

SAN FRANCISCO (SFO/KSFO)

Elevation 13ft

CATEGORY B**PRM & PRM LDA Approaches are available for RWY 28L & 28R.**

These approaches are available if both pilots are current (Performed such approach within the last 12 month).

If pilots are NOT current, pilots are required to review the latest PRM Video from FAA. Follow link below: https://www.faa.gov/training_testing/training/prm/media/PRM_training.pptx

Pilots must not accept a PRM approach if the above cannot be achieved.

GENERAL

- San Francisco airport is located 11nm south of downtown San Francisco.
- SFO is the main airport in the San Francisco Bay Area.
- Large Easterly variation

Threats**CFIT**

- There are more than 50 hills within city limits. San Bruno mountain 1,500ft asl is 4 NM NW and there is terrain up to 2,000ft asl within 3 nm W of the airfield. These hills have a significant influence on departure, arrival and missed approach procedures.
- The terrain gives a high descent MSA though SSAs are considerably lower
- Review GPWS caution and warning actions (OM A 4.3.9)
- Be aware of rate of descent limits within 3,000ft of relevant MSA/SSA (see OM A 4.3.15.5)
- Consider use of terrain display and full use of AFDS to facilitate look-out and situation awareness
- Departures have non-standard acceleration and thrust reduction heights and emergency turn procedures.
- RWY 10L – Tower, 1300ft Right of centre, 88ft high, 3280ft from end, 35:1 clearance slope.
- RWY 10R – Tower, 950ft Right of centre, 87ft high, 3875ft from end, 42:1 clearance slope.

Runway Incursion

- Vacating RW28R requires an aircraft to cross RW28L, usually at TWY T.

Runway Excursion

- SFO has a history of high energy and rushed approaches

Loss of Control

- See DEPARTURES section for risk of low climb out speed events on Rwy 28L/R due to change in strength of WNW winds above ground level
- Simultaneous operations in affect all RWYs.
- Flocks of birds feeding along shoreline adjacent to airport; on occasions fly across various parts of the airport.
- During summer months positive WINDSHEAR is common below 200ft, caused by sea breezes in the Bay. Coupled with ground effect this can destabilize the aircraft on short final.

Mid Air Collision

- Close simultaneous parallel (PRM) approaches to Rwy 28L, and LDA/LDA PRM approaches to Rwy 28R **are** authorised for use by BAV aircraft
- TCAS events are common in the vicinity of SFO, particularly during parallel approach operations. Brief TCAS procedures as well as PRM and SOIA approaches.
- Threats include Oakland traffic and departing SFO aircraft

Special Considerations

- Ensure compliance with the 'AT OR ABOVE' level constraints on SIDs due to the close proximity of Oakland and GA airfields.

ARRIVAL
Diversion Airports

OAKLAND	OAK/KOAK	010 nm/037°T	CAT B
SAN JOSE	SJC/KSJC	026 nm/112°T	CAT B
SACRAMENTO	SMF/KSMF	074 nm/016°T	CAT C
RENO	RNO/KRNO	167 nm/033°T	CAT C
LOS ANGELES	LAX/KLAX	293 nm/124°T	CAT B
ONTARIO	ONT/KONT	316 nm/118°T	CAT B

A380

- Only two runways are currently available for the A380 to land and depart at SFO – 10L/28R and 19L/01R
- 10L does not have an ILS. CAT II/III operations are approved on Rwy 28R.
- Rwy 01R does not have an ILS and 19L is not equipped for CAT II/III operations.
- When landing 19L pilots should if at all possible avoid rolling past Taxiway M. Doing so would require the A380 to make a 180° turn on the runway as taxiways south of M are restricted. BTV (Brake to Vacate) systems should be set to exit at Twy G, H and no later than M, if practical.

ALL

- Rwy 01L/01R are **not approved** for landing for any BAV aircraft types. This is due to the lack of published approaches, no approach lists or vertical guidance and rising terrain close to the threshold of the runways. In the event of strong northerly winds, consider 28L/R if crosswind is within limits or holding/diversion as appropriate.
- Routings are usually via Red Bluff (RBL) or Mustang (FMG) and then Golden Gate or Modesto STARs. Shortcuts are often given with a direct routing to Point Reyes (PYE), LOZIT or CEDES. Expect 11,000ft at these waypoints. The exact arrival routing should be requested from ATC on first contact.
- Clearance to cross SFO maintaining 11,000ft is typical.
- Include relevant configuration and speed targets in the descent brief to ensure energy is managed effectively – often there is a short distance to run and lots of height to lose.
- The heading off the SFO will indicate whether a left or right pattern will be flown – left hand patterns tend to involve greater track mileage and fewer energy management issues though it is still wise to consider early.

- It is prudent to lose height downwind whilst maintaining speed and then reduce speed on base leg (B747 – consider F10 on the base turn).
- Beware asking for a 10 NM final as this may be misinterpreted as a request for a shortcut. ATC will generally aim to vector for a turn on to the ILS at 12-14 NM – if in doubt prompt downwind for more track miles. Requests for “at least a 10 NM final” will generally be accepted but traffic for OAK Rwy 29 may impact this if you are RH downwind for Rwy 28R.
- Long delays are possible when Rwy 10/19 are in use due poor weather
- Arriving via BDEGA3 it is highly likely that the assigned runway transition and landing runway will differ – you may hear the following from NorCal Approach:

“Speedbird 287, Descend via BDEGA Three arrival, Runway 28 Left transition, expect ILS/Visual approach Runway 28 Right.”

Approach

- Wind is predominantly westerly
- The ILS can usually be expected but there are multiple final approach options, including the ILS PRM for Rwy 28R, LDA/LDA PRM for 28L, Quiet Bridge Visual for 28L/R or Tipp Toe Visual for 27L.
- If arriving between 2300-0600 local time, request a Quiet Bridge Visual approach and avoid overflying residential areas on the coastline if at all possible.
- Expect ATC requests of 180kt to 6 NM, 170kt to 5 NM or the more familiar 160 kt to 4 NM.
- Note go-arounds from published visual approaches are different to standard US and there is a requirement to maintain a specific heading.
- Late visual switches are infrequent for ‘Heavy’ aircraft but worth reviewing procedure for this along with the PRM breakout manoeuvre.
- Expect a heading of 265-280 climbing to 3000 or 4000ft if you go around, climbing to 5000ft over the ocean on handover to Norcal for a left hand downwind.
- Note that the DME reads 2 NM at the threshold of 28L/R, adding to the chances of a rushed approach.
- Landing 28L/R, expect traffic to depart on Rwy 01L/R at a late stage of the approach/
- If simultaneous visual approaches Rwy 28L/R are in use, advice Bay Approach Control on first contact that a single file approach (i.e. not side by side with 750ft separation in VMC) is required – a minor delay of about 5 mins may result.
- ATC frequently “cut in” small jets and light aircraft ahead of large aircraft on long finals.
- RNAV and Conventional STARs are published for all runways. Expect radar vectors for final approach. Some procedures start before descending through FL200.
- Arrival RWY 28L: Arrival can be changed to the BDEGA 3 to land RWY 28L from an ILS.
- Arrival RWY 28R: when exiting RWY 28R using RET T – holding short RWY 28L – marked as a hotspot: caution wing tip clearance with small aircraft on taxiway D and once clear of RWY

28L turning left onto taxiway B. Caution when crossing RWY 28L, confirm crossing clearance with tower. Be aware RWY 28L is normally used for faster smaller traffic.

- RWY 19L/R: Runway 19L is published with an ILS CAT I approach and runway 19R is published with an RNAV GPS approach. On approach for runway 19L a sidestep to parallel runway may be assigned by ATC. Expect wind shear and turbulence on short final to both runways.
- RWY 10L/R: For runway 10L there is an RNAV GPS approach and for 10R there is an RNP approach available. Both runways have a displaced threshold.
- RWY 28L/R: Runway 28R has an ILS CAT III approach available and 28L has an ILS CAT II approach available. Both runways have a displaced threshold. There is an obstacle departure procedure for these runways requiring a minimum climb gradient of 351ft/nm up to 1300ft.
- Twy Z is often used to cross aircraft and this may appear to be a runway incursion – if in doubt clarify with ATC
- Ensure missed approach tracks are flown accurately due to terrain

Quiet Bridge/Tipp Toe Visual

- The usual instruction is “Cleared visual 28L/R via the Quiet Bridge approach”.
- It is imperative that the instrument portion of the approach is flown.
- You are expected to maintain the SFO 095 radial until passing the San Mateo Bridge at the specified height before the turn toward the runway is made. This results in a significant offset, particularly for 28L.
- Similar restrictions for the Tipp Toe Visual must also be complied with.
- Note that you will be expected to maintain separation from any other traffic you have confirmed to ATC as being in sight.
- Whilst both the Quiet Bridge and Tipp Toe are visual approaches, they have promulgated missed approach procedures.
- The Quiet Bridge is primarily used for 28R arrivals, and the Tipp Toe for 28L.

Suggested review items to consider for the approach brief include:

- Terrain – RoD within 3000ft of MSA, review GPWS pull up recall actions
- Energy management – establish bottom lines and gates, what to do if it goes wrong (early gear selection can be very effective!)
- FMS programming – consider use of RTE2 for different arrivals/runways
- Traffic – review TCAS RA manoeuvre.
- ILS PRM approach – review breakout manoeuvres & late runway changes

GROUND

- Need to contact Ramp Control during taxi and then again on approaching “spot 2”. Final taxi on to gate initially via Marshaller, then via gate guidance.

- Approaching the ramp, expect to enter via spot 1 or 2. May have to hold at spot 3 or 4 if gate occupied. If delayed to gate, ramp will usually keep you updated.
- Do not enter TWY M1/M2 without a specific taxi clearance from Ramp Tower A.
- If landing 28R do not cross 28L until cleared to do so.
- Only contact Ground when instructed to do so
- Remain on the taxiway used to vacate the runway until clearance to continue is received.
- Consider use of wingtip lights as it is not uncommon for large aircraft to pass on Twys M and H.
- See Navigraph/Lido charts for widebody/A380 taxiway restrictions.
- Parking stands are generally A2-A10 at the International Terminal.

DEPARTURE

- Departure clearance can be obtained with 20 mins to go – SFO operates the Abbreviated Departure Clearance Readback Procedure (see OM C – North America/North Atlantic)
- The following SIDs are **NOT APPROVED** for BAV Operations:
 - Rwy 01L/01R: GAP and SSTIK SIDs
 - Rwy 10L/10R: GAP and MOLEN SIDs
 - Rwy 19L/19R: LUVVE, GAP and MOLEN SIDs
 - Rwy 28L/28R: GAP, SHORELINE, RNAV GNNRR, NIITE, RNAV TRUKN and RNAV WESLA.
- SFO/TRUKN SIDs Rwy 01L/01R to achieve 3000ft height requirement at SFO 6D or TYDYE:
 - EO ACCEL HT – 1000ft
 - ACCEL HT – 3000ft
 - THR RED – 3000ft
- Departures Rwy 19L/R:
 - B777:
 - EO ACCEL HT - 1400ft
 - ACCEL HT - 1400ft
 - THR RED - 1400ft
 - B787:
 - EO ACCEL HT – 1500ft
 - ACCEL HT – 1500ft

- THR RED – 1500ft.
- Departures Rwy 28L/R:
 - EO ACCEL HT – 1500ft
 - ACCEL HT – 1500ft
 - THR RED – 1500ft.
- “Parallel take-offs” have been understood to occur – as with all take-offs in the US, immediate compliance with a take-off clearance is assumed. If you wait for separation from the other traffic, it is likely your clearance will be cancelled.
- Possible late change of departure RWY. Consider take off calculation for both RWYs.
- GAP departures (GAP “X”/SFO “X”) minimum altitudes apply – refer to LIDO “Fly Quiet Program” chart and follow guidance below.
 - Set acceleration altitude at 3500ft unless lower level off provided by ATC.
 - Boeing 777: 340-345 tons – Use Assume Temperature 30 deg in FMC and speeds from CARD assumed temperature uncalculated.
 - Boeing 777: 345+ tons – Use APU-to-PACK (or PACKS OFF takeoff if not available).
- Takeoff from RWY 01R is possible and has a shorter taxi time. This can be requested with delivery around 30 minutes before STD. If approved, expect SID TRUKN2. Caution: close separation with departures on RWY 01L, although initial routing will separate traffic.
- The gap in the mountains at the end of Rwy 28L/R produces a near year-round W/NW wind which increases in strength during the summer. There are a number of low climb-out speed events seen during these months which is caused by the ground level headwind rapidly disappearing at around 400R. Ensure speed is monitored closely during climb-out, especially at around 400ft when distractions such as ATC frequency changes may occur.
- Aircraft have been cleared to take off from Rwy 28R with an aircraft positioned on Twy D between 28R and 28L – although aircraft positioned between the runways may appear close sufficient clearance does exist and this is allowable under current airfield procedures. If in doubt ask ATC.
- For the departure brief, review:
 - Terrain – Emergency Turn, GPWS pull up actions
 - Performance Restrictions – most suitable departure runway, non-standard thrust red/accel heights
 - (A380) Continuation policy in the event of an in-flight shutdown.
- CARD/OPT may produce a variety of flap settings for take-off depending on the departure runway – be prepared to change the take-off flap setting in the event of a runway change.

WEATHER

- Since San Francisco is surrounded on three sides by water, the weather is strongly influenced by the cool currents of the Pacific Ocean, which moderate temperature swings and produce a remarkably mild year-round climate with little seasonal temperature variation.
- San Francisco exhibits a multitude of distinct microclimates. The high hills in the geographic centre of the city are responsible for a 20% variance in annual rainfall between different parts of the city.
- The hills also protect neighbourhoods directly to their east (“banana belts” such as Noe Valley) from the foggy and sometimes very cold and windy conditions.
- Volmet is available on Honolulu Radio 2863, 6679, 8828, 13282 kHz.

Turbulence & Windshear

- Wake turbulence potential exists due to heavy jet traffic. The airport is equipped with low level windshear alerting system.

OPERATIONAL INFORMATION

Handling Agent	BA (Pax) Servisair (Ramp)
Handling Agent VHF	129.7
Potable Water	Uplift Permitted

IF ONLY Electrical Power is required	Use ground power at all times
If BOTH electrical power and air conditioning is required:	Use both ground services at all times