

SAN JOSE (Juan Santamaria) (SJO/MROC)

Elevation 3048 ft

CATEGORY B

AV brief not available.

GENERAL

- Juan Santamaria International Airport is located in the Central Plateau of Costa Rica.
- Mountainous terrain in the northwest, northeast and southeast quadrant.
- SJO operations are complex and require effective flight management, preparation and briefing
- Spanish is the main language used by ATC. Ensure standard phraseology and good Situational Awareness is maintained at all times. Clarify any ambiguous clearances immediately and beware of similar sounding waypoints, e.g. RAMON and RADON.
- Due to the small B777 fleet size at LGW any delays on this service can have a significant knock-on effect lasting well over a week.

Threats

CFIT

- Runway lies at the head of a horseshoe-shaped valley permitting long straight-in approaches to Rwy 07
- To the northeast, Mt Barvia rises to 9577 ft MSL within 10 NM
- To the east, the active Volcano Irazu rises to 11457 feet MSL within 21 NM
- To the southeast, terrain rises to 7972 feet MSL within 10 NM
- Pacific Ocean is 31 NM to the west, while the Caribbean Sea is 60 NM to the east
- It is recommended that approaches are made to Rwy 07 using the aircraft's maximum tailwind limit rather than fly the demanding Visual 25 CYRUS approach.

Runway Incursion

- High risk of RWY incursion and/or aircraft collision on taxiways. Please refer to the Hotspots overview in the charts
- Runway incursion is a significant threat when vacating the apron for departures
- Heavy jets are restricted from using certain parts of Twy A. Therefore Rwy 07 departures require a backtrack before vacating further down the runway.
- Ensure a clearance to enter, backtrack and exit at the appropriate point is fully understood in order to avoid a runway incursion and collision threat with departing/arriving aircraft, particularly as ATC comms are in Spanish. If necessary ascertain from ATC the exact location of arriving and departing aircraft prior to entering the runway.
- Aircraft waiting to enter the main apron via Twy C and D may overhang the runway area

Runway Excursion

- Displaced threshold at RWY 25 resulting in a reduced usable landing length – approx. 500m shorter than Rwy 07.
- Energy management – due to the elevation and warm temperatures expect higher than normal ground speeds and rates of descent on approach
- Crews must calculate landing performance for both runways including the effect of a deterioration in braking action or runway surface due to rapidly changing weather
- If rain is reported the runway will likely remain wet. In this case request a braking action report early on during the arrival. This will be the latest pilot report and will help in finalising

the landing performance calculation.

- RWY 07 has an upslope which can create the visual illusion of being above a normal approach path
- RWY 25 has a downslope which can create the visual illusion of being below a normal approach path
 - This runway has no VASI or PAPIs
 - It has a significant displaced threshold
 - Radalt readings may decrease slowly or increase during the turn to final and on final
 - The approach path angle is 3.3°
 - Use extreme caution when making the visual approach and ensure the aircraft follows the correct vertical profile and touches down at the appropriate point
 - Social media shows numerous circling approaches to Rwy 25 where aircraft touch down before the displaced threshold and at times barely clearing the security fence, in breach of the Stable Approach Criteria.
- Crews must include in their brief the baulked/rejected landing procedure

Loss of Control

- Turbulence, strong Winds and Downdrafts during Arrivals/Departures, particularly in the winter months. This has the potential to destabilise the approach and lead to a short, heavy or deep landing.
- WINDSHEAR and turbulence should be expected in the vicinity of the airfield with only moderate surface winds. The surface wind often differs over the length of the runway.
- Birds are in the vicinity of the airport

Mid Air Collision

- Arrivals are always along the Rwy 07 extended centreline and departures will be in the opposite direction. SIDs are designed such that a turn away from inbound traffic is made at the TIO VOR.
- MRPV airport 4 NM SE of the airfield, has a similar runway orientation and is used by local traffic
- Traffic can be extremely busy, particular on departure so a good look-out is essential
- During normal operations do not exceed R113 TIO during the initial turn when departing or carrying out the missed approach procedure for Rwy 07. This will keep the aircraft clear of the neighbouring airport's ATZ. During the engine-out case this radial may be exceeded and this is acceptable.

Special Considerations

- ATC assigned altitudes and vectors may not provide adequate obstruction clearance
- Due to high terrain in all quadrants, special care should be taken during all descents
- Due to the language barrier and differences in standard phraseology, speak clearly using simple, precise technical terms to avoid misunderstandings

ARRIVAL
Diversions Airports

LIBERIA	LIB/MRLB	137 nm/293°T	CAT A
MANAGUA	MGA/MNMG	174 nm/316°T	CAT B
PANAMA City	DAV/MPDA	145 nm/137°T	CAT B
SAN SALVADOR	SAL/MSLP	353 nm/306°T	CAT B
KINGSTON	KIN/MKJP	645 nm/042°	CAT B
CANCUN	CUN/MMUN	683 nm/347°T	CAT A

Crew Reports

- *We were cleared initially on the FIORA 4 arrival but subsequently direct to the TIO VOR. This is unhelpful because selecting abeam on the FMC dumps all the height constraints on the STAR. We therefore requested to remain on the STAR which of course allowed positive terrain management and enhanced SA.*

Approach

- This is a performance-limited airfield due to its elevation and surrounding high terrain. Weather can change rapidly with conditions of low ceiling and visibility developing in both the thunderstorm and ground fog seasons.
- **Landing on Rwy 07 with max tailwind is preferred to flying the circling approach to Rwy 25.**
- Dry season easterly winds favour 07. Wet season westerly winds favour Rwy 25.
- Approaches to Runway 25 only VFR
- Instrument approaches at Juan Santamaría International Airport must be carried out in accordance with the latest meteorological report issued, which must indicate that such conditions are above the authorized landing minimums for the procedure being carried out.
- The majority of operations will be flown toward the performance limiting terrain and must therefore be flown accurately and with maximum and appropriate use of the automatics at all times.
- Irregular terrain prior to the threshold of both runways will cause rapid radio altimeter changes. Radalt readings are therefore difficult to correlate to the baro altimeter, so it is recommended that crews achieve the Stable Approach Criteria as early as commercially possible.
- Do not expect to receive TIO VOR DME until approx. D35 due to the topography. It is imperative that crews are able to check their position at all times to minimise the risk of CFIT. This is particularly the case when ATC shorten the approach by vectoring aircraft off the STAR and toward the ILS.
- **Crews must follow the published procedures whenever RADAR coverage is not available.**

- FMC LEGS page must be checked carefully to ensure that all constraints correspond with the charted restrictions.

STARs/Holding

- In order to maximise fuel and avoid a diversion it is recommended to hold at high altitude or even at cruise altitude, either on the STAR or on the approach at PARZA, TOMAS or TURRU.
- ATC will provide holds at these points and will approve them at high altitude if necessary.
- The worst weather tends to last for approximately half an hour. When ready for an approach a descent in the hold is recommended as the inbound course is aligned with the ILS inbound course.

Rwy 07

- STARs are used by so too is a clearance direct to the TIO VOR followed by radar vectors to the ILS 07
- The terrain within 10nm beneath the approach to Rwy 07 rises at a gradient of 4.6% (approx. 2.5°) toward the runway
- During the wet season (Jun-Oct) a late afternoon/early evening arrival will often present CB activity, westerly surface winds up to 15kt and a scattered low cloud base over the airfield.
- When there is cloud in the valley it is common for the aircraft to remain at the base of the cloud layer until short final.
- It is common to lose visual contact with the ground as the runway is neared resulting in a decision at minima.
- The situation will be made more demanding by the high TAS of the aircraft and possible tailwind. This will leave little time to correct alignment of an ILS CAT 1 approach before touchdown.

Rwy 25

- Visual 25 CYRUS circling approach is DAY ONLY and flown left-hand inside high ground.
- Terrain clearance on base leg and short final can be as low as 500ft due to rising terrain east of the airfield
- Approach flown initially using the VOR DME 07 approach. This is to avoid aircraft landing on Rwy 07 after flying the ILS approach.
- Waypoints can be manually entered in to the FMC if the approach is not available in the FMC.
- Aircraft path beyond EPABE must be accurately flown to avoid terrain cautions and warnings during the turn.
- There are no PAPIs associated with this runway and the final approach angle is 3.3° to clear terrain
- Displaced threshold for Rwy 25 makes it harder to assess the vertical profile during the circling approach
- Stable Approach Criteria can easily be breached by the aircraft being below the profile resulting in GPWS Caution or Warnings on base leg and final
- This approach will mainly be used during the wet season due to westerly winds. As with Rwy 07 prevailing weather and low cloud base means loss of visual contact with the ground is a real possibility.

- If other aircraft are flying this approach be aware of the following:
 - Maintain a careful listening watch of ATC comms
 - Before CYRUS: if an aircraft ahead carries out a missed approach, expect to be cleared direct to BELEN in order to maintain traffic separation
 - After CYRUS: if instructed to carry out a missed approach, the remainder of the circling approach procedure must be flown whilst climbing to the missed approach altitude. An immediate turn to final must NOT be flown unless specifically cleared by ATC. This is to maintain traffic separation ahead and behind traffic landing at MRPV.

GROUND

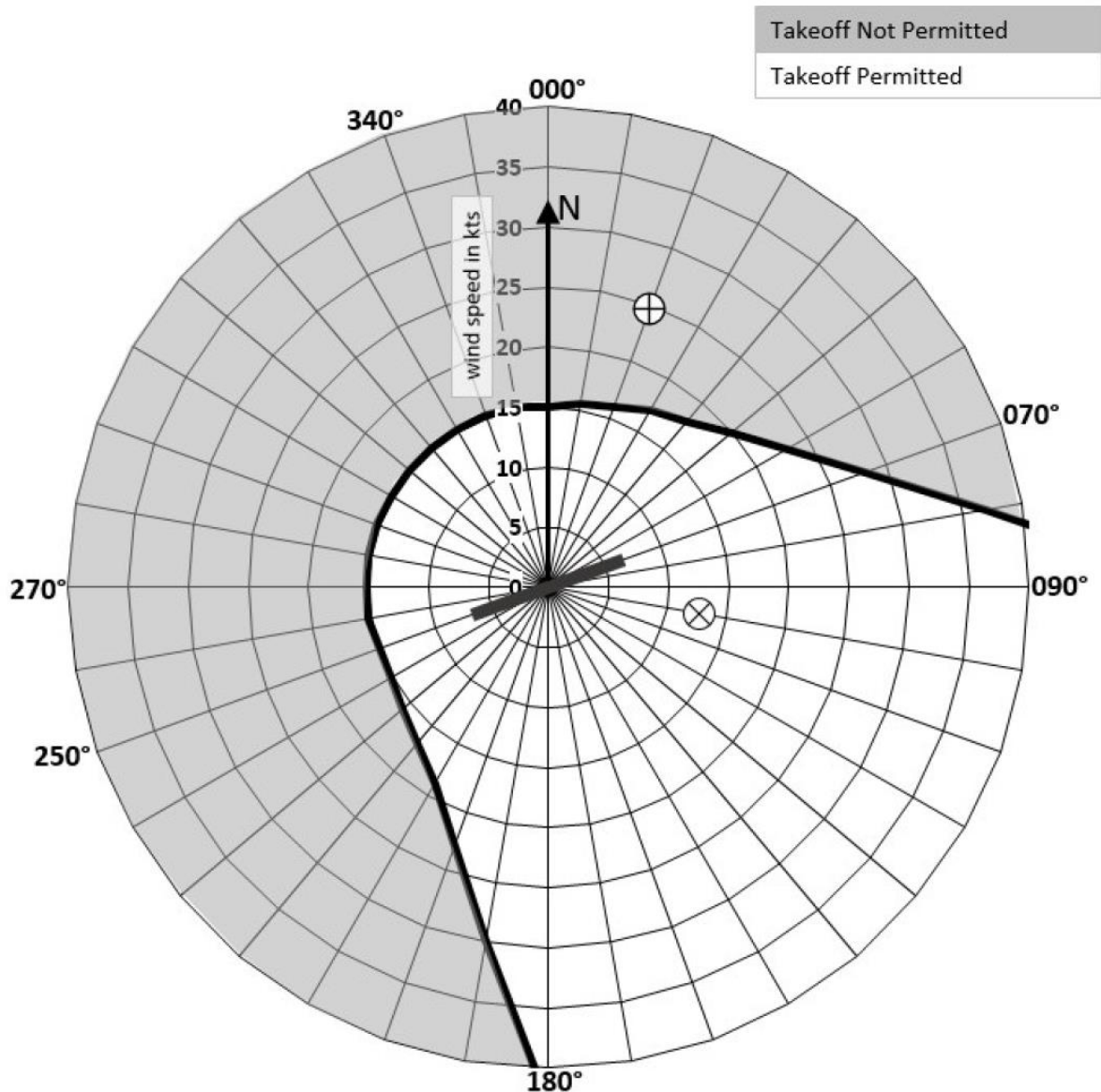
- Normal BA parking stands 2A and 3A.
- Stand 2A is set diagonally across stands 1 and 2 and is accessed via B
- Stand 3A is accessed via C
- The aircraft will vacate straight on to the apron after landing
- Twy A has a wingspan restriction detailed in the 10-1/AOI pages. Use B or C only.
- When vacating the runway at B or C the taxiways are downsloping toward A with the apron upsloping from A.
- Stands C1 and C2 in the Cargo apron can also be used and are designated for Cat E aircraft. Access to these is via E and there are no restrictions
- When parking at C4 (remote) the aircraft should be towed in. Crew will need to stop at C2, shut down engines and await ground team to tow on to Stand C4.

Pushback/Taxi Out

- Expect startup and taxi delays due to single runway operation and the need to space arrivals and departures by up to 20 minutes. Liaise ahead of time to ascertain taxi delays in order to consider fuel saving measures after pushback.
- Cat E aircraft pushbacks from stands 2A and 3A cause significant disruption to the airfield as:
 - Stands 4 and 5 must be empty
 - Wingtips infringe the runway safety zone so departures and arrivals are stopped during pushback
 - There is a requirement to backtrack for either runway.
- After pushback from Stands 2A or 3A the runway may only be entered via taxiway B and C
- When departing Rwy 07 a backtrack is required due wingspan restriction on A
- The turning area at the Rwy 25 threshold is sometimes used as a holding area to allow arriving aircraft to land
- The 180° turn requires an initial right-hand turn following the yellow line in to the turn pad, followed by an anticlockwise turn on to the runway.
- When departing it is important to ensure the aircraft does not stop prior to entering the runway as breakaway thrust on the upslopes will cause significant disruption to stands 1-5.

DEPARTURE

- It is a BAV requirement that all take-offs from Rwy 07 are carried out by Captains. There are no crew restrictions for departures from Rwy 25.
 - Rwy 07 takeoff not permitted when northerly wind exceeds 15kt. Observe wind limits from diagram below. Takeoff Rwy 07 not permitted when wind reported in shaded area:



Examples:

- ⊕ Wind 020/25 – takeoff Rwy 07 not permitted
 - ⊗ Wind 100/13 – takeoff Rwy 07 permitted
- Rwy 25 is the preferred departure runway as it has the benefits of avoiding the need to fly the performance-limiting departure from Rwy 07 as well as reducing workload.
 - Departures from both runways must be considered using the latest and most accurate environmental data, particularly when the runway is wet. It is essential that the runway and

configuration which provides the maximum possible TOPL is used in order to ensure the commercial success of this route – understanding how take-off performance calculators apply head and tail winds to calculate take-off performance is essential, because unnecessarily adjusting these may cause a significant reduction in TOPL and severely impact revenue.

- For information, analysis shows that Rwy 25 TOPL is better than that for Rwy 07 under the following Rwy 07 conditions:
 - Wet runway: 6kt headwind or less
 - Dry runway: 12 kt headwind or less
- The prevailing easterly winds are strongest Dec-Feb averaging 12kt. The wet months of Jun-Nov have average winds of 6kt.
- Carry out a take-off performance check for both runways as soon as you reach the aircraft. Maximise TOPL using packs off if necessary whenever possible.
- Long-haul aircraft regularly use Rwy 25 with a tailwind for take-off to improve TOPL. This is an approved procedure and ATC are aware of it.
- If you want to use Rwy 25 with a tailwind and Rwy 07 is in use, advise Tower ASAP and preferably 30-40 minutes prior to blocks-off to avoid departure delays.

Rwy 07:

- Rwy 07 departures must be accurately flown, particularly when TOPL limited.
- Terrain rises rapidly under the take-off flight path from the end of the runway leading to radalt readings rising slowly until halfway around the turn toward TIO
- Radalt readings may also decrease during initial climb due to terrain
- Noise abatement – no turns before D4 TIO. Start the turn at D4 without delay.
- Set AOB selector to Auto. This is because a selection of 25°AOB will reduce the radius of turn but also significantly reduce climb performance in the event of an engine failure.
- Do not accelerate until inbound TIO, in both all engine and OEI cases, even if acceleration height is reached during the turn. This ensure the turn radius does not increase due to the aircraft accelerating.
- Altitude restriction of 5500ft by D4 TIO to keep departing aircraft clear of traffic operating to/from MRPV up to 4500ft. However this altitude restriction is unlikely to be met, so when requesting departure clearance inform ATC “Unable to make 5500ft at D4 on the SID”. This will request a local procedure that ensures all traffic at MRPV is coordinated with your departure by displacing it much further south and is requested by the majority of US carriers.
- Not accurately following the FD in pitch following an engine failure could lead to speed decreasing below V2. The AFDS will automatically compensate for this by reducing the angle of bank to <math><15^\circ</math>, increasing the radius of turn and significantly increasing the risk of GPWS Cautions and Warnings during close in turns.
- **Following an engine failure, crews can expect to receive a GPWS caution approximately 1/3 of the way around the right turn toward TIO.**
- Delayed rotation beyond V_R or a delay in commencing the turn at D4 TIO could lead to a GPWS warning
- When flying the ETP - after reaching TIO and flowing outbound, crews may elect to fly one of the published holds on the ILS chart.

Rwy 25:

- Recommended departure is “straight ahead to TIO, left to intercept TIO R210 to 9000ft. At or above 9000ft turn right to PARZA or RAMON”.
- ATC should provide this clearance on initial request. If not, ensure it is requested.
- Other SIDs that can be used are ATENAS 4 – LIO transition and RAMON 4. These SIDs have altitude restrictions which require a climb in a holding pattern close to the airfield to ensure terrain clearance.
- It is recommended to climb at or close to max angle speed until above MSA.

PERFORMANCE RESTRICTIONS & EMERGENCY TURN PROCEDURES

SIDs/Departure Routes

- The following SIDs are **NOT APPROVED** for BAV use:
 - ATENAS SID – COTOS and ISEBA transitions
 - PARAI SID and all transitions
 - POAS SID and all transitions
 - RAMON SID – BARVA transition

Rwy 07:

ACCEL HT: 5000ft EO ACCEL HT: 5000ft THR RED HT: 5000ft

If ACCEL HT/EO ACCEL HT reached before established inbound TIO then speed intervene at current speed until established inbound TIO.

Use bank angle selector in AUTO for initial right turn to TIO. No bank angle restriction after TIO.

If altitude when crossing R318 TIO in northeasterly or R180 TIO in easterly direction is less than 13,000ft then request climbing hold or extended vectors up to 13,000ft before continuing.

Engine Failure:

BEFORE TIO: Fly rwy trk to D4 TIO. Turn left to intercept R248 TIO. Climb to MSA.

AFTER TIO but BEFORE D10 TIO: Manoeuvre immediately to intercept R248 TIO outbound to PARZA. Hold at PARZA. Climb/drift down to MSA.

AFTER D10 TIO but BELOW 13000FT: RAMON SID – ARENA/RIOBA/SASAY trans: Left hdg 250°. Climb/drift down to MSA.

ATENAS SID – LIMON/PARRI trans: follow SID to TEREL. Turn right to PARRI. Hold at PARRI. Climb/drift down to MSA.

AT or ABOVE 13000FT: No restrictions. Direct return to SJO might not be feasible if significant terrain transited while drifting down.

Rwy 25:

ACCEL HT: 2000ft EO ACCEL HT: 1000ft THR RED HT: 2000ft

If altitude when crossing R318 TIO in northeasterly or R180 TIO in easterly direction is less than 13,000ft then request climbing hold or extended vectors up to 13,000ft before continuing.

Engine Failure:

BEFORE D10 TIO: ALL SIDs and RADAR VECTOR DEPARTURE: Manoeuvre immediately to intercept R248 TIO outbound to PARZA. Hold at PARZA. Climb/drift down to MSA.

AFTER D10 TIO but BELOW 13000FT: RADAR VECTOR DEPARTURE: If BELOW 9000ft continue straight ahead. Climb/drift down to MSA. If ABOVE 9000ft fly heading 250°. Climb/drift down to MSA.

RAMON SID – ARENA/RIOBA/SASAY trans: left hdg 250°. Climb/drift down to MSA.

ATENAS SID – LIMON/PARRI trans: Follow SID to TEREL, then direct PARRI. Hold at PARRI. Climb/drift down to MSA.

AT or ABOVE 13000FT: ALL SIDs and RADAR VECTOR DEPARTURE: No restrictions. Direct return to SJO might not be feasible if significant terrain transited while drifting down.

WEATHER

- SJO has a tropical wet and dry climate
- Weather conditions at the airport can change rapidly between extremes. Hurricanes occasionally affect Costa Rica.
- Strongest winds occur during January and February

	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
① Precip Amount	20 mm 0.8 in	98 mm 3.9 in	231 mm 9.1 in	249 mm 9.8 in
Other Precip	< .5 day Thunderstorms	3 days Thunderstorms	6 days Thunderstorms	6 days Thunderstorms
IMC	<1%	4%	10%	8%
Prevailing Winds	E-12 kts	E-9 kts	E-6 kts	E-6 kts
Low Temp	14°C 58°F	16°C 61°F	17°C 62°F	16°C 60°F
High Temp	24°C 75°F	26°C 79°F	26°C 78°F	26°C 78°F
① Annual precipitation totals 180 cm (70.8 in).				

- Dry season Mid Nov – Mid Apr with predominantly easterly winds. In recent years abnormally heavy rain has fallen Jan-Feb.
- Wet season Mid Apr – Mid Nov with predominantly westerly winds. Rain mainly falls in the middle of the afternoon.
 - Cloud starts to form around noon developing in to thunderstorms and heavy rain from 1400L
 - Rain showers can typically last 2-3 hours
 - Weather blown in from the Pacific regularly gets trapped by surrounding terrain and sits overhead the airfield or along the approach to Rwy 07.

OPERATIONAL INFORMATION

Handling Agent	Swissport and IBERIA
Handling Agent VHF	126.25 / 130.45
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