110.65D (8/20/15):
   Between the hours of 2200 and 0700 local (Sundays to 0800), vector oceanic departures over the Bay to pass over the north end of the Golden Gate Bridge.

   SFO Tower Noise Abatement Primer (4/3/13) presented to SFO Roundtable Training:
   Mid-shift runway 10 oceanic departures taken over north tower GGB (NCT)

2. Keep the existing SFO ANAO nighttime preferential runway use in place, including Runway 10 L/R as the preferred nighttime runway for takeoffs.
3. The SFO Roundtable requests that the FAA work with the Roundtable to coordinate outreach efforts to educate dispatchers and pilots on the importance

of considering the use of a Runway 10 L/R ODO departure to the impacted communities.

Long Term

1. Create a procedure that includes the ability of aircraft to depart Runway 10 L/R on a heading that isn't in the direct path of aircraft arriving on Runway 28, such as making an immediate left turn after takeoff or flying to the east of the Runway 28 arrival path to provide lateral separation; for vertical separation, use altitude restrictions for the departing aircraft.

COLLABORATION:

1. Work with TRACON and the Western Service Center to look at operational solutions to ODO, including a procedure for aircraft to use Runway 10 L/R that does not use the same flight path as a Runway 28 L/R arrival.
2. Work with the FAA officials to ensure consistent use of effective noise abatement procedures such as the long-standing TRACON nighttime noise abatement procedure for aircraft taking off from Runway 10, to fly an approximate 330° heading up the Bay and thence out the Golden Gate Bridge.

REQUESTED FAA RESEARCH:

1. **There is no additional research requested.**

DRAFT

PROCEDURE: NIITE	**ADJUSTMENTS:** 1.f.iii, 2.a.ii., 2.a.ii.(c)., 2.f.i., 2.f.vi.



NIITE Procedure

DRAFT

DESCRIPTION: The NIITE departure is designed to be used only during nighttime hours as a noise abatement procedure when the volume is light and typically used by aircraft departing Runway 01 L/R at SFO during nighttime hours as a noise abatement procedure; aircraft will use the NIITE departure off Runway 28 L/R, but it is more commonly used off Runway 01. After takeoff, the aircraft flies northeast to a waypoint approximately six miles northeast of SFO called MDBAY. At this point aircraft turn towards the north to the NIITE waypoint, located approximately 12 miles north of MDBAY just north of Treasure Island, then northbound or eastbound aircraft turn to the north to the REBAS waypoint over Richmond, and westbound aircraft fly west to the GOBBS waypoint located approximately 11 miles west of the Golden Gate Bridge in the Pacific Ocean.
This procedure replaced the conventional navigation QUIET departure.

PRIMARILY IMPACTED CITIES: Brisbane, Daly City, Pacifica, San Francisco, South San Francisco and other mid-Peninsula communities.

NOISE ISSUES: Aircraft overflying compatible land uses reduce the number of citizens experiencing aircraft overflights during nighttime hours. Aircraft that can use the NIITE procedure instead of flying over the peninsula can reduce noise impacts for thousands of residents each night. Aircraft flying over the peninsula are overflying areas rich in diverse topography. This impacts how cities under the departure path experience aircraft noise; there are numerous ridges and peaks leading to valleys that experience aircraft noise differently that if it was all flat land.

SFO ROUNDTABLE REQUESTS

Short Term

1. Southbound Transition: While undergoing the formal process of amending the NIITE departure to add a transition for southbound aircraft, the SFO Roundtable requests that NORCAL TRACON work with the SFO RT to determine if an interim informal procedure based on TRACON vectors might be feasible to approximate the NIITE departure which would be heading up the Bay to NIITE, then west to GOBBS, then south-south-east to PORTE remaining offshore. The SFO Roundtable recognizes that even this shorter term request brings challenges to TRACON as well as to airline dispatchers and pilots filing their flight plan and flying such an interim departure procedure.
   For aircraft flying to southern destinations during nighttime hours, the SFO Roundtable requests TRACON use the existing transition from the NIITE waypoint to GOBBS waypoint, located in the ocean, past the Golden Gate Bridge. Aircraft would fly this transition from the NIITE waypoint instead of flying over the Peninsula on a PORTE or SSTIK procedure during nighttime hours.

2. Keep aircraft on the NIITE procedure as much as possible to reduce vectoring; aircraft remaining on the NIITE procedure until the REBAS waypoint located near the city of Richmond will keep aircraft over compatible land uses.

3. Runway 10: While undergoing the necessary research and procedure development to enable Runway 10 L/R departures to use the published NIITE departure, the SFO Roundtable requests that NORCAL TRACON use its longstanding noise abatement procedure to vector Runway 10 L/R departing aircraft up the Bay (approximate heading of 330°), then vector as needed for route of flight such as from NIITE to GOBBS (if the destination is to the west or south), in accordance with guidance for westbound aircraft in NCT 7110.65: *Between the hours of 10:00 pm 7:00 am local (Sundays to 8:00 am), vector oceanic departures over the Bay to pass over the north end of the Golden Gate Bridge.*

4. While not increasing the actual number of aircraft using Runway 01 L/R, the Roundtable urges the FAA to continue to use the Runway 01 L/R 050° heading option for southbound flights at night instead of the SSTIK procedure for south-bound departures.

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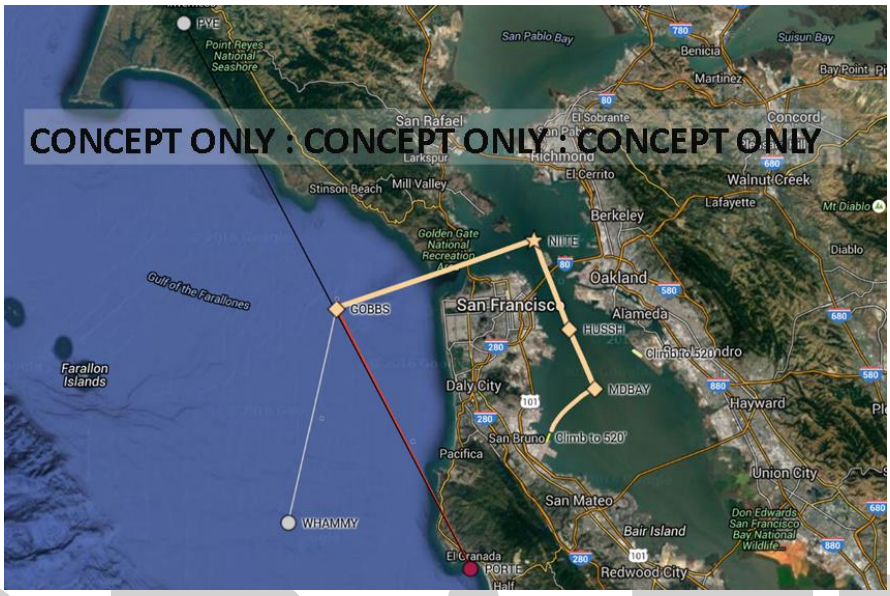
Long Term



BEIGE LINE *(approximate): Depicts current SFO NIITE Departure.* ***RED LINE*** *(approximate): Depicts* ***one concept option*** *for the NIITE Departure South Transition.* ***LIGHT GRAY LINE*** *(approximate): Depicts* ***one concept option*** *for the NIITE Departure South Transition*

1. NIITE Southbound Transition: The SFO Roundtable is in agreement with FAA *Initiative* Adjustment 2.f.i and formally requests that the FAA add a transition to the NIITE departure for southbound aircraft.

   Without presuming to technically design such a south transition, it would seem that this highly desirable southbound destination transition *might* be comprised of a single, simple "add-on" leg, using the existing NIITE departure to the GOBBS waypoint, and thence via already largely existing waypoints and flight paths mirroring much of the PORTE departure to PORTE intersection. In addition, the routing of the OFFSHORE departure may present an additional option. The SFO Roundtable understands that the design of professional flight procedures encompasses far more than a line drawn on a map, and understands that airspace use and airspace restrictions are significant challenges in this process.

   The possible southbound transition for the NIITE departure depicted above contains just two concepts to consider. The "add-on" paths depicted seem desirable not only because they keep aircraft largely over the Pacific Ocean, but also because a significant portion of the "add-on" paths are routinely used in the PORTE and OFFSHORE departures. Many other paths for this southbound transition could be designed that would also keep aircraft over the ocean.

   Once implemented, the concept for the NIITE southbound transition would be that during night time hours, the airline dispatcher would file for the NIITE departure with the new southbound transition. At the time of takeoff, if conditions and SFO Tower/TRACON workloads permit, an aircraft departing Runway 01 L/R will be offered the option of the 050° heading down the Bay departure instead of

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the filed NIITE/south transition.

2. NIITE Departure with Runway 10 takeoffs authorized: The SFO Roundtable requests that the NIITE departure and all transitions be amended to include authorization for its safe use by aircraft taking off from Runway 10 L/R.

COLLABORATION:

1. To monitor success, provide a monthly report indicating percentage of nighttime flights that fly the NIITE, 050 Heading and SSTIK procedures.

NIITE Southbound Transition & NIITE Departure with Runway 10 takeoffs authorized:

2. The SFO Roundtable requests that the FAA work in close collaboration with the SFO Roundtable in all aspects of the design of the new NIITE southbound transition and Runway 10 L/R NIITE authorization.

3. The SFO Roundtable requests that all research and reports related to the design of this southbound transition be made available to Roundtable members and consultants.

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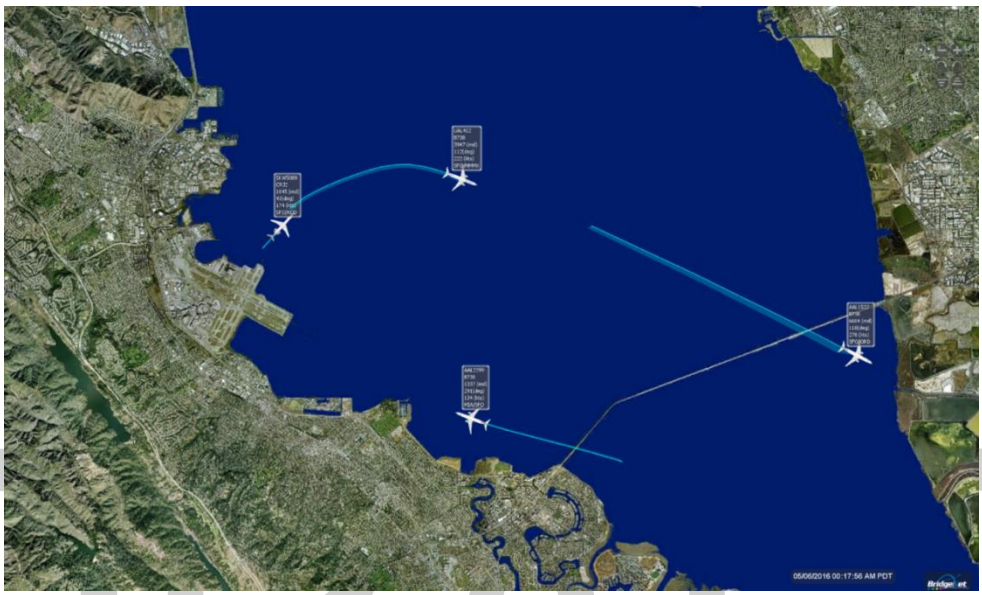
REQUESTED INITIAL FAA RESEARCH:

1. **The FAA is requested to research airspace issues for the NIITE procedure, including:**
   a. **Aircraft flying a NIITE procedure using the GOBBS intersection.**
   b. **Any conflicting airspace for this departure that would mirror the PORTE and OFFSHORE procedures.**

2. **The FAA is requested to report the conditions and concerns that caused the removal authorization of Runway 10 from the NIITE departure.**

PROCEDURE: 050° Heading Off Runway 01	**ADJUSTMENTS:** 2.e.ii., 2.g.ii.



Runway 01 L/R Flight Tracks

DESCRIPTION:
Aircraft departing during nighttime hours on Runways 1L/1R for southern destinations typically fly the SSTIK departure; the NIITE departure, the published noise abatement procedure, is typically only used for aircraft with northern or eastern destinations. During nighttime hours only and when traffic permits, ATC can assign a Runway 1L/1R departure to fly an initial heading of 050° with further right turns down the Bay until reaching a higher altitude and then direct them on course to their destination. This 050° initial heading can also be used to allow eastbound aircraft to gain additional altitude before turning them onto an easterly heading which reduces noise impact for East Bay residents. The 050° initial heading was originally created through collaboration between the Roundtable and TRACON, to help reduce noise impacts at night.

Typically, aircraft departing from OAK will also use the Bay for aircraft to climb before flying over land.

IMPACTED CITIES: Brisbane, Daly City, Pacifica, San Bruno, San Francisco, South San Francisco and other north Peninsula cities.

NOISE ISSUES: Aircraft using compatible land uses reduce the number of citizens experiencing aircraft overflights during nighttime hours. Aircraft that can use the 050° heading procedure instead of flying over the Peninsula and San Francisco can reduce noise impacts for thousands of residents each night. Aircraft flying over the Peninsula are overflying areas rich in diverse topography. This impacts how cities under the

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departure path experience aircraft noise; there are numerous ridges and peaks leading to valleys that experience aircraft noise.

SFO ROUNDTABLE REQUESTS:

Short Term

1. Use the 050° heading at night to the maximum extent feasible for aircraft departures to southern destinations instead of SSTIK or PORTE departure procedures that fly over the Peninsula and San Francisco. The request for maximum use of the 050° heading departure procedure is not a request to increase the number of flights using Runways 1L/1R since back blast from runways 1L/1R departures have a noise impact on the cities southwest of the departure end of Runways 1L/1R.
2. While undergoing the formal process of creating a published 050° departure procedure for Runway 1L/R southbound flights, it is requested that this procedure be codified into TRACON SOPs and training.

Long Term

1. Create a charted procedure for the 050° heading procedure. This charted procedure will maintain the FAA's NextGen goal of reduced data/communications between pilots and controllers and give pilots and dispatchers a procedure to code into their flight management systems.

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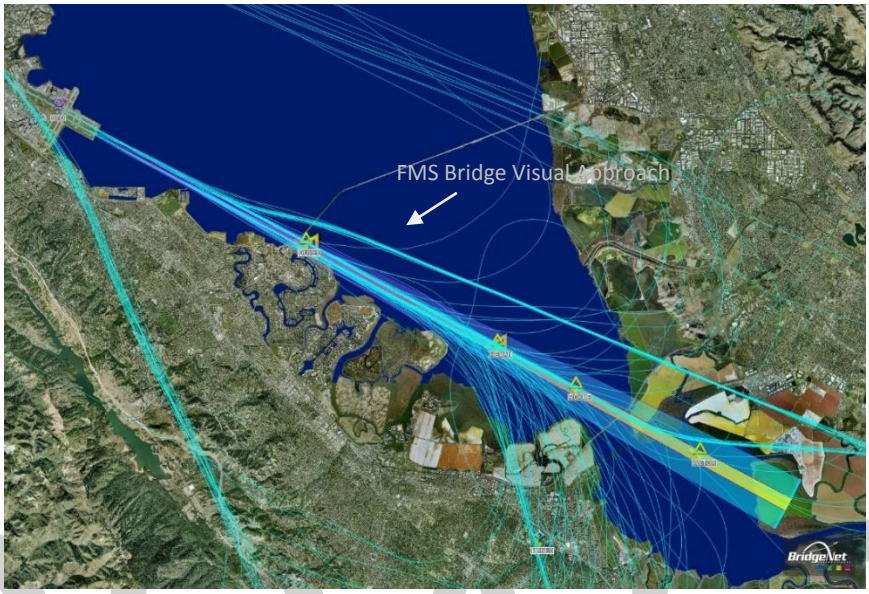
COLLABORATION:

1. Work with the local FAA to maximize the use of the 050° heading for aircraft departing at night on Runways 01L/1R. Aircraft using the 050° heading would use that departure instead of flying over the Peninsula and is not intended as a replacement for Runway 28 departures, rather serve the fleet that uses it today, which are typically narrow body aircraft.

REQUESTED FAA RESEARCH:

1. **There is no additional research requested.**

PROCEDURE: Visual Arrivals, Foster City Arrivals	**ADJUSTMENTS:** 1.b.iii., 1.b.iv., 1.b.v.



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DESCRIPTION: Runways 28L and 28R are the primary runways for landing at SFO when the airport is using the West Plan which is 85% of the time. Runways 28L and 28R are each served by a precision electronic Instrument Landing System (ILS). The lateral path for the Runway 28L ILS goes over the city of Foster City while the lateral path for Runway 28R ILS is slightly offshore. An ILS approach is used when the SFO weather is IMC (Instrument Meteorological Conditions) and pilots cannot visually see the airport and must rely on their instruments to be guided to the runway.

During VMC (Visual Meteorological Conditions), aircraft flying visually to 28L will generally replicate the Runway 28L ILS lateral path which provides separation from the Runway 28R lateral path. Aircraft flying visually to Runway 28R can fly offset visual approaches such as the FMS Bridge Visual Runway 28R or the RNAV (RNP) Runway 28R. These Runway 28R offset visual courses fly closer to the center of the Bay and do not intercept the Runway 28R ILS lateral path until just past the San Mateo Bridge. There is no offset approach for Runway 28L.

PRIMARILY IMPACTED CITIES: Foster City and other bayside cities.

NOISE ISSUES: Aircraft in a landing configuration is also known as a 'dirty' configuration, which means that the landing gear and flaps are deployed for the impending landing. Each of these pieces of the aircraft that extrude - the flaps, speed brakes, landing gear and the engines all contribute to noise generated by an aircraft on arrival. When air travels over these extended surfaces, it is disrupted by the different surfaces coming into contact with the air. The more surfaces come in contact with the air, the louder the aircraft will be to those on the ground. At this point, aircraft are

approximately seven miles from the airport at altitudes below 2,000' mean sea level. This can be very disruptive to sleep as well as to activities of daily life.

SFO ROUNDTABLE REQUESTS:

Short Term:

1. Dual Visual Approaches: Whenever there are arrivals to both Runway 28L and 28R, and VMC conditions allow, aircraft for Runway 28R should be assigned to fly the FMS Bridge Visual Runway 28R or RNAV (RNP) Runway 28R (as capable), Quiet Bridge Visual or other noise friendlier approach to land on Runway 28R.
2. Single Stream Visual Approaches: Regardless of the time of day, and when conditions and traffic allow, whenever there is a single stream operation to only one runway, aircraft should arrive only on Runway 28R and should be assigned to fly the FMS Bridge Visual 28R or RNAV (RNP) Rwy 28R (as capable), Quiet Bridge Visual or other "noise friendlier" approach to land on Runway 28R.
3. During the nighttime hours ATC should make every effort to coordinate traffic arrivals to create a single stream of traffic to land only on Runway 28R. Depending on weather conditions, aircraft would be expected to fly the FMS Bridge Visual 28R, the RNAV (RNP) Runway 28R, (or if conditions require) the ILS 28R or other approach to Runway 28R which minimizes noise impact to Foster City and other Bayside communities.
4. With air traffic control anticipating these arrivals to the right runway, efforts can be made to reduce any time spent waiting for aircraft to depart Runway 28L and coordinate these arrivals and departures.

Long Term

1. Research the feasibility of creating dual offset RNAV, RNAV (RNP) or other type of approach to Runway 28L and to Runway 28R which would create two offset paths closer to the middle of the Bay and would remain clear of Foster City and other bayside communities until past the San Mateo Bridge when aircraft would then line up with each runway for landing.

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***TEAL LINE*: existing 28L ILS. *PINK LINE*: existing 28R ILS. *GRAY LINE*: existing RNAV (RNP) Y RWY 28R. *ORANGE LINE*: existing FMS Bridge Visual Approach 28R. *GREEN LINE*: Concept for a possible 28L offset RNAV approach. *BLUE LINE*: Concept for a possible 28R offset RNAV approach. ALL POINTS AND LINES APPROXIMATE.**

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COLLABORATION:

1. Work with the local FAA to conduct controller outreach to emphasis the use of Runway 28R instead of Runway 28L during periods of single stream operations and the critical nature of nighttime operations which might require managing arrival traffic to create a single stream of traffic to 28R.

2. Work with the FAA to determine the feasibility -- and if feasible, the design details of dual Runway 28L and 28R offset approaches closer to the middle of the Bay.

3. Work with the FAA and airlines to create an RNP approach for Runway 28L that uses the Bay to keep planes from flying over Foster City.

REQUESTED FAA RESEARCH:

1. **There is no additional research requested.**

PROCEDURE: NIGHTTIME OFFLOADS/ROUTES	**ADJUSTMENTS:** 3.d.i.



Nighttime Flight Tracks

DESCRIPTION: Aircraft arriving from the oceanic procedures fly over Woodside VOR (OSI) and vicinity typically at 8,000' MSL (with aircraft on the optimized profile descent Oceanic Tailored Arrival crossing at about 6,000' MSL). Aircraft typically proceed to fly over MENLO intersection at 4,000' MSL during instrument metrological conditions (IMC) or 5,000' MSL during visual metrological conditions (VMC) and then fly a visual or ILS approach to Runway 28L or Runway 28R. Oceanic arrivals will almost invariably fly over the Woodside (OSI) VOR. But in visual conditions, planes do not always fly directly from Woodside VOR to MENLO, but are often vectored on alternate paths that allow them to fit into the traffic flow.

PRIMARILY IMPACTED CITIES: Menlo Park, Palo Alto, East Palo Alto, Redwood City, Woodside and other mid-Peninsula cities.

NOISE ISSUES: Aircraft fly the Oceanic arrivals during periods of low traffic volumes, typically at night, during late night and early morning hours. The areas in the south peninsula overflown by these procedures are located on large, wooded lots that have low ambient noise levels similar to what can be found in a national park setting. There are also peaks in the area that rise to 2,000' MSL, including the area around the Woodside VOR that is populated. In the early morning and late night hours, aircraft noise is especially prevalent given the low ambient noise levels that can be extremely disruptive to sleep. Although the total number of nighttime flights may not seem high, the impact of these overflights throughout the night is devastating to the residents. As an example, on July 19, 2016, between the hours of 4:33 am and 6:53 am, there were

seven flights from the Hawaiian Islands that flew over this area as close as 10 minutes apart as shown below:

- UAL 1557 landed at 4:26am
- UAL 396 landed at 4:33am
- UAL 1746 landed at 4:43am
- UAL 1724 landed at 5:03am
- VIR 48 landed at 5:40am
- UAL 1580 landed at 6:05am
- UAL 1575 landed at 6:53am

SFO ROUNDTABLE REQUESTS

Short Term:

1. During the nighttime hours, the SFO RT requests that arriving oceanic aircraft be kept as high as possible over land and are vectored so as to approach and land only on Runway 28R.

2. During the nighttime hours, the SFO RT requests that NORCAL TRACON controllers make every effort to keep these inbound aircraft at the preferred noise abatement altitudes over land and vector the aircraft out to the vicinity of TRDOW before turning them in for a visual or instrument approach to Runway 28R.

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YELLOW LINE *(approximate): Depicts typical oceanic arrival crossing over OSI (8,000' MSL or about 6,000' MSL if on the Tailored Arrival), then flying over MENLO (4,000' MSL IMC or 5,000' MSL VMC) to intercept ILS Runway 28L.* ***TEAL LINE*** *(approximate): SFO ILS Runway 28L.* ***ORANGE lines*** *(approximate) refer to the FMS Bridge Visual Runway 28R****; PINK AREA:*** *over the southern waters of the bay— outlines a* ***concept for a possible area*** *in which to extend flight miles flown to allow descent and then to intercept the FMS Bridge Visual to Runway 28R, the Runway 28R ILS or other Runway 28R approach to cross vicinity of TRDOW waypoint at approximately 6,000' MSL.*

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Longer Term:

1. During the nighttime hours, in order to achieve the preferred noise abatement altitudes over OSI and MENLO to reduce the noise impact to residents in the underlying communities, the SFO Roundtable requests that the FAA, especially NORCAL TRACON, engage with the SFO Roundtable in a collaborative effort to determine a formal or informal procedure that can be used consistently to achieve this goal. This concept is shown graphically in the illustration above.

   The amount of altitude increase over the noise-sensitive land uses will be related to the available additional distance flown to lose that altitude through whatever lateral path is designed. Creating a published approach or otherwise providing this information in advance to pilots will assist pilots in planning for a higher than normal altitude over land and an expedited descent after reaching the Bay shoreline.

2. **Nighttime Oceanic Arrivals**: The Roundtable requests the FAA use the BDEGA arrival for aircraft arriving from Hawaii and the far east during nighttime hours to remain over the Ocean and Bay. The Roundtable will encourage airlines to file

oceanic flight plans that tie into the BDEGA STAR with an east downwind to a landing on Runway 28R. The Roundtable will work with the FAA to make this flight plan filing and use as simple and automatic as can be designed.

3. The SFO Roundtable will consider making recommendations regarding the nighttime use of the Oceanic Tailored Arrival after receiving research information on this issue as requested below.

COLLABORATION:

1. Extensive collaboration will be required between the FAA TRACON and other FAA staff as well as the SFO Roundtable to implement an effective procedure to increase the altitude over noise sensitive land use areas.

REQUESTED INITIAL FAA RESEARCH:

1. **The SFO Roundtable requests that the FAA provide a list for the past 12 months of which aircraft have flown at least a portion of the Oceanic Tailored Arrival into SFO. This list should include date, time, airline, flight number and if the Oceanic Tailored Arrival was flown past OSI, flown past MENLO or flown completely to intercept the ILS to Runway 28R (or if any intercepted to Runway 28L), and if it can be determined, if the weather conditions were IMC or VMC. It would be appreciated if this information could be integrated with the SFO Noise Office data from noise monitors to correlate aircraft noise data.**

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