

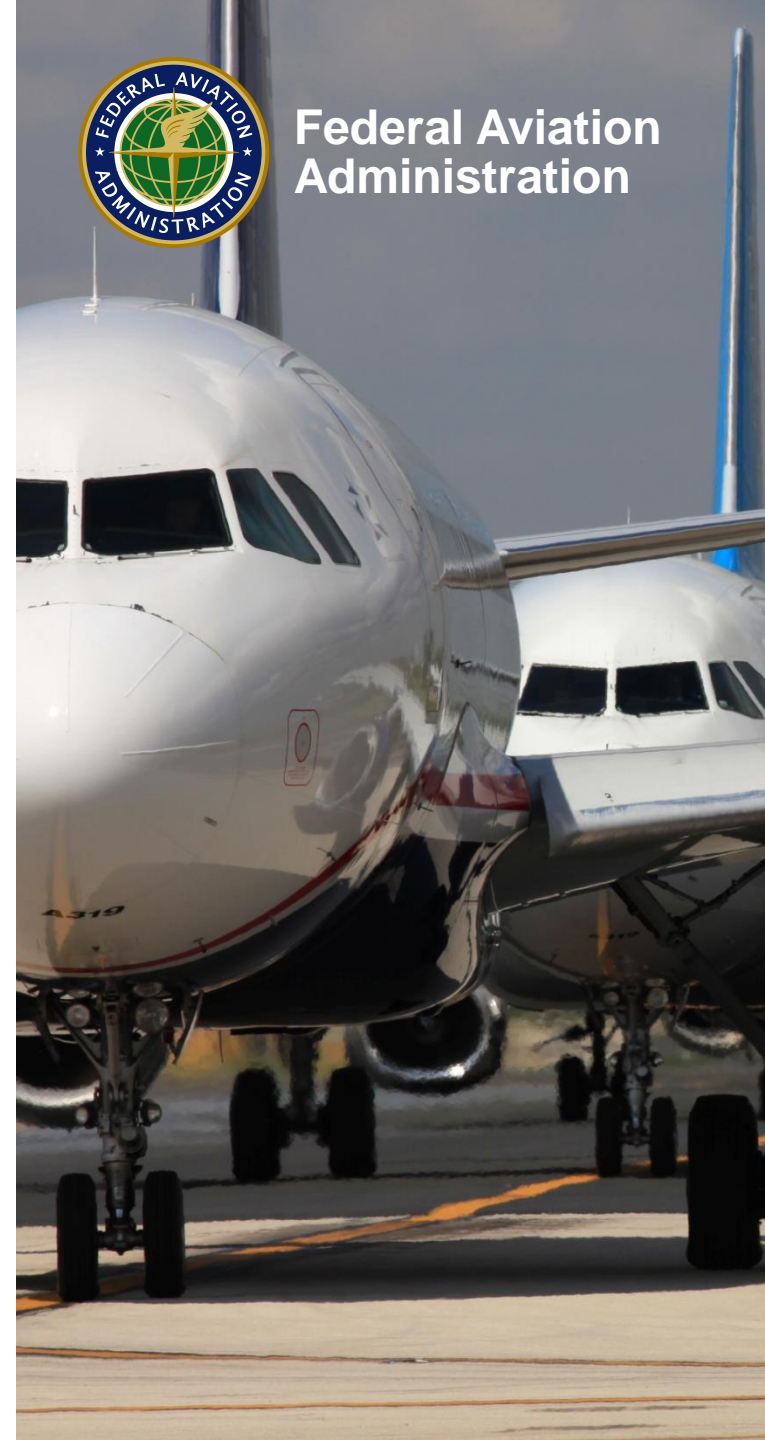
FAA Initiative to Address Noise Concerns of Santa Cruz/Santa Clara/San Mateo/San Francisco Counties

Work Group Meeting

September 28 2016



**Federal Aviation
Administration**



Discussion Overview

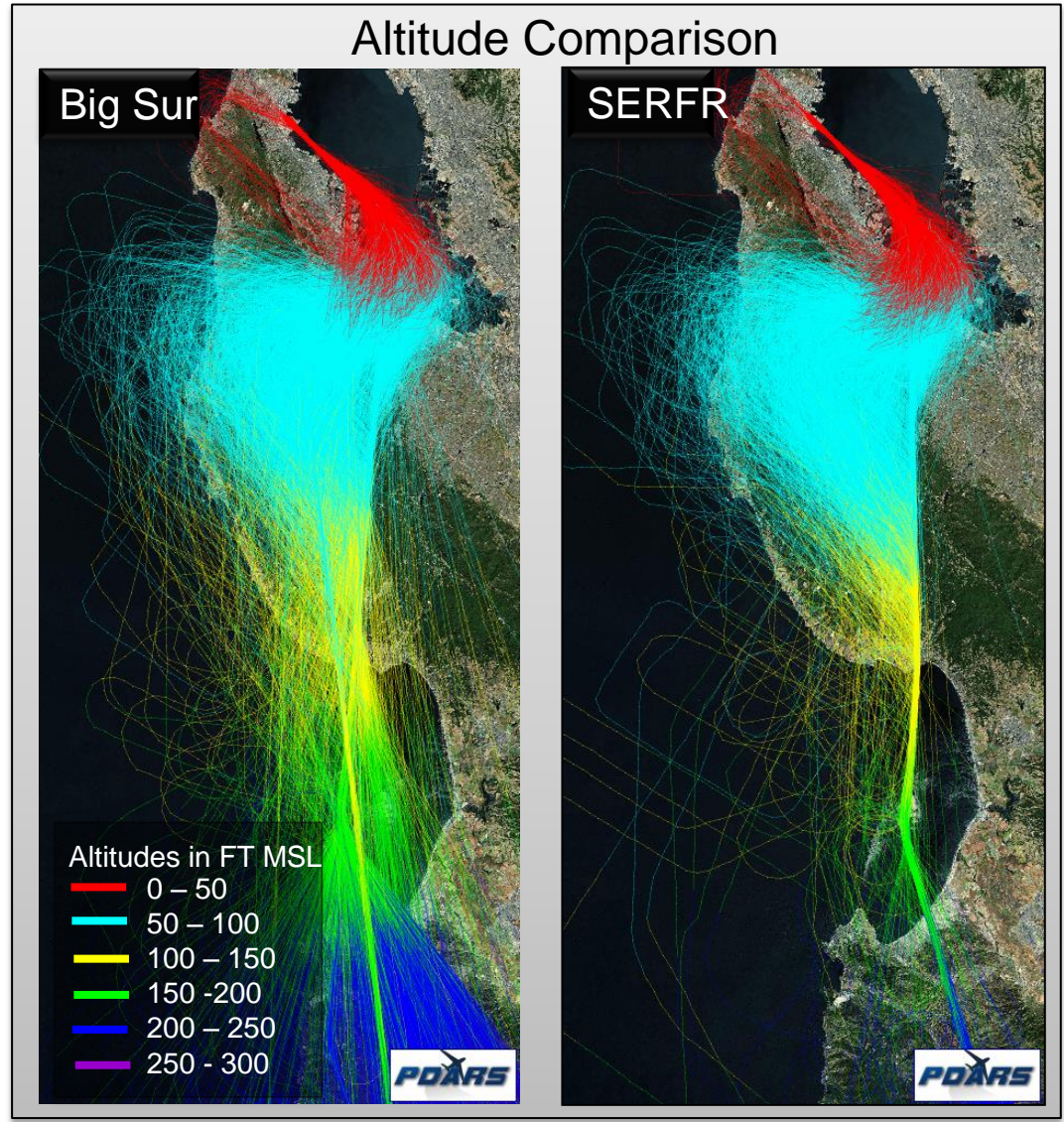
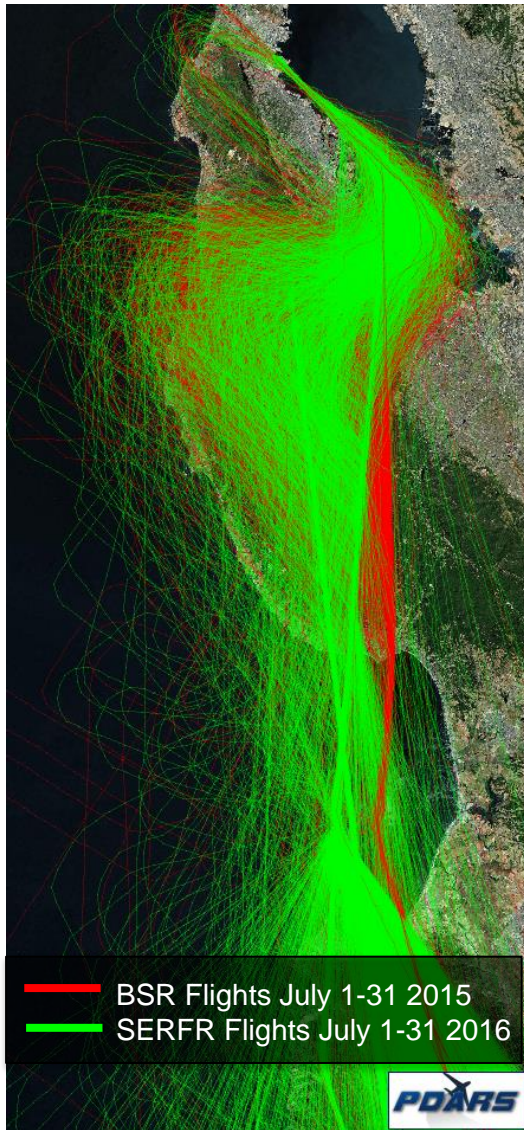
1. Aircraft vectoring
2. Herringbone Arrival Pattern
3. Fan in OCEANIC arrivals
4. Woodside at 8,000'
5. Northern Arrivals in to SFO
6. Redirect Southern Flights to Arrive into SFO from the East
7. MENLO



Aircraft Vectoring



Vectored Flights – BSR and SERFR

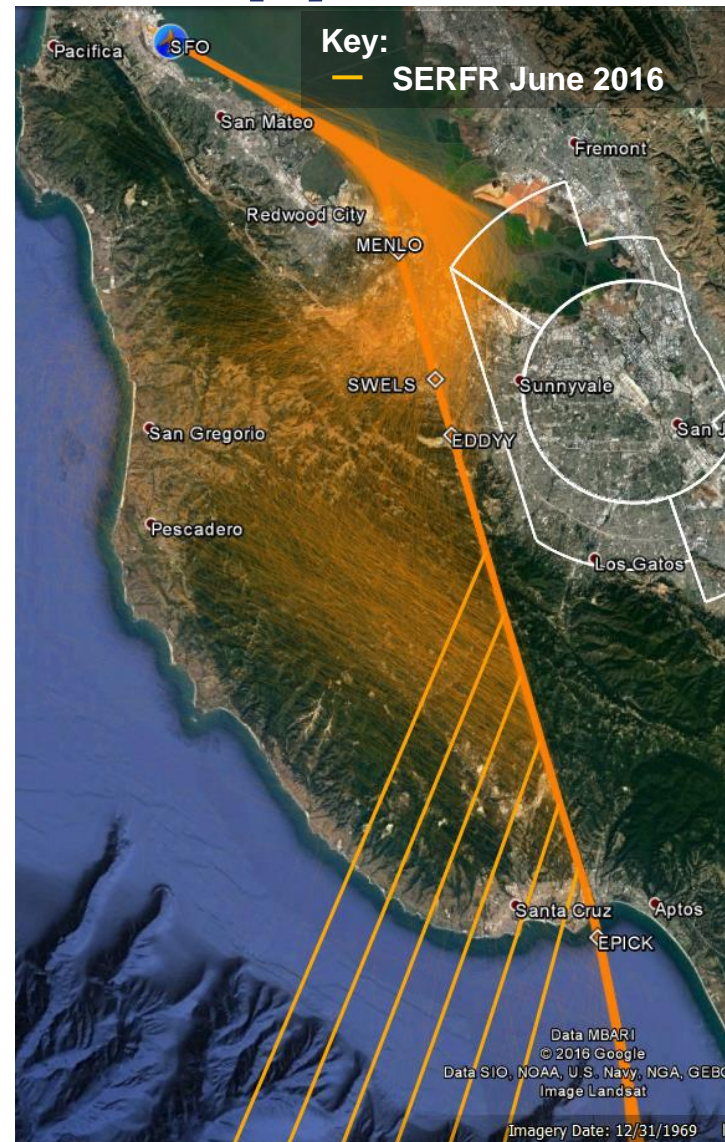
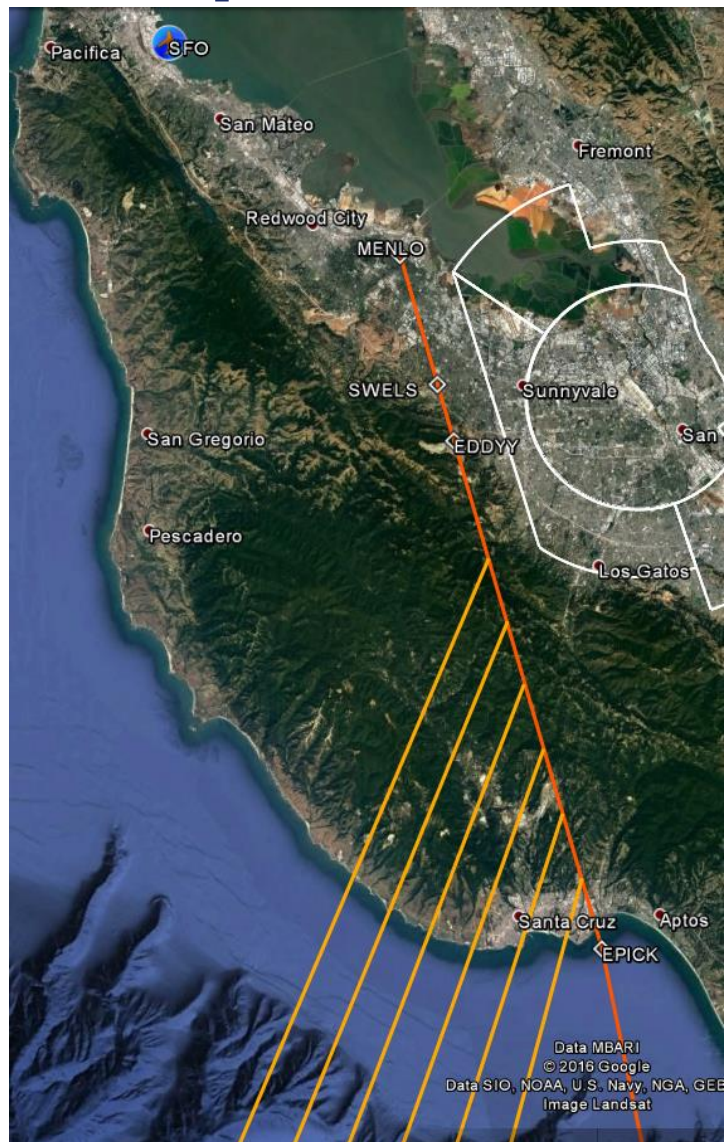


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Herringbone Arrival Pattern



Proposed Herringbone Approach



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Proposed Herringbone Approach

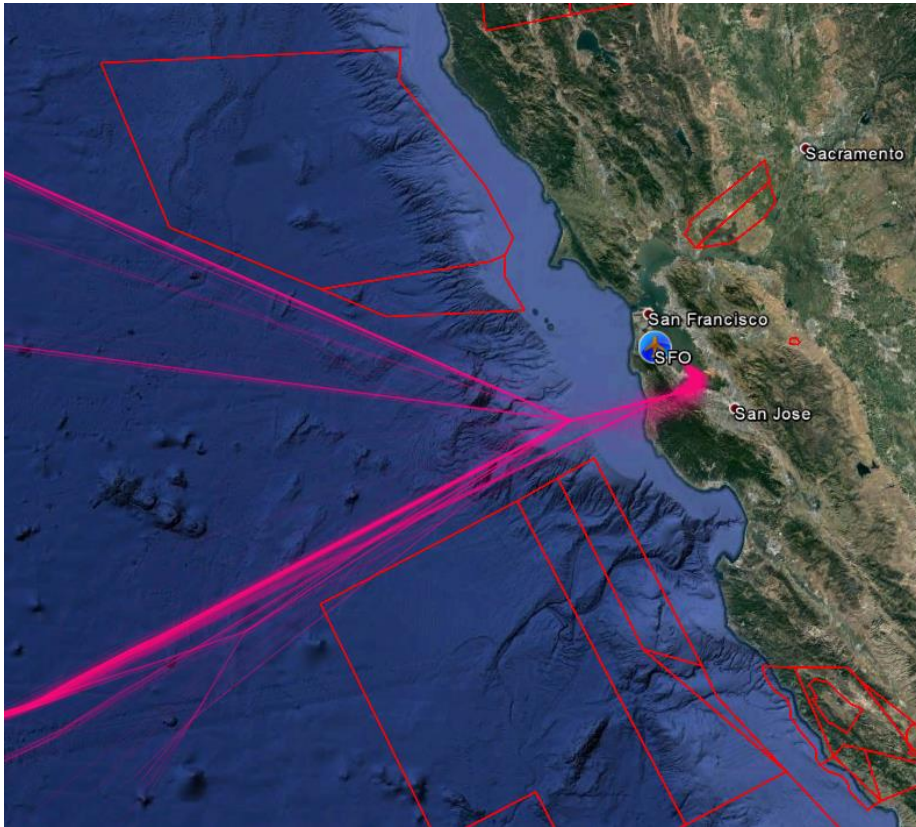
- The waypoints on the herringbone are separated by 3 NM (minimum IFR separation). This does not account for:
 - Heavy and Super class aircraft, which require between 4 to 8 NM separation.
 - Different aircraft flying characteristics, including performance, weight, weather, etc.
- A 'slot' on the SERFR would be required for an aircraft to be merged via the herringbone approach.
- The herringbone approach would cause a major safety concern when vectoring is necessary for sequencing.



Fan in Oceanic Arrivals



Constraints of “fanning”



Key:

- Special Use Airspace (SUA)
- Oceanic arrivals June 2016

- Offshore Special Use Airspace limits the location where the oceanic arrivals cross land.
- Once the oceanic arrivals cross land, spacing and sequencing needs to be accomplished as they are merged with SERFR and BDEGA arrivals.

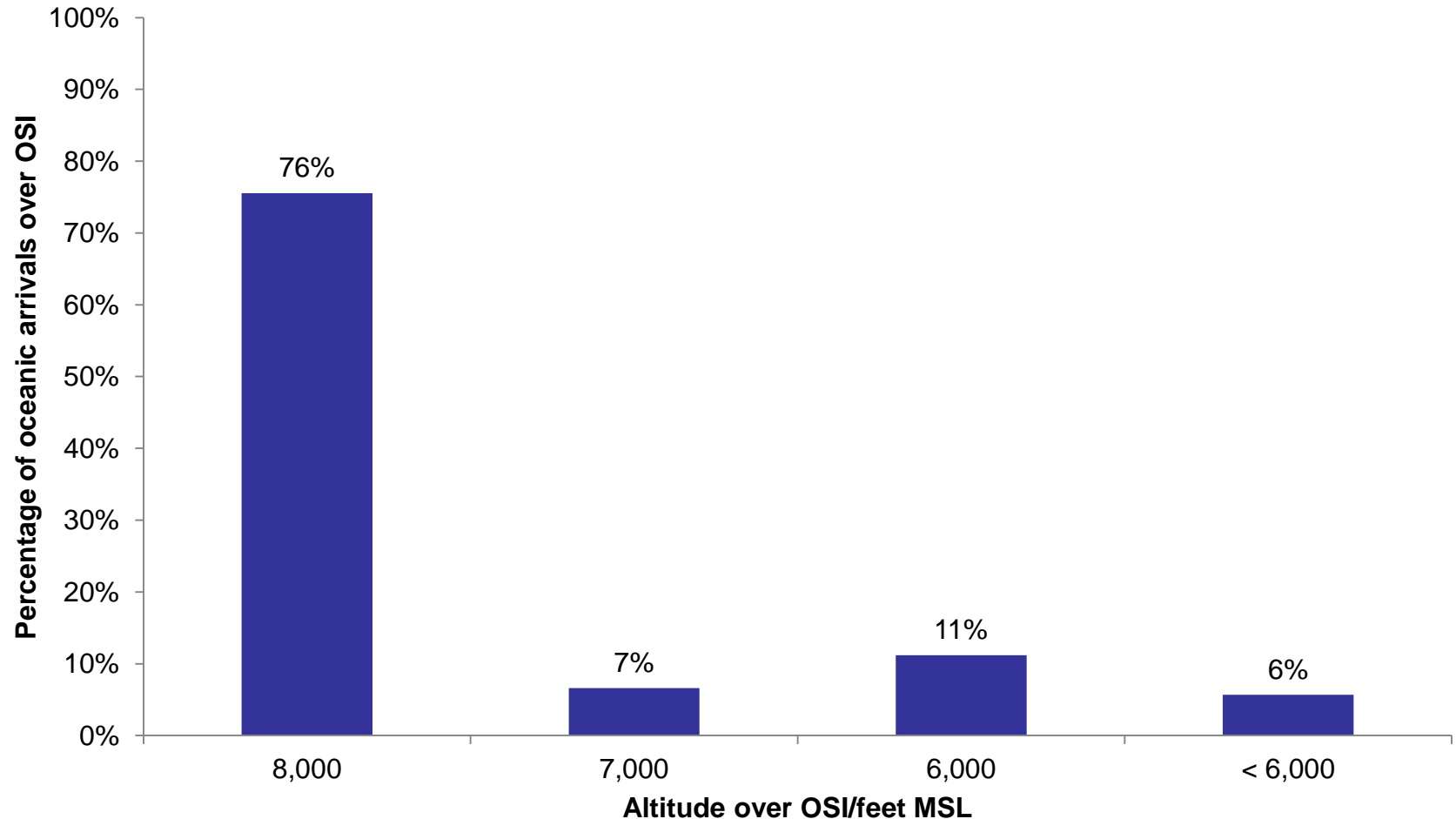


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Woodside at 8,000'



Altitudes of oceanic arrivals over OSI



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Analysis of Flights over Woodside

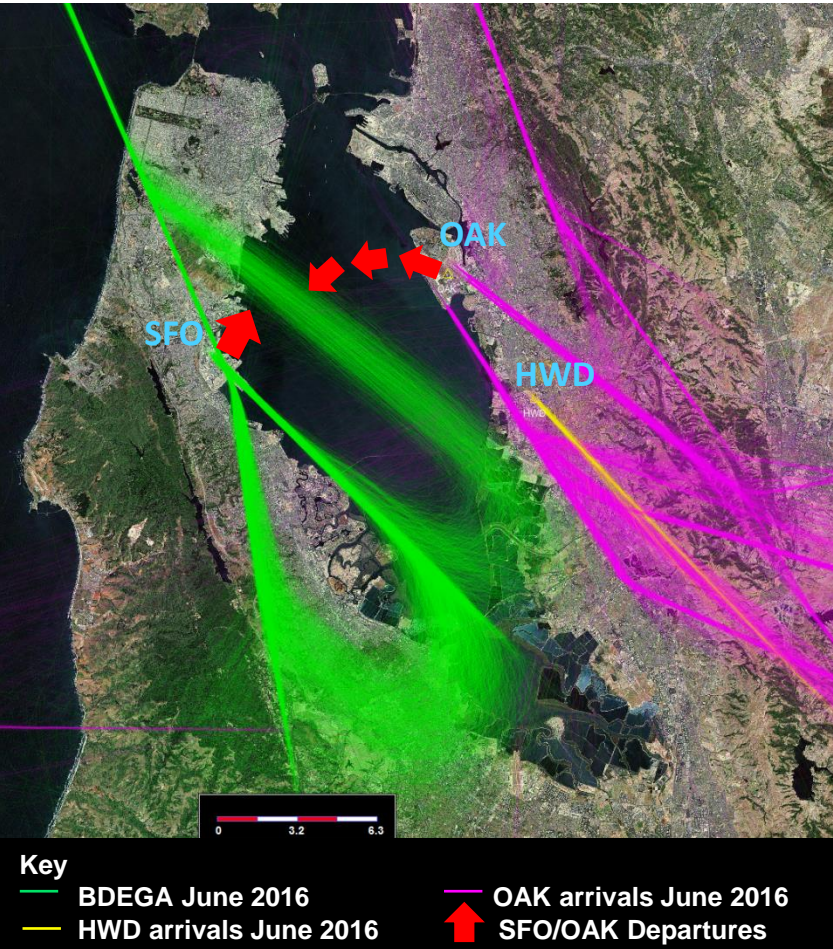
- **Approximately 75% of flights are at 8,000 feet over Woodside**
- **Some proportion of flights at 7,000 and 6,000 feet MSL fly the Optimized Tailored Approach (OTA).**
- **The OTA is a privately held procedure which enables aircraft to be on autopilot from takeoff until landing at SFO. It is primarily used for long haul flights i.e. from the far east.**
- **NCT is working with all carriers which are flying under 8,000 feet at OSI while not on the OTA, to fly at or above 8,000 over OSI.**



BDEGA



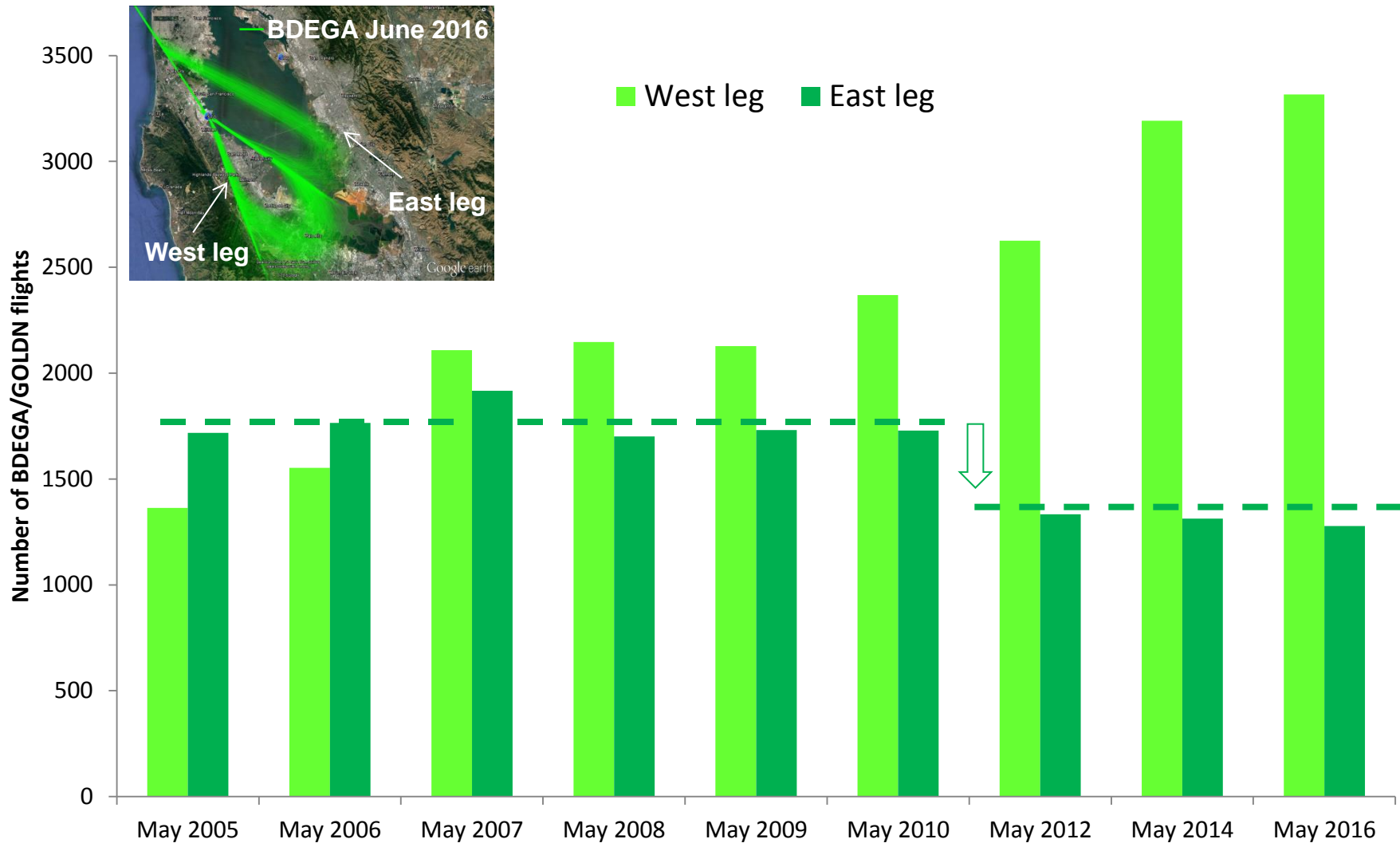
Usage: BDEGA East Leg



- The east leg has the potential to conflict with SFO/OAK departures and OAK/HWD arrivals.
- Volume on DYAMD arrival.
- The east leg requires a tighter turn to final than the west leg.
 - Harder to maintain a stabilized approach, especially for newer aircraft.
 - Aircraft operators have requested more stabilized approaches.



Usage: BDEGA East/West Legs



Summary

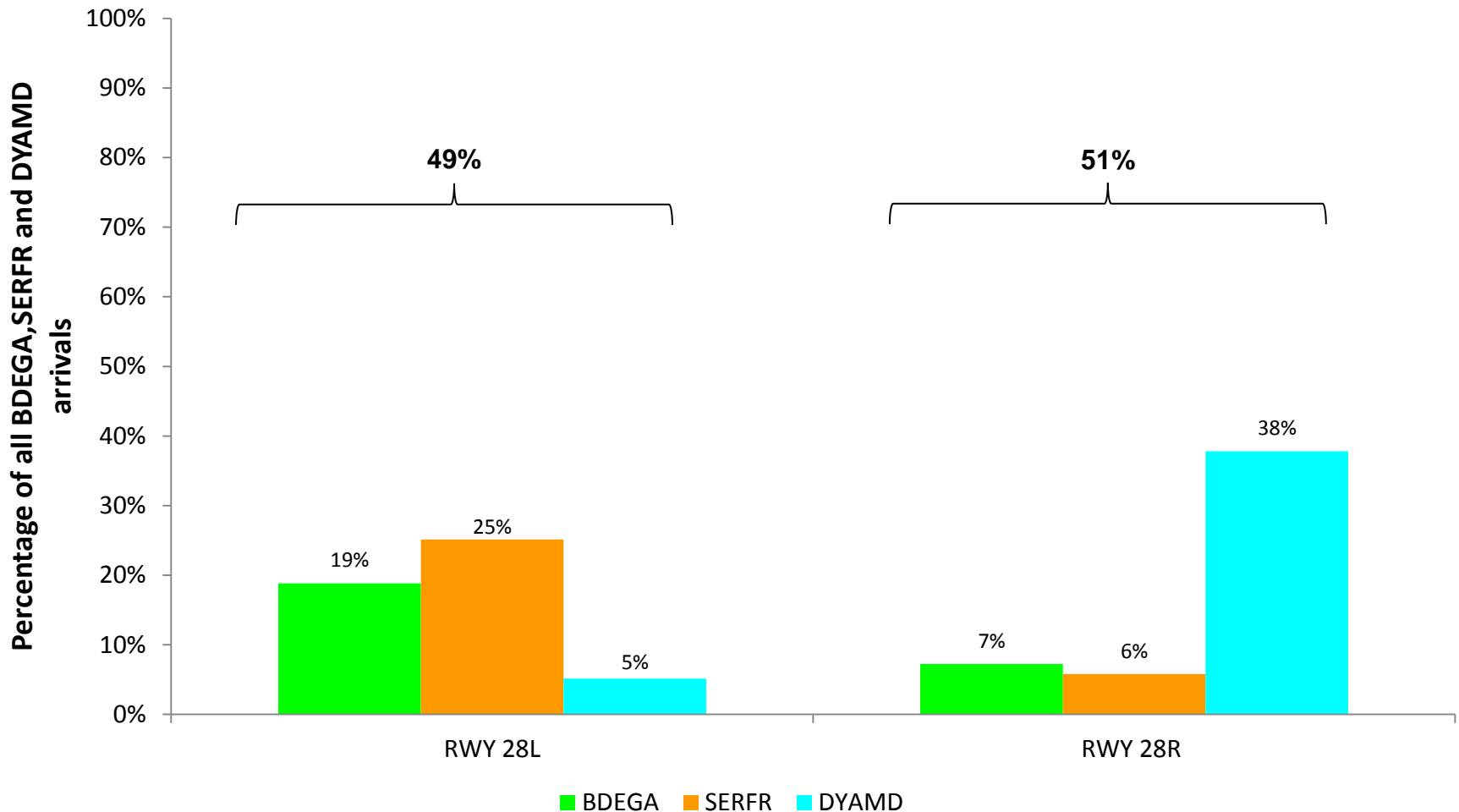
- **There was a consistent level of usage of the BEDGA East leg until between 2010 – 2012. The usage of the BGEDA east leg dropped after this point.**
- **There has been increasing use of the BEDGA West leg**
- **There is a limitation to East Leg usage:**
 - RWY 28R is predominately used by DYAMD arrivals, as designed.
 - The east leg of the BDEGA conflicts with OAK and SFO departures
 - The east leg requires a tighter turn to final than the west leg, resulting in a shorter final. This is harder to maintain a stabilized approach, especially for newer aircraft.
- **The east leg of the BDEGA is used as much as operationally feasible.**



Redirect Southern Flights to Arrive into SFO from the East



Distribution of Procedural Usage of RWY 28R/L



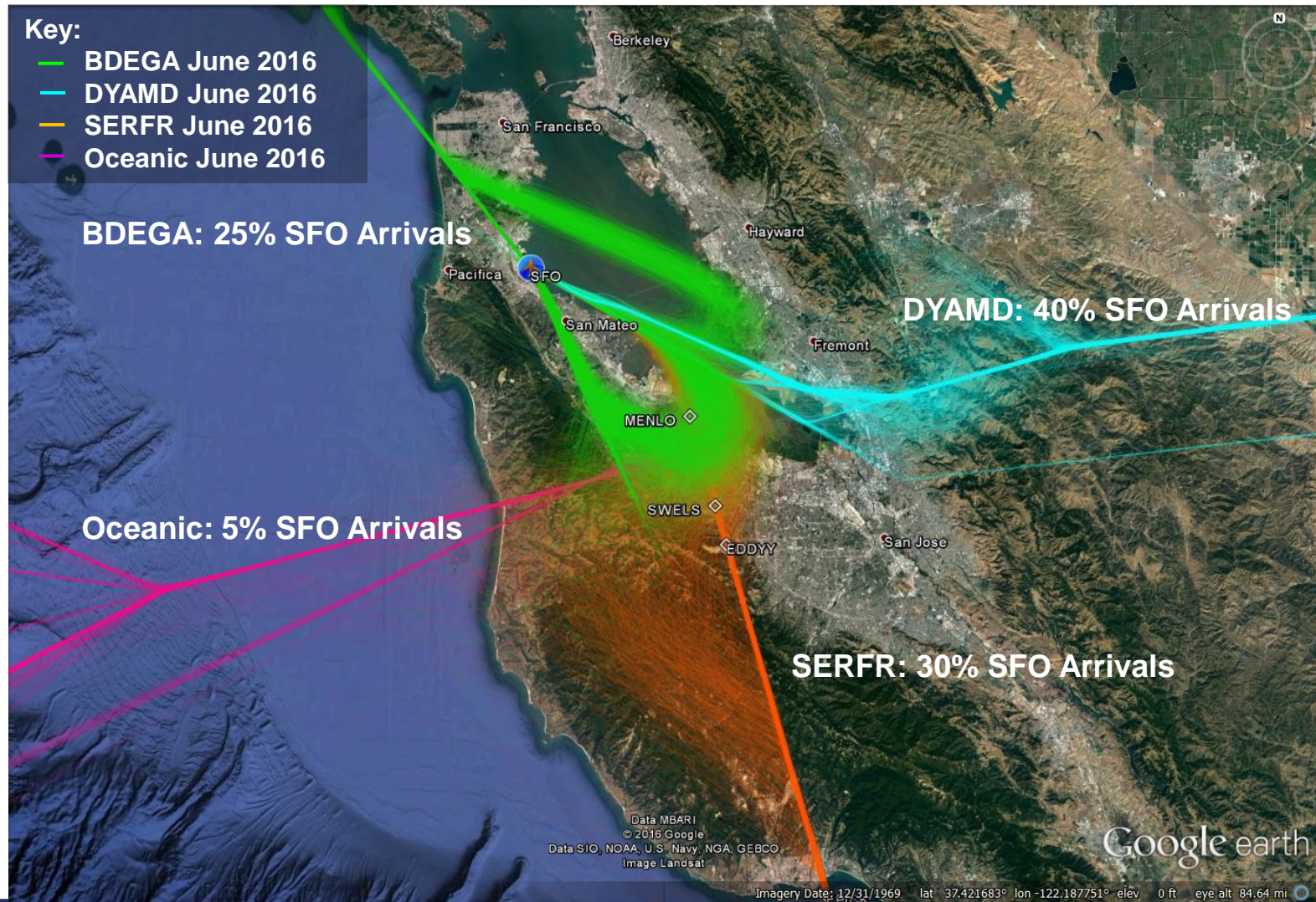
Southern Flights Arrive from East



MENLO

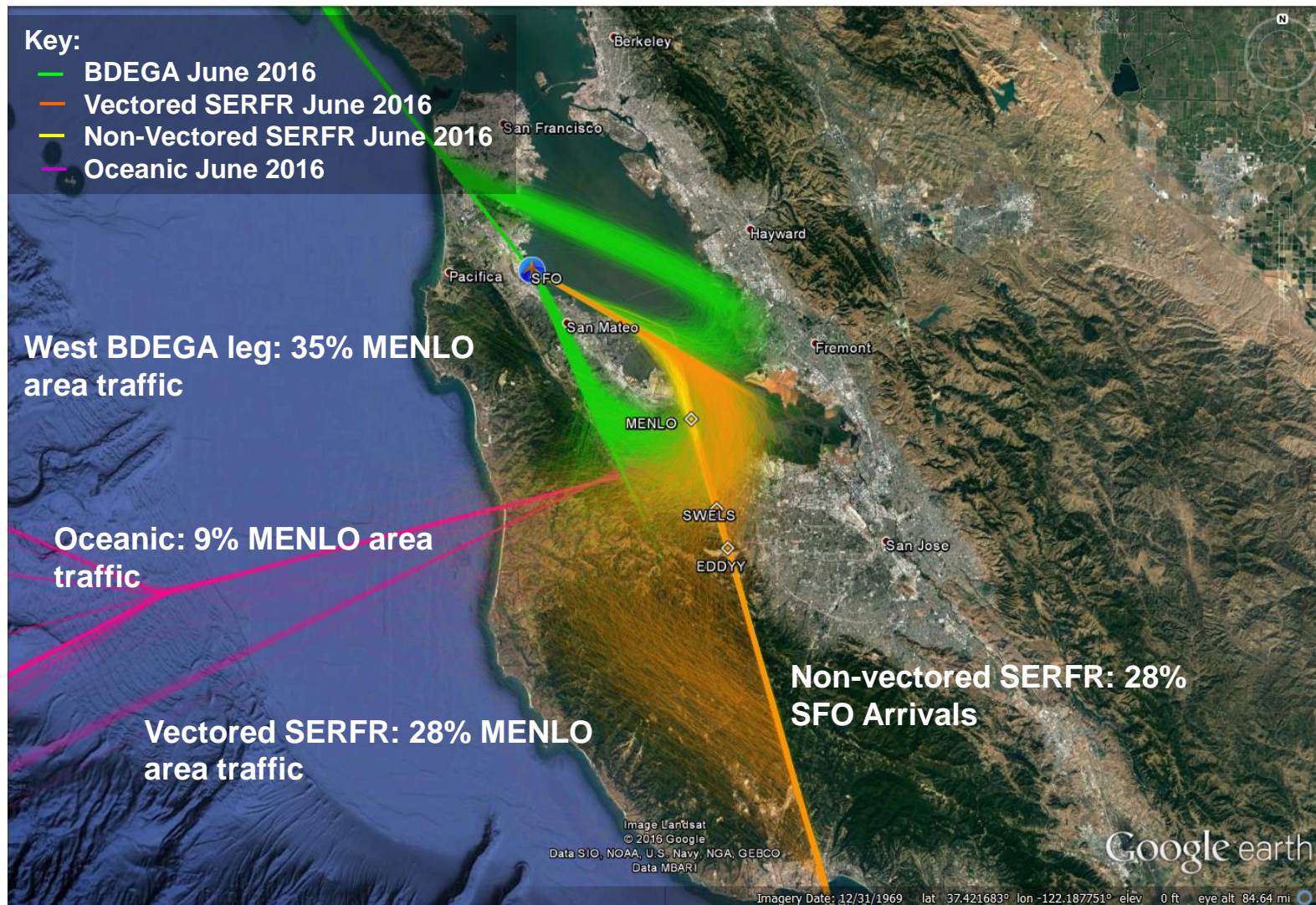


Arrivals into SFO



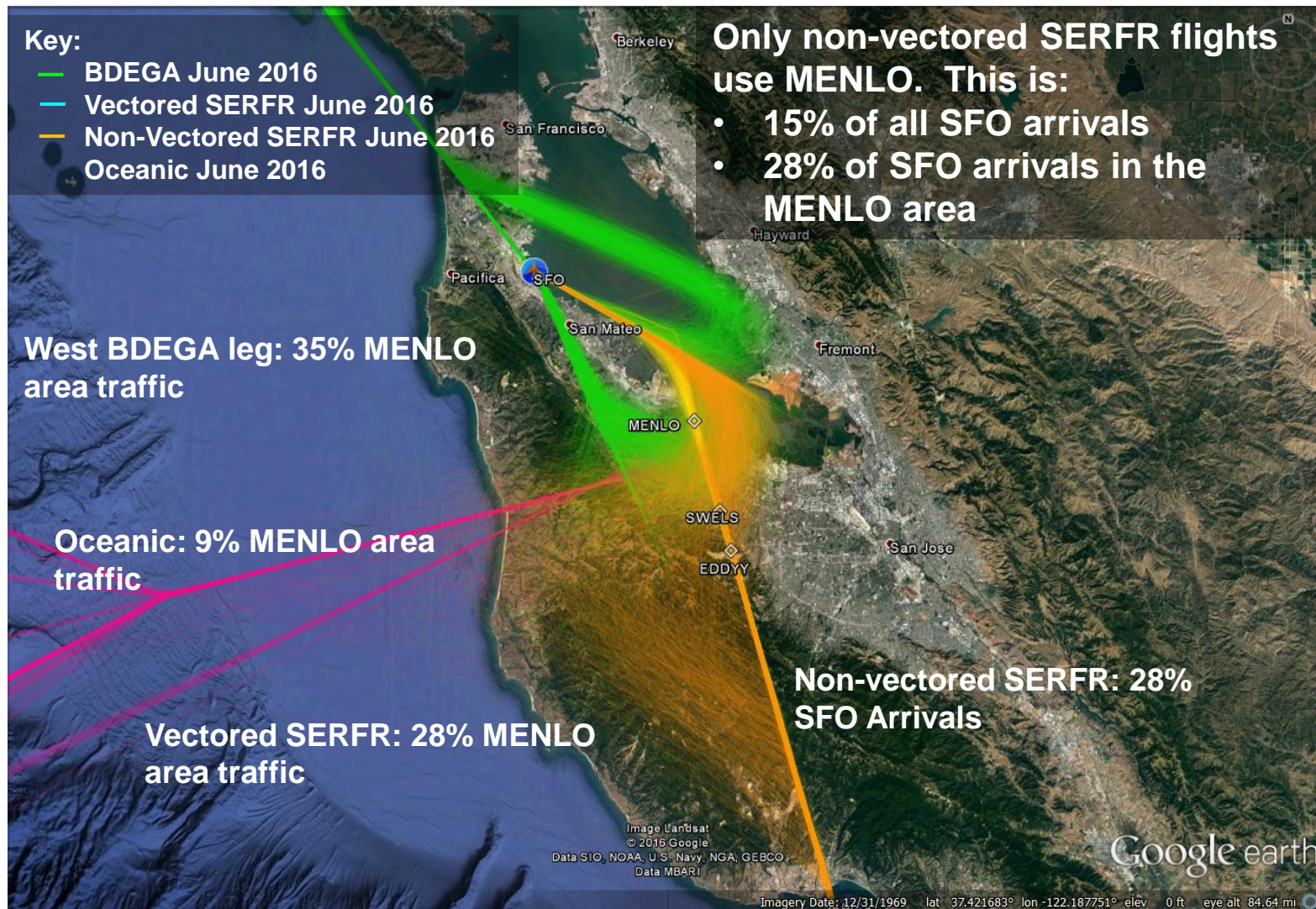
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SFO Arrivals in the MNELO area



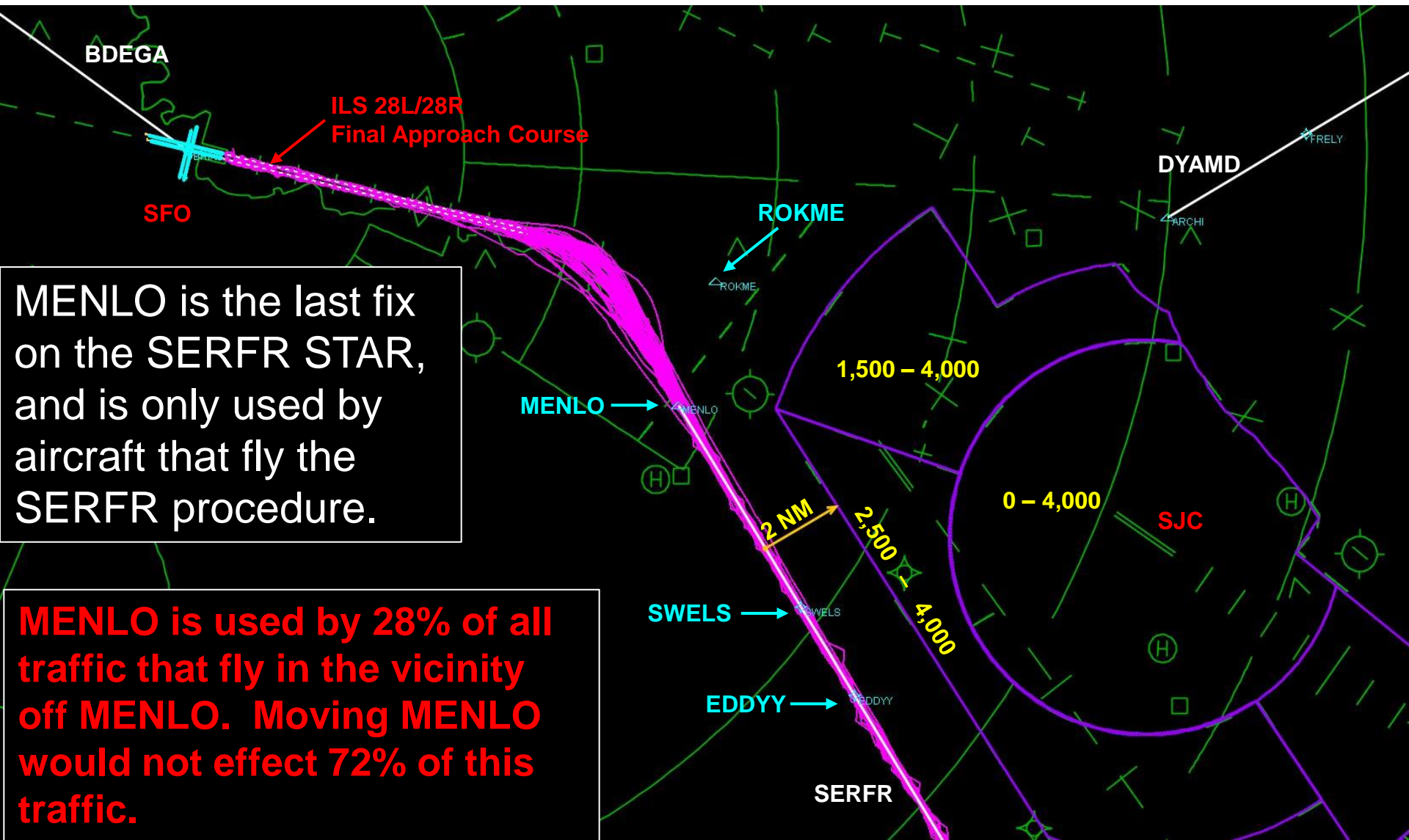
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Which flights are effected by MENLO



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MENLO Usage



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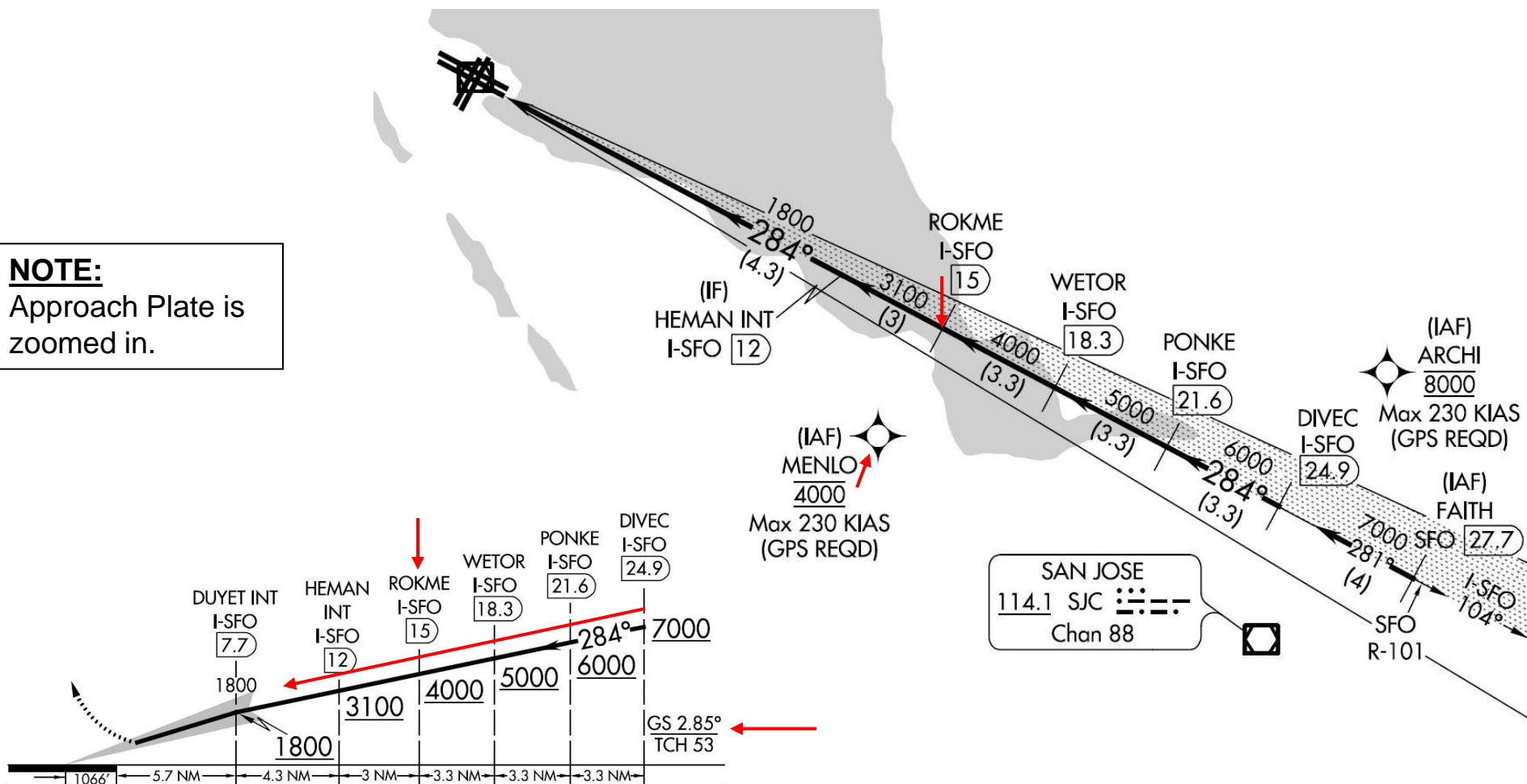
Select Committee Questions

- 1. Move MENLO East**
- 2. Use ROKME in place of MENLO**
- 3. Raise altitude at MENLO to 5,000 feet**



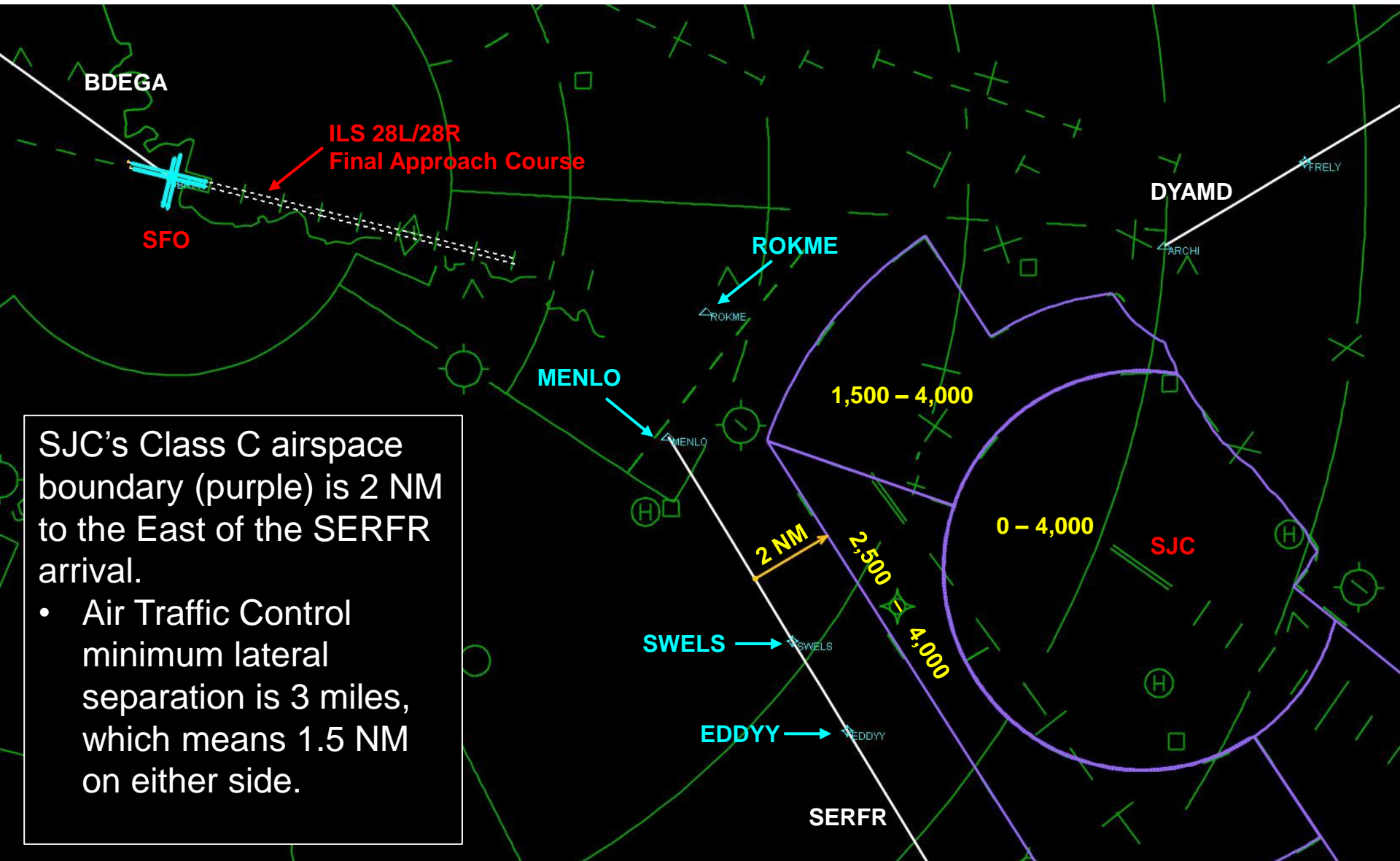
ILS RWY 28L Approach Plate

NOTE:
Approach Plate is
zoomed in.

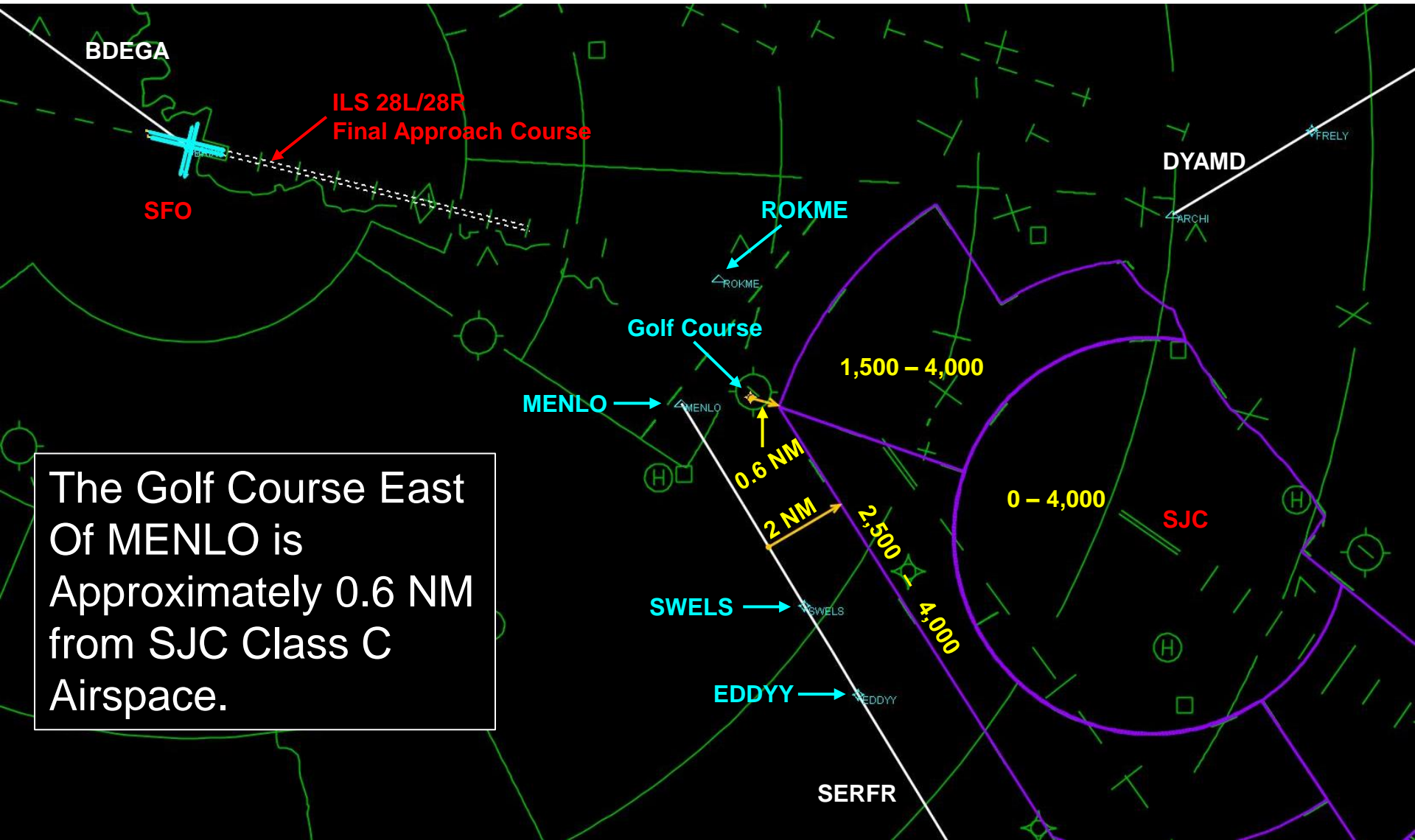


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1. Move MENLO East



1. MENLO East (to Golf Course)



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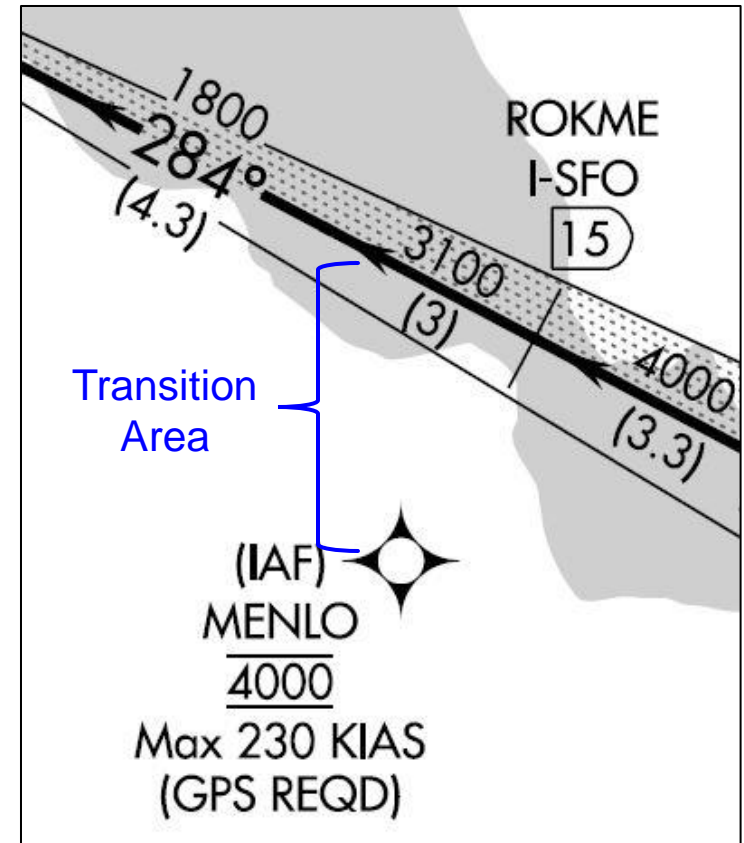
2. Use ROKME in place of MENLO

MENLO is an Initial Approach Fix (IAF) on the ILS RWY 28L

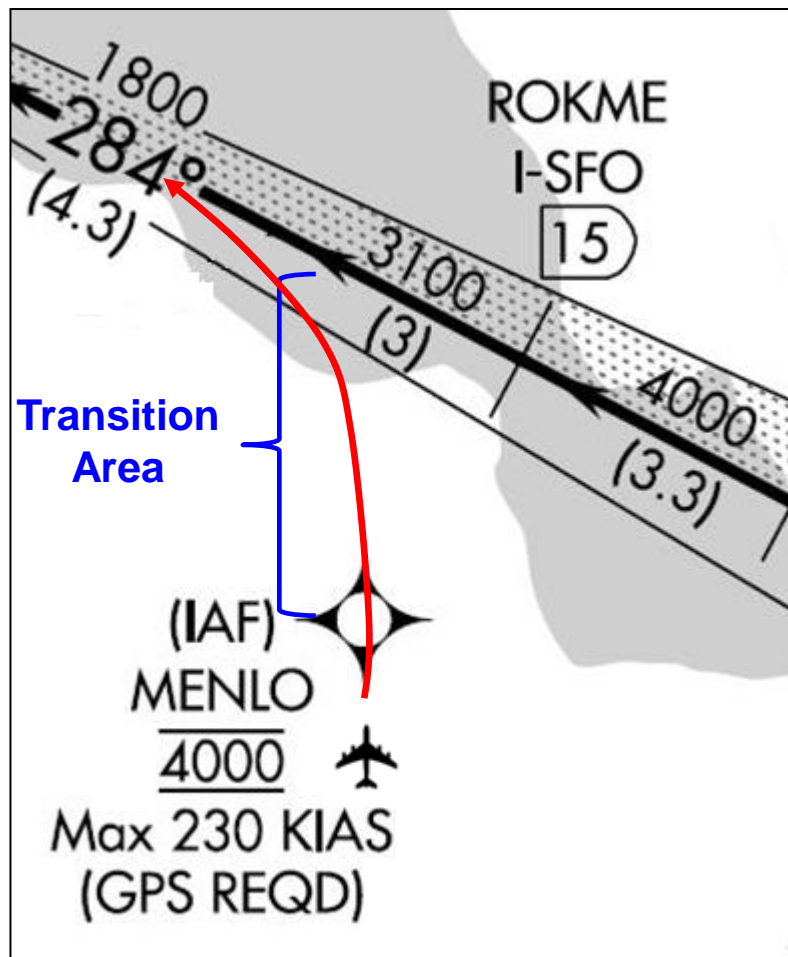
- An IAF is the beginning of the initial approach segment and is used to join the final approach course.

The SERFR STAR includes a 'Transition' – the space between the end of the STAR (MENLO) and where the aircraft intercepts the Final Approach Course (the straight-line path the aircraft flies down to the runway).

Using ROKME instead of MENLO would remove the Transition Area, leaving insufficient space for aircraft to intercept the RWY 28L or 28R final.



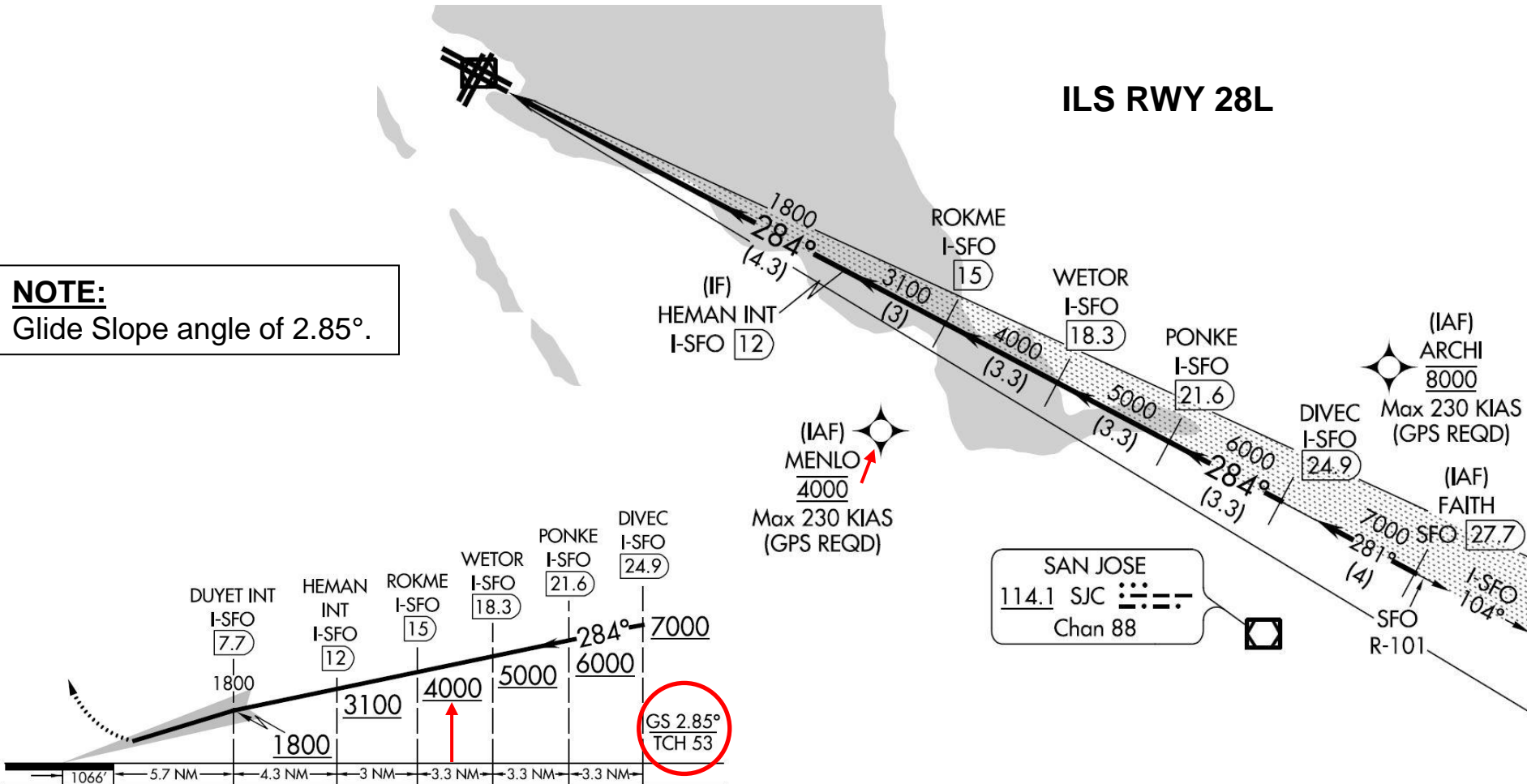
2. Use ROKME in place of MENLO



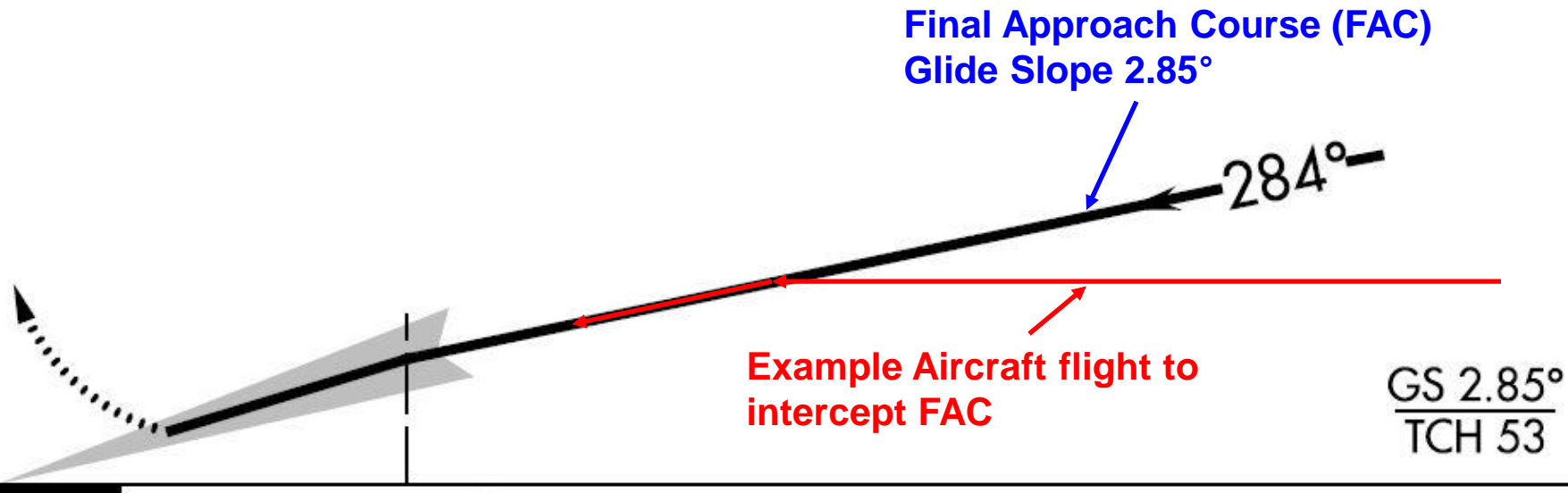
- The Transition Area is required for aircraft to make the turn from the SERFR STAR to the Final Approach Course.
- Aircraft intercepting a final approach course must do so from an angle of 30° or less.
 - Using ROKME instead of MENLO will violate the requirement.



3. Raise altitude at MENLO to 5,000 feet



3. Raise altitude at MENLO to 5,000 feet



The preferred method to intercept a glide path is from below.

Raising MENLO to 5,000 feet could create an unsafe descent rate, likely causing some aircraft to either join the Final Approach Course from above or be vectored to rejoin the sequence and try again. This would result in a negative safety impact for arriving aircraft.



Summary

- **MENLO cannot be moved East.**
 - Too close to SJC Class C.
- **ROKME cannot be used in place of MENLO.**
 - Violates the transition area to join the final approach course.
 - MENLO is an IAF, ROKME is not.
- **The altitude at MENLO cannot be raised to 5,000 feet.**
 - Creates an unsafe descent rate that will negatively impact aircraft joining the final approach course.

