



NATIONAL TRANSPORTATION SAFETY BOARD

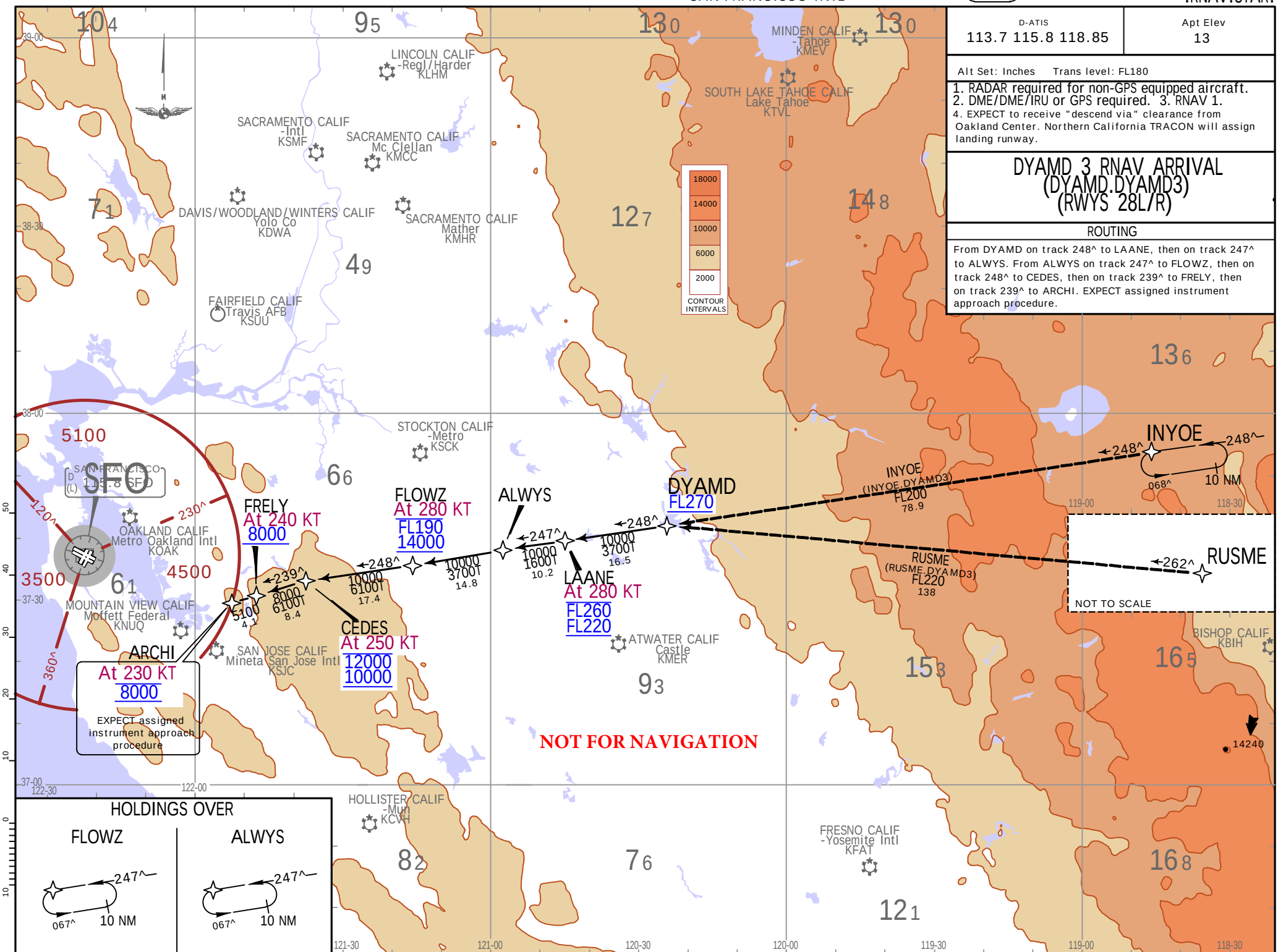
Office of Aviation Safety
Washington, D.C. 20594

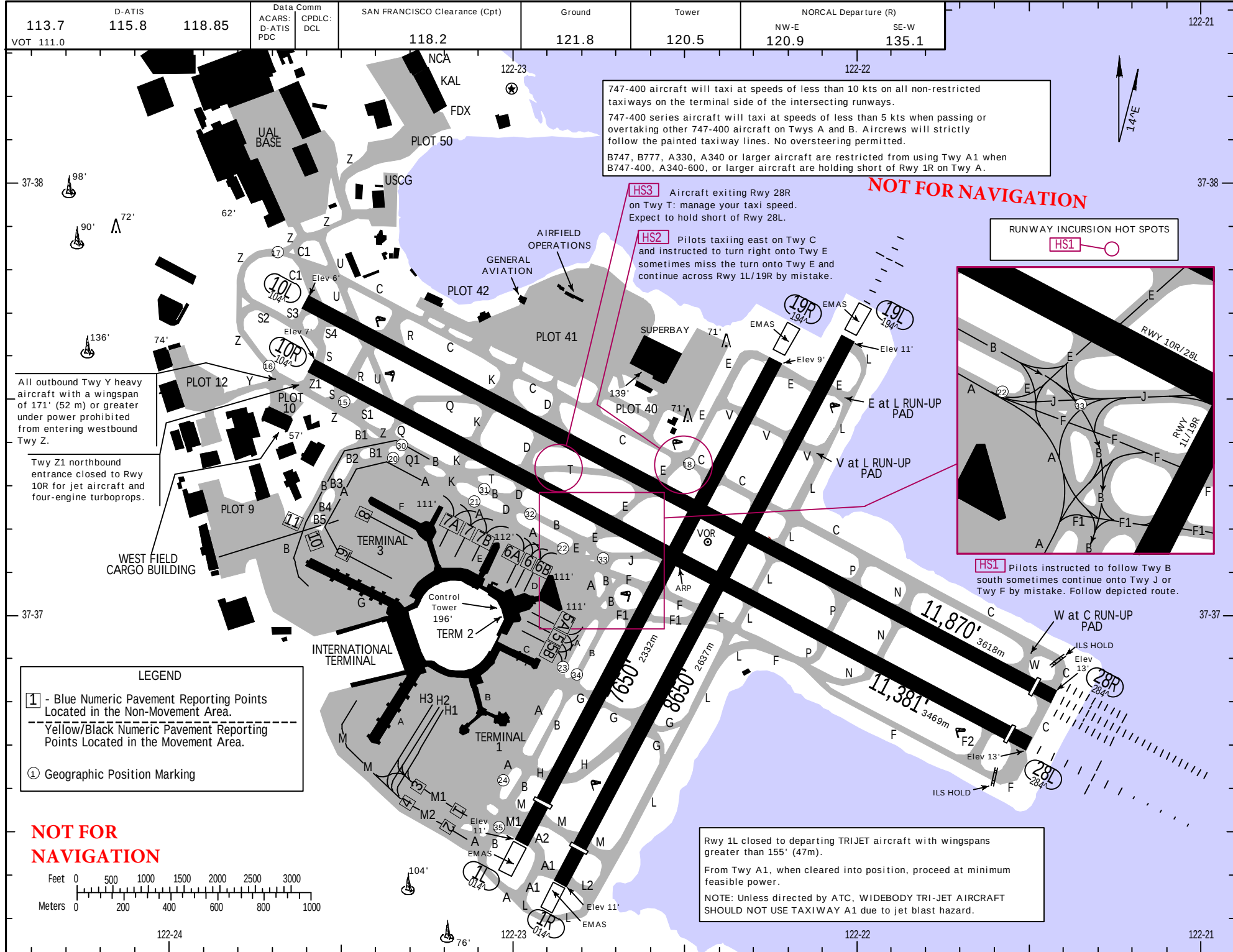
January 3, 2018

Attachment 11 – SFO Approach Charts [Excerpts]

OPERATIONAL FACTORS/HUMAN PERFORMANCE

DCA17IA148





GENERAL

CAUTION: Be alert to runway crossing clearances. Readback all runway assignments.
Readback of all runway hold short instructions is required.
Airport Surface Surveillance Capability (ASSC) in use. Operate transponders with altitude reporting mode and ADS-B (if equipped) enabled on all airport surfaces.
Runway status lights in operation.
Birds in vicinity of airport.
Simultaneous operations in effect all runways.
Low-Level Wind Shear Alert System.
No grooving exists at airport runway intersections.

NOT FOR NAVIGATION

ADDITIONAL RUNWAY INFORMATION			USABLE LENGTHS			
RWY			LANDING BEYOND		TAKE-OFF	WIDTH
			Threshold	Glide Slope		
1R	HIRL CL REIL	grooved RVR	8090' 2466m			200' 61m
19L	HIRL CL 1 MALSF TDZ 2 PAPI-L	grooved RVR		7606' 2318m		
1 Non-standard length of 1115'.						
2 Angle 3.0^.						
1L	HIRL CL REIL	grooved RVR	7010' 2137m			200' 61m
19R	HIRL CL PAPI-L (angle 3.00^)	grooved RVR				
10R	HIRL CL PAPI-L (angle 3.00^)	grooved RVR	4 10,704' 3263m			200' 61m
28L	HIRL CL MALSR 3 PAPI-L	grooved RVR	5 10,275' 3132m	9209' 2807m		
3 Angle 2.85^.						
4 Last 677' (206m) not available for landing distance computations.						
5 Last 806' (246m) not available for landing distance computations.						
10L	HIRL CL REIL 6 PAPI-L	grooved RVR	7 11,193' 3412m			200' 61m
28R	HIRL CL ALSF-II TDZ 6 PAPI-L	grooved RVR	8 11,236' 3425m	10,171' 3100m		
6 Angle 3.0^.						
7 Last 677' (206m) not available for landing distance computations.						
8 Last 334' (102m) not available for landing distance computations.						

TAKE-OFF & OBSTACLE DEPARTURE PROCEDURE (AMEND 9)					
Rwys 1L/R					
2 operating RVRs are required All operating RVRs are controlling		Adequate Vis Ref	STD		
CL & HIRL	CL, or RCLM & HIRL		3 & 4 Eng	1 & 2 Eng	
TDZ RVR 5	TDZ RVR 10	RVR 16 or 1/4	RVR 24 or 1/2	RVR 50 or 1	
Rollout RVR 5	Rollout RVR 10				
Rwys 10L/R					
2 operating RVRs are required All operating RVRs are controlling		Adequate Vis Ref	STD		
CL & HIRL	CL, or RCLM & HIRL		3 & 4 Eng	1 & 2 Eng	
TDZ RVR 5	TDZ RVR 10	RVR 16 or 1/4	RVR 24 or 1/2	RVR 50 or 1	
Mid RVR 5	Mid RVR 10				
Rollout RVR 5	Rollout RVR 10				
Rwys 19L/R					
With Mim climb of 575' /NM to 2000'					
2 operating RVRs are required All operating RVRs are controlling		Adequate Vis Ref	STD		
CL & HIRL	CL, or RCLM & HIRL		3 & 4 Eng	1 & 2 Eng	
TDZ RVR 5	TDZ RVR 10	RVR 16 or 1/4	RVR 24 or 1/2	RVR 50 or 1	
Rollout RVR 5	Rollout RVR 10				
Rwys 28L/R					
With Mim climb of 351' /NM to 1300'					
2 operating RVRs are required All operating RVRs are controlling		Adequate Vis Ref	STD		
CL & HIRL	CL, or RCLM & HIRL		3 & 4 Eng	1 & 2 Eng	
TDZ RVR 5	TDZ RVR 10	RVR 16 or 1/4	RVR 24 or 1/2	RVR 50 or 1	
Mid RVR 5	Mid RVR 10				
Rollout RVR 5	Rollout RVR 10				
OBSTACLE DP					
Rwys 1L/R: Climb heading 014^ to 2000', thence...					
Rwys 28L/R: Climb heading 284^ to 2000', thence...					
Rwys 10L/R: Climbing left turn heading 053^ to intercept SFO VOR R-090 to 2300', thence...					
Rwys 19L/R: Climbing left turn heading 053^ to intercept SFO VOR R-090 to 2600', thence...					
...continue climb on course.					
(For TAKEOFF OBSTACLE NOTES see 10-9A1)					
DIVERSE VECTOR AREA (Radar Vectors) (AMEND 1)					
Rwy 1L: Headings as assigned by ATC; requires minimum climb of 420' /NM to 2600.					
Rwy 1R: Headings as assigned by ATC; requires minimum climb of 410' /NM to 2600.					
Rwy 10L/10R: Headings as assigned by ATC.					
FOR FILING AS ALTERNATE					
	RNAV (GPS) Rwy 19L RNAV (GPS) Rwy 19R RNAV (RNP) Y Rwy 28R	ILS Rwy 28R	LOC Rwy 28R RNAV (GPS) Z Rwy 28R	ILS Rwy 28L	LOC Rwy 28L
A	800-2	700-2	800-2	1100-2	1100-2
B		1000-2	1000-2		
C		1600-3	1600-3	1600-3	1600-3
D		600-2	800-2	600-2	800-2
	RNAV (GPS) Rwy 28L	RNAV (RNP) Z Rwy 10R	RNAV (GPS) Rwy 10L RNAV (GPS) Y Rwy 10R	ILS Rwy 19L LOC Rwy 19L	Other
A	1100-2	1100-4	1200-2	1800-2	NA
B					
C			1600-3		
D			1100-2 1/2	1200-3	

Air Canada	130.47
AGRIS	130.47
Dispatch	

TELETYPE	SFOOOAC
Maintenance	Call Dispatch
LST / LDT	-8 / -7 UTC

GENERAL

1. **Mountainous Airport – Night visual approaches are permitted to Rwy 28L/R or via the published visual approach procedures.**

ARRIVAL**1. Pre-Descent Procedures**

- This airport is considered to be a mountainous airport. Review MEAs and terrain on all San Francisco Terminal, STAR and Approach charts.
- Speed may be assigned by ATC prior to TOD. Closely monitor crossing restrictions if operating with an assigned speed.
- Flights arriving from the North can anticipate a higher than normal altitude for the downwind vector for runways 28 L/R.
- Air Canada is authorized to conduct PRM approaches. These approaches require specific fleet authorization, and crew training; approval status will be indicated in the appropriate aircraft AOM.
- TCAS TA-only mode operations are permitted for visual approaches to closely spaced parallel runways 28R and 28L. TA-only mode may be selected when inside 9 DME on approach.

2. FMS NAV DB A319/320/321 Procedure Names

- ILS Rwy 28L and ILS PRM Rwy 28L are coded as ILS 28L.
- LDA/DME Rwy 28R and the LDA PRM Rwy 28R are coded as LOC28 (IFNP LDA).
- The FMS Bridge Visual Rwy 28R is coded as RNV28R.

3. Pilots are cautioned that visuals to Rwy 28L may also be in progress along with the Quiet Bridge Approach.**4. WARNING: Rwy 10L/R and 01L/R.**

Valid GPWS terrain warnings can be anticipated during approaches. Due to the extreme nature of terrain in the approach environments prior to the runway thresholds, consider earlier use of gear to reduce GPWS MODE 2 warning envelope.

5. CAT III Minima

CAT III – Rwy 28R	
SINGLE	DH 50ft, RVR 6
LAND 2 (B777 and B787 only)	
DUAL	AH 100ft, RVR 6
LAND 3	AH 100ft, RVR 6

**NOT FOR
NAVIGATION****6. CDA Approach Information**

Approach	FAF / FIX	Altitude	FPA
LOC Rwy 19L	SHAKE	2800	3.0
LOC Rwy 28L	DUYET	1900	3.0
LOC Rwy 28R	AXMUL	1800	3.0
LDA DME Rwy 28R	GOBEC	1900	3.1
VOR Rwy 19L	FULLR	1800	3.2

7. Missed Approach**ALL FLEETS**

- Rwy 28L/R

Engine-Out missed approach obstacle clearance has been verified up to MLW, follow the published procedure.

For missed approach above MLW proceed as follows:

1. Climb to 3500' on SFO VOR R-294.
2. Advise ATC of intentions.

GROUND INFORMATION**1. APU/GPU**

GPU will be connected on all arrivals. Use of APU during the turn should only be used for cabin cooling as required. Please advise the station and send a Hawkeye if GPU is not connected.

2. Ramp Lanes

- All ramp lanes run parallel to the boarding areas and fingers.
- See Ground Movement page 10-9B taxi/tow procedures.

3. Gate Positions

- Normal gate positions are at concourse (B) of the International Terminal.
- Approach the corner gates slowly as the gates are in close proximity to equipment and structures.

4. Gate Procedures

- Gate Hold Procedures

After receiving an ATC clearance and airborne release time, aircraft are instructed to contact Ground Control prior to engine start or push-back. After push-back and disconnect, a minimum 10 minutes is allowed for taxi. A grace period of 3 minutes by Oakland Centre is normally allotted for release. Any deviation beyond 3 minutes requires a new release time and resulting delay. Advise Ground Control as soon as possible if the release time cannot be met.

DEPARTURE**1. AC All Engine Departure Procedures****Rwys 19L/R**

- All SIDs

Manually fly the aircraft, LEFT turn no later than D1.2 SFO with a minimum bank of 25 degrees, keep V2+10 (Airbus and Embraer) or V2+15 (Boeing), do not engage autopilot until turn is completed.

Rwys 28L/R

- SIDs NIITE, TRUKN

Manually fly the aircraft, RIGHT turn at 520' (or no later than D1.1 SFO or end of runway) with a minimum bank of 25 degrees, keep V2+10 (Airbus and Embraer) or V2+15 (Boeing), do not engage autopilot until turn is completed.

- Other SIDs

No additional procedure required.

Rwys 01L/R and 10L/R

- All SIDs

No additional procedure required.

2. Engine Out Procedures

- All Runways – See 10-7

NOT FOR NAVIGATION

TERPS AMEND 25A 21 JUL 2016

KSFO/SFO

SAN FRANCISCO INTL

4 NOV 16

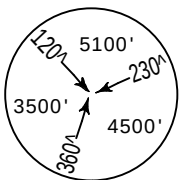
11-4

Eff.10.Nov.

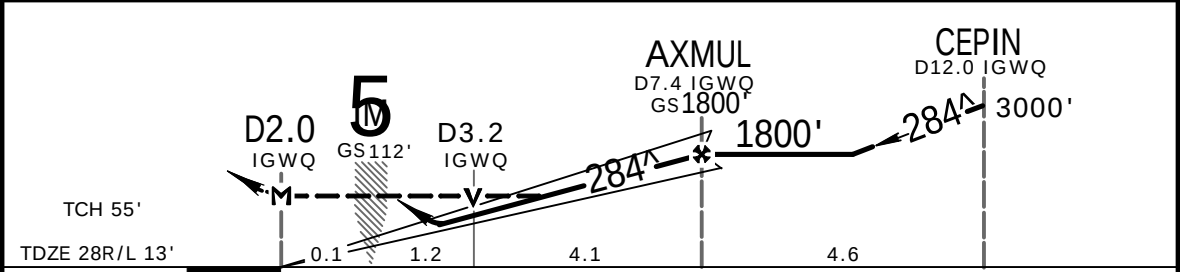
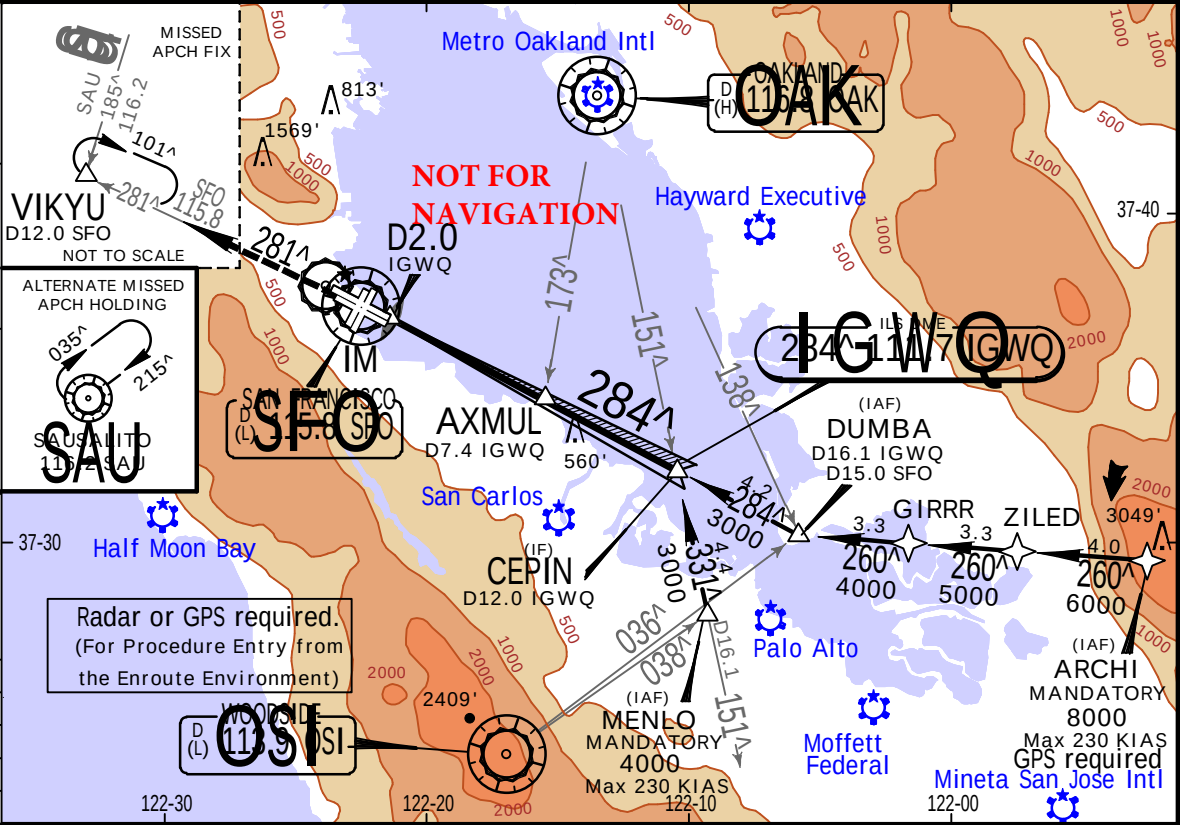
SAN FRANCISCO, CALIF

ILS or LOC Rwy 28R

D-ATIS			NORCAL Approach (R)		SAN FRANCISCO Tower		Ground	
113.7 115.8 118.85			134.5		120.5		121.8	
LOC IGWQ 111.7	Final Apch Crs 284^		GS AXMUL 1800' (1787')		ILS DA(H) 213' (200')		Apt Elev 13' TDZE 13'	
MISSED APCH: Climb to 3000' on SFO VOR R-281 to VIKYU INT/ D12.0 SFO and hold, or as directed by ATC. Missed approach requires minimum climb of 350'/NM to 1900'; if unable to meet climb gradient, see ILS or LOC Rwy 28L (11-2).								
Alt Set: INCHES			Trans level: FL 180			Trans alt: 18000'		
1. Use IGWQ DME when on the localizer course. 2. VGSI and ILS glidepath not coincident (VGSI angle 3.00°/TCH 68'). 3. MALSR, PAPI-L on Rwy 28L. 4. Simultaneous approach authorized with ILS or LOC Rwy 28L. 5. Simultaneous operations require use of vertical guidance maintain last assigned altitude until established on glideslope.								



MSA SFO VOR



Gnd speed-Kts		70	90	100	120	140	160	ALSF-II PAPI		3000'		on SFO 115.8 R-281	VIKYU			
GS		3.00^	372	478	531	637	743			849						
MAP at D2.0 IGWQ or AXMUL to MAP		5.4	4:38	3:36	3:14	2:42	2:19			2:02						
TERPS.																
STRAIGHT-IN LANDING RWY 28R				SIDESTEP LANDING RWY 28L				CIRCLE-TO-LAND								
ILS				LOC (GS out)				Not Authorized to Rwy 10L/R and 19L/R.								
DA(H) 213' (200')				MDA(H) 480' (467')				MDA(H) 480' (467')								
FULL		TDZ/CL out	ALS out		ALS out		RAIL/ALS out		Max Kts	MDA(H)						
A	RVR 18 or 1/2		1 RVR 24 or 1/2		RVR 40 or 3/4		RVR 24 or 1/2		RVR 50 or 1		RVR 55 or 1 1/4		90		640' (627') -1	
120													960' (947') -1 1/4			
140													1560' (1547') -3			
D													NA			
1 RVR 18 with Flight Director or Autopilot or HUD to DA(H).																

KSFO/SFO
SAN FRANCISCO INTL

JEPPESSEN
4 NOV 16 **(11-5)** .Eff.10.Nov.

SAN FRANCISCO, CALIF
LDA DME Rwy 28R

D-ATIS

113.7 115.8 118.85

NORCAL Approach (R)

134.5

SAN FRANCISCO Tower

120.5

Ground

121.8

LDA IFNP

110.75

Final Apch Crs

281[^]

GS GOBEC

1800' (1787')

DA(H) (CONDITIONAL)

1140' (1127')

Apt Elev 13'

TDZE 13'

MISSED APCH: Climbing RIGHT turn to 3000' on heading 030[^] then direct OAK VOR and hold, or as directed by ATC.

Alt Set: INCHES

Trans level: FL 180

Trans alt: 18000'

1. RADAR and DME required.

2. LDA/GLIDESLOPE.

3. Runway 28L and 28R separated by 750' centerline to centerline.

4. Procedure not authorized when glideslope is not available.

5. Localizer course 1183' right of rwy 28R THR.

6. VGSI and LDA glidepath not coincident.

MSA SFO VOR

Gnd speed-Kts	70	90	100	120	140	160	ALSF-II PAPI 3000' on 030[^] RT hdg OAK 116.8	
GS	3.00 [^]	372	478	531	637	743		849
MAP at DARNE								

.TERPS. STRAIGHT-IN LANDING RWY 28R
1 LDA/GS
DA(H) 1140' (1127')
FULL ALS out

A	4
B	
C	
D	

1 If go around executed after passing DARNE, go around requires minimum climb of 380' /NM to 1800'

CHANGES: ATIS frequency, AMEND number. | JEPPESSEN, 2004, 2016. ALL RIGHTS RESERVED.

TERPS AMEND 28 13 OCT 2016

KSFO/SFO



SAN FRANCISCO, CALIF

4 NOV 16 (11-6) .Eff.10.Nov.

SAN FRANCISCO INTL

ATTENTION ALL USERS OF LDA PRECISION RUNWAY MONITOR (PRM)
LDA PRM RWY 28R

Pilots who are unable to participate will be afforded appropriate arrival services as operational conditions permit and must notify the controlling ARTCC as soon as practical, but at least 100 miles from destination.

Briefing Points: (Note: Non-standard Missed Approach coding initially requires use of heading mode. Identify DARNE as I-FNP LOC/DME 4 NM if not in the FMC approach coding.)

- If required, develop a wake mitigation strategy as soon as practical. After passing DARNE (D4.0 IFNP), pilots will be operating in close proximity to the 28L aircraft and will be responsible for wake turbulence avoidance.
 - When in range, tune in the PRM monitor frequency (127.675) on a secondary radio and set the audio volume, then deselect the audio.
 - Re-select the PRM monitor frequency when communicating with the NORCAL approach control (frequency 120.35).
 - Utilize glidepath; do not step down between fixes after passing HEGOT.
 - Descending on the glidepath ensures compliance with any charted crossing restrictions.
 - Report the 28L traffic in sight as soon as practical and prior to DARNE. **DO NOT PASS.**
 - Remain on the LDA until passing DARNE so as not to penetrate the NTZ.
 - Expect to be switched to SFO tower (120.5) at DARNE.
 - PRM monitor frequency may be deselected after determining that the aircraft is on the tower frequency.
 - After passing DARNE, MANEUVER VISUALLY.
 - In the visual segment after DARNE, pilots are responsible for collision and wake avoidance. (See Visual Segment under Expanded Procedures for additional information).
 - If executing a go-around between DARNE and runway 28R, initially establish a climbing right turn heading 030° unless otherwise instructed by ATC. Missed approach leg from airport to OAK VORTAC, if depicted on a map display, is for reference only. Follow IAP published missed approach procedure unless otherwise instructed by ATC.
1. ATIS. When the ATIS broadcast advises that simultaneous PRM Rwy 28L and PRM Rwy 28R approaches are in progress, pilots must brief to fly the PRM approach. If later advised to expect an ILS, LDA or RNAV (GPS) approach, the PRM chart may be used after noting the following:
 - (a) Minimums and missed approach procedures are unchanged.
 - (b) Monitor frequency no longer required.
 - (c) A different glidepath or VNAV path intercept altitude may be assigned when advised to expect ILS, LDA or RNAV (GPS) approach.
- Simultaneous parallel approaches will only be offered/conducted when the weather is at least 1600 feet (ceiling) and 4 miles (visibility).
2. Dual VHF Communication required. To avoid blocked transmissions, each runway will have two frequencies, a primary and a PRM monitor frequency. The NORCAL approach controller will transmit on both frequencies. The PRM Monitor controller's transmissions, if needed, will override both frequencies. Pilots will ONLY transmit on the approach controller's frequency, but will listen to both frequencies. When practical, on a second communications radio, select the PRM monitor frequency. Set the audio level to about the same volume as the primary communications radio so that transmissions on the PRM monitor frequency can be heard in the event the approach control frequency is blocked. Then deselect the PRM monitor audio. Re-select the PRM monitor frequency audio only when in contact with the NORCAL approach controller (120.35).
 3. All "Breakouts" are to be hand flown to assure that the maneuver is accomplished in the shortest amount of time. Pilots, when directed by ATC to break off an approach, must assume that an aircraft is blundering toward their course and a breakout must be initiated immediately.
 - (a) ATC Directed "Breakouts": ATC directed breakouts will consist of a turn and a climb or descent. Pilots must always initiate the breakout in response to an air traffic controller instruction. Controllers will give a descending breakout only when there are no other reasonable options available, but in no case will the descent be below minimum vectoring altitude (MVA) which provides at least 1,000 feet required obstruction clearance.
 - (b) Phraseology - "TRAFFIC ALERT": If an aircraft enters the "NO TRANSGRESSION ZONE (NTZ)", the controller will breakout the threatened aircraft on the adjacent approach. The phraseology for the breakout will be: "TRAFFIC ALERT, (aircraft call sign) TURN (left/right) IMMEDIATELY, HEADING (degrees). CLIMB/DESCEND AND MAINTAIN (altitude)".
 4. Visual Segment (Rwy 28R): If ATC advises that there is traffic approaching Rwy 28L, pilots are authorized to continue past DARNE to align with Rwy 28R centerline only when:
 - (a) The Rwy 28L traffic is in sight and is expected to remain in sight,
 - (b) ATC has been advised that "traffic is in sight." (ATC is not required to acknowledge this transmission.)
 - (c) The runway environment is in sight.

Otherwise, a missed approach must be executed at DARNE. Between DARNE and the runway threshold, pilots are responsible for separating themselves visually from traffic approaching Rwy 28L, which means maneuvering the aircraft as necessary to avoid the runway 28L traffic until landing (do not pass), and providing wake turbulence avoidance, as applicable. If visual contact with the runway 28L traffic is lost, advise ATC as soon as practical and execute the published missed approach unless otherwise instructed by ATC.

KSFO/SFO

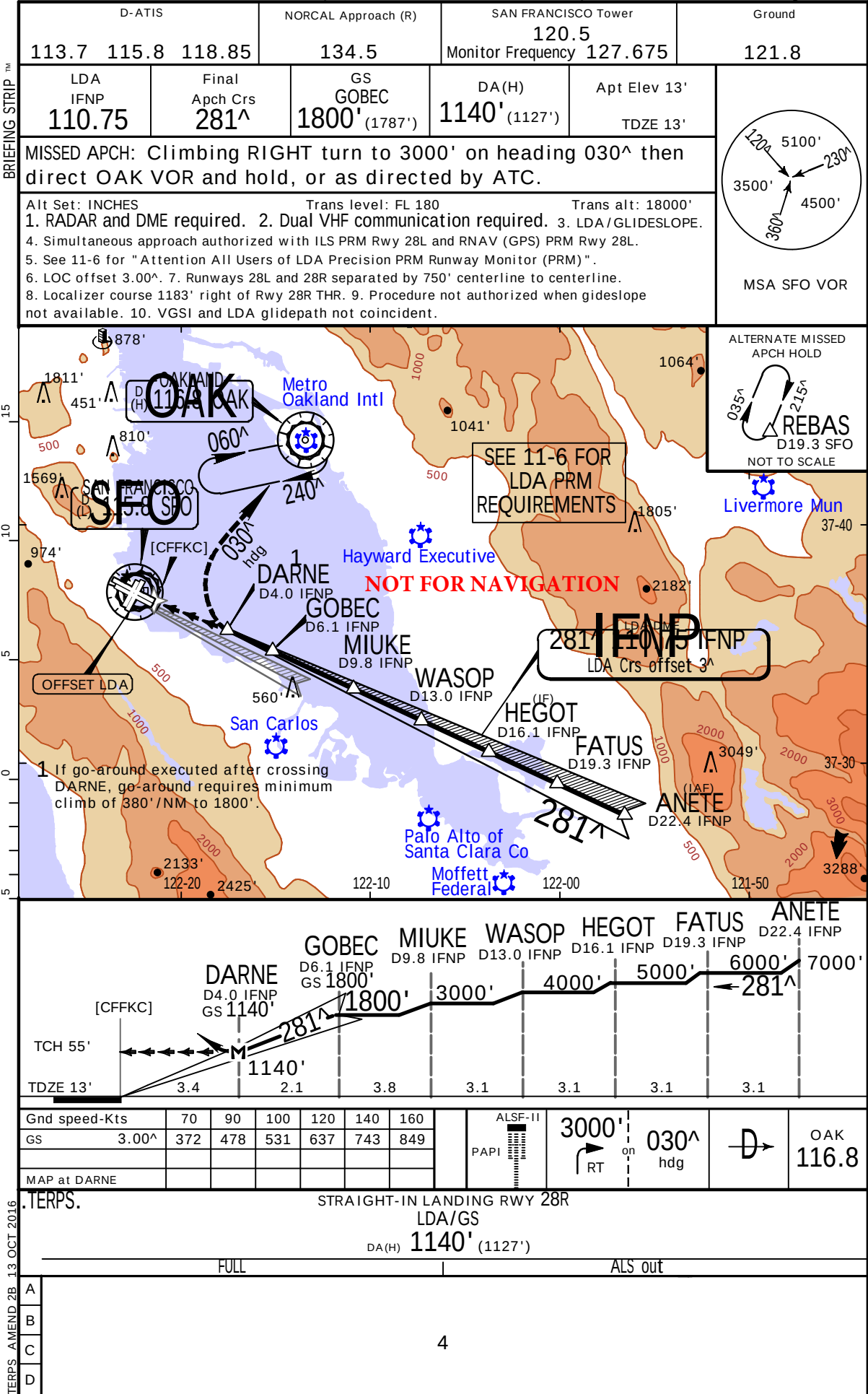
JEPPESSEN

SAN FRANCISCO, CALIF

SAN FRANCISCO INTL

4 NOV 16 (11-6A).Eff.10.Nov.
(SIMULTANEOUS CLOSE PARALLEL)

LDA PRM Rwy 28R



KSFO/SFO

SAN FRANCISCO INTL

4 NOV 16

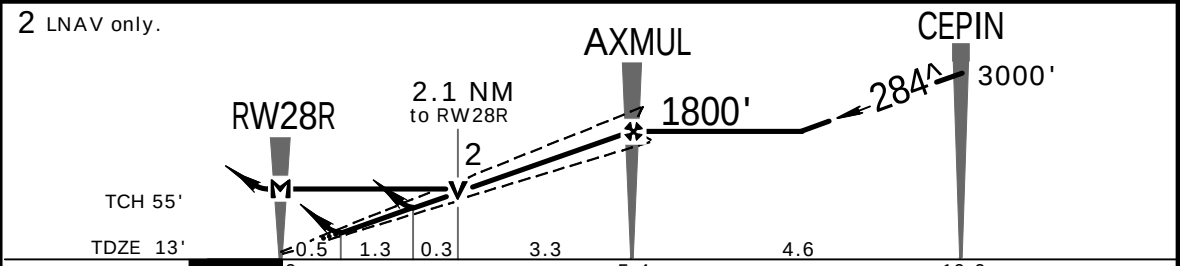
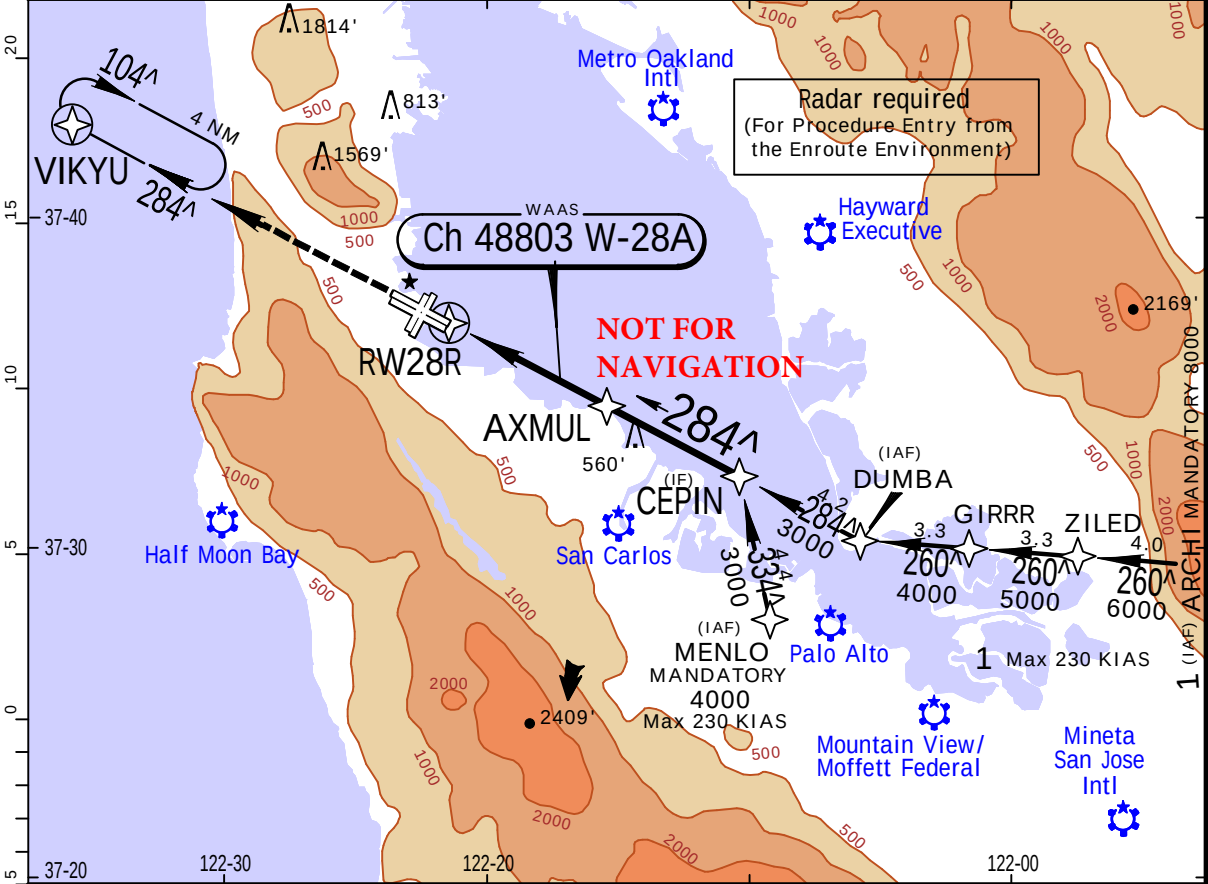
12-6

Eff.10.Nov.

SAN FRANCISCO, CALIF

RNAV (GPS) Z Rwy 28R

D-ATIS			NORCAL Approach (R)		SAN FRANCISCO Tower		Ground	
113.7	115.8	118.85	134.5		120.5		121.8	
WAAS CH 48803 W-28A	Final Apch Crs 284^	Minimum Alt AXMUL 1800' (1787')		LPV DA(H) 213' (200')	Apt Elev 13' TDZE 13'		5100' MSA RW28R	
MISSED APCH: Climb to 3000' direct VIKYU and hold.								
Alt Set: INCHES 1. Radar required. 2. For uncompensated Baro-VNAV systems, LNAV/VNAV not authorized below 3°C (38°F) or above 54°C (130°F). 3. DME/DME RNP-0.30 not authorized. 4. VGSI and RNAV glidepath not coincident (VGSI angle 3.00^/TCH 68').								
Trans level: FL 180					Trans alt: 18000'			



Gnd speed-Kts	70	90	100	120	140	160	ALSF-II PAPI 3000'	VIKYU
Glide Path Angle	3.00 [^]	372	478	531	637	849		
LPV, LNAV/VNAV: MAP at DA								
LNAV: MAP at RW28R								

TERPS		STRAIGHT-IN LANDING RWY 28R		LNAV		1 2 CIRCLE-TO-LAND	
LPV		LNAV/VNAV		LNAV			
DA(H) 213' (200')		DA(H) 642' (629')		MDA(H) 760' (747')			
ALS out		ALS out		ALS out			
A				RVR 24 or 1/2	RVR 50 or 1	90	760' (747') -1
B	RVR 24 or 1/2	RVR 40 or 3/4	1 5/8	2 1/2	RVR 40 or 3/4	120	960' (947') -1 1/4
C					1 3/4	140	1560' (1547') -3
D					2	D	NA

1 Not Authorized to Rwy 10L, 10R, 19L, and 19R. 2 Night landing: Rwy 1L and 1R not authorized.

KSFO/SFO

SAN FRANCISCO INTL

4 NOV 16

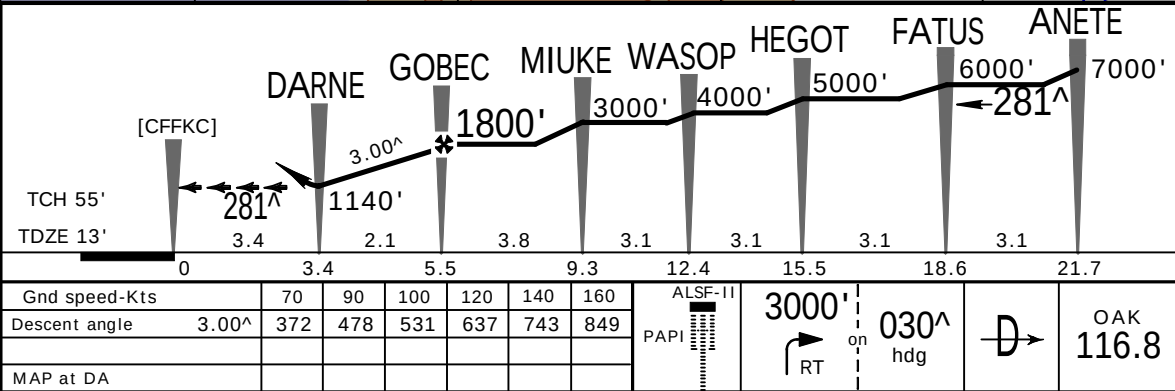
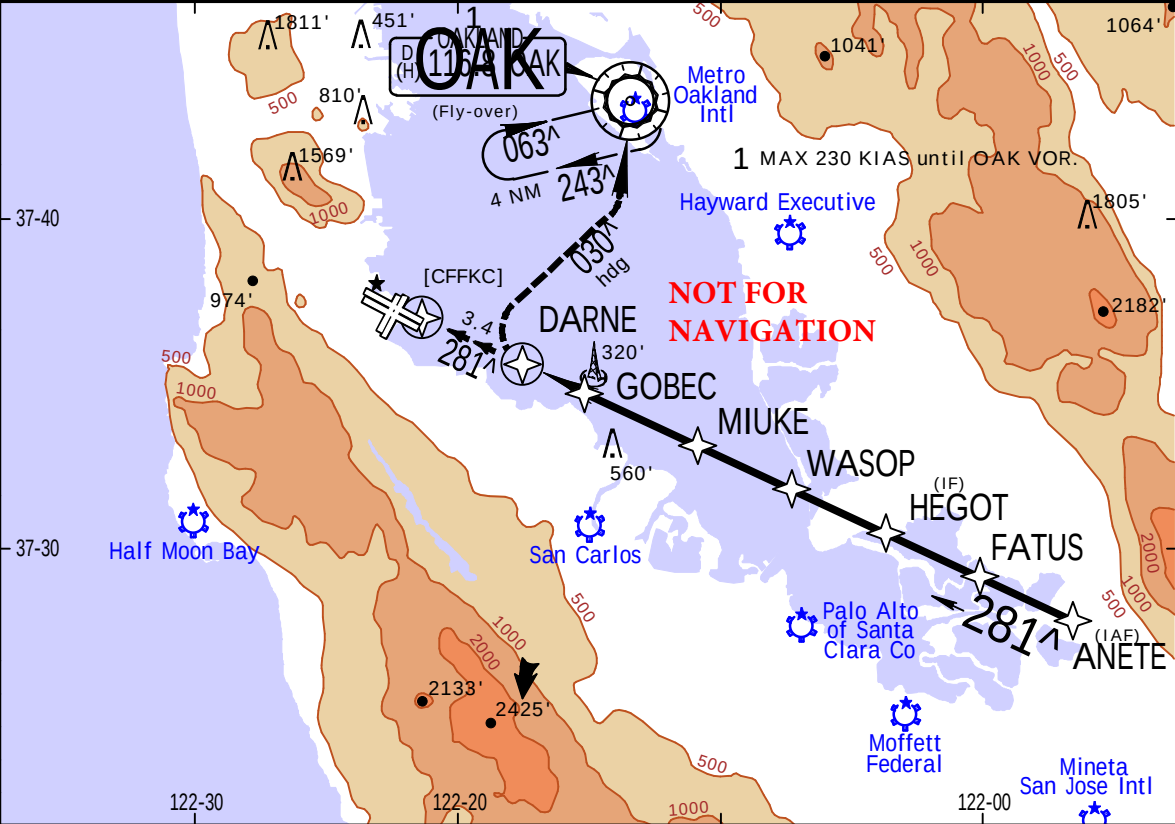
12-7

Eff.10.Nov.

SAN FRANCISCO, CALIF

RNAV (GPS) X Rwy 28R

D-ATIS			NORCAL Approach (R)		SAN FRANCISCO Tower		Ground	
113.7	115.8	118.85	134.5		120.5		121.8	
RNAV	Final Apch Crs 281^	Minimum Alt GOBEC 1800' (1787')		LNAV/VNAV DA(H) 1140' (1127')		Apt Elev 13' TDZE 13'		5100' MSA DARNE
MISSED APCH: Climbing RIGHT turn to 3000' on heading 030^ then direct OAK VOR and hold. When executing a missed approach or go around, unless otherwise instructed by ATC, initially turn right to 030^ utilizing HEADING mode.								
Alt Set: INCHES								



.TERPS.		1 STRAIGHT-IN LANDING RWY28R	
		LNAV/VNAV	
		DA(H) 1140' (1127')	
		ALS out	
A	4		
B			
C			
D			
1 If a go around is executed after passing DARNE, go around requires a minimum climb gradient of 380'/NM to 1800'.			

KSFO/SFO


JEPPESSEN
4 NOV 16 (12-9) .Eff.10.Nov.

SAN FRANCISCO, CALIF

SAN FRANCISCO INTL

ATTENTION ALL USERS OF RNAV PRECISION RUNWAY MONITOR (PRM)
RNAV (GPS) PRM X RWY 28R
(SIMULTANEOUS CLOSE PARALLEL)

Pilots who are unable to participate will be afforded appropriate arrival services as operational conditions permit and must notify the controlling ARTCC as soon as practical, but at least 100 miles from destination.

Briefing Points: (Notes: Non-standard RNAV Missed Approach coding initially requires use of heading mode. Identify DARNE WP as 3.4 NM from CFFKC WP if not in the FMC approach coding.)

- If required, develop a wake mitigation strategy as soon as practical. After passing DARNE WP, pilots will be operating in close proximity to the 28L aircraft and will be responsible for wake turbulence avoidance.
- When in range, tune in the PRM monitor frequency (127.675) on a secondary radio and set the audio volume, then deselect the audio.
- Re-select the PRM monitor frequency when communicating with the NORCAL approach control (frequency 120.35).
- If practical, utilize constant descent angle after passing HEGOT WP.
- Monitor descent path to ensure that fix crossing requirements are adhered to.
- VDA is 3° between all waypoints on the final approach course.
- Report the 28L traffic in sight as soon as practical and prior to DARNE. DO NOT PASS.
- Remain on the RNAV track until passing DARNE WP so as not to penetrate the NTZ.
- Expect to be switched to SFO tower (120.5) at DARNE WP.
- After passing DARNE, MANEUVER VISUALLY.
- The VNAV path is valid to the runway threshold.
- PRM monitor frequency may be de-selected after determining that the aircraft is on the tower frequency.
- In the visual segment after DARNE, pilots are responsible for collision and wake avoidance. (See Visual Segment under Expanded Procedures for additional information).
- If executing a missed approach or go-around, initially establish a climbing right turn heading 030°. Caution: Missed approach leg from airport to OAK VORTAC, if depicted on a map display, is for reference only. Follow IAP published missed approach procedure unless otherwise instructed by ATC.

Expanded Procedures: (Optional, brief if necessary)

1. ATIS. When the ATIS broadcast advises that simultaneous PRM Rwy 28L and PRM Rwy 28R approaches are in progress, pilots must brief to fly the PRM approach. If later advised to expect an ILS, LDA or RNAV (GPS) approach, the PRM chart may be used after noting the following:
 - (a) Minimums and missed approach procedures are unchanged.
 - (b) Monitor frequency no longer required.
 - (c) A different glidepath or VNAV path intercept altitude may be assigned when advised to expect ILS, LDA or RNAV (GPS) approach.

Simultaneous parallel approaches will only be offered/conducted when the weather is at least 1600 feet (ceiling) and 4 miles (visibility).

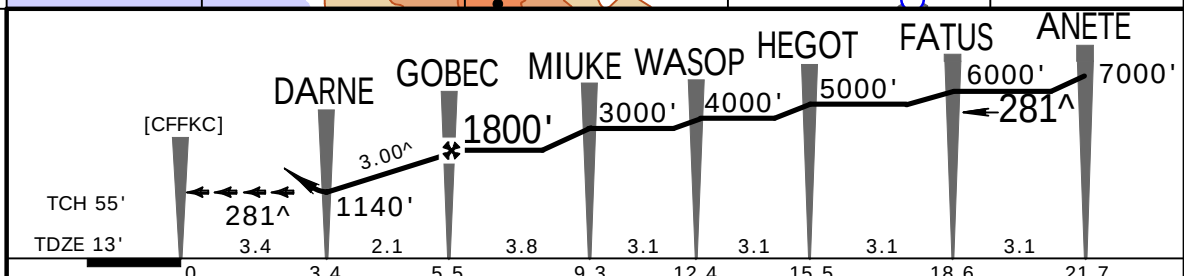
2. Dual VHF Communication required. To avoid blocked transmissions, each runway will have two frequencies, a primary and a PRM monitor frequency. The NORCAL approach controller will transmit on both frequencies. The PRM Monitor controller's transmissions, if needed, will override both frequencies. Pilots will ONLY transmit on the approach controller's frequency, but will listen to both frequencies. When practical, on a second communications radio, select the PRM monitor frequency. Set the audio level to about the same volume as the primary communications radio so that transmissions on the PRM monitor frequency can be heard in the event the approach control frequency is blocked. Then deselect the PRM monitor audio. Re-select the PRM monitor frequency audio only when in contact with the NORCAL approach controller (120.35).
3. All "Breakouts" are to be hand flown to assure that the maneuver is accomplished in the shortest amount of time. Pilots, when directed by ATC to break off an approach, must assume that an aircraft is blundering toward their course and a breakout must be initiated immediately.
 - (a) ATC Directed "Breakouts": ATC directed breakouts will consist of a turn and a climb or descent. Pilots must always initiate the breakout in response to an air traffic controller instruction. Controllers will give a descending breakout only when there are no other reasonable options available, but in no case will the descent be below minimum vectoring altitude (MVA) which provides at least 1,000 feet required obstruction clearance.
 - (b) Phraseology - "TRAFFIC ALERT": If an aircraft enters the "NO TRANSGRESSION ZONE (NTZ)", the controller will breakout the threatened aircraft on the adjacent approach. The phraseology for the breakout will be:
"TRAFFIC ALERT, (aircraft call sign) TURN (left/right) IMMEDIATELY,
HEADING (degrees). CLIMB/DESCEND AND MAINTAIN (altitude)".
4. Visual Segment (Rwy 28R): If ATC advises that there is traffic approaching runway 28L, pilots are authorized to continue past DARNE to align with runway 28R centerline only when:
 - (a) The runway 28L traffic is in sight and is expected to remain in sight,
 - (b) ATC has been advised that "traffic is in sight." (ATC is not required to acknowledge this transmission.)
 - (c) The runway environment is in sight.

Otherwise, a missed approach must be executed at DARNE. Between DARNE and the runway threshold, pilots are responsible for separating themselves visually from traffic approaching runway 28L, which means maneuvering the aircraft as necessary to avoid the runway 28L traffic until landing (do not pass), and providing wake turbulence avoidance, as applicable.

If visual contact with the runway 28L traffic is lost, advise ATC as soon as practical and execute the published missed approach unless otherwise instructed by ATC.

Alt Set: INCHES Trans level: FL 180 Trans alt: 18000'

1. Radar required. 2. Dual VHF communication required. 3. For uncompensated Baro-VNAV systems, LNAV/VNAV not authorized below 2°C (36°F) or above 54°C (130°F). 4. DME/DME RNP-0.30 not authorized. 5. VGSi and RNAV glidepath not coincident. 6. Simultaneous approach authorized with ILS PRM Rwy 28L and RNAV (GPS) PRM Rwy 28L. 7. See 12-9 for "Attention All Users of RNAV Precision Runway Monitor (PRM)". 8. Use of Flight Director or Autopilot providing RNAV track guidance required during simultaneous operations. 9. Rwy 28L and 28R separated by 750' centerline to centerline. 10. Final approach course offset 2.95°. 11. Final approach course 1343' right of rwy centerline extended 3000' from threshold.



Gnd speed-Kts	70	90	100	120	140	160			
Descent angle 3.00^	372	478	531	637	743	849			
MAP at DA									

TERPS.	1 STRAIGHT-IN LANDING RWY 28R	
	LNAV/VNAV	
	DA(H) 1140' (1127')	
		ALS out

A	4
B	
C	
D	

1 If a go around is executed after passing DARNE, go around requires a minimum climb gradient of 380'/NM to 1800'.

- 1 Missed approach requires minimum climb of 250'/NM to 2000'.
- 2 Missed approach requires minimum climb of 325'/NM to 2500'.

KSFO/SFO

SAN FRANCISCO INTL

4 NOV 16
Eff.10.Nov.

JEPPESEN

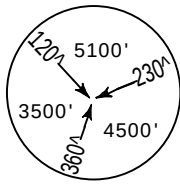
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SAN FRANCISCO, CALIF

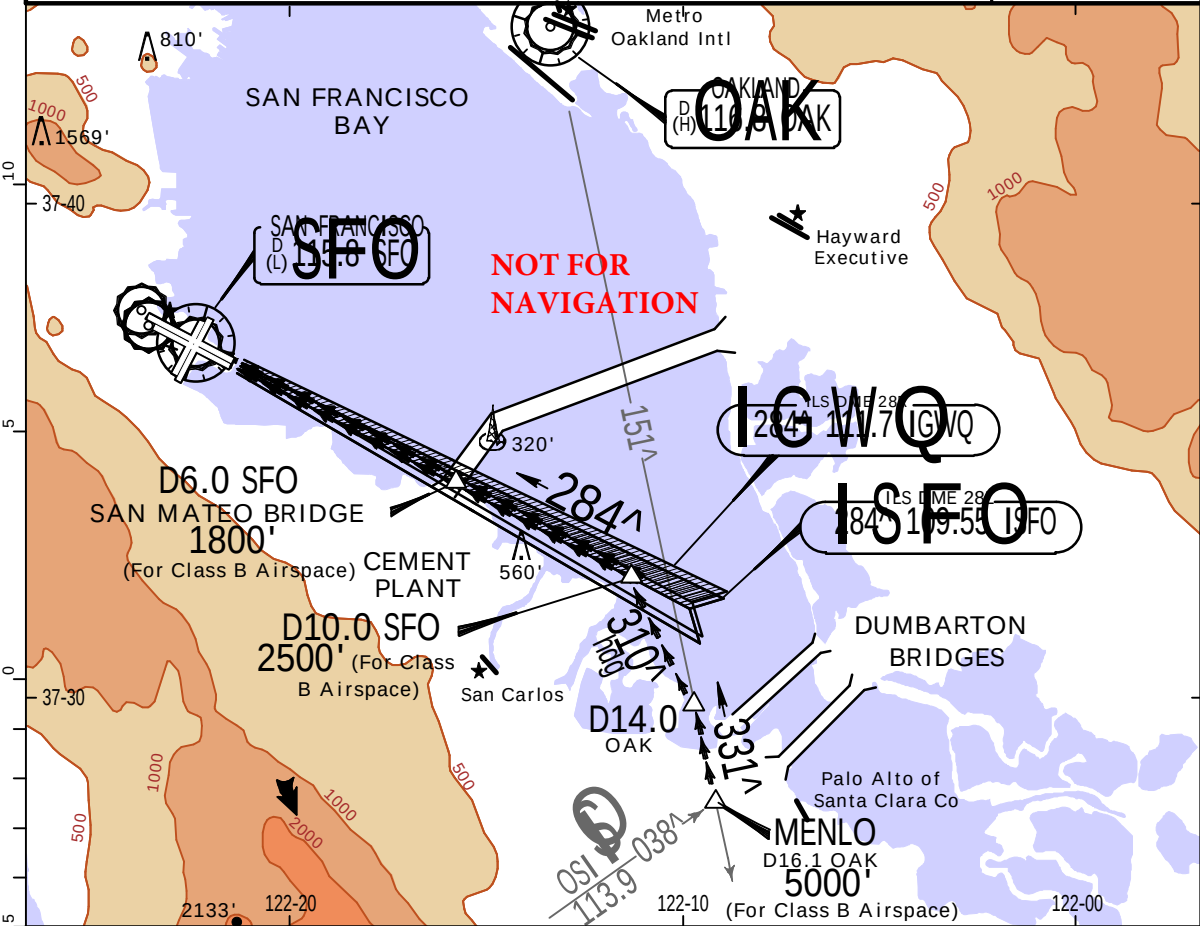
TIPP TOE VISUAL RWY 28L/R

BRIEFING STRIP™

D-ATIS			NORCAL Approach (R)		SAN FRANCISCO Tower		Ground		
113.7 115.8 118.85			134.5		120.5		121.8		
NAVAIDS- Refer to Planview		Final Apch Crs Rwy 28L/R 284^		No FAF		Refer to Minimums		Apt Elev 13'	
No Missed Approach procedure									
Alt Set: INCHES Trans level: FL 180 Trans alt: 18000'									
1. RADAR required. 2. CAUTION: Aircraft operating within 500 ft to parallel runway - possible wake turbulence. 3. Vertical Guidance Navaid and Angle: LOC ISFO (GS 2.85^).									



MSA SFO VOR



TIPP TOE VISUAL APPROACH RWY 28L/R

When visual approaches to Runways 28L/R are in progress, arriving aircraft may be vectored into a position for a straight-in visual approach to Runways 28L/R via the ISFO localizer.

Aircraft should cross the OAK VOR R-151/D16.1 (Menlo Int) at or above 5000' and the San Mateo Bridge at or above 1800'.

NOTE: Closely spaced parallel visual approaches may be in progress to Runway 28R utilizing the SFO VOR R-095.

In the event of a go-around on Runway 28L, turn left heading 265^, or on Runway 28R, turn right heading 310^, climb and maintain 3000', or as directed by Air Traffic Control.

WEATHER MINIMUMS

SFO Ceiling 2100' - VIS 5

OR

SFO Ceiling 1000' - VIS 3 With VIS 5 in Eastern Quadrant (030^ Clockwise 120^)

and San Mateo AWOS Ceiling 2400' - VIS 5 [San Mateo AWOS info available from SFO Tower. If San Mateo AWOS inop, use San Carlos (KSQL) ceiling of 2400'-VIS 5; San Carlos ATIS on 125.9]

TERPS AMEND 1 22 AUG 2013

KSFO/SFO

SAN FRANCISCO INTL

4 NOV 16

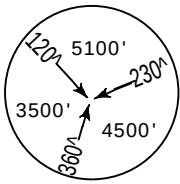
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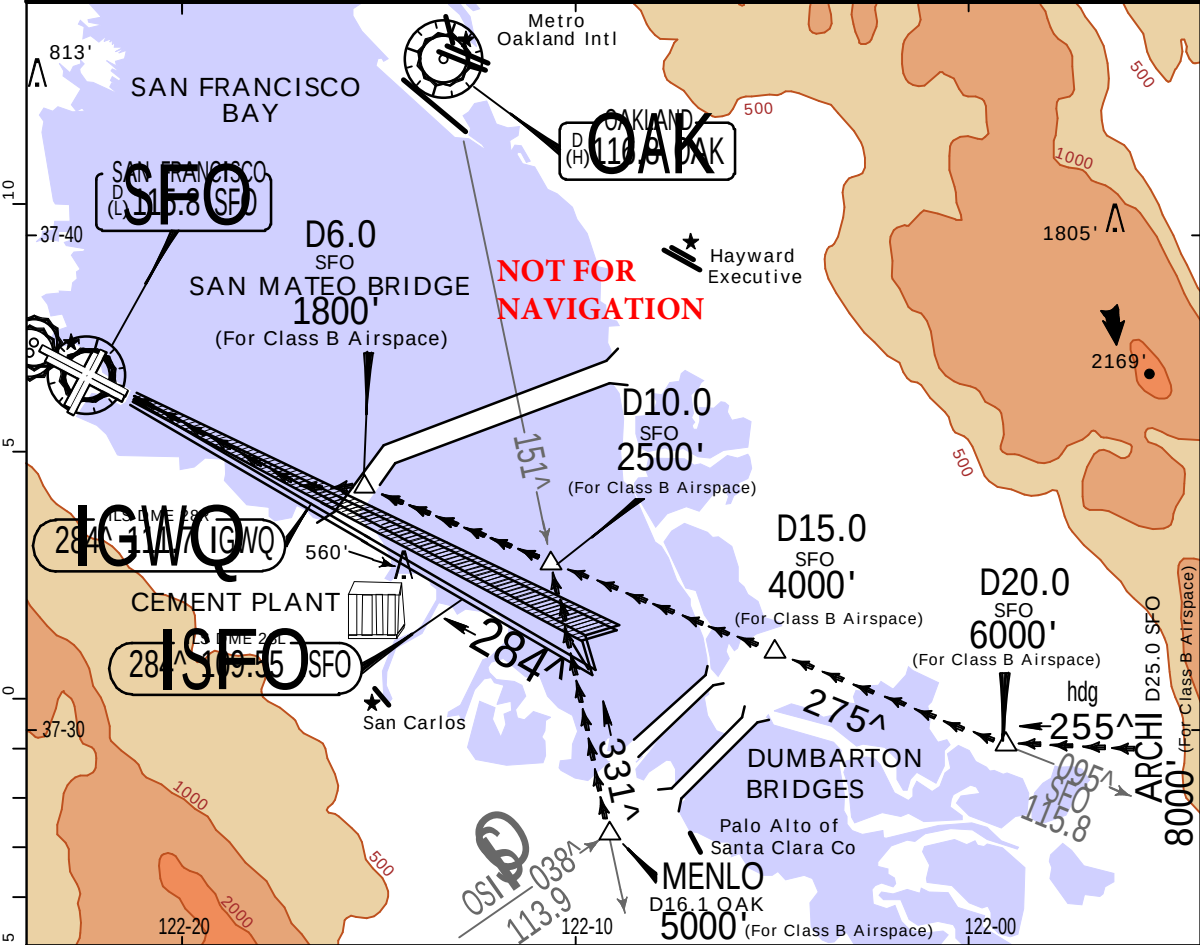
JEPPESEN

SAN FRANCISCO, CALIF

QUIET BRIDGE VISUAL

Rwys 28L/R

BRIEFING STRIP™	D-ATIS			NORCAL Approach (R)		SAN FRANCISCO Tower		Ground	
	113.7	115.8	118.85	134.5		120.5		121.8	
	NAVAIDS- Refer to Planview	Final Apch Crs Rwy 28L/R 284^		No FAF	Refer to Minimums	Apt Elev 13'			
	No Missed Approach procedure								
	Alt Set: INCHES		Trans level: FL 180		Trans alt: 18000'				
	1. RADAR required. 2. CAUTION: Aircraft operating within 500' to parallel runway - possible wake turbulence. 3. Vertical Guidance Navaid and Angle: LOC IGWQ (GS 3.00^).								
	MSA SFO VOR								



KSFO/SFO
SAN FRANCISCO INTL

AIR CANADA

SAN FRANCISCO, CALIF

4 NOV 16
Eff 10 Nov

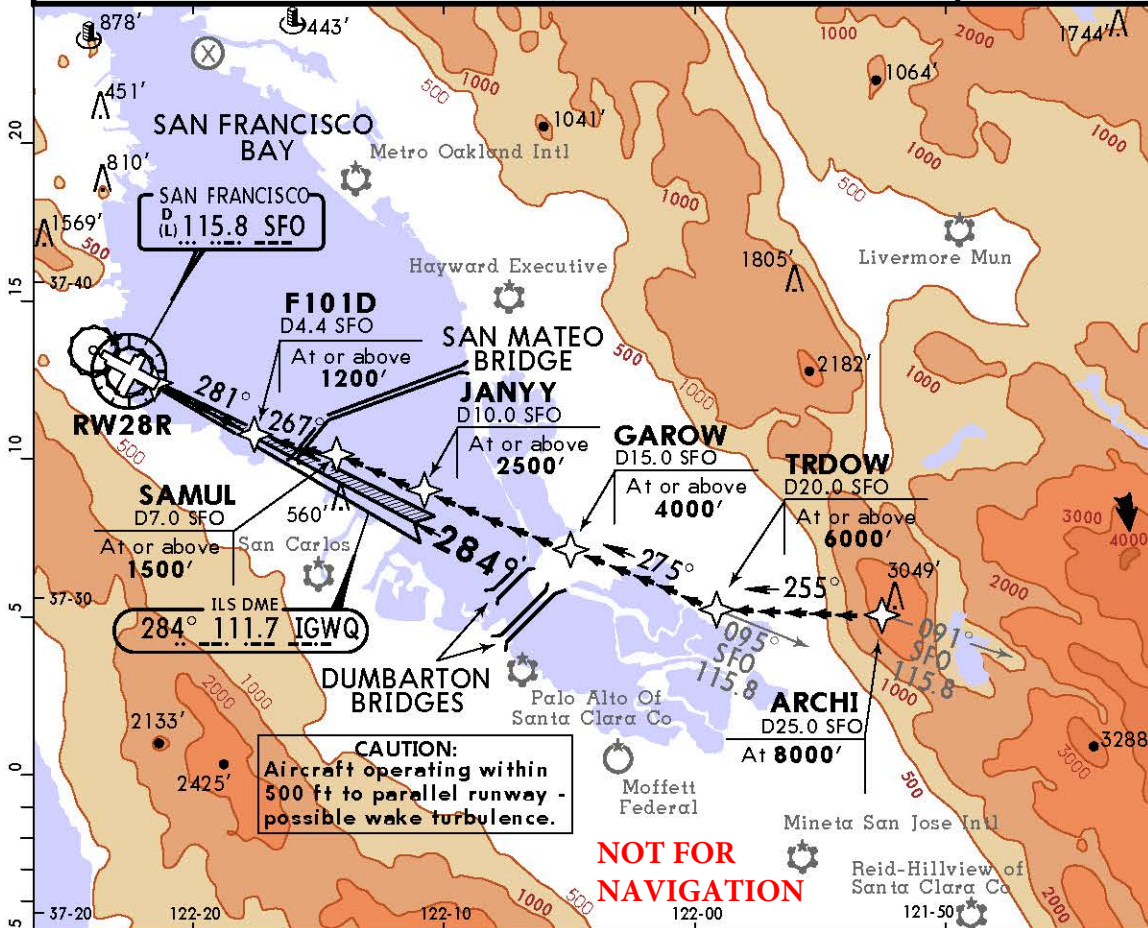
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FMS BRIDGE VISUAL Rwy 28R

BRIEFING STRIP™

D-ATIS			NORCAL Approach (R)		SAN FRANCISCO Tower		Ground		
113.7 115.8 118.85			134.5		120.5		121.8		
NAVAIDS- See Planview		Final Apch Crs 284°		No FAF		Ceiling-Vis 2100'-5		Apt Elev 13' TDZE 13'	
MISSED APCH: In the event of a go-around on Rwy 28R, turn RIGHT heading 310°, climb and maintain 3000' or as directed by ATC.									
Alt Set: INCHES			Trans level: FL 180			Trans alt: 18000'			
1. Radar required. 2. DME/DME/IRU or GPS required.									

MSA SFO VOR



FMS BRIDGE VISUAL APPROACH RWY 28R

When visual approaches to Runway 28R are in progress, aircraft arriving over ARCHI intersection may request this approach on initial contact with NORCAL Approach.

Closely-spaced parallel visual approaches may be in progress to Rwy 28L utilizing ISFO ILS 28L localizer or RNAV 28L approaches.

WEATHER MINIMUMS

Ceiling **2100'** - VIS **5**

FMS BRIDGE VISUAL APPROACH RWY 28R (RNAV 28R)

The FMS Bridge Visual Approach is coded as the RNAV 28R Approach. Selecting this procedure will display the entire approach procedure, including missed approach guidance.

The FMS Bridge Visual Approach must be requested on initial contact with NORCAL Approach.

Embraer

Select the RNAV 28R approach from the database. Manually tune and preview the ILS 28R. Intercept the FMS Bridge Visual in LNAV and descend via the profile.

A319/320/321

Anticipate crossing ARCHI at 8,000'. Select the RNV28R approach from the database. Tune the ILS 28R. Intercept the FMS Bridge Visual track in NAV and descend via the profile. At or before F101D, disengage autopilot and continue as per Visual Approaches (SOP).

The FMS Bridge Visual Approach is a visual approach procedure. Crews are responsible for traffic watch. ATC may amend the FMS procedure or impose additional restrictions during the approach. Clearance may also be issued to follow the FMS path or intercept the final approach course prior to receiving clearance for the approach. When doing this, the controller should use the following phraseology: 'PROCEED DIRECT ARCHI, MAINTAIN EIGHT THOUSAND, INTERCEPT FINAL APPROACH COURSE or INTERCEPT FMS APPROACH COURSE'

NOT FOR NAVIGATION