



AGENDA

TECHNICAL WORKING GROUP OF THE

SANTA CLARA/SANTA CRUZ COUNTIES AIRPORT/COMMUNITY ROUNDTABLE

December 15, 2020
1:30 PM – 3:30 PM PDT

This meeting will be conducted in accordance with State of California Executive Order N-29-20, dated March 17, 2020. All members of the Committee will participate by video conference, with no physical meeting location.

Members of the public wishing to observe the meeting live may do so at:

[Youtube.com → Cities Association of Santa Clara County Channel](https://www.youtube.com/channel/UC1m1m1m1m1m1m1m1m1m1m1m)

Members of the public wishing to comment on an item on the agenda may do so in the following ways:

1. Email comments to scscroundtable@gmail.com by 1:30 p.m. on December 14, 2020. Emails will be forwarded to the Committee. Emails received after 1:30 p.m. and prior to the Chair announcing that public comment is closed for each item may be read into the record by the Chair at the meeting (up to 3 minutes) at the discretion of the Chair. **IMPORTANT: Identify the Agenda Item number in the subject line of your email. All emails received will be entered into the record for the meeting.**
2. Provide oral public comments during the meeting, click the following link to register in advance to access the meeting via Zoom Webinar: https://esassoc.zoom.us/webinar/register/WN_EfHN3KD1SQ2mYiwdIPvitA
 - a. You will be asked to enter an email address and a name. Your email address will not be disclosed to the public. After registering, you will receive an email with instructions on how to connect to the meeting.
 - b. When the Chair announces the item on which you wish to speak, click the “raise hand” feature in Zoom. Speakers will be notified shortly before they are called to speak.
 - c. When called to speak, please limit your comments to the time allotted (up to 3 minutes, at the discretion of the Chair).

Or join by Telephone:

US: +1 213 338 8477 or +1 669 219 2599 or +1 206 337 9723 or +1 346 248 7799 or +1 470 250 9358 or +1 646 518 9805 or 833 548 0276 (Toll Free) or 833 548 0282 (Toll Free) or 877 853 5247 (Toll Free) or 888 788 0099 (Toll Free)

Meeting ID: 896 1518 7500

*6 toggles mute and unmute

*9 raises your hand.

SPECIAL NOTICES TO PUBLIC: In compliance with the Americans with Disabilities Act, those requiring accommodation for this meeting should notify the City of Los Altos to make reasonable arrangements and ensure accessibility to this meeting. If you need special assistance to participate in this meeting, please contact the City Clerk 72 hours prior to the meeting at (650) 947-2720.

- | | |
|--|-------------|
| 1. Call to Order and Identification of Members Present (2 min.) | Information |
| 2. Review of Procedures to Facilitate Online Participation by Technical Working Group Members and the Public (2 min.) | Information |
| 3. Changes to the Order of the Agenda (5 min.)
Entertain any motions to change the published order of the agenda

Public Comment | Information |
| 4. Discussion of Items Assigned from the Work Plan / Or By the SCSC Roundtable Chairperson on Exception/Time-sensitive Topics (1 hour and 25 minutes). | Information |

1. Review of SFO project to implement GBAS/GLS arrival procedures, with focus on 28L and 28R (SCSC Roundtable Work Plan 1.3.2 and 2.6.2).
SFO has a project to acquire and implement GBAS equipment and is working with FAA to develop associated GLS procedures. Recent briefings at the SFO Roundtable and the SFO Technical Working Group show potential impacts to communities within the SCSC Roundtable. SCSC TWG will:

- Review the recent SFO TWG briefing;
- Prepare a summary of potential impacts on SCSC Roundtable communities;
- Develop technical questions to be asked of the SFO project staff (with the possibility of live response during the full RT meeting in January);
- Recommend to the full SCSC Roundtable any feedback to be given to the SFO project staff, which may include solicitation and compilation of community input.

The SFO schedule for community and roundtable input anticipates completion of their activity for community and roundtable input in January and February 2021. Therefore, the SCSC TWG needs to begin work on this item immediately, with the expectation that it can be agendaized to the full SCSC Roundtable in January 2021. The current SFO schedule would not allow for delay in providing such input until March 2021. TWG would likely begin work on this item in a December 2020 meeting and complete its work at a second meeting (in early January), prior to the January 2021 full RT meeting.

Public Comment

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2. Develop a list of concerns (with examples where possible) regarding the FAA Environmental Review Process that can be further developed by the Legislative Subcommittee (SCSC Roundtable Work Plan 2.3).
 - Receive refresher briefing from ESA on the current FAA Environmental Review Process
 - Compile information gained from FAA briefings, FAA responses to the Ad Hoc and Select Committee recommendations, FAA responses to Roundtable and community correspondence, and other publicly available data regarding the various Environmental Review processes as they have been applied and impacted SCSC Roundtable communities.
 - Analyze the information and provide a technical summary that can then be used by the Legislative Committee.

TWG anticipates that this initial meeting (Dec. 15, 2020) will include a short review of the existing process, identification of relevant information, and plan for analysis and compilation of a draft document. The second meeting will focus on finalizing the report to be referred to the Legislative committee. Target date for completion of the report will be determined at the first TWG meeting in December 2020.

Public Comment

5. Oral Communications from the Public Regarding Items Not on the Agenda (15 min.) Information

This portion of the meeting is reserved for persons wishing to address the Technical Working Group on any matter not on the agenda, including suggestions for future agenda items. Speakers are allowed to speak on any such topic for up to three minutes. If there are a large number of speakers, speaking time may be reduced at the discretion of the Chair. State law prohibits the Technical Working Group from acting on or discussing non-agenda items.
6. Future Agenda Items (10 min.) Information

Suggestions from members on items they would like to see on future agendas of the Technical Working Group. Extended discussion will not be allowed nor will action will be taken on any of the items suggested.
7. Adjournment

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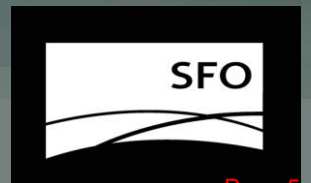
Agenda Item 4-1. Review of SFO project to implement GBAS/GLS arrival procedures, with focus on 28L and 28R



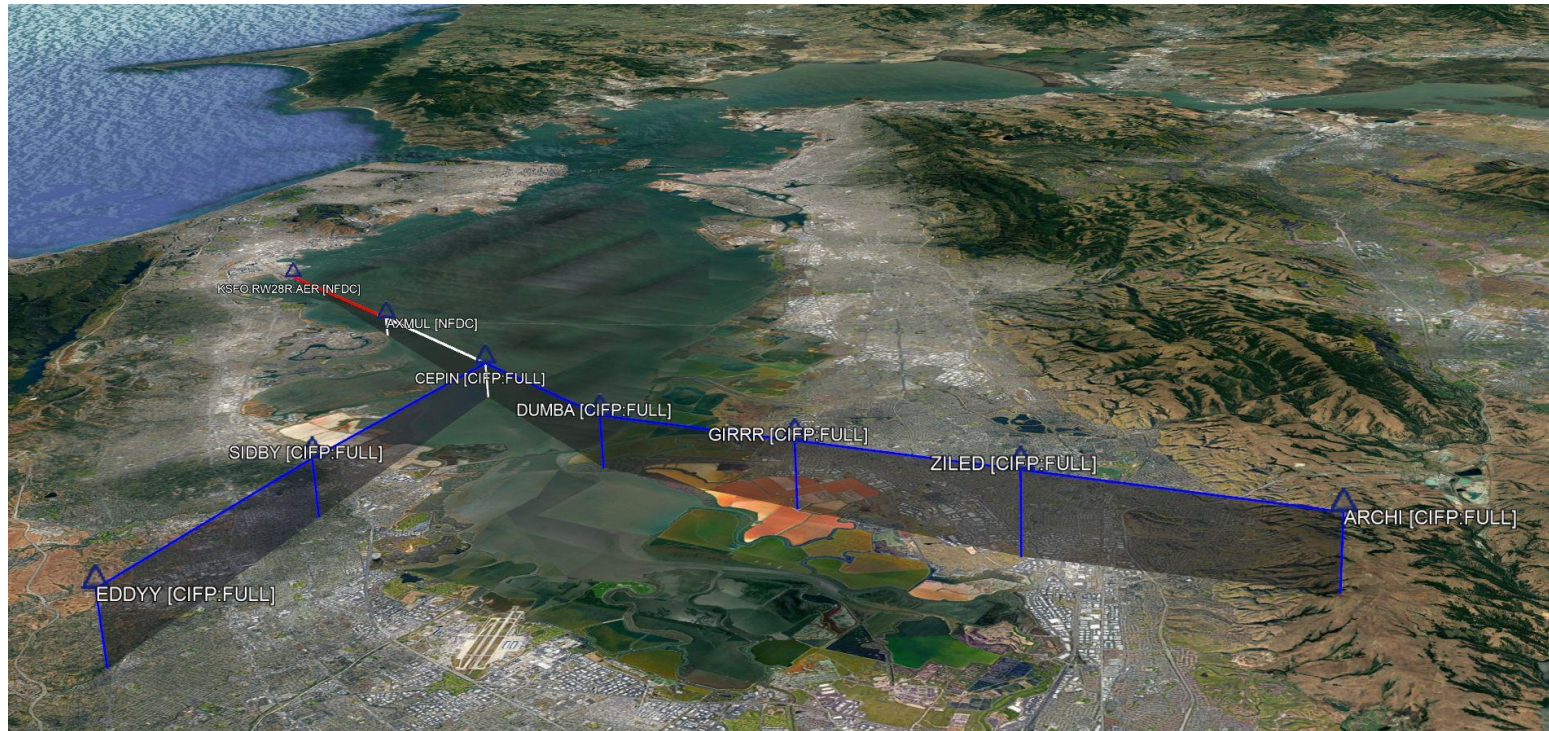
San Francisco International Airport GBAS Procedure Review

SFO Roundtable Technical Working Group

November 19, 2020



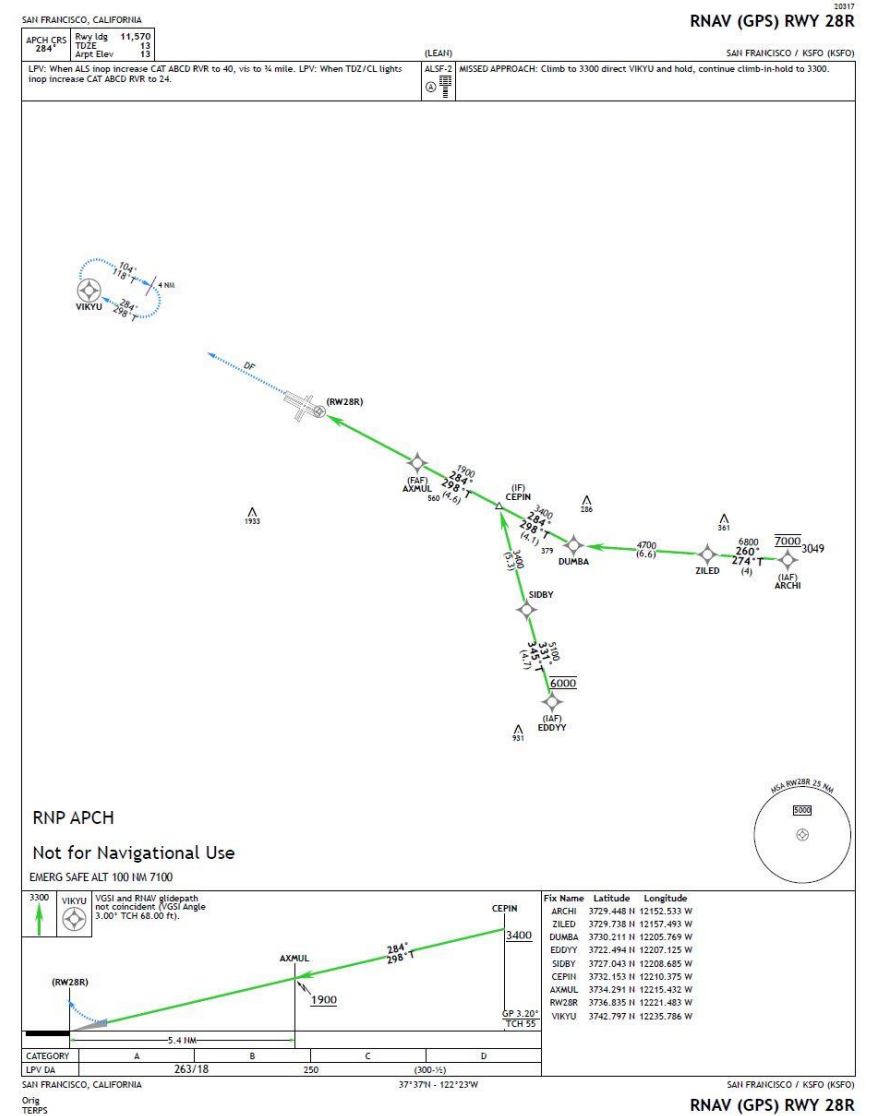
SFO GLS Concept: 28R



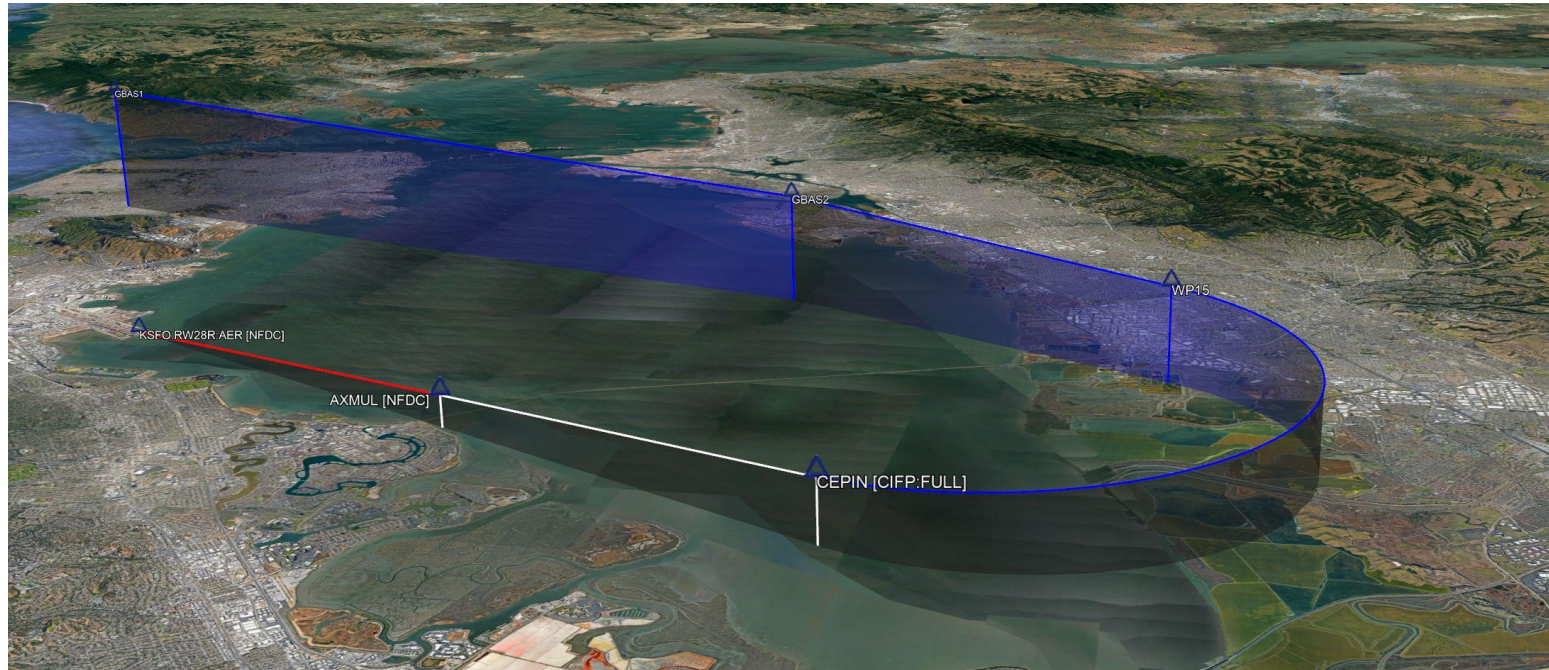
28R GLS Procedure Image TARGETS, Background Image Google Earth

GLS B RWY 28R

- GPA: 3.20°
- Opportunity: 95%
- CSPR: TBD
- Final approach, and preceding altitudes are increased
- Can not change location or altitude at EDDYY or ARCHI
- Can not change location of any other waypoints



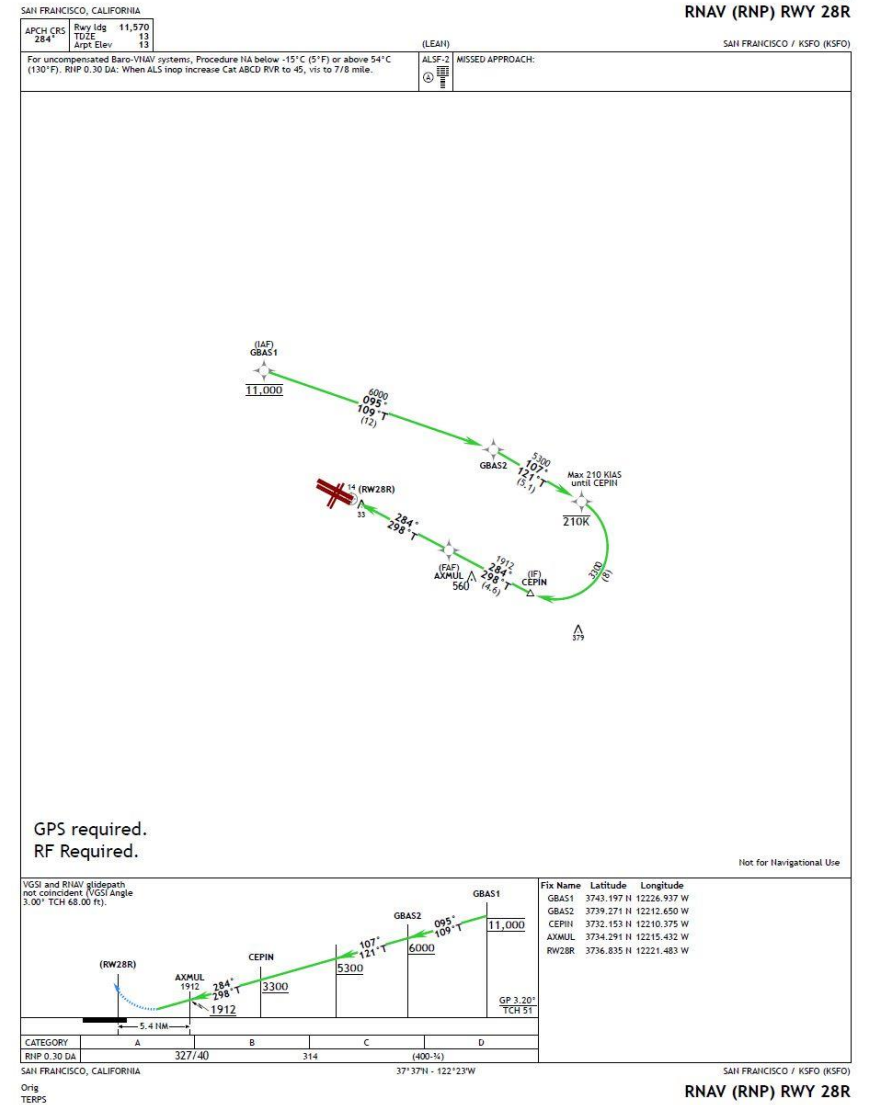
SFO GLS Concept: 28R "Down the Bay"



28R GLS Procedure Image TARGETS, Background Image Google Earth

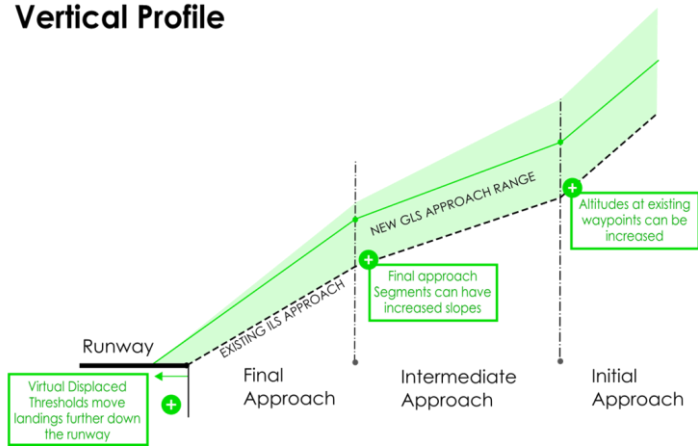
GLS B RWY 28R "Down the Bay"

- GPA: 3.20°
- Opportunity: 95%
- CSPR: No
- Intended to mirror existing vectors from BDEGA Arrival to 28R at CEPIN
- Can not start the approach at CORKK (New Waypoint – GBAS 1)
- Can not change location of CEPIN or AXMUL



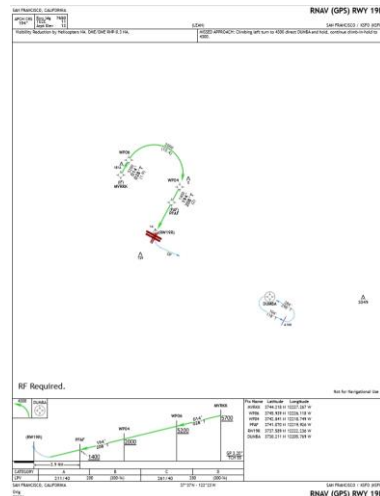
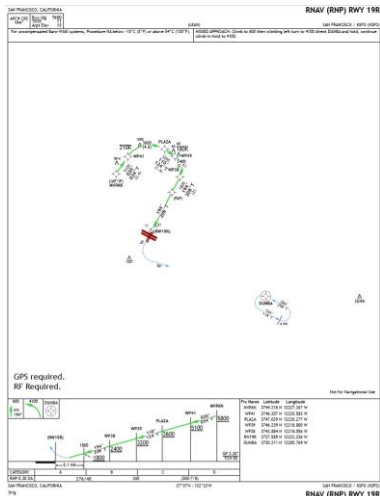
GBAS Innovative Approach Evaluation Status

GBAS Approach Vertical Profile



Group 2 Innovative Approach Concepts (Beyond 5 Years)

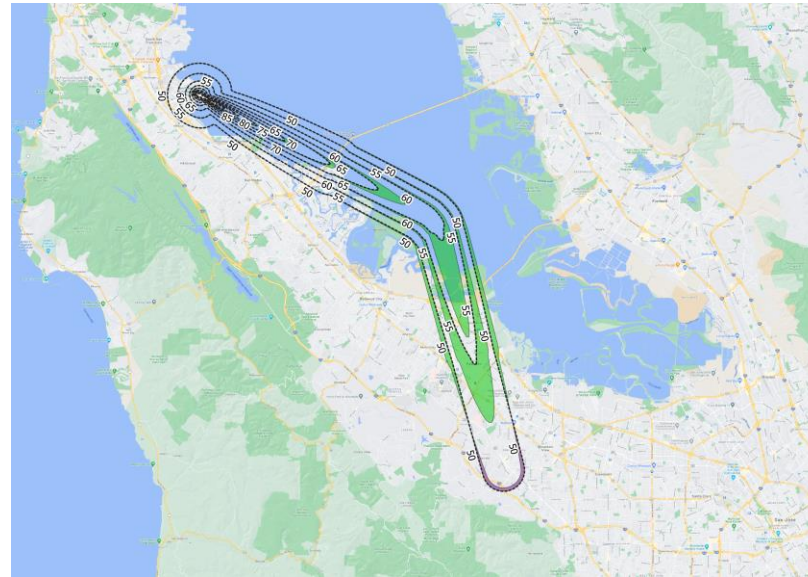
- GLS CAT II with a 3.00⁰ or 3.10⁰ GPA
- 19R RNP to GLS
- Virtually Displaced Threshold
- Short final RNP to GLS
- Additional concepts that emerge from exploration with residents, airlines and air traffic



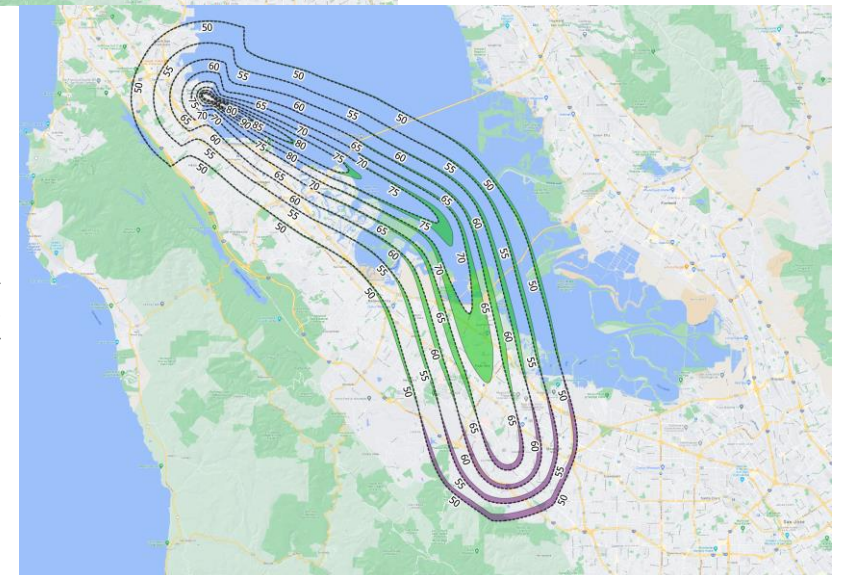
Innovative GLS Approach Noise Consideration

Single Event Noise Analysis

- FAA AEDT v3C with Eurocontrol BADA 4
- LAMAX
- SEL (1 Second)
- Noise sensors utilized both 0.1 Nmi Grid Spacing and existing SFO Noise Monitor Locations
- Noise analysis is presented as areas where single event noise could be expected to change
 - Green areas indicate potential reductions in noise over an area
 - Purple areas indicate potential expansions in noise over an area

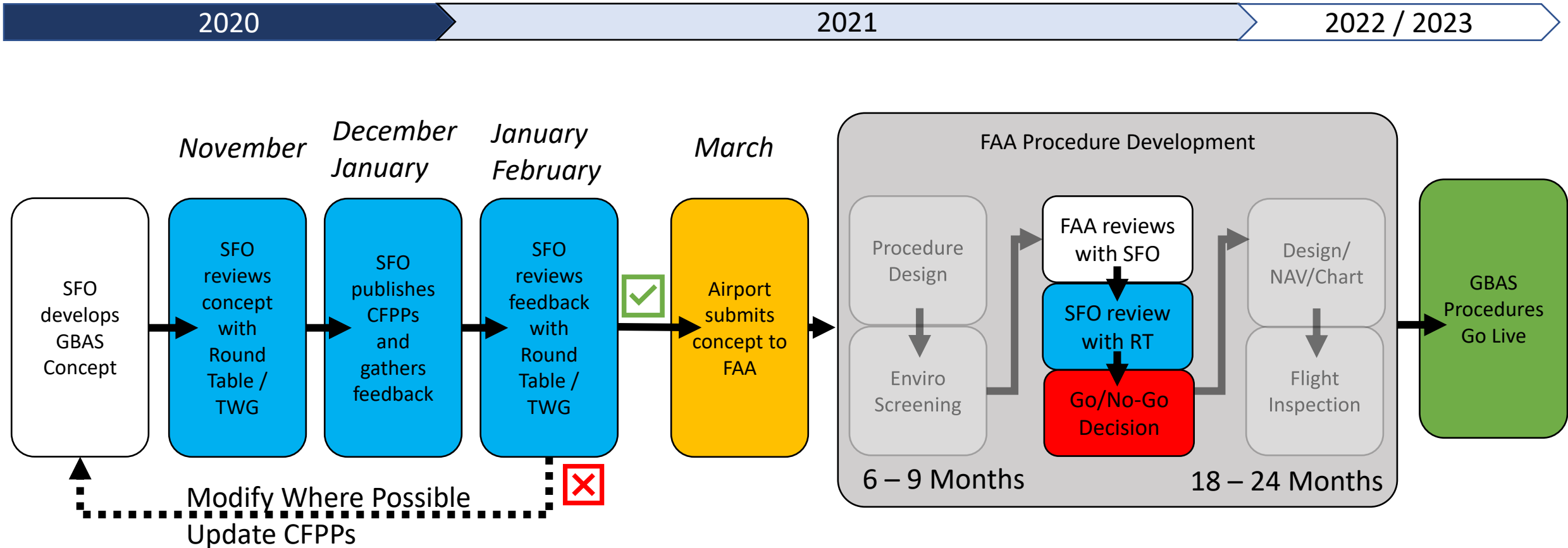


28R GLS LAMAX Noise Analysis from AEDT v3C (BADA 4), Background Image Google Maps XYZ Layer



28R GLS SEL Noise Analysis from AEDT v3C (BADA 4), Background Image Google Maps XYZ Layer

SFO GLS Procedure Development and Community Evaluation



Timeline to FAA Procedure development will depend on outreach

**Agenda Item 4-2. NEPA 101 Presentation and the
FAA Environmental Review Process**



Santa Clara/Santa Cruz Counties
Airport/Community Roundtable
Technical Working Group

Air Traffic NEPA 101

Chris Sequeira, ESA

December 15, 2020

Presentation Outline

- Key Environmental Laws, Policies, and Regulations Relevant to Air Traffic Actions
- Levels of National Environmental Policy Act (NEPA) Review
- Air Traffic Action Environmental Review Process

This presentation provides a brief overview of how NEPA applies to air traffic actions. For details, please review the official FAA documents referenced in this presentation, which have been placed on the SCSC Website.

Key Environmental Laws, Policies, and Regulations Relevant to Air Traffic Actions

Key Environmental Laws and Regulations

- National Historic Preservation Act of 1966 (NHPA)
Public Law 89-665
 - Particularly Section 106
- Department of Transportation Act of 1966 (DOT Act)
Public Law 89-670
 - Particularly Section 4(f)
- National Environmental Policy Act of 1969 (NEPA)
Public Law 91-190

Key Environmental Laws and Regulations (cont.)

- FAA Modernization and Reform Act of 2012 (FMRA)
Public Law 112-95
 - Particularly Section 213
- White House Council on Environmental Quality (CEQ)
Regulations for Implementing NEPA: Title 40 Code of
Federal Regulations (CFR) Parts 1500 - 1508
- There are numerous other laws that can also apply to air
traffic actions, such as the Clean Air Act (CAA)

Key FAA Environmental Policies Relevant to Air Traffic Actions

- **FAA Order 1050.1 – Environmental Impacts: Policies and Procedures**
 - Current version is F
 - Implements overall DOT environmental review requirements contained in DOT Order 5610.1C
- **FAA Order JO 7400.2 – Air Traffic Matters**
 - Current version is M Change 3
 - Chapter 32 provides policies for complying with FAA Order 1050.1F requirements specific to air traffic actions
 - Appendix 10 is the FAA's Community Involvement Policy

Levels of NEPA Review

Definition of “Significant Impact” for Noise

A significant impact would occur if “[t]he action would increase noise by DNL* 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the no action alternative for the same timeframe. For example, an increase from DNL 65.5 dB to 67 dB is considered a significant impact, as is an increase from DNL 63.5 dB to 65 dB.”

FAA Order 1050.1F, Exhibit 4-1

* DNL: Day-Night Average Sound Level

Categorical Exclusion (CATEX)

- A category of actions “that normally do not have a significant effect on the human environment”
 - 40 CFR Part 1501.4
- “Significant effect” for FAA actions discussed in FAA Order 1050.1F, Paragraph 4-3

A CATEX is a level of NEPA review rather than an exclusion from NEPA review.

40 CFR Part 1501.4

Categorical Exclusion (CATEX) (cont.)

- A CATEX cannot be used if “extraordinary circumstances” exist, unless the action is subject to categorical exclusion under Section 213 of the FMRA
- “Extraordinary circumstances” defined in FAA Order 1050.1F, Paragraph 5-2.
 - Example: A significant impact on noise levels over noise sensitive areas

Environmental Assessment (EA)

- A document prepared “for a proposed action that is not likely to have significant effects or when the significance of the effects is unknown”
 - 40 CFR Part 1501.5
- FAA actions that “normally require an EA” are given in FAA Order 1050.1F, Paragraph 3-1.2b.
 - Example: New or modified air traffic procedures that “routinely route aircraft over noise sensitive areas at less than 3,000 feet above ground level (AGL) (unless otherwise categorically excluded under Paragraphs (procedures category) 5-6.5q and 5-6.5r).”



Environmental Impact Statement (EIS)

- A detailed written statement prepared for “major Federal actions significantly affecting the quality of the human environment.”
 - 40 CFR Part 1502.3
- FAA actions that “normally require an EIS” are given in FAA Order 1050.1F, Paragraph 3-1.3b.
 - Examples: “Location of a new commercial service airport in an MSA [Metropolitan Statistical Area]”; “A new runway to accommodate air carrier aircraft at a commercial service airport in an MSA”

Public Involvement Requirements

- CATEX: “There is no requirement to notify the public when a CATEX is used”
 - FAA Order 1050.1F, Paragraph 5-4
- EA: Preparation of EAs “must involve the public, to the extent practicable” – the level of involvement “is determined on a case-by-case basis”
 - Examples of some “optional public involvement methods for EAs”: circulation of a draft EA for public comment; public meetings, workshops, and hearings
 - FAA Order 1050.1F, Paragraph 6-2.2b

Public Involvement Requirements (cont.)

- EIS: Several requirements are given in FAA Order 1050.1F. These include, but are not limited to:
 - Publish “Notice of Intent to Prepare an EIS” (Paragraph 7-1.2b)
 - Perform scoping: “an early and open process for determining the scope of issues to be addressed in the EIS” (Paragraph 7-1.2c)
 - Make “copies of the draft EIS available for review and comment” (Paragraph 7-1.2d)
 - Public comments “must be responded to” (Paragraph 7-1.2e)

Other applicable laws (such as the NHPA) may require public involvement even when NEPA does not.

What CATEXs Apply to Air Traffic Actions?

- An extensive list of CATEXs for air traffic actions is provided in FAA Order 1050.1F, Paragraph 5-6.5. Examples:
 - Paragraph 5-6.5f: Establishment of Area Navigation/Required Navigation Performance (RNAV/RNP) procedures that “use overlay of existing flight tracks”
 - Paragraph 5-6.5i: Establishment of new or revised air traffic procedures “conducted at 3,000 feet or more above ground level (AGL)”

CATEXs Legislated by Section 213(c) of the FMRA: “CATEX1”

- Paragraph 5-6.5q: Certain procedures conducted “at, above, or below 3,000 feet” AGL
 - RNAV/RNP procedures at “core airports and any medium or small hub airports located within the same metroplex area”
 - RNP procedures proposed at 35 non-core airports selected by the Administrator
- Specific guidance given in FAA Order 1050.1F Desk Reference, Section 17.2, labeled as “CATEX1”



CATEXs Legislated by Section 213(c) of the FMRA: “CATEX1” (cont.)

- The FAA guidance provides a list of “core airports” and “medium or small hub airports within the same metroplex area” that CATEX1 can be applied to
- The core airports given in the guidance include SFO
- The medium / small hub airports in “the same metroplex area” as SFO include SJC and OAK

CATEXs Legislated by Section 213(c) of the FMRA: “CATEX2”

- Paragraph 5-6.5r: “Any navigation performance or other performance based navigation procedure that, in the determination of the Administrator, would result in measurable reductions in fuel consumption, carbon dioxide emissions, and noise, on a per flight basis, as compared to aircraft operations that follow existing instrument flight rules procedures in the same airspace. This CATEX may be used irrespective of the altitude of such procedures.”

CATEXs Legislated by Section 213(c) of the FMRA: “CATEX2” (cont.)

- Specific guidance given in FAA Order 1050.1F Desk Reference, Section 17.3, labeled as “CATEX2”
 - Includes an extensive analysis methodology for fuel consumption, emissions, and noise
- According to Section 213(c)(2) of the FMRA, this CATEX could be used (if applicable) even if extraordinary circumstances exist

Has FAA Ever Used a Legislative CATEX?

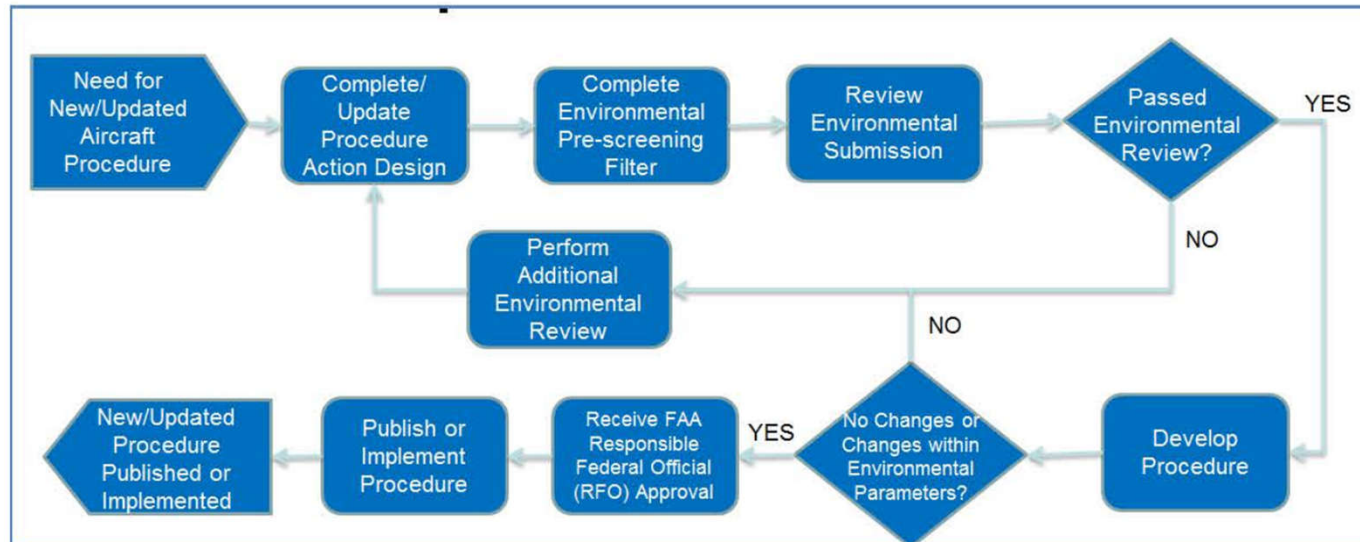
ESA is not aware of and could not determine from publicly-available records whether any of the two legislative CATEXs have ever been used by FAA.

However, the non-legislative CATEXs in paragraph 5-6.5 cover many types of FAA air traffic actions, which may limit the need to use the legislative CATEXs.

Air Traffic Action Environmental Review Process

Overall Environmental Review Process

FIG 32-1-1
IFP Re-Engineered Environmental Review Process



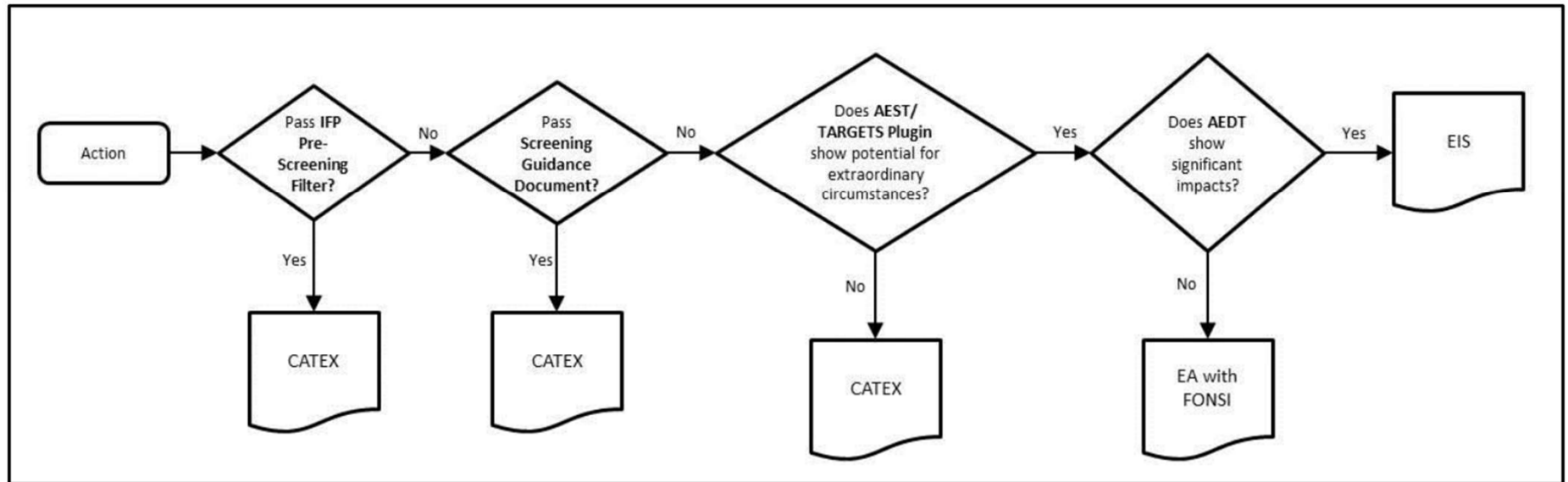
- Detailed in FAA Order JO 7400.2M, Chapter 32*
- The review process includes NEPA as well as any other applicable laws, such as NHPA
- The “pre-screening filter” is online at <http://faaenvtools.com/> specifically for FAA ATO staff who are given access to the tool

Image source: FAA Order JO 7400.2M, Chapter 32.
* IFP: Instrument Flight Procedure.



Levels of NEPA Screening/Modeling

FIG 32-2-1
Levels of Environmental Screening and Modeling for NEPA Compliance



- Compliance with other laws such as the National Historic Preservation Act may still be required even if a CATEX is used for NEPA
- The publicly-available screening guidance document is dated 2012 and may be out of date*

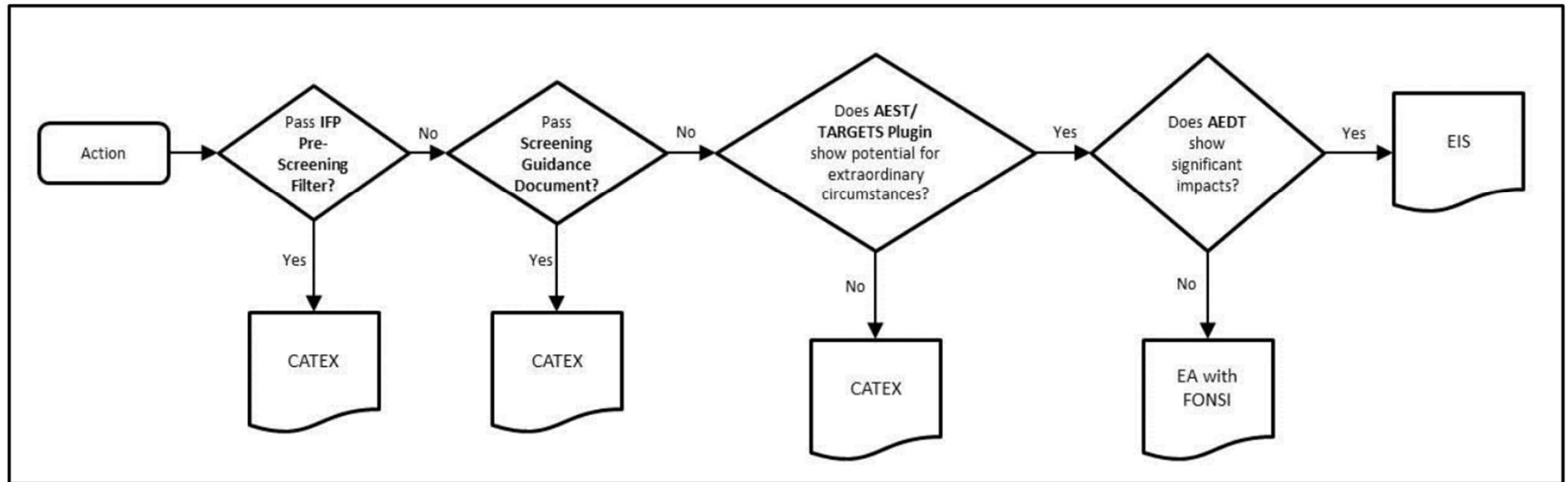
Image source: FAA Order JO 7400.2M, Chapter 32.

* https://www.faa.gov/air_traffic/environmental_issues/environmental_tetam/media/guidance_noise_screening_air_traffic_actions.pdf



Levels of NEPA Screening/Modeling (cont.)

FIG 32-2-1
Levels of Environmental Screening and Modeling for NEPA Compliance



- The Aviation Environmental Screening Tool (AEST) and the Terminal Area Route Generation and Traffic Simulation (TARGETS) Plug-In are not publicly available
- The Aviation Environmental Design Tool (AEDT) is available at <https://aedt.faa.gov>

Image source: FAA Order JO 7400.2M, Chapter 32.

* https://www.faa.gov/air_traffic/environmental_issues/environmental_tetam/media/guidance_noise_screening_air_traffic_actions.pdf



Community Involvement Requirements

- FAA Order JO 7400.2M does not dictate a specific type of community involvement
- Instead, ATO personnel are directed to the following materials to determine the nature of community involvement on a case-by-case basis (Paragraph 32-4-3c)
 - FAA Order 1050.1
 - FAA Community Involvement Manual (CIM)
 - FAA Air Traffic Organization Community Involvement Plan (ATO CIP)
 - FAA Community Involvement Performance Based Navigation Desk Guide (CIPDG)
 - FAA Order JO 7400.2, Appendix 10, FAA’s “Community Involvement Policy” statement
 - FAA Scenario-Based Guidance for Community Engagement*

* This document is “an internal agency guidance” – FAA FY 2020 Portfolio of Goals, page 36. https://www.faa.gov/about/plans_reports/media/portfolio_goals.pdf



Questions?

**SCSC Roundtable - Technical Working Group Committee (TWG)
All Correspondence Received for the TWG prior to 12/11/2020**



TWG Meeting 12/15/2020 - GBAS questions for SFO to address

Darlene Yaplee

Thu, Dec 10, 2020 at 3:33 PM

To: SCSC Roundtable <scscroundtable@gmail.com>

Cc: Anita Enander, Lydia Kou, Darlene E. Yaplee, Marie-Jo Fremont

TWG Committee,

Thank you for putting GBAS on the agenda of the next TWG meeting on Dec 15, 2020.

After attending the SFO GBAS presentations at the SFO RT (Oct 7) and SFO RT TWG (Nov 19), we created a list of GBAS questions to be addressed by SFO for all of us to understand **what changes will occur and what impacts these changes will have**. We organized our GBAS questions in 7 sections. See below.

We would like these questions submitted by the SCSC RT TWG to SFO.

We appreciate your consideration of our input.

Darlene and Marie-Jo

1. GBAS Overlay Approaches: we have been told that there is no change in altitudes, waypoints, etc. However, we have not seen detailed specifications to understand that there will not be any additional noise impacts.

- a. What does "overlay" mean exactly?
 - i. Where is it an exact copy of the current ILS approaches, and where and how is it different? Are there any changes to today's arrival and approach procedures, which will be required or have been requested as part of the Overlay update, that are not strictly a one-for-one translation of RNAV and ILS into RNP to GLS?
 - ii. What specific changes are involved in implementing a GBAS mirroring of the current ILS?
 - iii. Does the 28L overlay require planes to approach the legacy localizer intercept point exactly as before at 3100 feet, 200 knots and flying upward or level? Or are these noise creating artifacts of the ILS and the Localizer smoothed out in the GBAS overlay to some extent?
 - iv. How do the charted Tipp Toe and FMS Bridge RNAV/Visuals change with the RNP to GLS overlay? (The typical ATC instructions coming off "descend via SERFR" are "Over EDDYY, join the Tipp Toe visual approach, course only" or once past EDDYY, "Join the Tipp Toe Visual, Expect 28 L.")
- b. Does the overlay make any attempt to address the current and known SERFR speed brake problem at EDDYY? Has this issue been discussed?
- c. How much will RNP reduce lateral separation over mid-Peninsula cities, and how narrow will the path be?
 - i. If the answer is "there will be no reduction", please explain why this will not happen.
 - ii. What are the exact RNP specifications of the RNP segment over mid-Peninsula cities?
- d. Will the overlay approaches allow SFO to land more planes per hour?
 - i. If so, please explain the expected potential increase in the context of pre-Covid usage rates.
 - ii. If not, please explain why this will not happen in the future.
- e. What changes in noise impacts do you anticipate with the GBAS Overlay approaches?
- f. Will SFO measure noise before and after GBAS overlay approaches are implemented in October 2021?
 - i. If so, what is SFO's noise monitoring plan (when, where, for how long)?
 - ii. If there is no plan, please explain why not.

2. Current FAA constraints for 28L and 28R innovative approaches over mid-Peninsula cities: We understand that the SFO GBAS team is limited in their designs to optimize the approaches for noise abatement purposes because of constraints imposed by the FAA.

- a. Please list all the GBAS-specific constraints currently imposed by the FAA that affect the optimal altitudes, speeds, descent angles, etc. that could reduce noise substantially.
- b. What are the specific constraints at EDDYY and why?
 - i. Please explain in particular why the EDDYY altitude or location can't be changed given that such changes have occurred for SERFR3/SERFR4 and may occur in the future.
 - ii. Why is the area around EDDYY, which is the termination of the SERFR4 STAR and the beginning of the RNP segment, so noisy (i.e., showing purple area)?
- c. Has the GBAS team discussed the descent angle of SERFR? In their meeting notes, the BSR Overlay Full Working Group noted that the descent angle was overly steep.
 - i. In particular, what would the noise impact be if SERFR arrivals were less steep and crossed EDDYY at a higher altitude?
- d. What would be the optimal altitude, speed, and location for the end of a new SERFR STAR that would most reduce noise over mid-Peninsula cities if the arrival were fully designed from the runway back?

3. Noise calculations for proposed innovative approaches:

- a. For mid-Peninsula residential areas and extending 1 mile into the Bay, please show on a grid the expected impact differences before and after the proposed innovative approaches:
 - i. Display data for different metrics: LAMAX, SEL, N-Above (start at 45 dB and use 5 dB increments up to 70 dB), T-Above (start at 45 dB and use 5 dB increments up to 70 dB).
 - ii. Is it possible to report data using C-weighting and A-weighting?
- b. Explain the reasons behind potential noise increases and possible remedies.
 - i. We want to understand in particular the effect of shallower or steeper descent angles .
- c. Explain whether the noise calculations take into account speed brakes and aircraft configuration.
 - i. If yes, please pinpoint on the grid the assumed locations where speed brakes and changes in aircraft configuration and thrust levels would occur.
 - ii. If no, how do you plan to estimate the noise impacts accurately?

4. Additional details on proposed innovative approaches for 28L and 28R: we would like the detailed specifications for 28L and 28R to understand the potential noise reduction. For each 28L and 28R innovative approach, please specify:

- a. Speeds and altitudes at waypoints, distance between waypoints, and descent angles in each segment.
- b. Expected aircraft configuration (e.g. flap schedules) and anticipated levels of thrust at waypoints (per representative aircraft and BADA4 modeling).
- c. How do horizontal and vertical separations for Closely Spaced Parallel Operations affect the descent angle on 28L?
 - i. Will horizontal or vertical separation for 28L and 28R approaches change (or could change in the future) given that SFO is introducing new vertical separation for Closely Spaced Parallel Operations (e.g., .308 procedures) for the 19L and 19R approaches?
 1. If yes, please describe the changes. If no, please explain why not.
 2. Industry and FAA whitepapers describe similar GBAS-enabled vertical separation (potentially including displaced thresholds) to reduce the horizontal distance between sequentially arriving aircraft. Furthermore, SFO's presentation suggests that GBAS will not replicate the current 28R lateral offset.
 3. Please describe how vertical separation in Closely Spaced Parallel Operations will affect or constrain descent angles for 28L going forward.
- d. How do you plan to estimate the cumulative impact of GBAS innovative approaches given the mix of aircraft types and the potentially different noise profiles of each aircraft type?
 - i. Will you model the noise impact of different aircraft types?
 - ii. Will you run estimated impacts based on pre-Covid usage rates?
 - iii. When and how will you share the data?

5. Innovative "BDEGA-east down the Bay" approach:

- a. Will more planes be able to use this approach? Why?
- b. Will planes using this approach always use just 28R or can they be assigned or request 28L as well?

- c. DYAMD arrivals are sometimes vectored to 28L near FAITH, which is near the south end of the Bay. Could this become a standard procedure to increase use of a BDEGA RNP to GLS?

6. Design questions on other potential innovative approaches for 28L and 28R:

- a. In principle, could GBAS innovative approaches follow different ground tracks (e.g, a short final or curved approach) given that planes no longer need to connect to the old ILS system? Why or why not?
- b. What barriers stand in the way of low power and clean/low drag aircraft configuration through all descent segments?
 - i. How could these barriers be removed?
 - ii. How would migrating to low power/low drag arrival profiles affect altitudes, speeds, separation, etc.?

7. Additional technical clarifications on the Glide Path Angle (GPA) for innovative approaches: How are the GPAs in the GBAS presentation measured? Are they measured in straight lines from the runway out (as it is for ILS), or are they constants relative to the curvature of the earth (more likely for a GPS-based system)?

- a. If the angles are measured differently, how are the two normalized for comparison? (A 3 degree GPS derived angle is actually a lower altitude than a 2.85 ILS angle at Palo Alto's distance from the airport.)