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Revision Letter For Cycle 01-2015

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General Information

Location: Singapore Sgp
IATA Code: SIN
Lat/Long: N01° 21.6' E103° 59.4'
Elevation: 22 ft

Airport Use: Public
Magnetic Variation: 0.2°E

Fuel Types: Jet A-1
Repair Types: Major Airframe, Major Engine
Customs: Yes
Airport Type: IFR
Landing Fee: No
Control Tower: Yes
Jet Start Unit: No
LLWS Alert: Yes
Beacon: Yes

Sunrise: 2308 Z
Sunset: 1111 Z,

Runway Information

Runway: 02C
Length x Width: 13123 ft x 197 ft
Surface Type: bitu
TDZ-Elev: 15 ft
Lighting: Edge, ALS, Centerline, REIL
Stopway: 197 ft

Runway: 02L
Length x Width: 13123 ft x 197 ft
Surface Type: bitu
TDZ-Elev: 22 ft
Lighting: Edge, ALS, Centerline, REIL, TDZ
Stopway: 197 ft

Runway: 20C
Length x Width: 13123 ft x 197 ft
Surface Type: bitu
TDZ-Elev: 15 ft
Lighting: Edge, ALS, Centerline, REIL, TDZ
Stopway: 197 ft

Runway: 20R
Length x Width: 13123 ft x 197 ft
Surface Type: bitu
TDZ-Elev: 14 ft

Lighting: Edge, ALS, Centerline, REIL
Displaced Threshold: 2428 ft
Stopway: 197 ft

Communication Information

ATIS 128.6
Singapore Tower 118.25
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Singapore Ground Control 124.3
Singapore Ground Control 121.725
Singapore Ground Control 121.85
Changi Ramp/Taxi Control 121.9
Singapore Clearance Delivery 121.65
Singapore Pre-Taxi Clearance 121.65
Singapore Approach Control 124.6 Secondary
Singapore Approach Control 120.3
Singapore Arrival Control 119.3
Singapore Radar 124.05 Arrival Service

FLIGHT AND GROUND PROCEDURES**1. LOW VISIBILITY PROCEDURES (LVP) FOR CATEGORY II ILS OPERATIONS****1.1 INTRODUCTION**

- 1.1.1 Category II ILS approaches will be made available at Singapore Changi Airport to authorized flights during prolonged periods of low visibility, except during thunderstorms. RVR minima for Cat II ILS operations is limited to 1148' (350m) due to Rwy and Twy light spacing requirements on the airfield.

1.2 AUTHORIZATION FOR CATEGORY II ILS APPROACHES

- 1.2.1 Operators who wish to conduct Category II ILS operations at Singapore Changi Airport are required to submit the following documents to the Airworthiness/Flight Operations Division of the Civil Aviation Authority of Singapore at least one month before the commencement of the operations:
- a) Authorization for Category II ILS operations by the relevant authority of the State of Registry/Operator of the operators;
 - b) Operators' minima for Category II ILS operations; and
 - c) Operators' method of verifying its pilots' Category II qualification and currency.

1.3 CATEGORY II ILS RUNWAYS

- 1.3.1 At Singapore Changi Airport, Category II ILS approaches are available only on RWY 02L and RWY 20C, which are also equipped with precision approach Category II lighting system. When required, pilots making Category II ILS approaches to Singapore Changi Airport should refer to the procedures in the Instrument Approach Charts WSSS AD 2-101 to WSSS AD 2-119 and the Precision Approach Terrain Charts for RWY 02L and RWY 20C at WSSS AD 2-43 and WSSS AD 2-45 respectively.

1.4 INITIATION OF CATEGORY II ILS OPERATIONS

- 1.4.1 Preparations will be made to implement LVP for Category II ILS operations at Singapore Changi Airport during prolonged period of low visibility, except during thunderstorms, when the RVR drops below 2625' (800m).
- 1.4.2 Availability of the Category II ILS approaches will be made known through NOTAM and ATIS broadcasts as well as air traffic control radio communications.
- 1.4.3 During LVP operations, aircraft will not be cleared for Category II ILS approach if any of the ILS or approach/runway lights fall below Category II requirements. Aircraft will not be cleared for landing if the Touchdown Zone RVR is unserviceable.

1.5 ILS SENSITIVE AREAS

- 1.5.1 Upon landing, pilots shall report to Changi Tower once the aircraft has cleared the runway and has passed the ILS sensitive areas demarcated by alternate yellow and green lights along the centerlines of Rapid Exit Taxiways and Cross Taxiways.

1.6 TERMINATION OF LVP FOR CATEGORY II ILS OPERATIONS

- 1.6.1 LVP for Category II ILS operations will be terminated when RVR has improved above 2625' (800m). Termination of LVP for Category II ILS operations will be made known through NOTAM and ATIS broadcasts as well as air traffic control radio communications.

2. RUNWAY UTILIZATION**2.1 RUNWAY-IN-USE**

- 2.1.1 The runway-in-use (Departure/Arrival) is selected by Aerodrome Control as the optimum for general purposes and to maximize runway utilization. If the assigned runway is unsuitable for a particular operation, the pilot can obtain permission from ATC to use another runway but should anticipate delay.

2.2 DEPARTURES - WAKE VORTEX SEPARATION

- 2.2.1 Pilots should arrange their taxi such that they are ready to depart without delay on reaching the runway holding point. As standard ICAO wake turbulence separation is being applied, pilots are to advise ATC early if more time is needed for the aircraft to be ready for departure. When informed, ATC will be able to make changes in the departure sequence, if necessary, to minimize delays to other succeeding departures.

2.2.2 Pilots should complete cockpit checks prior to line-up for departure and keep any checks on the runway to a minimum.

2.2.3 Conditional line-up clearance may be used by ATC to facilitate an expeditious flow of traffic. On receipt of line-up clearance, pilots should taxi into position promptly without delay. Unless given instruction to line-up and wait, pilots should be ready and prepared to depart without stopping. On receipt of take-off clearance, pilots to commence take-off roll without delay.

2.3 CLEARANCE FOR IMMEDIATE TAKE-OFF

2.3.1 A pilot receiving the ATC instruction 'cleared for immediate take-off' is required to act as follows:

- (a) if waiting clear of the runway, taxi immediately on to it and begin take-off run immediately without stopping the aircraft;
- (b) if already lined-up on the runway, take-off without delay;
- (c) if unable to comply with the instruction, inform ATC immediately.

2.4 ARRIVALS - MINIMUM RUNWAY OCCUPANCY TIME

2.4.1 Arriving aircraft upon landing are reminded that it is imperative to vacate the runway as quickly as practicable to enable ATC to apply minimum spacing on final approach and minimize the occurrence of "go-arounds".

2.4.2 To ensure minimum Runway Occupancy Time (ROT) and reduce missed approaches due to occupied runway, pilots should vacate the runway via the first available exit taxiway corresponding to operational requirements, or as instructed by ATC. If an exit taxiway other than the first available exit taxiway is required, pilots shall advise the Tower Controller on first contact.

2.4.3 To enhance planning, pilots can make reference to the Landing Exit Distance (LED), the distance from threshold to the furthest edge of the exit taxiway:

RWY	TWY Exits	LED
20R	①② W6, ①② W7, W8	5423' 1655m, 6965' 2123m, 10,043' 3061m
20C	①② E6, ①② E7, E8	6391' 1948m, 7844' 2391m, 10,341' 3152m
02L	①② W5, ①② W4, ② W3	6450' 1966m, 8173' 2491m, 9436' 2876m
02C	①② E5, ①② E4, ② E3	6742' 2055m, 8415' 2565m, 10,719' 3267m
20L	Not applicable	Not applicable
02R	Not applicable	Not applicable

① Recommended exit taxiways. ② Rapid Exit Taxiway (RET) and maximum design ground speed for the exit taxiway is 50 KT.

2.4.4 Pilots can expect initial taxi instructions from the Runway Controller before clearing the exit taxiway. Aircraft vacating the runway-in-use should not stop on the exit taxiway until the entire aircraft has passed the runway holding point.

2.4.5 Between 0830 - 1030 daily estimated delays of 15 minutes can be expected for arrivals into Changi Airport.

2.5 LAND AFTER PROCEDURES

2.5.1 Normally, only one aircraft is permitted to land or take-off on the runway-in-use at any one time. However, when the traffic sequence is two successive landing aircraft, the second aircraft may be allowed to land before the first aircraft has cleared the runway-in-use provided:

- (a) the runway is long enough;
- (b) during daylight hours;
- (c) the second aircraft will be able to see the first aircraft clearly and continuously until it is clear of the runway;
- (d) the second aircraft has been warned.

2.5.2 ATC will provide this warning in the landing clearance as shown in para 2.7.

2.5.3 Responsibility for ensuring adequate separation between the two aircraft rests with the pilot of the second aircraft.

2.6 SPECIAL LANDING PROCEDURES

2.6.1 Special landing procedures may be in force at Singapore Changi Airport in conditions shown as follows:

- (a) When the runway-in-use is temporarily occupied by other traffic, landing clearance may be issued to an arriving aircraft provided that at the time the aircraft crosses the threshold of the runway-in-use

the following separation distances will exist:

- i) Landing following landing - The preceding landing aircraft will be clear of the runway-in-use or will be at least 8202' (2500m) from the threshold of the runway-in-use.
- ii) Landing following departure - The departing aircraft will be airborne and at least 8202' (2500m) from the threshold of the runway-in-use, or if not airborne, will be at least 8202' (2500m) from the threshold of the runway-in-use.

2.6.2 These procedures will be used only under the following conditions:

- (a) during daylight hours;
- (b) visibility of at least 5km;
- (c) cloud ceiling of 1,500ft in the departure/missed approach area;
- (d) ATC is satisfied that the pilot of the next arriving aircraft will be able to observe continuously the relevant traffic;
- (e) no unfavourable surface wind conditions (including significant tailwind, windshear, turbulence, etc);
- (f) when the runway is dry and free of all precipitants such that there is no evidence that the braking action may be adversely affected.

2.7 PHRASEOLOGY

2.7.1 When issuing a landing clearance following the application of these procedures, ATC will issue the second aircraft with the following instructions:

...(call sign)...after the landing / departing...(Aircraft Type) Runway...
(Designator) cleared to land.

3. TOTAL RADIO FAILURE - SPECIAL PROCEDURES - SINGAPORE CHANGI AP - ARRIVALS

3.1 In VMC during daylight hours, if total radio communication failure occurs to an aircraft bound for Singapore Changi Airport, the pilot shall maintain VMC to land at the most suitable airfield and report to the appropriate air traffic control unit by the most expeditious means.

3.2 For IFR flights to Singapore Changi Airport, aircraft experiencing radio failure shall:

3.2.1 Proceed according to the last acknowledged clearance received from Singapore ATC, or

3.2.2 If no specific instructions or clearance has been received from Singapore ATC:

- a) Maintain the last assigned altitude or flight level and proceed via airways thereafter the appropriate transition and STAR for Rwy 02L/02C to SAMKO Holding Area (SHA) except for the following STARS: LAVAX 1A and PASPU 1A shall proceed to SHA after SANAT.
- b) Commence descent from SHA at or as close as possible to the ETA as indicated on the flight plan.
- c) Carry out the appropriate instrument approach procedure from SHA to land on Rwy 02L/02C.

3.2.3 If unable to effect a landing on:

a) Rwy 02L

Carry out missed approach procedure to AKOMA (PU R-356/20DME). Leave AKOMA at 4,000' to NYLON Holding Area (NHA) and execute the appropriate instrument procedure from NHA to land on Rwy 20R or Rwy 20C, as appropriate.

b) Rwy 02C

Carry out missed approach procedure to NYLON Holding Area (NHA) and execute the appropriate instrument procedure from NHA to land on Rwy 20R or Rwy 20C, as appropriate.

c) Rwy 20R

Carry out missed approach procedure to SAMKO Holding Area (SHA) and execute the appropriate instrument procedure from SHA to land on Rwy 02L or Rwy 02C, as appropriate.

d) Rwy 20C

Carry out missed approach procedure to EXOMO (VTK R-158/22DME).
Leave EXOMO at 4,000' to SAMKO Holding Area (SHA) and execute the appropriate instrument procedure from SHA to land on Rwy 02L or Rwy 02C, as appropriate.

4. IDENTIFICATION OF RUNWAY-IN-USE

- 4.1 ATC will switch on the appropriate approach lights and the ILS serving the runway-in-use to assist the pilot in its identification. If the approach lights for the runway-in-use are sighted but the ILS frequency is not received, the pilot shall assume that the ILS is inoperative and shall proceed to land on the runway on which the approach lights have been sighted.
- 4.2 If unable to land within 30 minutes of EAT or ETA, if no EAT has been received and acknowledged, proceed to cross SAMKO Holding Area (SHA) at 4,000' then via A457 at FL200 if Kuala Lumpur is the nominated alternate or via B470 at FL 290 if Soekarno-Hatta is the nominated alternate or otherwise proceed at the planned flight level to other nominated alternate.

5. TOTAL RADIO FAILURE - SPECIAL PROCEDURES - SINGAPORE CHANGI AP - DEPARTURES

- 5.1 When an aircraft which has been cleared by ATC to an intermediate level experiences total radio communication failure immediately after departure from Singapore Changi Airport and it is deemed unsafe for it to continue to its destination, the pilot will set the aircraft transponder to Mode A/C Code 7600 and adhere to the procedures below.
- 5.2 When radio communication failure occurs immediately after the aircraft has departed on Rwy 02L/02C, the pilot shall proceed according to the following procedures:
- a) Proceed straight ahead to NYLON Holding Area (NHA) climbing to the last assigned altitude. At NHA, climb/descend to maintain 7,000'.
 - b) Hold at NHA for 4 minutes and leave NHA on track 203°. At 10 DME north of VTK, turn left for HOSBA Holding Area (HHA) to jettison fuel, maintaining 7,000'.
 - c) After fuel jettison, proceed to SAMKO Holding Area (SHA) via AWY G580 and SINJON DVOR. Maintain 7,000'. At SHA descend for an instrument approach on Rwy 02L/02C. Identify the runway-in-use in accordance with paragraph 4 on 10-1P2.
- 5.3 When radio communication failure occurs immediately after the aircraft has departed on Rwy 20R/20C, the pilot shall proceed according to the following procedures:
- a) Proceed straight ahead to SAMKO Holding Area (SHA) climbing to the last assigned altitude. At SHA climb/descend to maintain 7,000'.
 - b) Hold at SHA for 4 minutes. Leave SHA for HOSBA Holding Area (HHA) via SJ DVOR and Airway G580 to jettison fuel, maintaining 7,000'.
 - c) After fuel jettison, proceed to NHA via Airway W401. Maintain 7,000'. On crossing VTK 042R turn right to intercept VTK 023R. At NHA descend to carry out an instrument approach on Rwy 20R/20C.
- 5.4 ATC action is based on the assumption that the aircraft will take a minimum of 10 min to jettison fuel. An aircraft therefore should not leave earlier than 10 min after arrival at HOSBA Holding Area even if fuel jettison is completed at a shorter time or if jettisoning is not necessary or possible unless circumstances require an immediate return.
- 5.5 Alternatively, aircraft may jettison fuel between HOSBA and point 90 NM from SJ DVOR/DME on airway G580.

6. RNAV (GNSS) SID/STAR OPERATIONS

- 6.1 For RNAV (GNSS) SIDs and STARs operations, the aircraft shall be GNSS-equipped and the navigation systems shall meet ICAO RNP-1 standard of accuracy, or equivalent, such as JAA TGL 10 or FAA AC 90-96A Appendix 2 - Precision Area Navigation (P-RNAV).

CONTINUOUS DESCENT OPERATION (CDO) FOR ARRIVALS**1. Introduction**

- 1.1 CDO is an aircraft operating technique which enables the pilot to execute an optimized arrival descent profile utilizing the onboard capability of the aircraft. CDO is facilitated by appropriate instrument flight procedure design and ATC procedures.
- 1.2 The vertical profile of CDO takes the form of a continuously descending path with minimum level flight segments to enable smooth aircraft deceleration and configuration prior to an ILS approach. New CDO RNAV STARs have been constructed in accordance with ICAO Doc 9931 CDO Manual and ICAO Doc 8168 Procedures for Air Navigation, Aircraft Operations, to facilitate CDO into Singapore Changi Airport.

2. Conditions for conducting a CDO

- 2.1 Pilots shall adhere to the instructions as depicted on the CDO RNAV STARs and the conditions for ILS procedures into Changi. In addition, the following conditions must be met:
- Changi Runway 02L/20R is open for landing;
 - ILS for the intended runway of landing into Changi is in operation;
 - Visibility is greater than or equal to 800m;
 - RVR is greater than or equal to 550m for runway-in-use; and
 - No other system degradation that may affect a GNSS or ILS operation.

3. Requirements for individual flights

- 3.1 Flights that fulfill the following requirements can be allowed to conduct a CDO subject to ATC and real-time traffic condition:
- Flight enters Singapore FIR via one of the following waypoints and ATS routes:

ATETI (G-580)	IPRIX (M-753)	PARDI (G-579)	VPK (B-469)
BAVUS (L-504)	KADAR (M-774)	SURGA (M-635)	
ESPOB (L-642)	KAMIN (B-348)	TAROS (R-469)	
IGARI (N-891)	MELAS (N-892)	TEGID (M-767)	

- RNAV-equipped aircraft with FMC capable of:
 - LNAV and VNAV;
 - flying Changi RNAV STARs and to abide by all speed and altitude restrictions depicted on the charts;
 - continuing on planned vertical path from RNAV STAR onto ILS of intended runway of landing.

4. Preparations for CDO

- 4.1 To ensure that the CDO procedures can be effectively carried out, pilots are advised to abide by the following:
- Check if conditions for conducting the CDO are met;
 - Check if flight meets requirement for executing a CDO; and
 - Plan the lateral route in your FMC as shown below based on FIR entry point and landing runway-in-use. The landing runway-in-use is available from D-ATIS.

FIR entry point	RWY	STAR	Transition
ESPOB, IPRIX, IGARI	02L	PASPU 1K	VEPLI
	20R	PASPU 1L	
MELAS	02L	PASPU 1K	MABAL
	20R	PASPU 1L	
VPK	02L	PASPU 1K	BIKTA
	20R	PASPU 1L	
TEGID, KAMIN, AGOBA	02L	LAVAX 1K	TOMAN
	20R	LAVAX 1L	
KADAR, BAVUS	02L	LAVAX 1K	OBDOS
	20R	LAVAX 1L	
SURGA	02L	LAVAX 1K	SURGA
	20R	LAVAX 1L	
PARDI	02L	REMES 1K	
	20R	REMES 1L	
TAROS	02L	BOBAG 1K	
	20R	BOBAG 1L	

5. CDO Execution

- 5.1 On first contact with Singapore RADAR, use the following when requesting for a CDO:

"Request **C-D-O**"

-Depending on the situation, Singapore ATC will make an early assessment to approve/disapprove your request accordingly. When it is obvious to ATC that the conduct of CDO flight will not reap any operational benefit, ATC shall disapprove your request and inform you accordingly.

CONTINUOUS DESCENT OPERATION (CDO) FOR ARRIVALS

5.2 If CDO is approved, Singapore ATC shall reply using the following phraseology:

"[flight callsign], **EXPECT C-D-O** and cleared to Singapore via [STAR] Arrival, [transition, if any] transition, Runway [runway-in-use]. **MAINTAIN** [cruising altitude], report ready for descent"

On receipt of this clearance from Singapore ATC, pilot shall plan the arrival route using the FMC and to report estimated time/distance for Top Of Descent (TOD) once the information is available. CDO RNAV STARs have been designed for arrivals into Runway 02L or Runway 20R and linking up to the ILS of these respective runways. As such, please refrain from requesting for a change in landing runway (i.e. 02C or 20C).

5.3 Prior to reaching TOD, pilot shall make another call to request CDO execution:

"Request descent"

Once cleared for descent:

- Start descent at the calculated FMC TOD based on the planned lateral and vertical path;
- Use lateral and vertical navigation functions of the FMC throughout CDO execution.

5.4 When transferred to another ATC sector/frequency, always inform the next sector that flight is on CDO upon initial contact:

"Singapore [ATC sector transferred to], [flight callsign], **on C-D-O** to [last cleared altitude by ATC], Runway [runway-in-use]"

5.5 Once in contact with Singapore Arrival, ATC shall issue onward clearance to facilitate final phase of the CDO flight. Clearance would be in the following form:

"[flight callsign], **descend to [altitude], cleared ILS approach** Runway [runway-in-use]"

-With this clearance, pilot may proceed on remaining route of CDO flight procedure to intercept on the appropriate ILS.

NOTE:

- During CDO, standard ATC procedures continue to apply. ATC may at times clear you to an intermediate level which would still facilitate a CDO profile. In doing so, ATC shall endeavor to issue further descent clearance prior to the CDO flight reaching 3000' from last assigned altitude so as to prevent leveling off.
- If CDO flight has commenced and in the course of the CDO execution, Changi changes direction of its runway-in-use, i.e. Rwy 02 to Rwy 20 or vice versa, ATC shall advise if the CDO flight can resume and issue the necessary re-clearance. Pilot shall then re-plan arrival route to the revised landing runway and advise ATC if the flight would still be able to meet all the required speed/altitude restrictions.

5.6 Deviation from lateral or vertical path - At times, it may be necessary for ATC to take you off track temporarily or stop descent at an intermediate level due to a change in traffic situation. When instructed, pilot shall comply with ATC instructions until such a time when informed that the CDO flight can resume.

5.7 Termination of a CDO - In the event that traffic complexity reaches a stage where cancellation of the CDO flight becomes necessary, ATC shall issue a clearance to terminate the CDO flight. In doing so, ATC shall use the following phrase to terminate the CDO flight:

"[callsign], [reason for CDO termination], **C-D-O is now terminated.** [other ATC instructions that may follow]..."

5.8 Radio Communication Failure - In the event of a radio communication failure, CDO flight is to be terminated immediately and pilot is to apply the radio communication failure procedures.

6. CDO Flight procedures

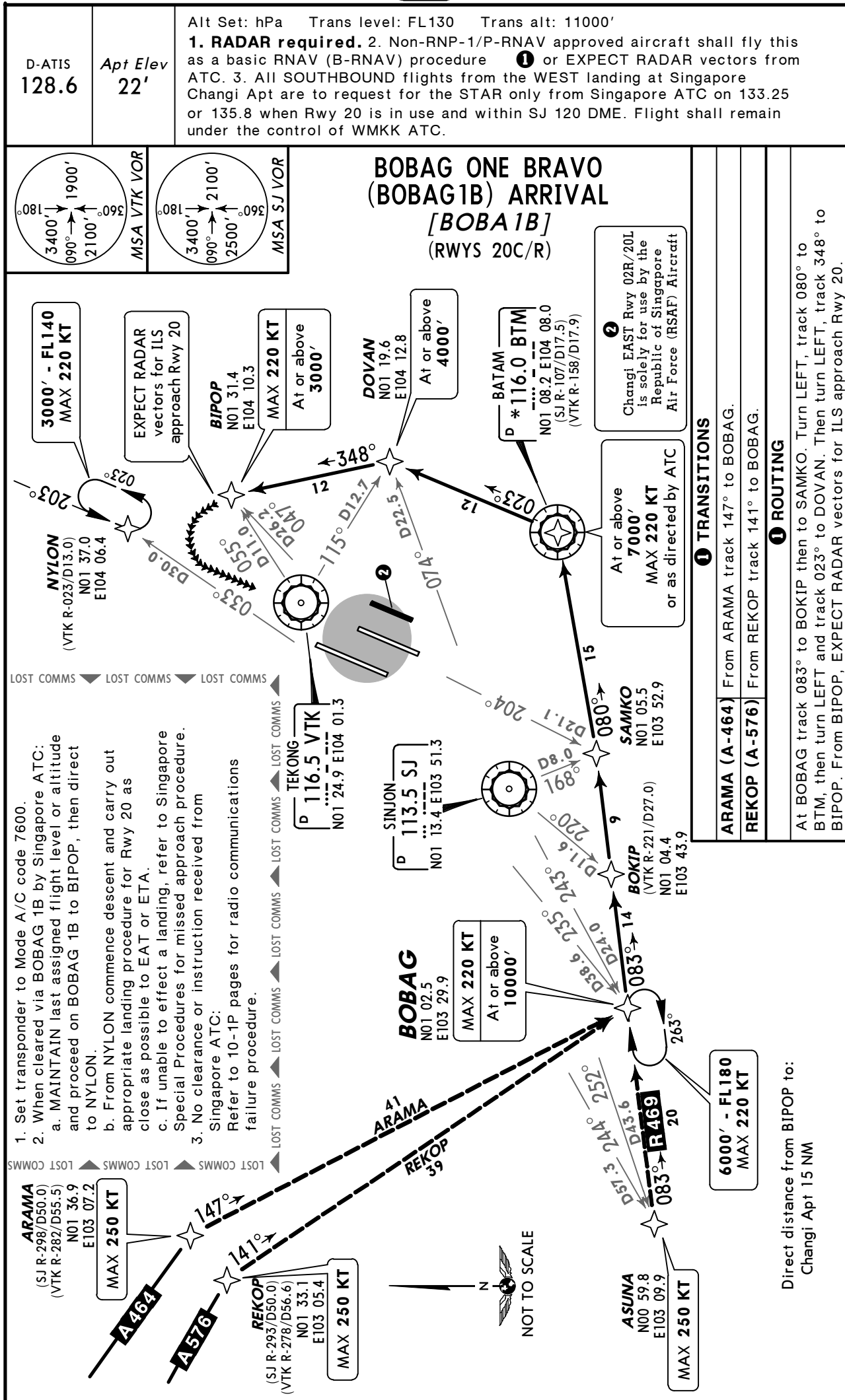
6.1 The CDO flight shall track along the CDO RNAV STARs up to the intermediate segment and ILS procedure for the final and missed approaches for the respective runways. The CDO RNAV STARs have been designed as closed approaches into Changi, special provisions have been made herein to facilitate CDO flight joining the ILS Approach from the RNAV STAR.

6.2 In the event that airborne RNAV equipment fails, pilot shall inform ATC as soon as practicable. ATC shall then terminate CDO operation and resume with RADAR vectors to aid pilot in landing into Changi.

6.3 For each set of RNAV STAR, information on distance to threshold has been added to aid pilot in CDO planning and execution and to reduce radio voice transmissions between pilot and ATC.

2. Non-RNP-1/P-RNAV approved aircraft shall fly this as a basic RNAV (B-RNAV) procedure **1** or EXPECT RADAR vectors from ATC.

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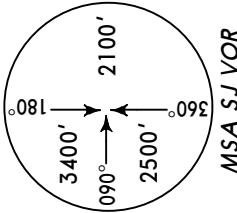


D-ATIS
128.6

Apt Elev
22'

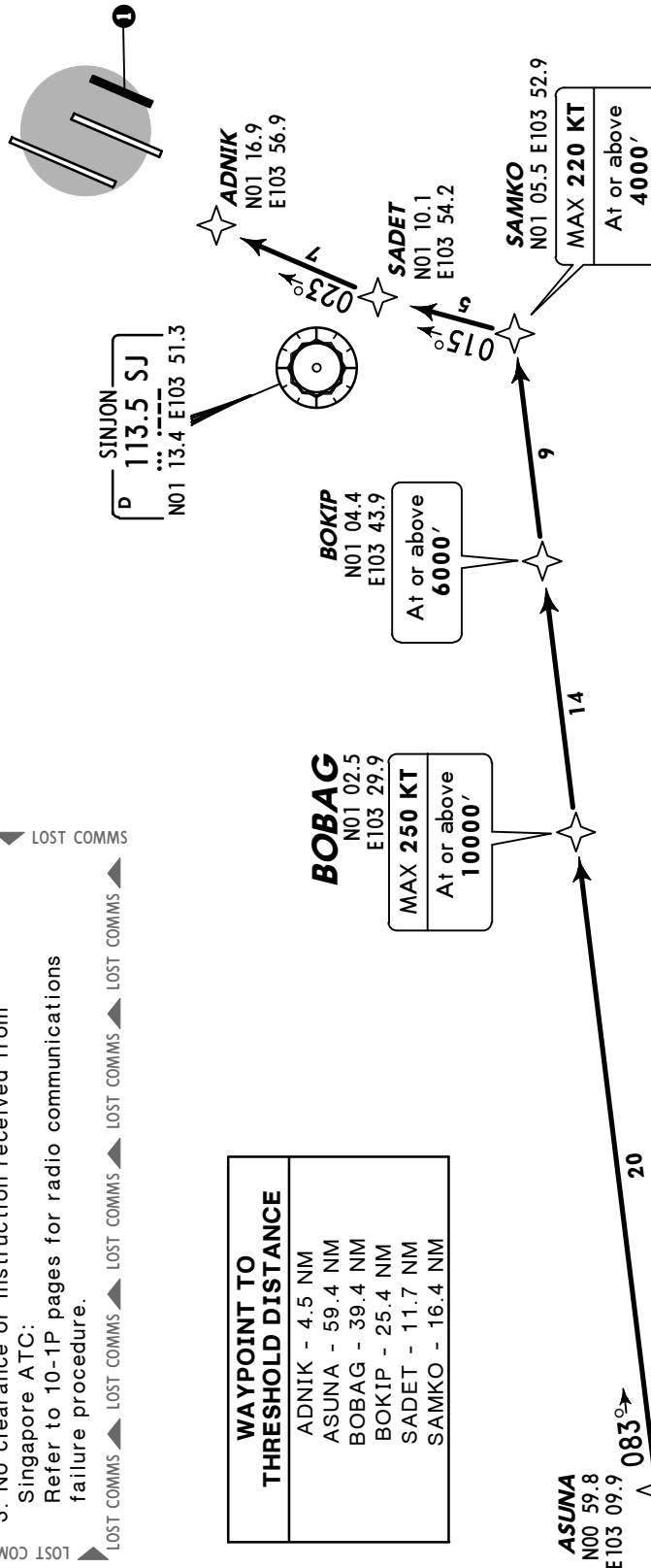
Alt Set: hPa Trans level: FL130 Trans alt: 11000'

1. RNAV 1.
2. RADAR required.
3. RNAV (GNSS) CDO.
4. Changi arrivals via ATS route A-464 shall flight plan BOBAG 1A or BOBAG 1B as STAR route. When traffic permits, BOBAG 1K, BOBAG 1L or LELIB 2B STAR will be issued to pilots.



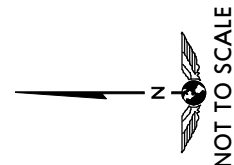
BOBAG ONE KILO (BOBAG1K) ARRIVAL [BOBA1K] (RWY 02L)

1
Changi EAST Rwy 02R/20L
is solely for use by the
Republic of Singapore
Air Force (RSAF) Aircraft



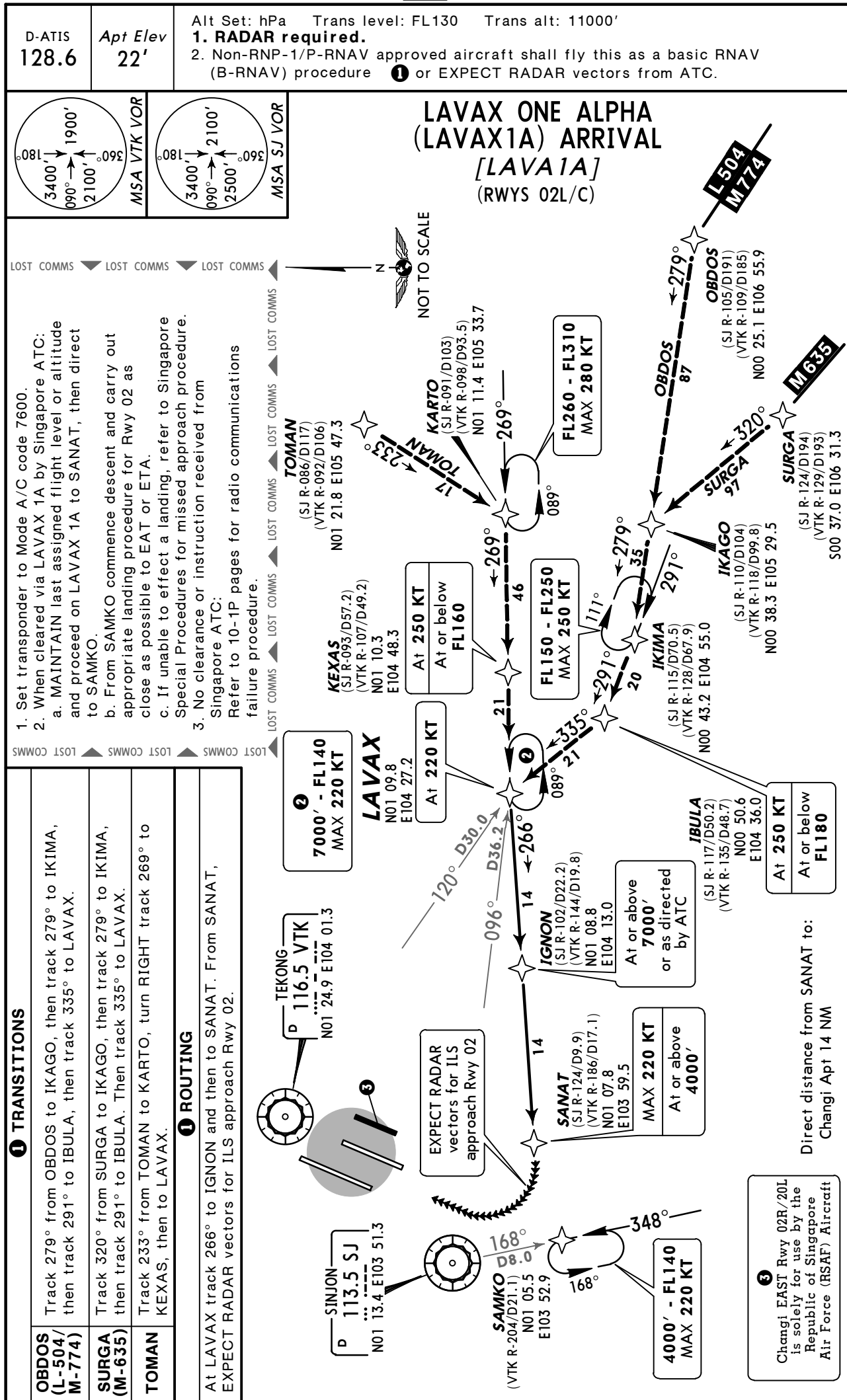
ROUTING

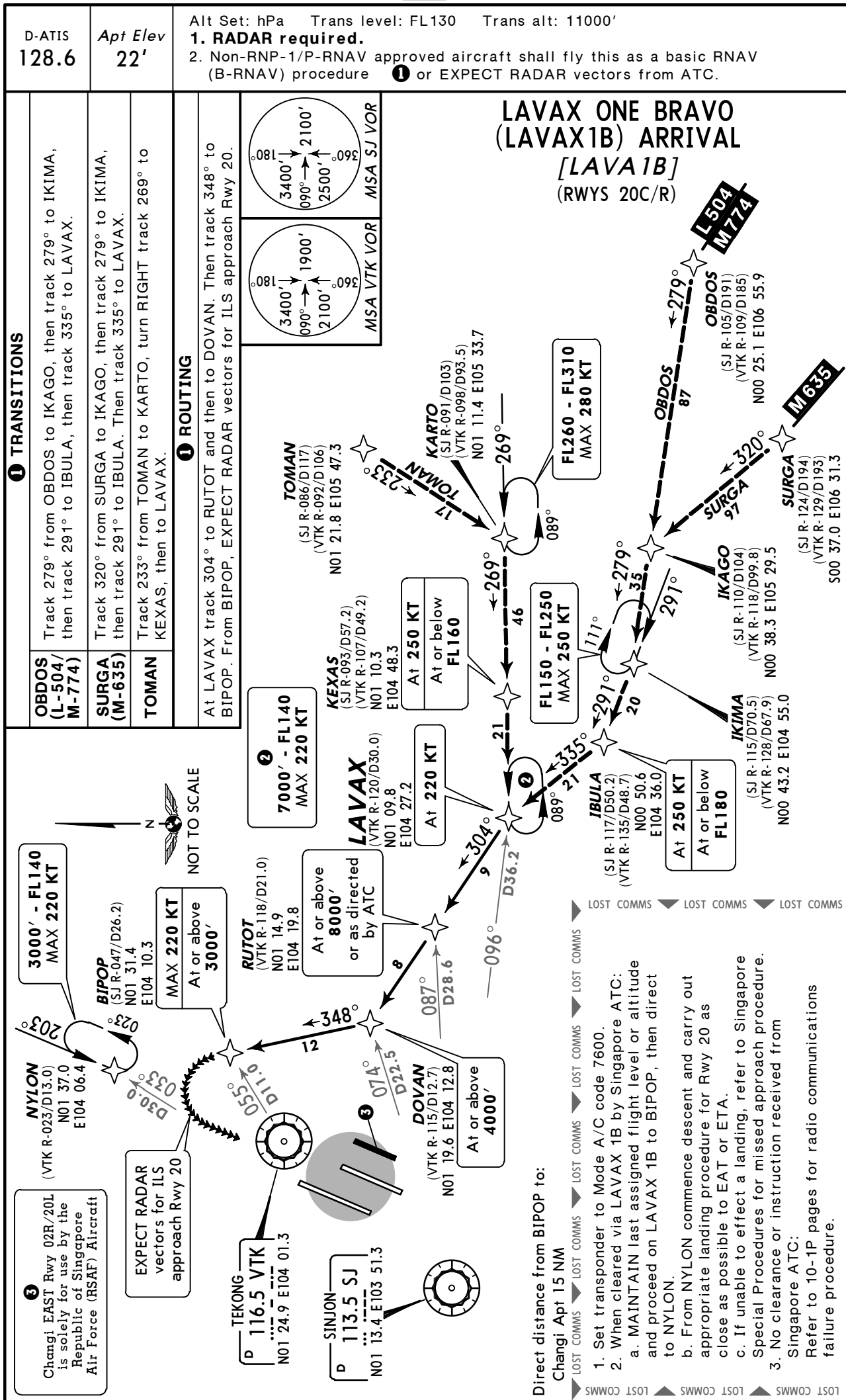
From ASUNA to BOBAG, to BOKIP, to SAMKO, to SADET, to ADNIK.

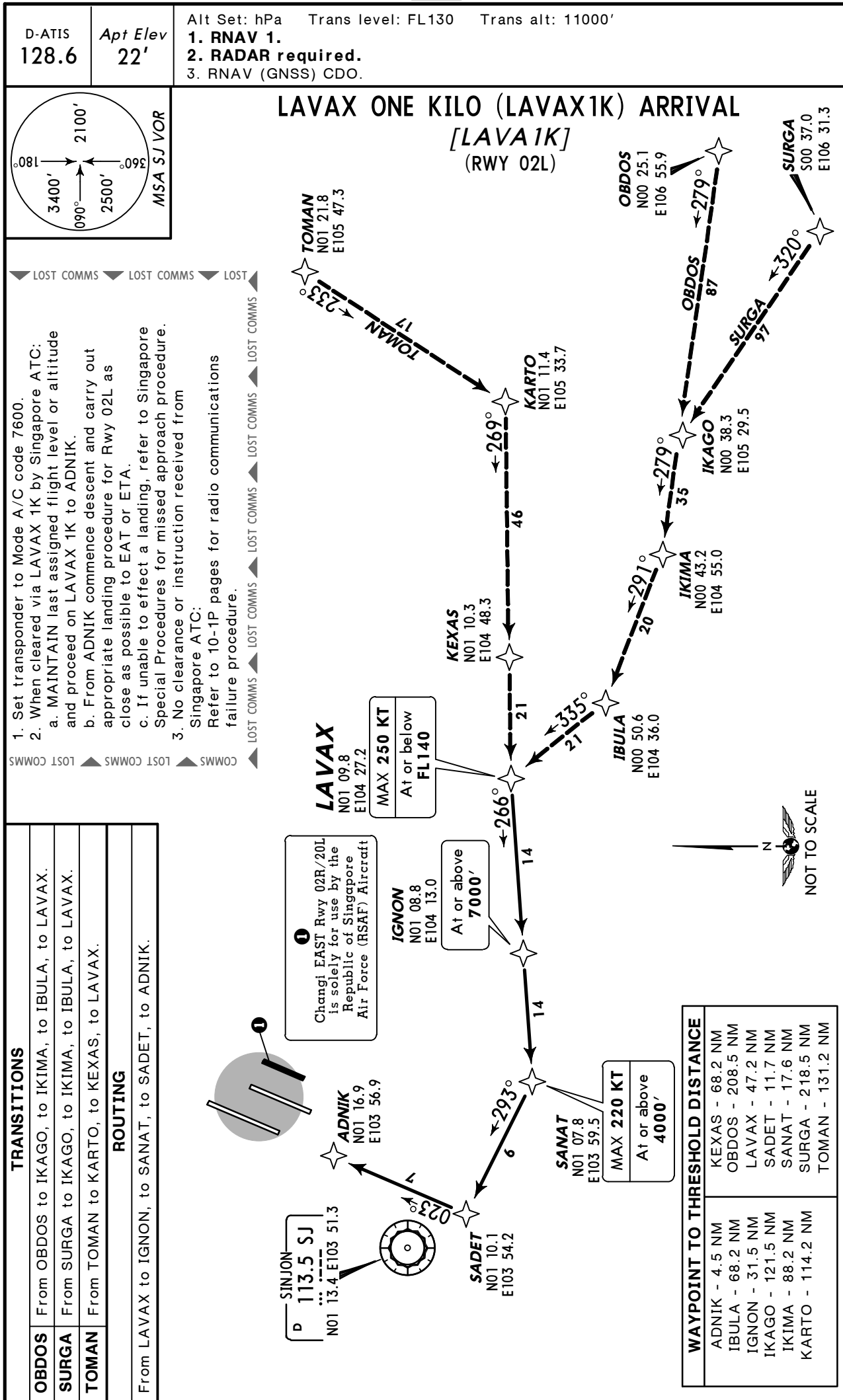


LOST COMMS LOST COMMS LOST COMMS

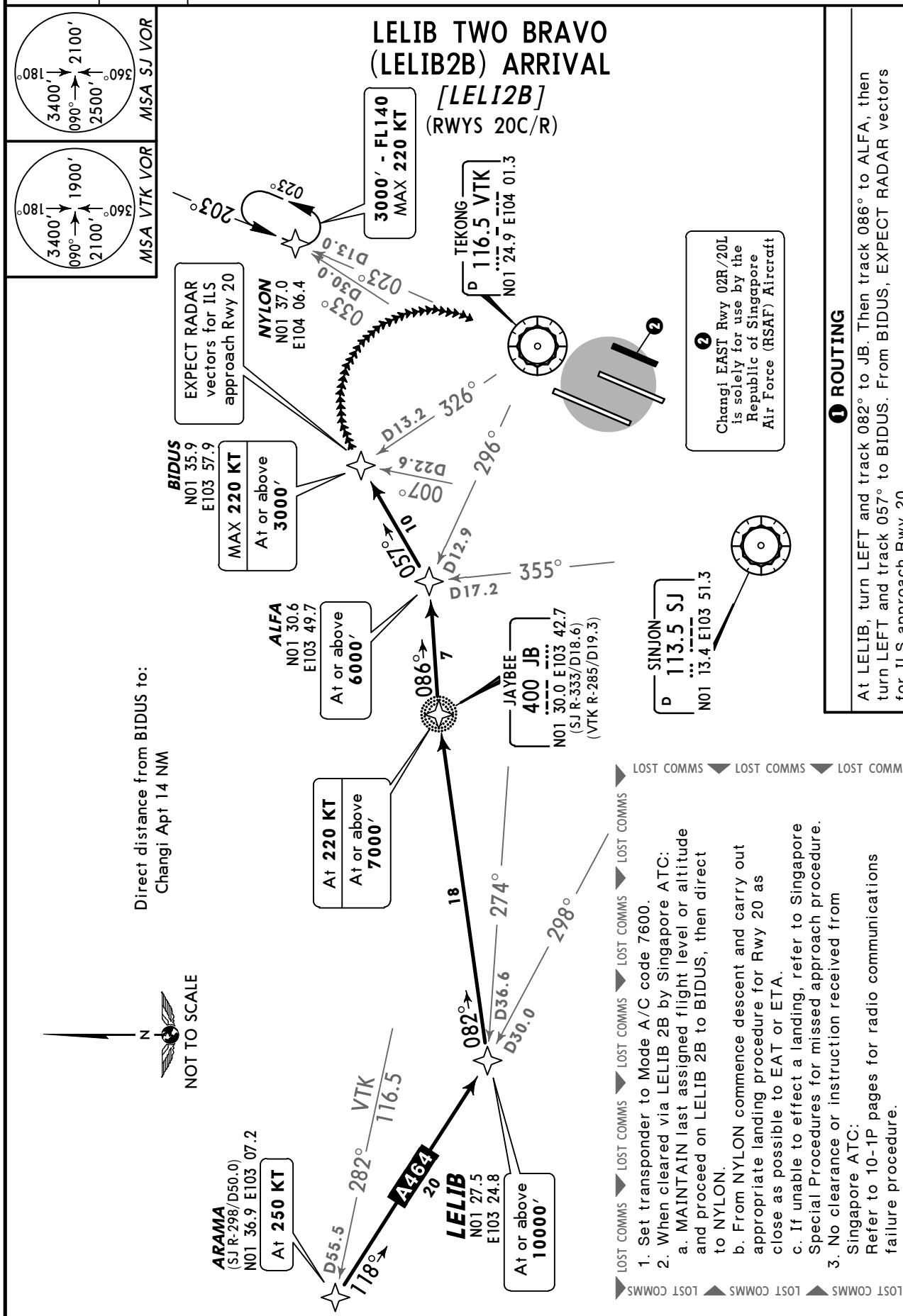
1. Set transponder to Mode A/C code 7600.
2. When cleared via BOBAG 1K by Singapore ATC:
 - a. MAINTAIN last assigned flight level or altitude and proceed on BOBAG 1K to ADNIK.
 - b. From ADNIK commence descent and carry out appropriate landing procedure for Rwy 02L as close as possible to EAT or ETA.
 - c. If unable to effect a landing, refer to Singapore Special Procedures for missed approach procedure.
3. No clearance or instruction received from Singapore ATC:
 - a. Refer to 10-1P pages for radio communications failure procedure.







D-ATIS 128.6	Apt Elev 22'	Alt Set: hPa Trans level: FL130 Trans alt: 11000' 1. RADAR required. 2. Non-RNP-1/P-RNAV approved aircraft shall fly this as a basic RNAV (B-RNAV) procedure 1 or EXPECT RADAR vectors from ATC. 3. All SOUTHBOUND flights from the WEST landing at Singapore Changi Apt are to request the STAR only from Singapore ATC on 133.25 or 135.8 when Rwy 20 is in use and within 120 DME SJ. Flight shall remain under the control of WMKK ATC. 4. Changi arrivals via ATS route A-464 shall flight plan BOBAG 1A or BOBAG 1B as STAR route. When traffic permits, BOBAG 1K, BOBAG 1L or LELIB 2B STAR will be issued to pilots.
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D-ATIS
128.6Apt Elev
22'

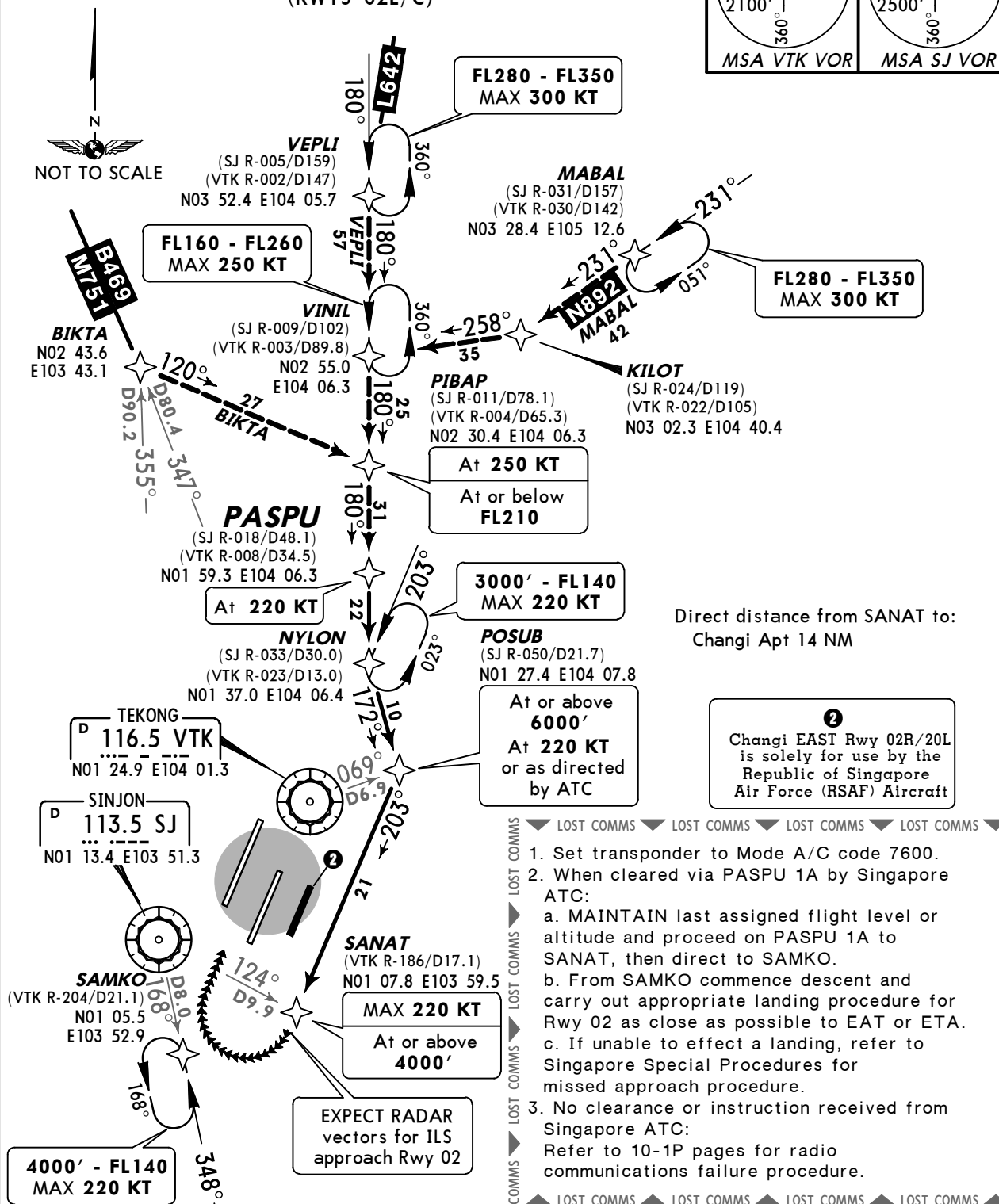
Alt Set: hPa Trans level: FL130 Trans alt: 11000'

1. **RADAR required.**

2. Non-RNP-1/P-RNAV approved aircraft shall fly this as a basic RNAV (B-RNAV) procedure ① or EXPECT RADAR vectors from ATC.

PASPU ONE ALPHA (PASPU1A) ARRIVAL**[PASP1A]**

(RWYS 02L/C)

**① TRANSITIONS****BIKTA**
(M-751/B-469)

At BIKTA track 120° to PIBAP, then turn RIGHT and track 180° to PASPU.

MABAL
(N-892)

At MABAL track 231° to KILOT, then turn RIGHT to track 258° to VINIL. Turn LEFT and track 180° to PIBAP and then to PASPU.

VEPLI
(L-642)

At VEPLI track 180° to PIBAP then to PASPU.

① ROUTING

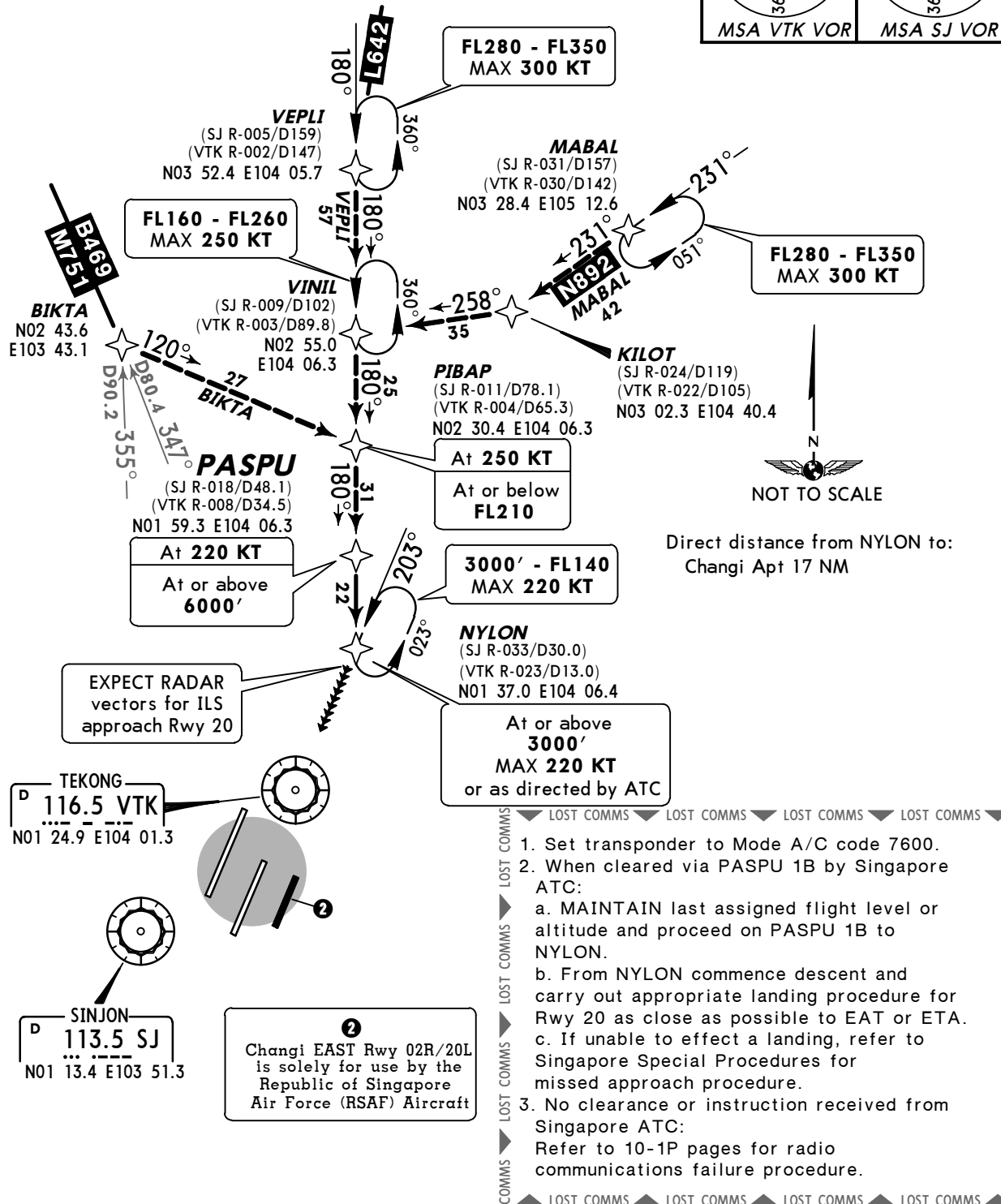
At PASPU track 180° to NYLON then track 172° to POSUB. Turn RIGHT and track 203° to SANAT. From SANAT, EXPECT RADAR vectors for ILS approach Rwy 02.

D-ATIS
128.6Apt Elev
22'

Alt Set: hPa Trans level: FL130 Trans alt: 11000'

1. **RADAR required.**

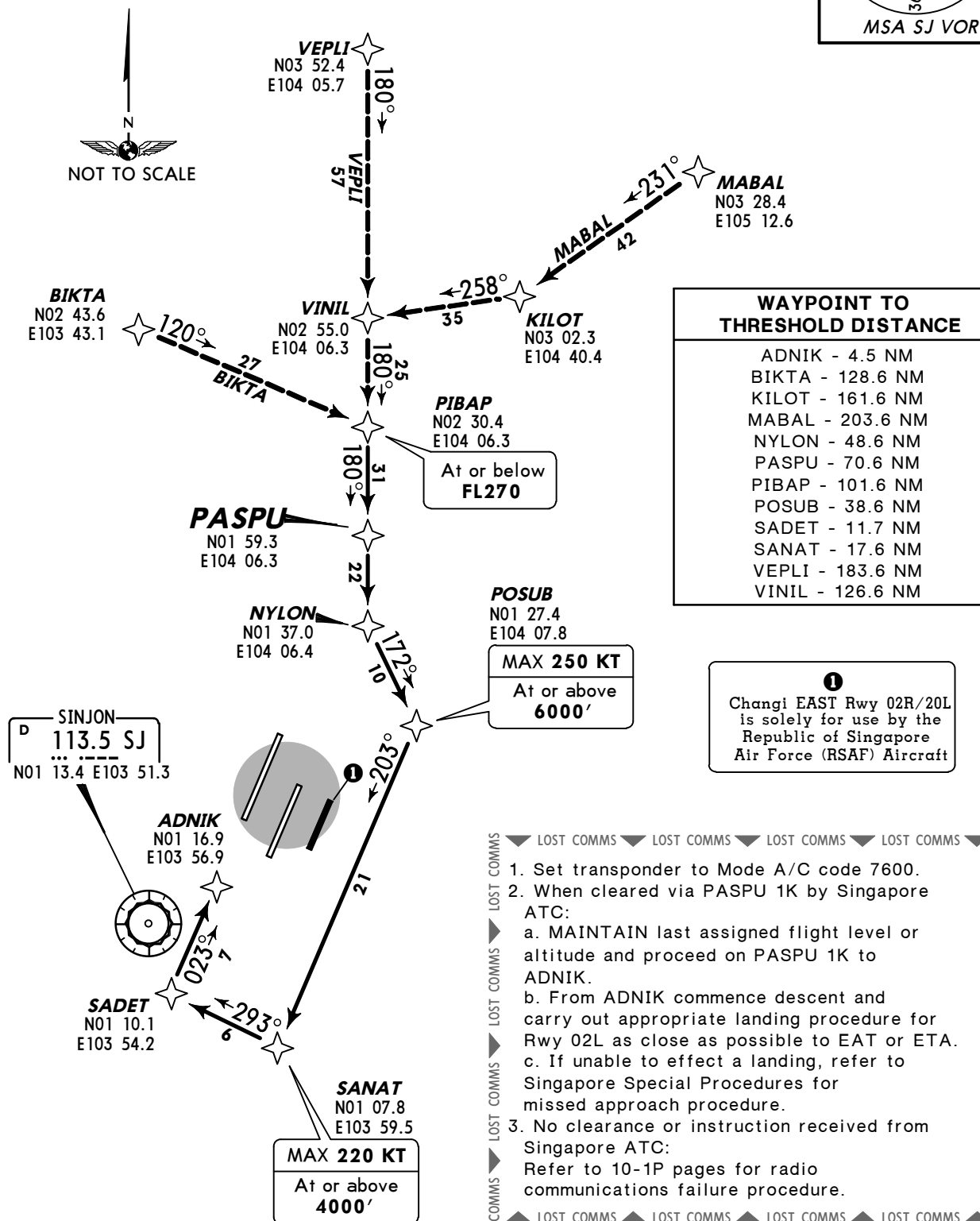
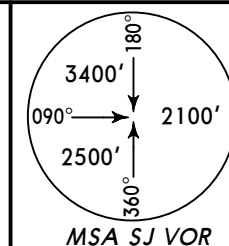
2. Non-RNP-1/P-RNAV approved aircraft shall fly this as a basic RNAV (B-RNAV) procedure ① or EXPECT RADAR vectors from ATC.

PASPU ONE BRAVO ARRIVAL (PASPU1B)
[PASP1B]
(RWYS 20C/R)**① TRANSITIONS**

BIKTA (M-751/B-469)	At BIKTA track 120° to PIBAP, then turn RIGHT and track 180° to PASPU.
MABAL (N-892)	At MABAL track 231° to KILLOT, then turn RIGHT to track 258° to VINIL. Turn LEFT and track 180° to PIBAP and then to PASPU.
VEPLI (L-642)	At VEPLI track 180° to PIBAP then to PASPU.

① ROUTING

At PASPU track 180° to NYLON. From NYLON, EXPECT RADAR vectors for ILS approach Rwy 20.

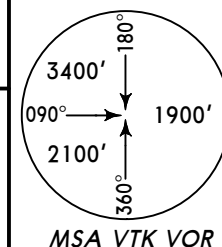
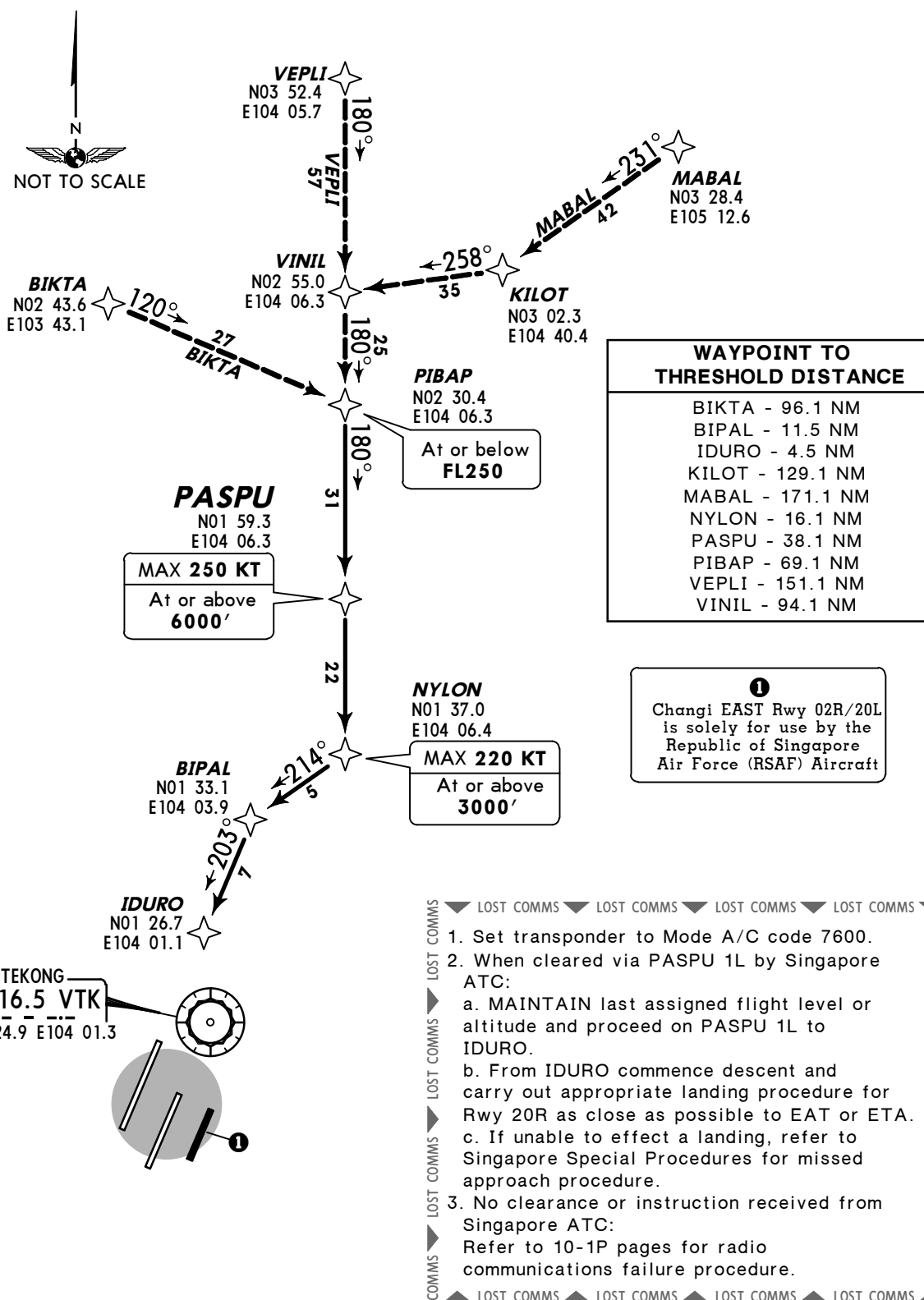
D-ATIS
128.6Apt Elev
22'Alt Set: hPa Trans level: FL130 Trans alt: 11000'
1. RADAR required. 2. RNAV 1.
3. RNAV (GNSS) CDO.PASPU ONE KILO ARRIVAL (PASPU1K)
[PASP1K]
(RWY 02L)

TRANSITIONS

BIKTA	From BIKTA to PIBAP.
MABAL	From MABAL to KILOT, to VINIL, to PIBAP.
VEPLI	From VEPLI to VINIL, to PIBAP.

ROUTING

From PIBAP to PASPU, to NYLON, to POSUB, to SANAT, to SADET, to ADNIK.

D-ATIS
128.6Apt Elev
22'Alt Set: hPa Trans level: FL130 Trans alt: 11000'
1. RADAR required. 2. RNAV 1.
3. RNAV (GNSS) CDO.**PASPU ONE LIMA ARRIVAL (PASPU1L)**
[PASPU1L]
(RWY 20R)**TRANSITIONS**

BIKTA	From BIKTA to PIBAP.
MABAL	From MABAL to KILOT, to VINIL, to PIBAP.
VEPLI	From VEPLI to VINIL, to PIBAP.

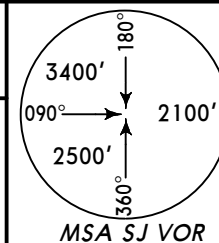
ROUTING

From PIBAP to PASPU, to NYLON, to BIPAL, to IDURO.

D-ATIS
128.6

Apt Elev
22'

Alt Set: hPa Trans level: FL130 Trans alt: 11000'
1. **RADAR required.** 2. **RNAV 1.**
3. RNAV (GNSS) CDO.



REMES ONE KILO ARRIVAL (REMES1K)
[REME1K]
(RWY 02L)

①
Changi EAST Rwy 02R/20L
is solely for use by the
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SINJON
113.5 SJ
N01 13.4 E103 51.3

ADNIK
N01 16.9
E103 56.9

SADET
N01 10.1
E103 54.2

SAMKO
N01 05.5
E103 52.9

MAX 220 KT
At or above
4000'

REMES
N00 43.7
E103 57.6

MAX 250 KT
At or above
6000'

**WAYPOINT TO
THRESHOLD DISTANCE**

ADNIK - 4.5 NM
REMES - 38.4 NM
REPOV - 66.4 NM
SADET - 11.7 NM
SAMKO - 16.4 NM

REPOV
N00 16.4
E104 03.0

At or below
FL250



- LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼
- Set transponder to Mode A/C code 7600.
 - When cleared via REMES 1K by Singapore ATC:
 - MAINTAIN last assigned flight level or altitude and proceed on REMES 1K to ADNIK.
 - From ADNIK commence descent and carry out appropriate landing procedure for Rwy 02L as close as possible to EAT or ETA.
 - If unable to effect a landing, refer to Singapore Special Procedures for missed approach procedure.
 - No clearance or instruction received from Singapore ATC:
Refer to 10-1P pages for radio communications failure procedure.
- COMMS ▼ LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼

ROUTING

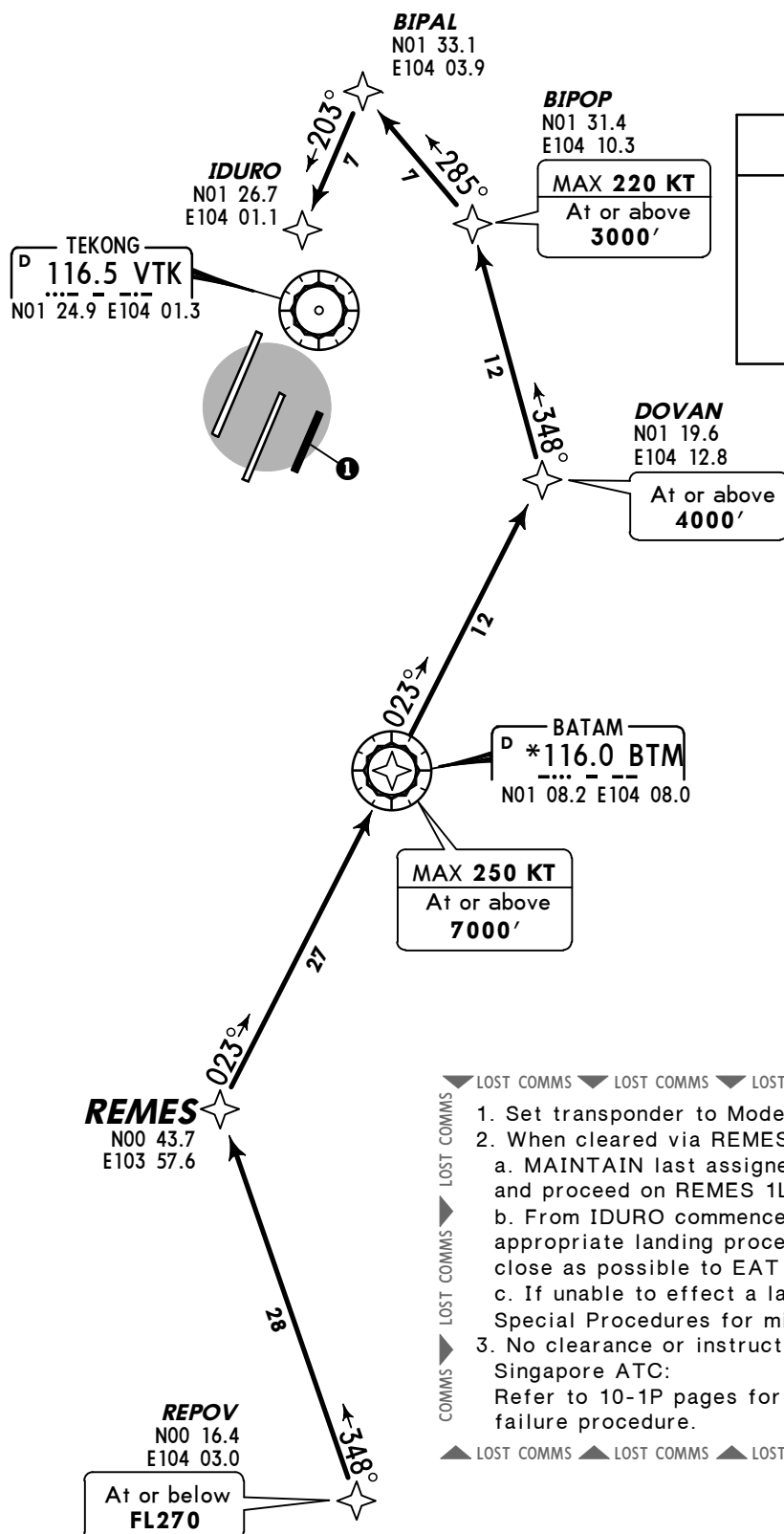
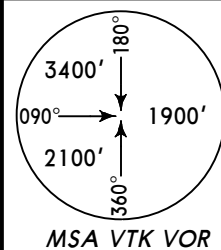
From REPOV to REMES, to SAMKO, to SADET, to ADNIK.

Alt Set: hPa Trans level: FL130 Trans alt: 11000'

1. RADAR required. 2. RNAV 1.

3. RNAV (GNSS) CDO.

REME ONE LIMA (REME1L) ARRIVAL
[REME1L]
(RWY 20R)



WAYPOINT TO THRESHOLD DISTANCE

BIPAL	- 11.5	NM
BIPOP	- 18.2	NM
BTM	- 42.2	NM
DOVAN	- 30.2	NM
IDURO	- 4.5	NM
REMES	- 69.2	NM
REPOV	- 97.2	NM

Changi EAST Rwy 02R/20L
is solely for use by the
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Air Force (RSAF) Aircraft

NOT TO SCALE

▼ LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼ LOST COMMS

1. Set transponder to Mode A/C code 7600.
 2. When cleared via REMES 1L by Singapore ATC:
 - a. MAINTAIN last assigned flight level or altitude and proceed on REMES 1L to IDURO.
 - b. From IDURO commence descent and carry out appropriate landing procedure for Rwy 20R as close as possible to EAT or ETA.
 - c. If unable to effect a landing, refer to Singapore Special Procedures for missed approach procedure.
 3. No clearance or instruction received from Singapore ATC:
Refer to 10-1P pages for radio communications failure procedure.

▲ LOST COMMS ▲ LOST COMMS ▲ LOST COMMS ▲ LOST COMMS ▲ LOST COMMS

ROUTING

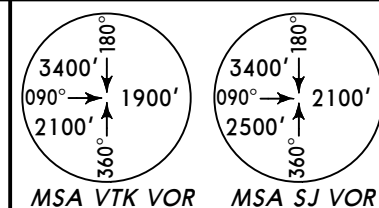
From REPOV to REMES, to BTM, to DOVAN, to BIPOP, to BIPAL, to IDURO.

D-ATIS
128.6Apt Elev
22'

Alt Set: hPa Trans level: FL130 Trans alt: 11000'

1. **RADAR required.**

2. Non-RNP-1/P-RNAV approved aircraft shall fly this as a basic RNAV (B-RNAV) procedure ① or EXPECT RADAR vectors from ATC.

REMES FIVE ALPHA (REMES5A) ARRIVAL
[REME5A]
(RWYS 02L/C)

②
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is solely for use by the
Republic of Singapore
Air Force (RSAF) Aircraft

TEKONG
D 116.5 VTK
N01 24.9 E104 01.3

SINJON
D 113.5 SJ
N01 13.4 E103 51.3

EXPECT RADAR
vectors for ILS
approach Rwy 02

4000' - FL140
MAX 220 KT

SAMKO
(SJ R-168/D8.0)
N01 05.5
E103 52.9

MAX 220 KT
At or above
4000'

REMES
(SJ R-168/D30.2)
N00 43.7
E103 57.6

At 220 KT
At or above
6000'

6000' - FL140
MAX 220 KT

FL150 - FL250
MAX 250 KT

REPOV
(SJ R-168/D57.9)
N00 16.4
E104 03.0

At 250 KT
At or below
FL210



LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼

1. Set transponder to Mode A/C code 7600.
2. When cleared via REMES 5A by Singapore ATC:
 - a. MAINTAIN last assigned flight level or altitude and proceed on REMES 5A to SAMKO.
 - b. From SAMKO commence descent and carry out appropriate landing procedure for Rwy 02 as close as possible to EAT or ETA.
 - c. If unable to effect a landing, refer to Singapore Special Procedures for missed approach procedure.
3. No clearance or instruction received from Singapore ATC:
Refer to 10-1P pages for radio communications failure procedure.

COMMS ▲ LOST COMMS ▲ LOST COMMS ▲ LOST COMMS ▲ LOST COMMS ▲

Direct distance from SAMKO to:
Changi Apt 17 NM

① ROUTING

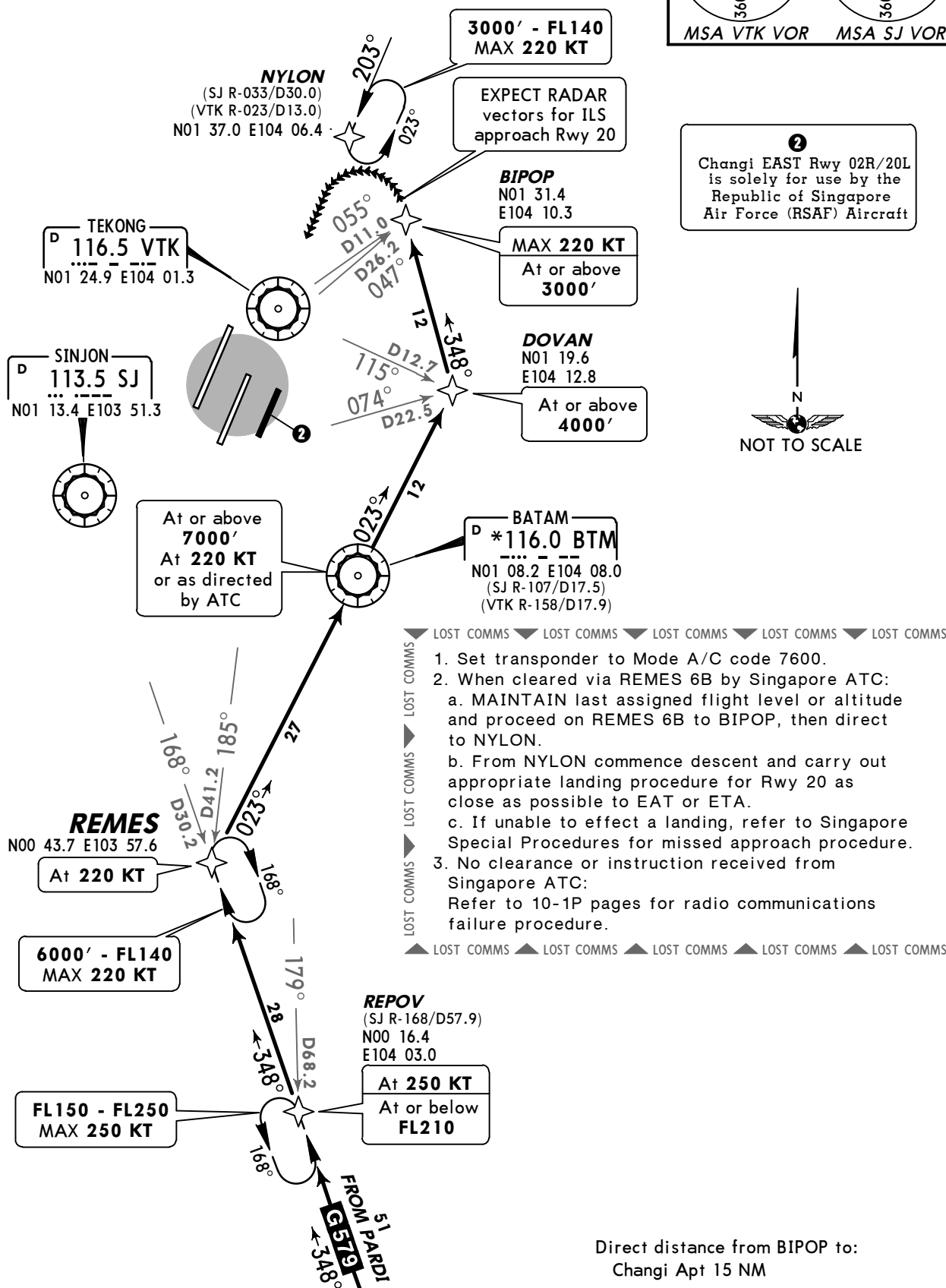
At PARDI track 348° to REPOV, then to REMES, then to SAMKO. From SAMKO, EXPECT RADAR vectors for ILS approach Rwy 02.

D-ATIS
128.6Apt Elev
22'

Alt Set: hPa Trans level: FL130 Trans alt: 11000'

1. **RADAR required.**

2. Non-RNP-1/P-RNAV approved aircraft shall fly this as a basic RNAV (B-RNAV) procedure ① or EXPECT RADAR vectors from ATC.

REMES SIX BRAVO (REMES6B) ARRIVAL
[REME6B]
(RWYS 20C/R)**① ROUTING**

At PARDI track 348° to REPOV, then to REMES. Then turn RIGHT and track 023° to BTM, then to DOVAN. Turn LEFT and track 348° to BIPOV. From BIPOV, EXPECT RADAR vectors for ILS approach Rwy 20.

MINIMUM CLIMB GRADIENT CRITERIA

The Instrument Departure Procedures are only applicable for aircraft with all engines operating. It remains the responsibility of the operator to develop contingency procedures for the individual type of aircraft and to conduct the necessary examination of obstacles throughout the areas concerned in relation to the certificated performance of the individual aircraft type. It is also the responsibility of the operator to ensure that contingency procedures comply fully with the airplane performance requirements of Annex 6.

The specific routes to be followed are depicted in SID Charts pages. Altitude restrictions at fixes and/or DME specify ATC/airspace requirements. Minimum net climb gradient specifies obstacle clearance requirements.

In the event that the minimum net climb gradient cannot be achieved, pilots shall inform ATC and ATC shall hold departures if pilots indicate that they are unable to meet the required net climb gradient.

RUNWAY 02L

When there are no reports of vessel movement along the northern shipping channel, or where the reported vessel height is less than 35m (115 ft) AMSL, the aircraft minimum net climb gradient shall be at 3.3%.

Where the reported vessel height is 35m (115 ft) AMSL or higher, ATC shall advise departing pilots of the vessel height. Pilots, on receipt of this information, shall apply the minimum net climb gradient in accordance with the table below.

Ht of Vessel (meters AMSL)	Gradient (%)	Minimum Crossing Altitude Over Vessel	
		meters	feet
35	3.4	44	142
40	3.9	49	158
50	4.8	59	191
60	5.8	69	224
70	6.8	79	257
80	7.8	89	290
90	8.8	99	322
100	9.7	109	355
110	10.7	119	388
120	11.7	129	421
130	12.7	139	454
140	13.7	149	486

After the aircraft has reached or passed the minimum crossing altitude over vessel, the minimum net climb gradient shall be 3.3%.

RUNWAY 02C

When there are no reports of vessel movement along the northern shipping channel, or where the reported vessel height is less than 70m (230 ft) AMSL, the aircraft minimum net climb gradient shall be at 3.3%.

Where the reported vessel height is 70m (230 ft) AMSL or higher, ATC shall advise pilots of the vessel height. Pilots, on receipt of this information, shall apply the minimum net climb gradient in accordance with the following table.

MINIMUM CLIMB GRADIENT CRITERIA

Ht of Vessel (meters AMSL)	Gradient (%)	Minimum Crossing Altitude Over Vessel	
		meters	feet
70	3.4	89	292
80	3.8	99	325
90	4.3	109	358
100	4.7	119	390
110	5.1	129	423
120	5.5	139	456
130	6.0	149	489
140	6.4	159	522

After the aircraft has reached or passed the minimum crossing altitude over vessel, the minimum net climb gradient shall be 3.3%.

RUNWAYS 20C/20R

All departures on Runway 20C/20R shall be on a minimum net climb gradient of 5% until reaching or passing 400 ft. Thereafter, the minimum net climb gradient shall be 3.3%.

Refer to Standard Instrument Departures for Runways 20C and 20R.

DETERMINATION OF CLIMB GRADIENT BY OPERATORS

The minimum net climb gradients specified above need not apply to operators who wish to calculate their own climb gradients based on actual lift-off point, provided the calculation ensures the following:

- the most penalizing obstacle is taken into account under both all-engines operating procedures as well as one-engine-out procedures; and
- the required minimum obstacle clearance (MOC) is met under all engines operating procedures.

For the above calculations, operators shall use the following information:

- a. The most penalizing obstacle is a tall vessel which is on the extended center line of the runway. (ATC shall advise pilots of the height of the tall vessel.)
- b. The required MOC is 0.8% of the distance (d) from the departure end of runway (DER) to the obstacle, in accordance with Volume II of ICAO Doc 8168 - *Procedures for Air Navigation Services Operations (PANS-OPS)* where, in the case of Singapore Changi Airport, the DER is defined as the end of the clearway.
- c. The distance (d) for departure Runways 02L/02C is measured from the DER to the shipping channel north of Changi. The distance (d) for departure Runways 20C/20R is measured from the DER to the boundary of the restricted waters south of Changi wherein tall vessels of height above 49m (161 ft) AMSL are not permitted. The distance (d) for the various departure runways is as follows:

Departure Runway	Distance (d)
02L	1020m
02C	2360m
20C	5945m
20R	8370m

Apt Elev
22'

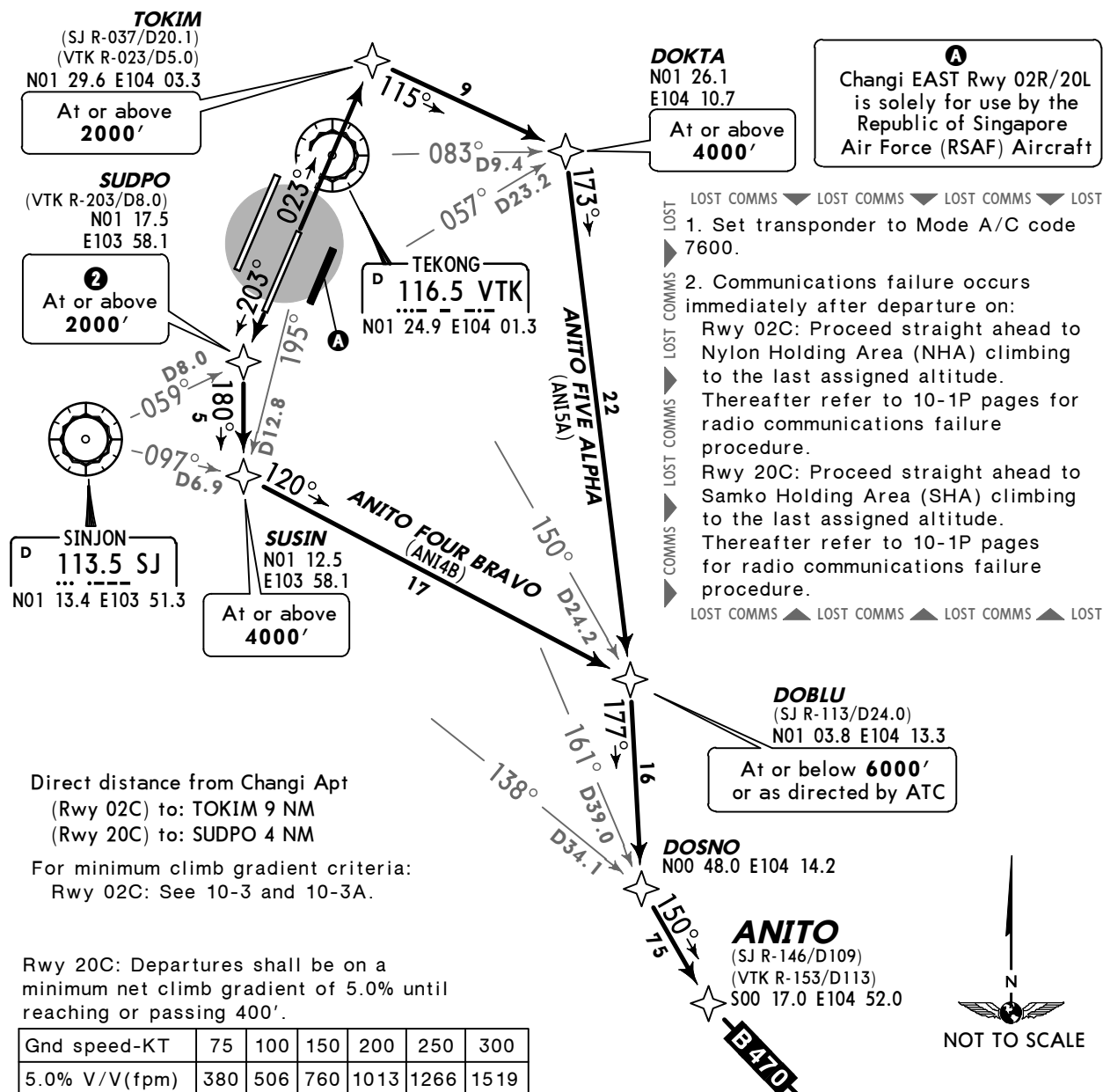
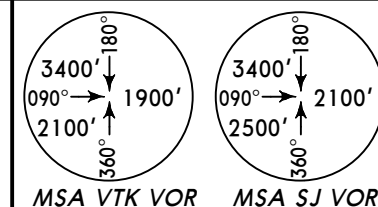
Trans level: FL130 Trans alt: 11000'

1. **RADAR required.** 2. Non-RNP-1/P-RNAV approved aircraft shall fly this as a basic RNAV (B-RNAV) procedure ① or EXPECT RADAR vectors from ATC.
 3. ② The restriction to cross SUDPO at or above 2000' is applicable between 2301-1100 UTC. All departure aircraft on Runway 20C issued with heading instructions by ATC shall also cross VTK 8 DME at or above 2000' between 2301-1100 UTC. If the altitude restriction cannot be complied with, the pilot-in-command of an aircraft departing on Runway 20C shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. 4. All SIDs include noise preferential routes. 5. Cruising levels will be issued after take-off by Singapore RADAR. 6. On initial contact when requesting ATC, inform ATC of the FL can cross at ANITO.

ANITO FIVE ALPHA (ANI5A), ANITO FOUR BRAVO (ANI4B) DEPARTURES

(RWYS 02C, 20C)

**SPEED: MAX 220 KT UNTIL PASSING
4000' AND 250 KT UNTIL
PASSING 10000'**

Initial climb clearance **3000'** or as directed by ATC

SID

RWY

① INITIAL CLIMB

ANI5A

02C

Climb straight ahead to TOKIM, turn RIGHT and track 115° to DOKTA. Turn RIGHT and track 173° to DOBLU. Then track 177° to DOSNO.

ANI4B

20C

Climb straight ahead to SUDPO, turn LEFT and track 180° to SUSIN. Turn LEFT and track 120° to DOBLU. Turn RIGHT and track 177° to DOSNO.

① ROUTING

At DOSNO turn LEFT and track 150° to ANITO and join ATS route B-470.

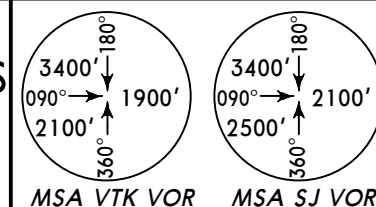
Apt Elev
22'

Trans level: FL130 Trans alt: 11000'

1. **RADAR required.** 2. Non-RNP-1/P-RNAV approved aircraft shall fly this as a basic RNAV (B-RNAV) procedure ① or EXPECT RADAR vectors from ATC.
3. ② The restriction to cross SUNVA at or above 2000' is applicable between 2301-1100 UTC. All departure aircraft on Runway 20R issued with heading instructions by ATC shall also cross VTK 8 DME at or above 2000' between 2301-1100 UTC. If the altitude restriction cannot be complied with, the pilot-in-command of an aircraft departing on Runway 20R shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. 4. All SIDs include noise preferential routes. 5. Cruising levels will be issued after take-off by Singapore RADAR. 6. On initial contact when requesting ATC, inform ATC of the FL can cross at ANITO.

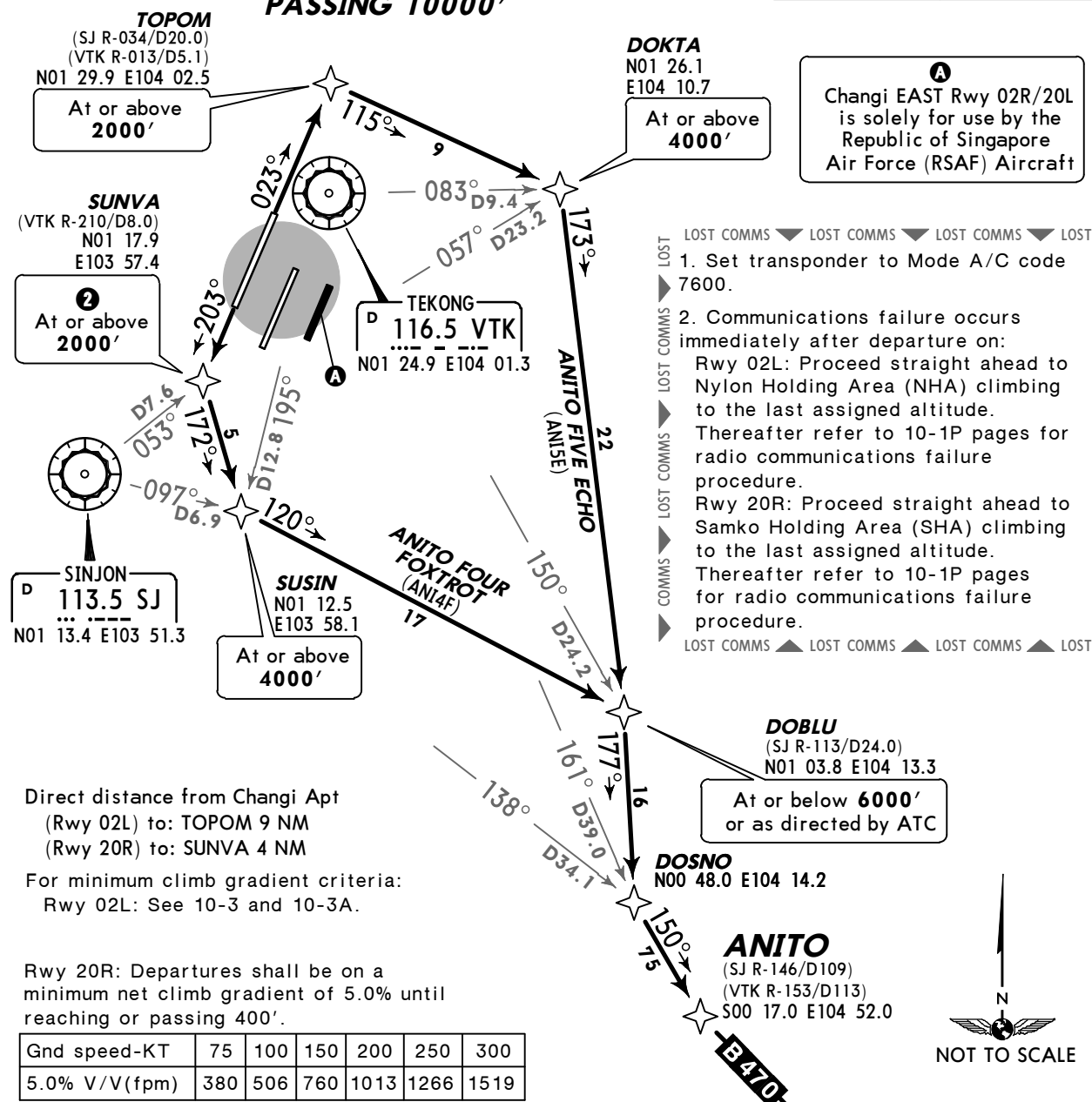
**ANITO FIVE ECHO (ANI5E),
ANITO FOUR FOXTROT (ANI4F) DEPARTURES**

(RWYS 02L, 20R)

***SPEED: MAX 220 KT UNTIL PASSING
4000' AND 250 KT UNTIL
PASSING 10000'***

MSA VTK VOR

MSA SJ VOR



Direct distance from Changi Apt
(Rwy 02L) to: TOPOM 9 NM
(Rwy 20R) to: SUNVA 4 NM

For minimum climb gradient criteria:
Rwy 02L: See 10-3 and 10-3A.

Rwy 20R: Departures shall be on a
minimum net climb gradient of 5.0% until
reaching or passing 400'.

Gnd speed-KT	75	100	150	200	250	300
5.0% V/V(fpm)	380	506	760	1013	1266	1519

Initial climb clearance **3000'** or as directed by ATC

SID

RWY

① INITIAL CLIMB

ANI5E

02L

Climb straight ahead to TOPOM, turn RIGHT and track 115° to DOKTA.
Turn RIGHT and track 173° to DOBLU. Then track 177° to DOSNO.

ANI4F

20R

Climb straight ahead to SUNVA, turn LEFT and track 172° to SUSIN.
Turn LEFT and track 120° to DOBLU. Turn RIGHT and track 177° to DOSNO.

① ROUTING

At DOSNO turn LEFT and track 150° to ANITO and join ATS route B-470.

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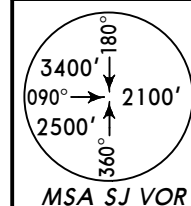
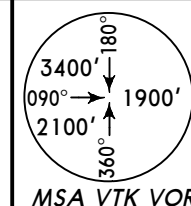
Apt Elev
22'

Trans level: FL130 Trans alt: 11000'

1. RADAR required. 2. **1** The restriction to cross SUNVA at or above 2000' is applicable between 2301-1100 UTC. All departure aircraft on Runway 20R issued with heading instructions by ATC shall also cross VTK 8 DME at or above 2000' between 2301-1100 UTC. If the altitude restriction cannot be complied with, the pilot-in-command of an aircraft departing on Runway 20R shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. 3. All SIDs include noise preferential routes. 4. Cruising levels will be issued after take-off by Singapore RADAR.

AROSO 1E (AR01E), AROSO 1F (AR01F) DEPARTURES
(RWYS 02L, 20R)

SPEED: **RWY 02L ARO 1E: MAX 220 KT UNTIL 4000'**
AND 250 KT UNTIL PASSING 10000'
RWY 20R ARO 1F: MAX 220 KT UNTIL SAKIN
AND 250 KT UNTIL PASSING 10000'

**AROSO**
N02 08.8
E103 24.4**AKMET**
N01 53.9
E103 43.7At or above
11000'

NOT TO SCALE

AKOMA
N01 45.4
E103 54.7AROSO 1E
At or above
7000'**TOPOM**
N01 29.9
E104 02.5At or above
2000'**TEKONG**
116.5 VTK
N01 24.9 E104 01.3At or above
7000'**SULUG**
N01 15.6
E104 04.4**SAKIN**
N01 12.0
E104 02.6MAX 220 KT
At or above
4000'**SUNVA**
N01 17.9
E103 57.4MAX 220 KT
1
At or above
2000'**SINJON**
113.5 SJ
N01 13.4 E103 51.3**SUSIN**
N01 12.5 E103 58.1

MAX 220 KT

LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼ LOST COMMS

1. Set transponder to Mode A/C code 7600.

2. Communications failure occurs immediately after departure on:

Rwy 02L: Proceed straight ahead to Nylon Holding Area (NHA) climbing to the last assigned altitude.

Thereafter refer to 10-1P pages for radio communications failure procedure.

Rwy 20R: Proceed straight ahead to Samko Holding Area (SHA) climbing to the last assigned altitude.

Thereafter refer to 10-1P pages for radio communications failure procedure.

LOST COMMS ▲ LOST COMMS ▲ LOST COMMS ▲ LOST COMMS

A
Changi EAST Rwy 02R/20L
is solely for use by the
Republic of Singapore
Air Force (RSAF) Aircraft

Direct distance from Changi Apt

(Rwy 02L) to: TOPOM 9 NM

(Rwy 20R) to: SUNVA 4 NM

For minimum climb gradient criteria:

Rwy 02L- See 10-3 and 10-3A.

Rwy 20R: Departures shall be on a minimum net climb gradient of 5.0% until reaching or passing 400'.

Gnd speed-KT	75	100	150	200	250	300
5.0% V/V(fpm)	380	506	760	1013	1266	1519

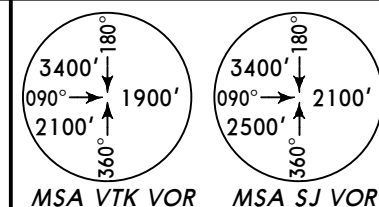
Initial climb clearance **3000'** or as directed by ATC

SID	RWY	INITIAL CLIMB
AROSO 1E	02L	To TOPOM on course 023°, then to AKOMA.
AROSO 1F	20R	To SUNVA on course 203°, then to SUSIN, SAKIN, SULUG, VTK, AKOMA.
ROUTING		
At AKOMA to AKMET, AROSO.		

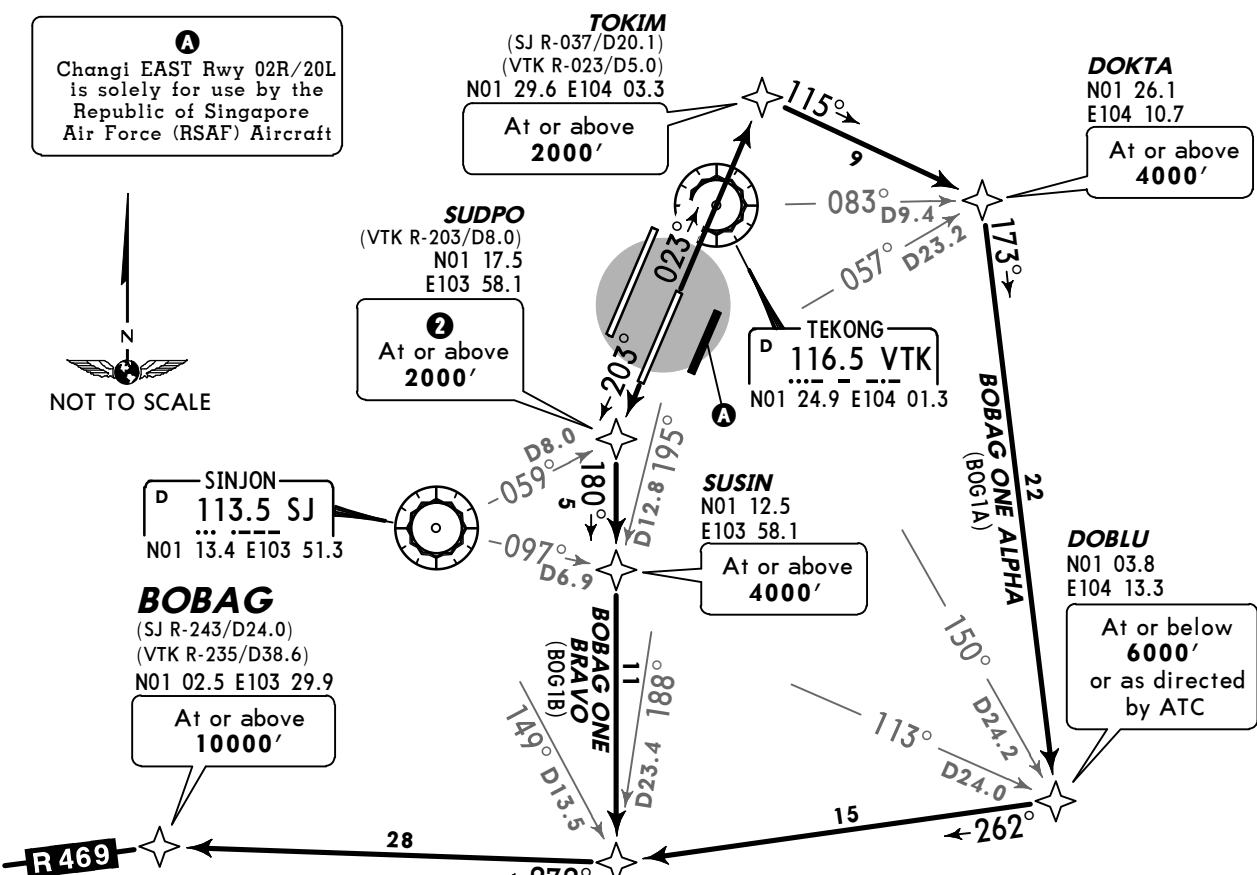
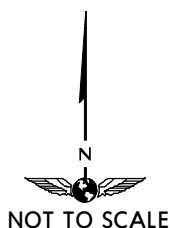
Apt Elev
22'

Trans level: FL130 Trans alt: 11000'

1. **RADAR required.** 2. Non-RNP-1/P-RNAV approved aircraft shall fly this as a basic RNAV (B-RNAV) procedure ① or EXPECT RADAR vectors from ATC.
3. ② The restriction to cross SUDPO at or above 2000' is applicable between 2301-1100 UTC. All departure aircraft on Runway 20C issued with heading instructions by ATC shall also cross VTK 8 DME at or above 2000' between 2301-1100 UTC. If the altitude restriction cannot be complied with, the pilot-in-command of an aircraft departing on Runway 20C shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. 4. All SIDs include noise preferential routes. 5. Cruising levels will be issued after take-off by Singapore RADAR.

**BOBAG ONE ALPHA (BOG1A),
BOBAG ONE BRAVO (BOG1B) DEPARTURES**
(RWYS 02C, 20C)**SPEED: MAX 220 KT UNTIL PASSING 4000' AND
250 KT UNTIL PASSING 10000'**

A
Changi EAST Rwy 02R/20L
is solely for use by the
Republic of Singapore
Air Force (RSAF) Aircraft



Direct distance from Changi Apt
(Rwy 02C) to: TOKIM 9 NM
(Rwy 20C) to: SUDPO 4 NM

For minimum climb gradient criteria:
Rwy 02C- See 10-3 and 10-3A.

Rwy 20C: Departures shall be on a
minimum net climb gradient of 5.0% until
reaching or passing 400'.

Gnd speed-KT	75	100	150	200	250	300
5.0% V/V(fpm)	380	506	760	1013	1266	1519

- LOST COMMS
1. Set transponder to Mode A/C code 7600.
 2. Communications failure occurs immediately after departure on:
Rwy 02C: Proceed straight ahead to Nylon Holding Area (NHA) climbing to the last assigned altitude. Thereafter refer to 10-1P pages for radio communications failure procedure.
Rwy 20C: Proceed straight ahead to Samko Holding Area (SHA) climbing to the last assigned altitude. Thereafter refer to 10-1P pages for radio communications failure procedure.
- LOST COMMS

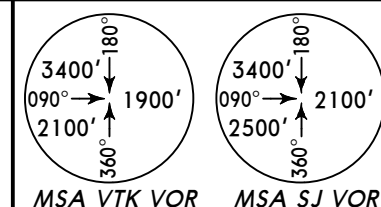
Initial climb clearance **3000'** or as directed by ATC

SID	RWY	① INITIAL CLIMB
BOG1A	02C	Climb straight ahead to TOKIM, turn RIGHT and track 115° to DOKTA, turn RIGHT and track 173° to DOBLU. Turn RIGHT and track 262° to DUNAL, then track 272° to BOBAG and join ATS route R-469.
BOG1B	20C	Climb straight ahead to SUDPO, turn LEFT and track 180° to SUSIN. Then track 180° to DUNAL, turn RIGHT and track 272° to BOBAG and join ATS route R-469.

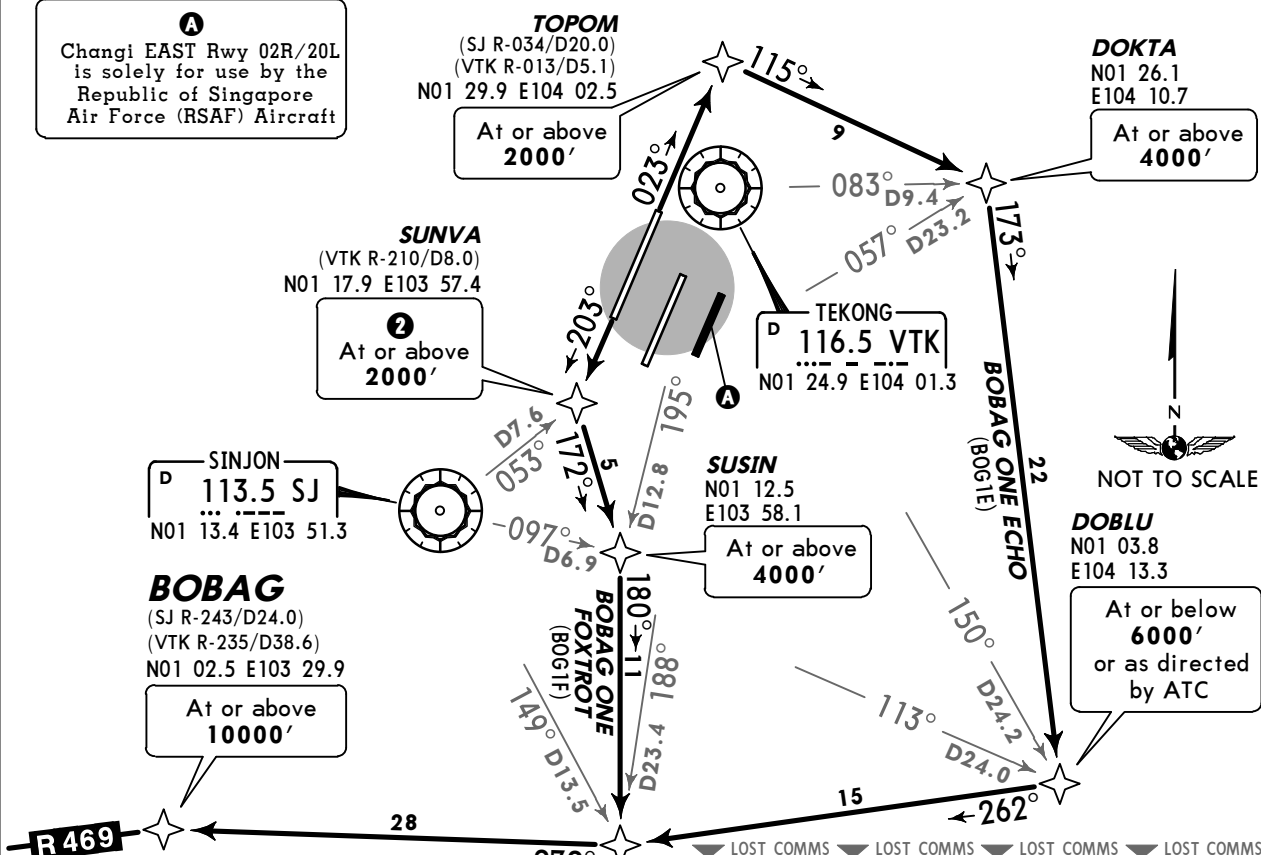
Apt Elev
22'

Trans level: FL130 Trans alt: 11000'

1. **RADAR required.** 2. Non-RNP-1/P-RNAV approved aircraft shall fly this as a basic RNAV (B-RNAV) procedure ① or EXPECT RADAR vectors from ATC. 3. ② The restriction to cross SUNVA at or above 2000' is applicable between 2301-1100 UTC. All departure aircraft on Runway 20R issued with heading instructions by ATC shall also cross VTK 8 DME at or above 2000' between 2301-1100 UTC. If the altitude restriction cannot be complied with, the pilot-in-command of an aircraft departing on Runway 20R shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. 4. All SIDs include noise preferential routes. 5. Cruising levels will be issued after take-off by Singapore RADAR.

**BOBAG ONE ECHO (BOG1E),
BOBAG ONE FOXTROT (BOG1F) DEPARTURES**
(RWYS 02L, 20R)***SPEED: MAX 220 KT UNTIL PASSING 4000' AND
250 KT UNTIL PASSING 10000'***

A
Changi EAST Rwy 02R/20L
is solely for use by the
Republic of Singapore
Air Force (RSAF) Aircraft



Direct distance from Changi Apt
(Rwy 02L) to: TOPOM 9 NM
(Rwy 20R) to: SUNVA 4 NM

For minimum climb gradient criteria:
Rwy 02L- See 10-3 and 10-3A.

Rwy 20R: Departures shall be on a
minimum net climb gradient of 5.0% until
reaching or passing 400'.

Gnd speed-KT	75	100	150	200	250	300
5.0% V/V(fpm)	380	506	760	1013	1266	1519

- LOST COMMS
1. Set transponder to Mode A/C code 7600.
 2. Communications failure occurs immediately after departure on:
 - Rwy 02L: Proceed straight ahead to Nylon Holding Area (NHA) climbing to the last assigned altitude. Thereafter refer to 10-1P pages for radio communications failure procedure.
 - Rwy 20R: Proceed straight ahead to Samko Holding Area (SHA) climbing to the last assigned altitude. Thereafter refer to 10-1P pages for radio communications failure procedure.
- LOST COMMS

Initial climb clearance **3000'** or as directed by ATC

SID	RWY	① INITIAL CLIMB
BOG1E	02L	Climb straight ahead to TOPOM, turn RIGHT and track 115° to DOKTA. Turn RIGHT and track 173° to DOBLU. Turn RIGHT and track 262° to DUNAL, then track 272° to BOBAG and join ATS route R-469.
BOG1F	20R	Climb straight ahead to SUNVA, turn LEFT and track 172° to SUSIN. Then track 180° to DUNAL, then turn RIGHT and track 272° to BOBAG and join ATS route R-469.

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Apt Elev
22'

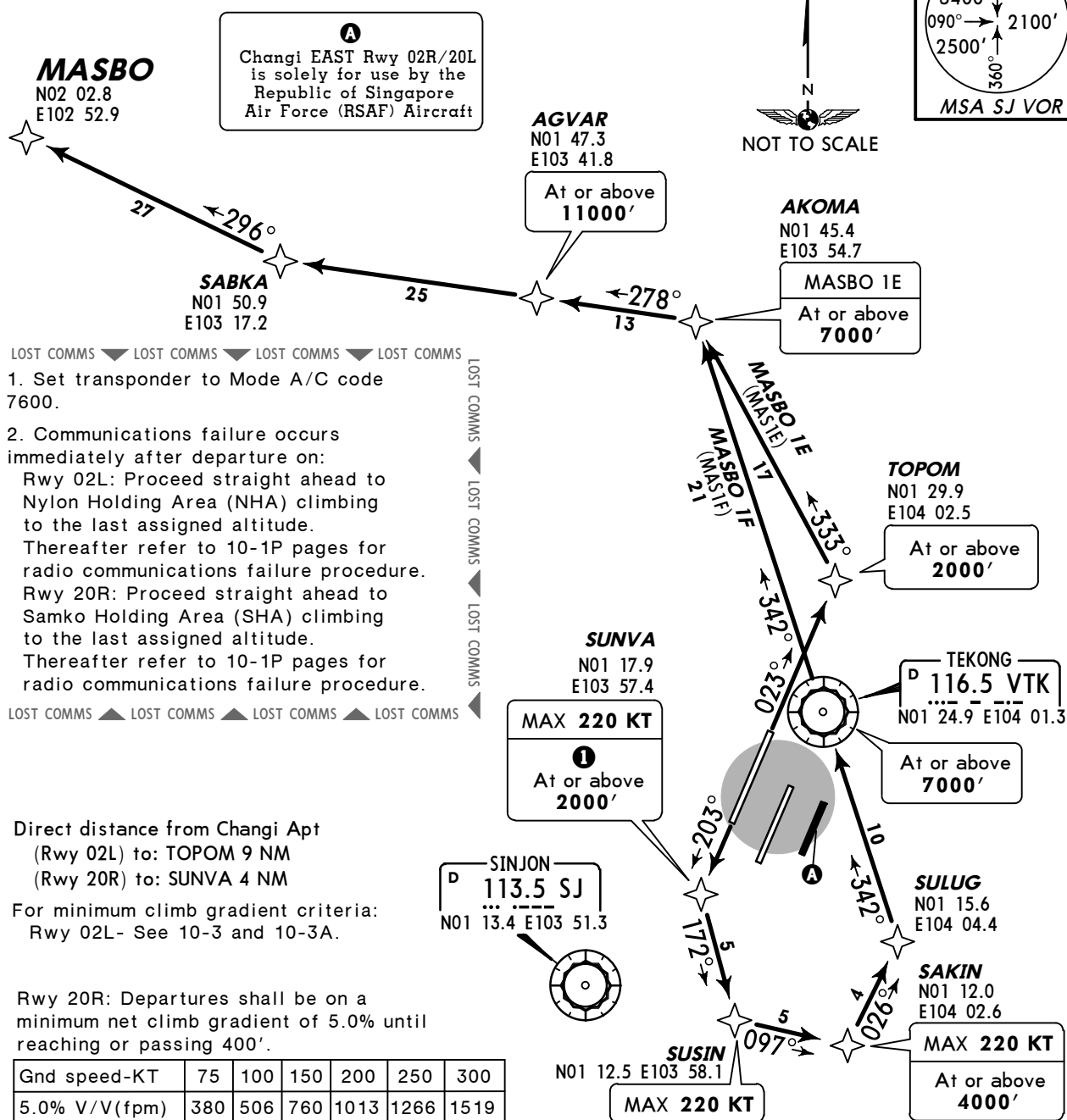
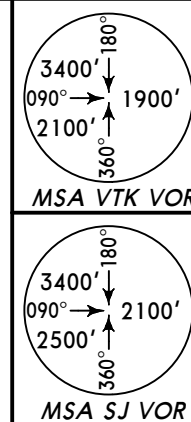
Trans level: FL130 Trans alt: 11000'

1. **RADAR required.** 2. ① The restriction to cross SUNVA at or above 2000' is applicable between 2301-1100 UTC. All departure aircraft on Runway 20R issued with heading instructions by ATC shall also cross VTK 8 DME at or above 2000' between 2301-1100 UTC. If the altitude restriction cannot be complied with, the pilot-in-command of an aircraft departing on Runway 20R shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. 3. All SIDs include noise preferential routes. 4. Cruising levels will be issued after take-off by Singapore RADAR.

MASBO 1E (MAS1E), MASBO 1F (MAS1F) DEPARTURES

(RWYS 02L, 20R)

SPEED: RWY 02L MAS 1E: MAX 220 KT UNTIL 4000'
AND 250 KT UNTIL PASSING 10000'
RWY 20R MAS 1F: MAX 220 KT UNTIL SAKIN
AND 250 KT UNTIL PASSING 10000'

Initial climb clearance **3000'** or as directed by ATC

SID	RWY	INITIAL CLIMB
MASBO 1E	02L	To TOPOM on course 023°, then to AKOMA.
MASBO 1F	20R	To SUNVA on course 203°, then to SUSIN, SAKIN, SULUG, VTK, AKOMA.

ROUTING	
At AKOMA to AGVAR, SABKA, MASBO.	

Apt Elev
22'

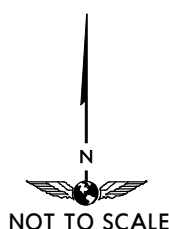
Trans level: FL130 Trans alt: 11000'

1. RADAR required. 2. **①** The restriction to cross SUDPO at or above 2000' is applicable between 2301-1100 UTC. All departure aircraft on Runway 20C issued with heading instructions by ATC shall also cross VTK 8 DME at or above 2000' between 2301-1100 UTC. If the altitude restriction cannot be complied with, the pilot-in-command of an aircraft departing on Runway 20C shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. 3. All SIDs include noise preferential routes. 4. Cruising levels will be issued after take-off by Singapore RADAR. 5. MERSING 4A will also be assigned during air defense exercises.

MERSING 4A (VMR4A), MERSING 5B (VMR5B) DEPARTURES

(RWYS 02C, 20C)

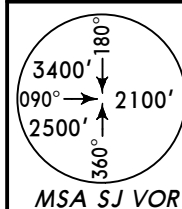
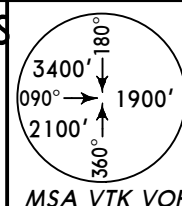
SPEED: **RWY 02C VMR 4A: MAX 220 KT UNTIL 4000'**
AND 250 KT UNTIL PASSING 10000'
RWY 20C VMR 5B: MAX 220 KT UNTIL SAKIN
AND 250 KT UNTIL PASSING 10000'



MERSING
D 116.8 VMR
N02 23.3 E103 52.3

AKOMA
N01 45.4
E103 54.7

MERSING 4A
At or above
7000'



LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼

1. Set transponder to Mode A/C code 7600.

2. Communications failure occurs immediately after departure on:

Rwy 02C: Proceed straight ahead to Nylon Holding Area (NHA) climbing to the last assigned altitude. Thereafter refer to 10-1P pages for radio communications failure procedure.
 Rwy 20C: Proceed straight ahead to Samko Holding Area (SHA) climbing to the last assigned altitude. Thereafter refer to 10-1P pages for radio communications failure procedure.

LOST COMMS ▲ LOST COMMS ▲ LOST COMMS ▲ LOST COMMS ▲

LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼

SUDPO
N01 17.5
E103 58.1

MAX 220 KT
①
At or above
2000'

TOKIM
N01 29.6
E104 03.3

At or above
2000'

TEKONG
D 116.5 VTK
N01 24.9 E104 01.3

MERSING 5B
At or above
7000'

SINJON
D 113.5 SJ
N01 13.4 E103 51.3

Direct distance from Changi Apt

(Rwy 02C) to: TOKIM 9 NM

(Rwy 20C) to: SUDPO 4 NM

For minimum climb gradient criteria:

Rwy 02C- See 10-3 and 10-3A.

Rwy 20C: Departures shall be on a minimum net climb gradient of 5.0% until reaching or passing 400'.

Gnd speed-KT	75	100	150	200	250	300
5.0% V/V(fpm)	380	506	760	1013	1266	1519

SUSIN
N01 12.5 E103 58.1

MAX 220 KT

Changi EAST Rwy 02R/20L is solely for use by the Republic of Singapore Air Force (RSAF) Aircraft

SULUG
N01 15.6
E104 04.4

SAKIN
N01 12.0
E104 02.6

MAX 220 KT
At or above
4000'

Initial climb clearance **3000'** or as directed by ATC

SID	RWY	INITIAL CLIMB
VMR4A	02C	To TOKIM on course 023°, then to AKOMA.
VMR5B	20C	To SUDPO on course 203°, then to SUSIN, SAKIN, SULUG, VTK, AKOMA.
ROUTING		
At AKOMA to VMR.		

Apt Elev
22'

Trans level: FL130 Trans alt: 11000'

1. RADAR required. 2. **1** The restriction to cross SUNVA at or above 2000' is applicable between 2301-1100 UTC. All departure aircraft on Runway 20R issued with heading instructions by ATC shall also cross VTK 8 DME at or above 2000' between 2301-1100 UTC. If the altitude restriction cannot be complied with, the pilot-in-command of an aircraft departing on Runway 20R shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. 3. All SIDs include noise preferential routes. 4. Cruising levels will be issued after take-off by Singapore RADAR. 5. MERSING 4E will also be assigned during air defense exercises.

MERSING 4E (VMR4E), MERSING 5F (VMR5F) DEPARTURES

(RWYS 02L, 20R)

SPEED: **RWY 02L VMR 4E: MAX 220 KT UNTIL 4000'**
AND 250 KT UNTIL PASSING 10000'
RWY 20R VMR 5F: MAX 220 KT UNTIL SAKIN
AND 250 KT UNTIL PASSING 10000'



LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼ LOST COMMS ▼

1. Set transponder to Mode A/C code 7600.

2. Communications failure occurs immediately after departure on:

Rwy 02L: Proceed straight ahead to Nylon Holding Area (NHA) climbing to the last assigned altitude.
Thereafter refer to 10-1P pages for radio communications failure procedure.
Rwy 20R: Proceed straight ahead to Samko Holding Area (SHA) climbing to the last assigned altitude.
Thereafter refer to 10-1P pages for radio communications failure procedure.

LOST COMMS ▲ LOST COMMS ▲ LOST COMMS ▲ LOST COMMS ▲

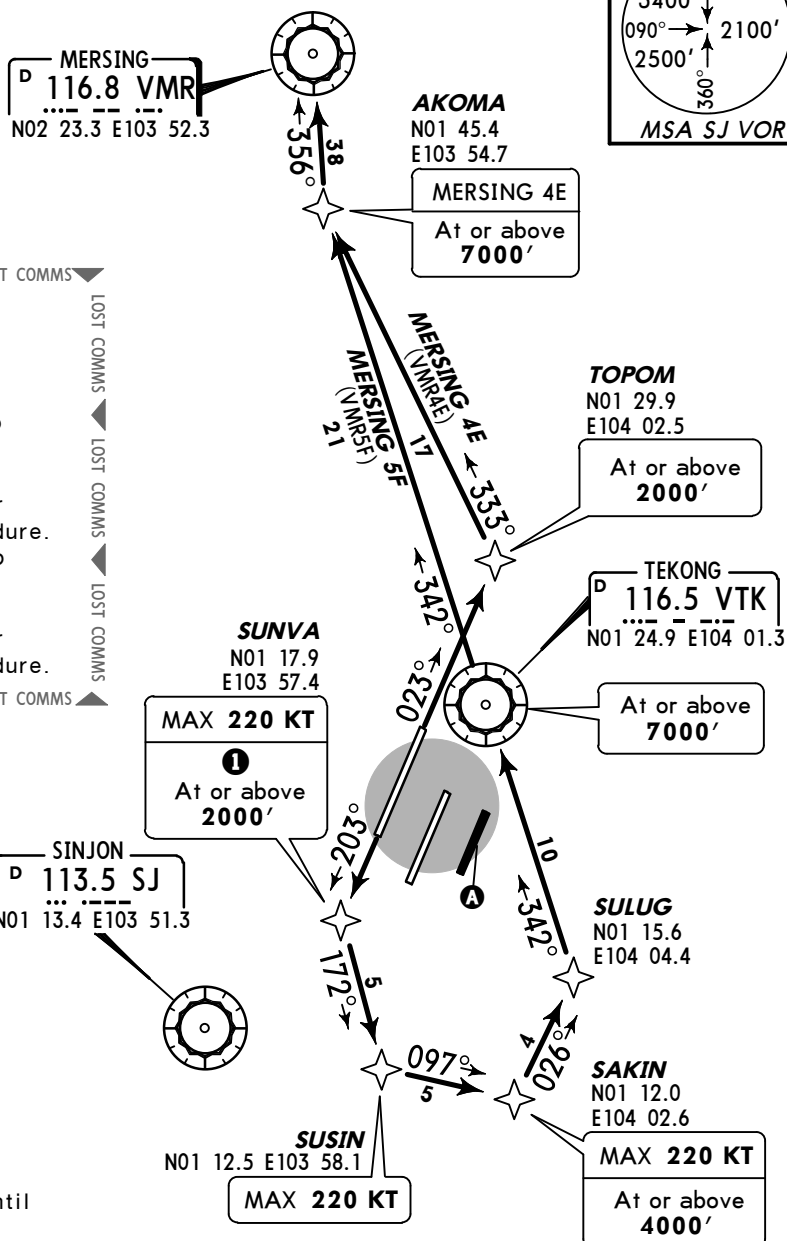
A
Changi EAST Rwy 02R/20L is solely for use by the Republic of Singapore Air Force (RSAF) Aircraft

Direct distance from Changi Apt
(Rwy 02L) to: TOPOM 9 NM
(Rwy 20R) to: SUNVA 4 NM

For minimum climb gradient criteria:
Rwy 02L- See 10-3 and 10-3A.

Rwy 20R: Departures shall be on a minimum net climb gradient of 5.0% until reaching or passing 400'.

Gnd speed-KT	75	100	150	200	250	300
5.0% V/V(fpm)	380	506	760	1013	1266	1519

Initial climb clearance **3000'** or as directed by ATC

SID	RWY	INITIAL CLIMB
VMR4E	02L	To TOPOM on course 023°, then to AKOMA.
VMR5F	20R	To SUNVA on course 203°, then to SUSIN, SAKIN, SULUG, VTK, AKOMA.
ROUTING		
At AKOMA to VMR.		

Apt Elev
22'

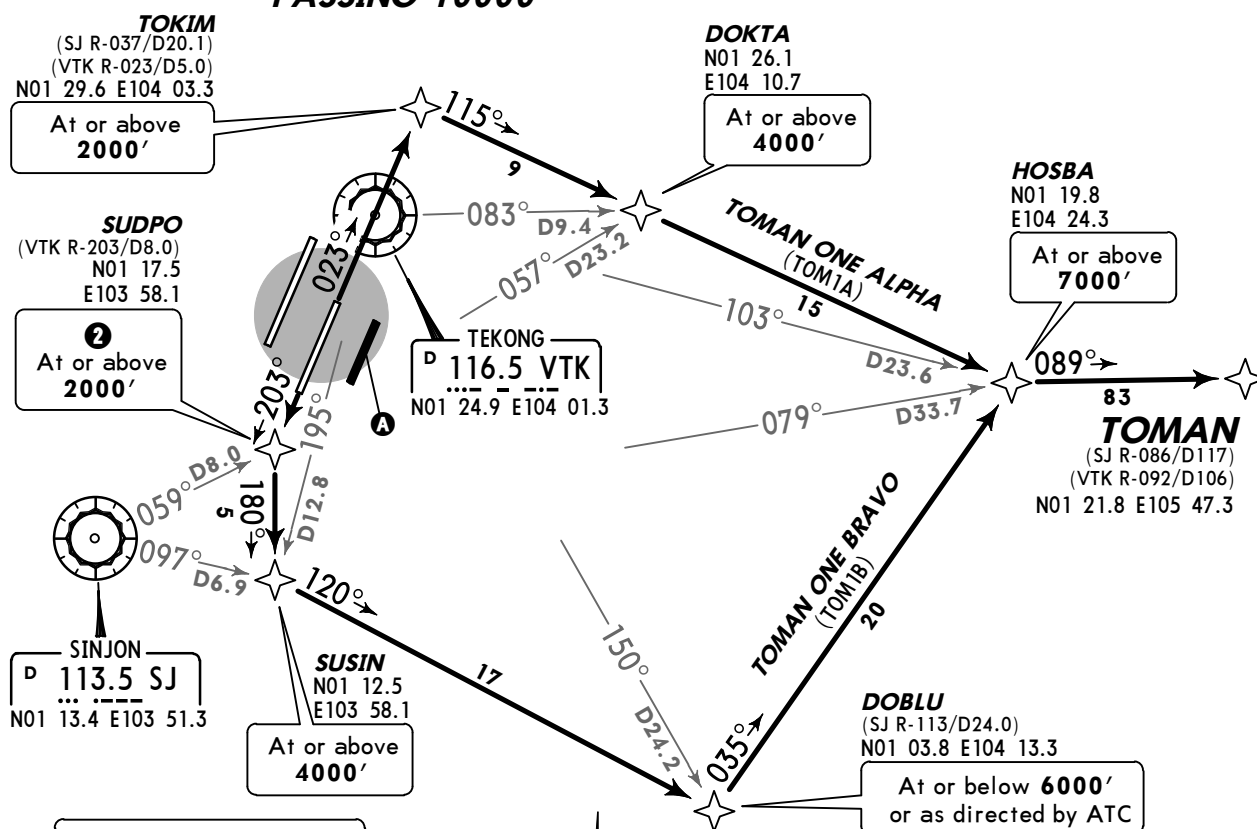
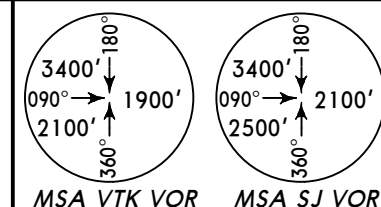
Trans level: FL130 Trans alt: 11000'

1. **RADAR required.** 2. Non-RNP-1/P-RNAV approved aircraft shall fly this as a basic RNAV (B-RNAV) procedure ① or EXPECT RADAR vectors from ATC.
 3. ② The restriction to cross SUDPO at or above 2000' is applicable between 2301-1100 UTC. All departure aircraft on Runway 20C issued with heading instructions by ATC shall also cross VTK 8 DME at or above 2000' between 2301-1100 UTC. If the altitude restriction cannot be complied with, the pilot-in-command of an aircraft departing on Runway 20C shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. 4. All SIDs include noise preferential routes. 5. Cruising levels will be issued after take-off by Singapore RADAR.

TOMAN ONE ALPHA (TOM1A), TOMAN ONE BRAVO (TOM1B) DEPARTURES

(RWYS 02C, 20C)

**SPEED: MAX 220 KT UNTIL PASSING
4000' AND 250 KT UNTIL
PASSING 10000'**



Changi EAST Rwy 02R/20L
is solely for use by the
Republic of Singapore
Air Force (RSAF) Aircraft

Direct distance from Changi Apt

(Rwy 02C) to: TOKIM 9 NM

(Rwy 20C) to: SUDPO 4 NM

For minimum climb gradient criteria:

Rwy 02C- See 10-3 and 10-3A.

Rwy 20C: Departures shall be on a
minimum net climb gradient of 5.0% until
reaching or passing 400'.

Gnd speed-KT	75	100	150	200	250	300
5.0% V/V(fpm)	380	506	760	1013	1266	1519



- LOST COMMS LOST COMMS LOST COMMS LOST
1. Set transponder to Mode A/C code 7600.
 2. Communications failure occurs immediately after departure on:
 Rwy 02C: Proceed straight ahead to Nylon Holding Area (NHA) climbing to the last assigned altitude. Thereafter refer to 10-1P pages for radio communications failure procedure.
 Rwy 20C: Proceed straight ahead to Samko Holding Area (SHA) climbing to the last assigned altitude. Thereafter refer to 10-1P pages for radio communications failure procedure.
- LOST COMMS LOST COMMS LOST COMMS LOST

Initial climb clearance **3000'** or as directed by ATC

SID	RWY	① INITIAL CLIMB
TOM1A	02C	Climb straight ahead to TOKIM, turn RIGHT and track 115° to DOKTA, then track 115° to HOSBA. Turn LEFT and track 089° to TOMAN.
TOM1B	20C	Climb straight ahead to SUDPO, turn LEFT and track 180° to SUSIN. Turn LEFT and track 120° to DOBLU. Turn LEFT and track 035° to HOSBA, then turn RIGHT and track 089° to TOMAN.

Apt Elev
22'

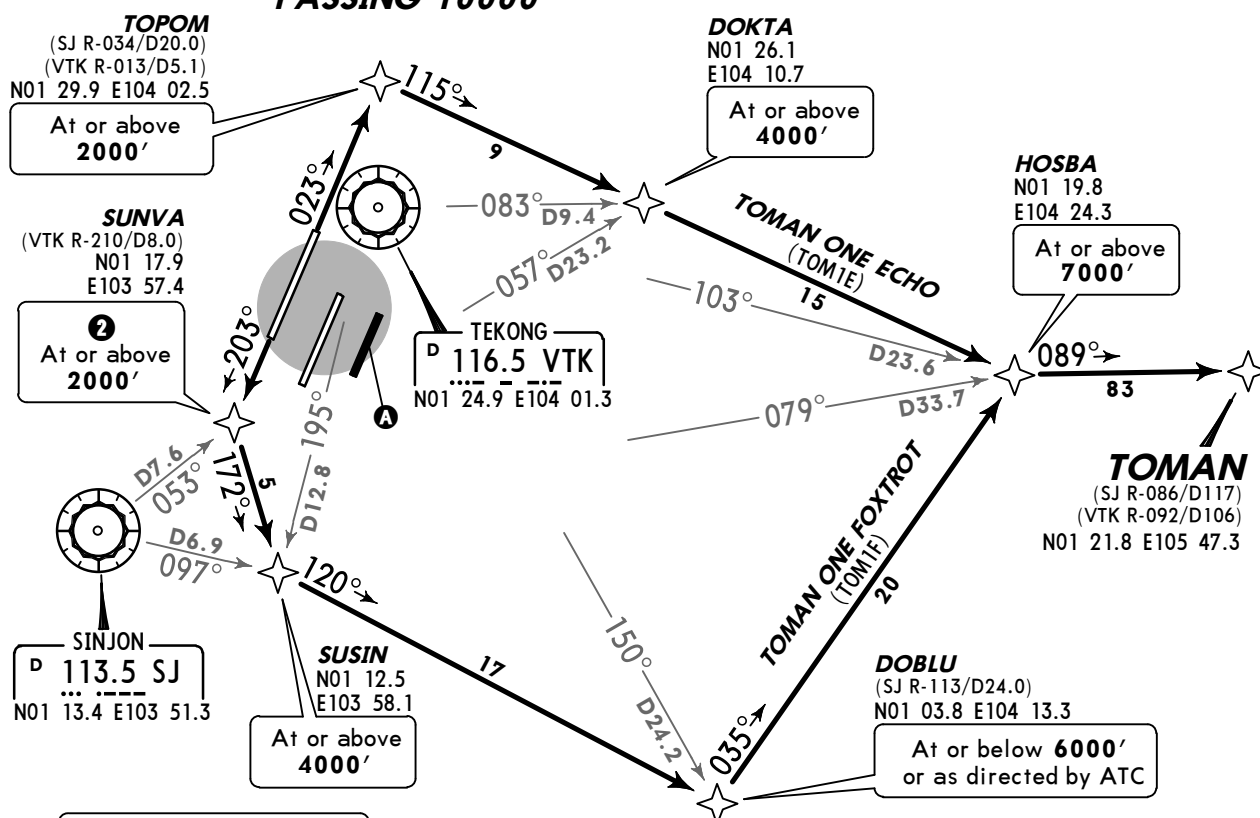
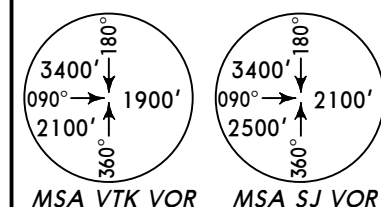
Trans level: FL130 Trans alt: 11000'

1. RADAR required. 2. Non-RNP-1/P-RNAV approved aircraft shall fly this as a basic RNAV (B-RNAV) procedure **①** or EXPECT RADAR vectors from ATC. 3. **②** The restriction to cross SUNVA at or above 2000' is applicable between 2301-1100 UTC. All departure aircraft on Runway 20R issued with heading instructions by ATC shall also cross VTK 8 DME at or above 2000' between 2301-1100 UTC. If the altitude restriction cannot be complied with, the pilot-in-command of an aircraft departing on Runway 20R shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. 4. All SIDs include noise preferential routes. 5. Cruising levels will be issued after take-off by Singapore RADAR.

TOMAN ONE ECHO (TOM1E), TOMAN ONE FOXTROT (TOM1F) DEPARTURES

(RWYS 02L, 20R)

**SPEED: MAX 220 KT UNTIL PASSING
4000' AND 250 KT UNTIL
PASSING 10000'**



A
Changi EAST Rwy 02R/20L
is solely for use by the
Republic of Singapore
Air Force (RSAF) Aircraft

Direct distance from Changi Apt
(Rwy 02L) to: TOPOM 9 NM
(Rwy 20R) to: SUNVA 4 NM

For minimum climb gradient criteria:
Rwy 02L- See 10-3 and 10-3A.

Rwy 20R: Departures shall be on a
minimum net climb gradient of 5.0% until
reaching or passing 400'.

Gnd speed-KT	75	100	150	200	250	300
5.0% V/V(fpm)	380	506	760	1013	1266	1519



- COMMS ▼ LOST COMMS ▼ LOST COMMS ▼ LOST COMMS
1. Set transponder to Mode A/C code 7600.
 2. Communications failure occurs immediately after departure on:
Rwy 02L: Proceed straight ahead to Nylon Holding Area (NHA) climbing to the last assigned altitude. Thereafter refer to 10-1P pages for radio communications failure procedure.
Rwy 20R: Proceed straight ahead to Samko Holding Area (SHA) climbing to the last assigned altitude. Thereafter refer to 10-1P pages for radio communications failure procedure.
- ▲ LOST COMMS ▲ LOST COMMS ▲ LOST COMMS ▲ LOST

Initial climb clearance **3000'** or as directed by ATC

SID	RWY	① INITIAL CLIMB
TOM1E	02L	Climb straight ahead to TOPOM, turn RIGHT and track 115° to DOKTA, then track 115° to HOSBA. Turn LEFT and track 089° to TOMAN.
TOM1F	20R	Climb straight ahead to SUNVA, turn LEFT and track 172° to SUSIN. Turn LEFT and track 120° to DOBLU. Turn LEFT and track 035° to HOSBA, then turn RIGHT and track 089° to TOMAN.

Apt Elev
22'

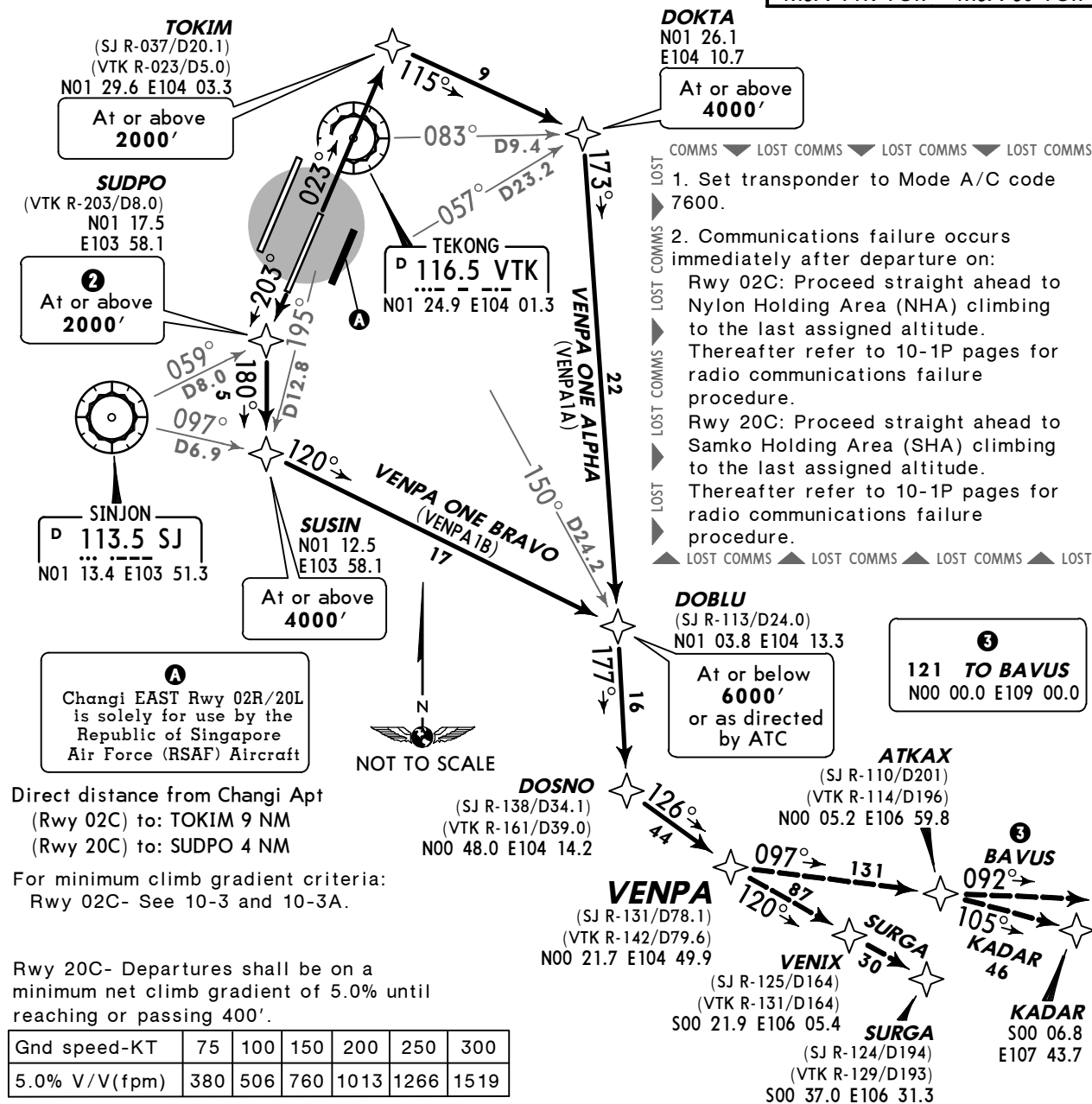
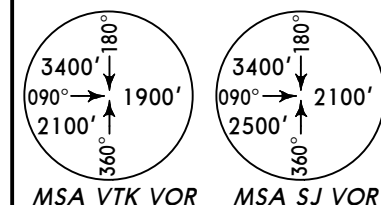
Trans level: FL130 Trans alt: 11000'

1. **RADAR required.** 2. Non-RNP-1/P-RNAV approved aircraft shall fly this as a basic RNAV (B-RNAV) procedure ① or EXPECT RADAR vectors from ATC. 3. ② The restriction to cross SUDPO at or above 2000' is applicable between 2301-1100 UTC. All departure aircraft on Runway 20C issued with heading instructions by ATC shall also cross VTK 8 DME at or above 2000' between 2301-1100 UTC. If the altitude restriction cannot be complied with, the pilot-in-command of an aircraft departing on Runway 20C shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. 4. All SIDs include noise preferential routes. 5. Cruising levels will be issued after take-off by Singapore RADAR.

VENPA ONE ALPHA (VENPA1A), VENPA ONE BRAVO (VENPA1B) DEPARTURES

(RWYS 02C, 20C)

**SPEED: MAX 220 KT UNTIL PASSING 4000' AND
250 KT UNTIL PASSING 10000'**

Initial climb clearance **3000'** or as directed by ATC

SID

RWY

① INITIAL CLIMB

VENPA1A
[VENP1A]

02C

Climb straight ahead to TOKIM, turn RIGHT and track 115° to DOKTA. Turn RIGHT and track 173° to DOBLU, then track 177° to DOSNO.

VENPA1B
[VENP1B]

20C

Climb straight ahead to SUDPO, turn LEFT and track 180° to SUSIN. Turn LEFT and track 120° to DOBLU, then turn RIGHT and track 177° to DOSNO.

① ROUTING

At DOSNO turn LEFT and track 126° to VENPA and follow the appropriate transition route to join the ATS route.

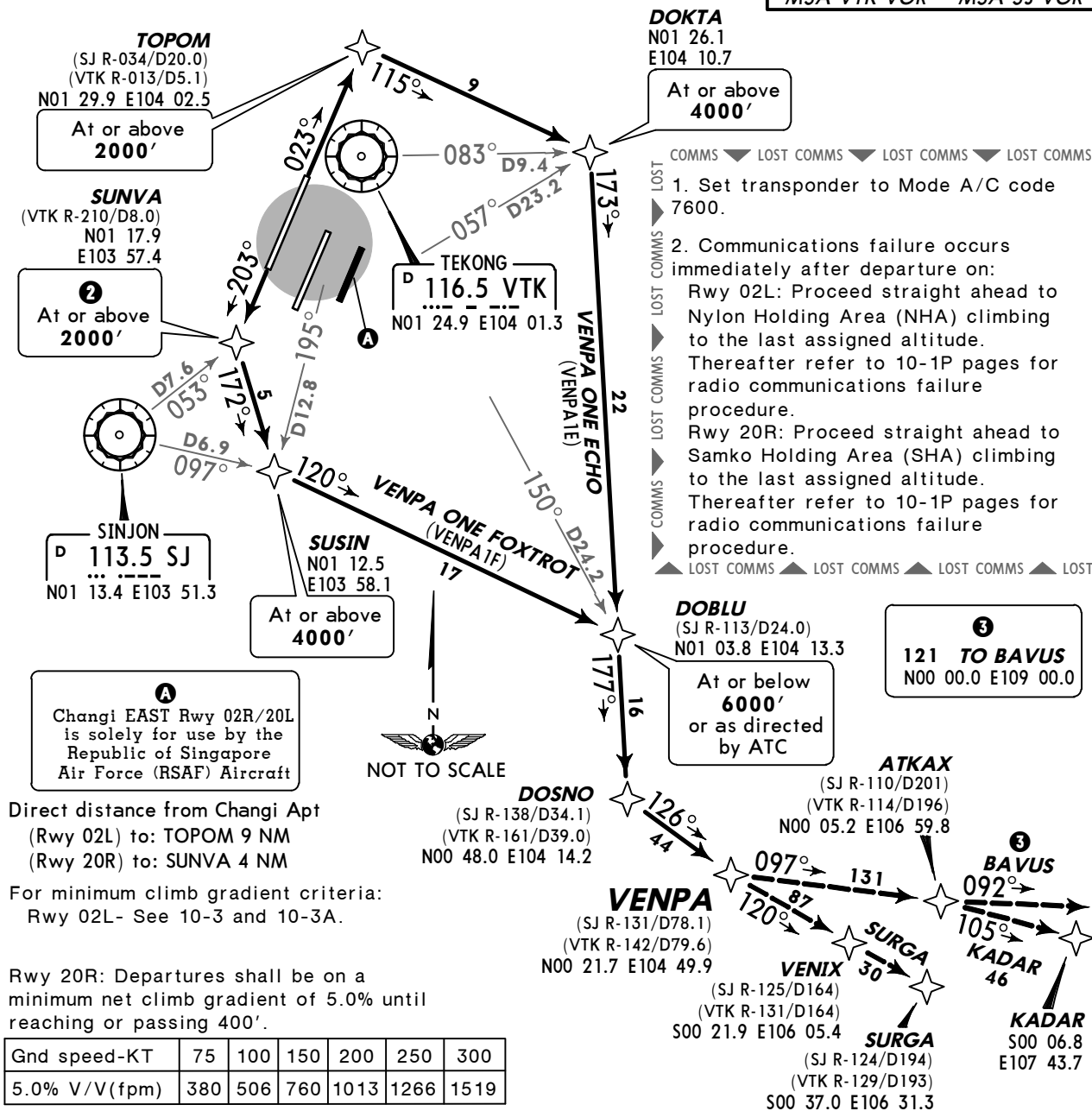
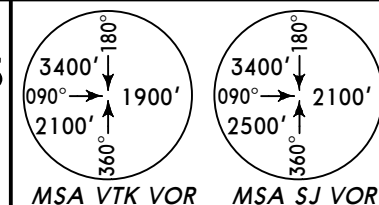
Apt Elev
22'

Trans level: FL130 Trans alt: 11000'

1. **RADAR required.** 2. Non-RNP-1/P-RNAV approved aircraft shall fly this as a basic RNAV (B-RNAV) procedure ① or EXPECT RADAR vectors from ATC. 3. ② The restriction to cross SUNVA at or above 2000' is applicable between 2301-1100 UTC. All departure aircraft on Runway 20R issued with heading instructions by ATC shall also cross VTK 8 DME at or above 2000' between 2301-1100 UTC. If the altitude restriction cannot be complied with, the pilot-in-command of an aircraft departing on Runway 20R shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. 4. All SIDs include noise preferential routes. 5. Cruising levels will be issued after take-off by Singapore RADAR.

**VENPA ONE ECHO (VENPA1E),
VENPA ONE FOXTROT (VENPA1F) DEPARTURES**

(RWYS 02L, 20R)

**SPEED: MAX 220 KT UNTIL PASSING 4000' AND
250 KT UNTIL PASSING 10000'**

Direct distance from Changi Apt
(Rwy 02L) to: TOPOM 9 NM
(Rwy 20R) to: SUNVA 4 NM

For minimum climb gradient criteria:
Rwy 02L- See 10-3 and 10-3A.

Rwy 20R: Departures shall be on a
minimum net climb gradient of 5.0% until
reaching or passing 400'.

Gnd speed-KT	75	100	150	200	250	300
5.0% V/V(fpm)	380	506	760	1013	1266	1519

Initial climb clearance **3000'** or as directed by ATC

SID	RWY	① INITIAL CLIMB
VENPA1E [VENPIE]	02L	Climb straight ahead to TOPOM, turn RIGHT and track 115° to DOKTA. Turn RIGHT and track 173° to DOBLU, then track 177° to DOSNO.
VENPA1F [VENPIF]	20R	Climb straight ahead to SUNVA, turn LEFT and track 172° to SUSIN. Turn LEFT and track 120° to DOBLU, then turn RIGHT and track 177° to DOSNO.

① ROUTING

From DOSNO turn LEFT and track 126° to VENPA and follow the appropriate transition route to join the ATS route.

D-ATIS	ACARS: D-ATIS	SINGAPORE Delivery (Cpt)	West of Terminal 2	Ground *East of Terminal 2	Tower
128.6		121.65	124.3	121.72 0001Z-1600Z	118.6 ② 118.25

Pushback clearance expires in 5 min, see 10-9D and 10-9E.

2 For ACFT operating on Rwy 02C/20C - (0000 to 1600).

**FOR PARKING POSITIONS
SEE 10-9B & 10-9C1**

Bldg Area

Twy WC centerline behind aircraft stands 506, 507 and 508 diverted 105' (32m) westward. Pilots to follow the twy centerline while taxiing along Twy WC.

Twy NC3 (between Twy WA and Twy A6) is a twy with reduced minimum separation distances between the twy centerline and object. Due to the reduced minimum separation distances, pilots are advised to adhere strictly to the twy centerline and to slow down the taxi speed accordingly. Twy NC3 (between Twy WA and Twy A6) can only be used by aircraft with a maximum wingspan of 213' (65m).

Pilots are advised to apply minimum thrust when turning into Twy WA from Taxilane V

Taxilane U4 (behind aircraft stands A18 to A21) can only be used by aircraft with maximum wingspan of 200' (61m).

Twy N1 (behind aircraft stands C16 to C19 and between Twy NC2 and Twy NC3), Twy N2 and Twy N3 (behind aircraft stands D35 to D38 and between Twy NC2 and Twy NC3) can only be used by aircraft with maximum wingspan of 213' (65m).

Pilots are advised to apply speed limit of 20 Kts when taxiing along twy South Cross 1 and South Cross 2.

Taxilane A6 (behind aircraft stands E20 to E24) and taxilane C6 (behind aircraft stands F50 to F54) can only be used by aircraft with maximum wingspan 213' 65m (towing and pushback exempted).

Pilots operating aircraft with wheel base longer than B747 or 85' (26m) shall take note that judgemental oversteering may be required when maneuvering around taxiway turns.

Frangible poles are installed for the purpose of identifying 295' (90m) away from the centerline

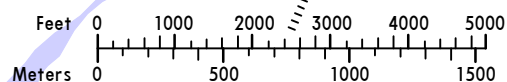
Pilots are advised to exercise caution when taxiing near Twys L5, L8, L9 and L10.

**For AIRPORT BRIEFING
refer to 10-1P pages.**

Twys L5 can only be used by aircraft with maximum wingspan of 118' (36m). Twys L8, L9, and L10 can only be used by aircraft with maximum wingspan 213' (65m).

Twy A2 is a one-way taxiway for aircraft taxiing from Twy EP to Twy A7 only. No-entry signs have been mounted on either side of Twy A2 along Twy A7. Taxiway centerline lights along Twy A2 have been shielded to provide guidance only from Twy EP in the direction of Twy A7.

Pilots are advised to apply minimum thrust when turning into Twy A1, A3, A4 and taxilane A5 while taxiing either Northwards or Southwards on taxilane A6, and thereafter when taxiing along Twy A1 up to and including the Twy A7/A1 junction. This is in view of apron activities at aircraft stands D40, D41, D47, D48, D49, E22, E24, E27 and E28.



GENERAL

Due to close proximity of Paya Lebar and Seletar airports, correct approach is vital.

Maritime vessels of variable heights off Changi Apt.

Birds in vicinity of airport.

Low-level wind shear alert system.

Departures on Runway 20R are not permitted between 1600/2200 UTC. However, this restriction is not applicable when Runway 20C/02C is unavailable because of maintenance work or for other reasons.

Unless it is necessary for operational or safety reasons, when using engine reverse, arrivals on Runway 02L/20R between 1600/2200 UTC may not exceed idle reverse thrust.

To maximize runway utilization and minimize runway occupancy time, departing aircraft, when instructed to enter the runway, shall commence the maneuver without delay. Pilots are required to commence take-off roll as soon as take-off clearance is issued by ATC. Arriving aircraft upon landing shall vacate the runway as quickly as practicable to enable ATC to apply minimum spacing on final approach and minimize the occurrence of go-arounds.

ADDITIONAL RUNWAY INFORMATION

ADDITIONAL RUNWAY INFORMATION							USABLE LENGTHS		TAKE-OFF	WIDTH
RWY							LANDING BEYOND			
							Threshold	Glide Slope		
02L	HIRL CL ALSF-II TDZ REIL	①	PAPI	RVR			11,998'	3657m		197'
20R	HIRL CL HIALS REIL	①	PAPI	RVR	10,696'	3260m	9613'	2930m		60m

① Angle 3.0°.

02C	HIRL CL ALSF-I REIL	②	PAPI	RVR			12,014' 3662m			197'
20C	HIRL CL ALSF-II TDZ REIL	②	PAPI-L	RVR			12,014' 3662m			60m

② Angle 3.0°.

DECLARED DISTANCES

Rwy Designator	Intersection Departures	TORA
20R	Not applicable W2 W3 W4 W5	13,123' 4000m 12,631' 3850m 10,007' 3050m 8,530' 2600m 7,054' 2150m
02L	Not applicable W8 W7 W6	13,123' 4000m 12,631' 3850m 10,007' 3050m 8,530' 2600m
20C	Not applicable E2 E3 E4 E5	13,123' 4000m 12,631' 3850m 11,237' 3425m 9,022' 2750m 7,382' 2250m
02C	Not applicable E10 E9 E8 E7 E6	13,123' 4000m 12,631' 3850m 10,974' 3345m 10,515' 3205m 8,383' 2555m 6,906' 2105m
02R	Not applicable	9,022' 2750m
20L	Not applicable	9,022' 2750m

Intersection departures are allowed subject to the following:

- (a) Initiated by pilot and approved by ATC, traffic permitting.
- (b) ATC is able to keep aircraft visual at all times.

TAKE-OFF

	AIR CARRIER (JAA)			AIR CARRIER (FAR 121)	
	LVP must be in Force			All Rwys	
	All Rwys RL & CL	All Rwys RCLM (DAY only) or RL	All Rwys RCLM (DAY only) or RL	CL & RCLM any RVR out, other two required	Adequate Vis Ref
A				2 Eng	TDZ RVR 175m
B	200m (150m)	250m	400m	3 & 4 Eng	MID RVR 175m
C					Rollout RVR 175m
D	250m (200m)	300m			RVR 500m VIS 400m

RUNWAY CAPACITY ENHANCEMENT**1. DEPARTING AIRCRAFT**

- 1.1 Pilots should arrange their taxi such that they are ready to depart without delay on reaching the runway holding point. As standard ICAO wake turbulence separation is being applied, pilots are to advise ATC early if more time is needed for the aircraft to be ready for departure. When informed, ATC will be able to make changes in the departure sequence, if necessary, to minimize delays to other succeeding departures.
- 1.2 Pilots should complete cockpit checks prior to line-up for departure and keep any checks on the runway to a minimum.
- 1.3 Conditional line-up clearance may be used by ATC to facilitate an expeditious flow of traffic. On receipt of line-up clearance, pilots should taxi into position promptly without delay.
- 1.4 Unless given instructions to line-up and wait, pilots should be ready and prepared to depart without stopping.
- 1.5 On receipt of take-off clearance, pilots to commence take-off roll without delay.

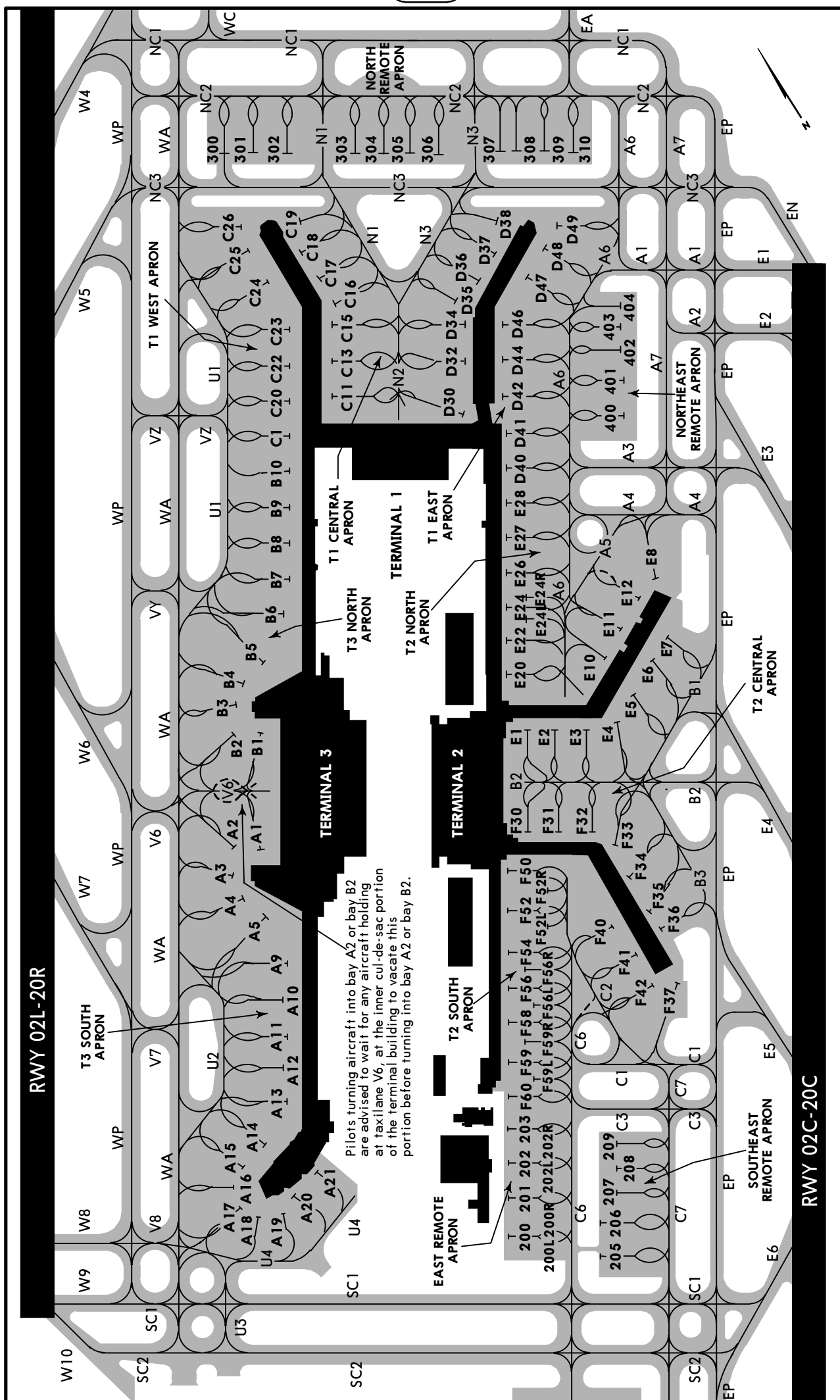
2. ARRIVING AIRCRAFT

- 2.1 To achieve minimum ROT and reduce missed approaches due to occupied runway, pilots should vacate the runway via the first available exit taxiway corresponding to operational requirements, or as instructed by ATC.
- 2.2 If an exit taxiway other than the first available exit taxiway is required, pilots shall advise the Tower Controller on first contact.
- 2.3 To enhance planning, pilots can make reference to the Landing Exit Distance (LED), the distance from threshold to the furthest edge of the exit taxiway, as shown in the table below.
- 2.3 Pilots can expect initial taxi instructions from the Runway Controller before clearing the exit taxiway.

Runway	Exit Taxiway	Landing Exit Distance
20R	❶❷ W6	5,430' 1655m
	❶❷ W7	6,965' 2123m
	W8	10,043' 3061m
20C	❶❷ E6	6,391' 1948m
	❶❷ E7	7,844' 2391m
	E8	10,341' 3152m
02L	❶❷ W5	6,450' 1966m
	❶❷ W4	8,173' 2491m
	❷ W3	9,436' 2876m
02C	❶❷ E5	6,742' 2055m
	❶❷ E4	8,415' 2565m
	❷ E3	10,719' 3267m
20L	Not applicable	Not applicable
02R	Not applicable	Not applicable

❶ Recommended exit taxiways.

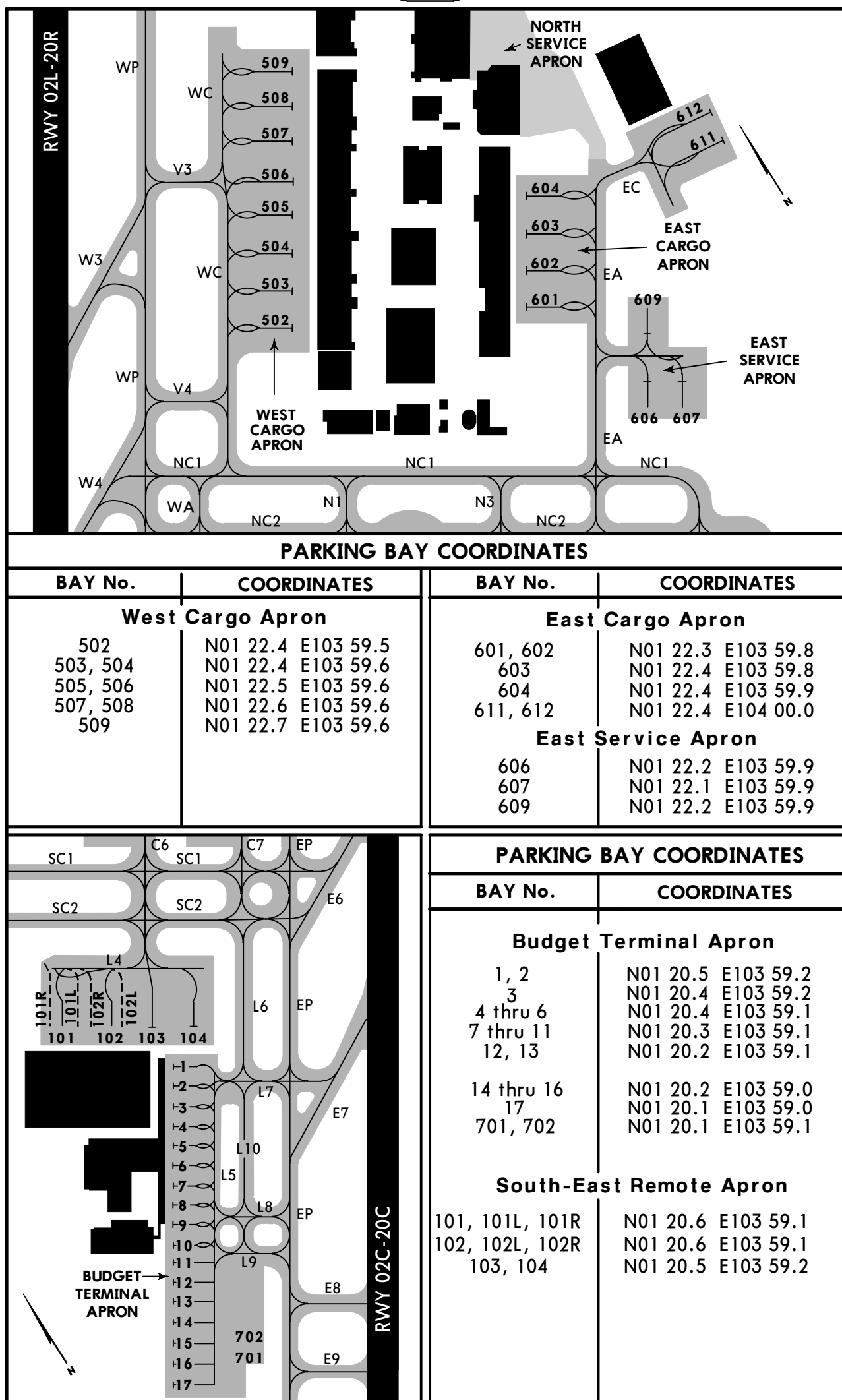
❷ Rapid Exit Taxiway and maximum design ground speed for the exit taxiway is 50 kts.



PARKING BAY COORDINATES

BAY No.	COORDINATES	BAY No.	COORDINATES
T3 South Apron		T2 Central Apron	
A1, A2	N01 21.4 E103 59.1	E1	N01 21.3 E103 59.4
A3, A4	N01 21.3 E103 59.0	E2 thru E4	N01 21.3 E103 59.5
A5	N01 21.3 E103 59.1	E5	N01 21.3 E103 59.6
A9	N01 21.2 E103 59.1	E6, E7	N01 21.4 E103 59.6
A10	N01 21.2 E103 59.0	F30, F31	N01 21.2 E103 59.4
A11 thru A13	N01 21.1 E103 59.0	F32, F33	N01 21.2 E103 59.5
A14	N01 21.0 E103 59.0	F34 thru F36	N01 21.1 E103 59.5
A15 thru A17	N01 21.0 E103 58.9	T2 North Apron	
A18	N01 20.9 E103 58.9	E8	N01 21.5 E103 59.6
A19, A20	N01 20.9 E103 59.0	E10	N01 21.4 E103 59.5
A21	N01 21.0 E103 59.0	E11	N01 21.4 E103 59.6
T3 North Apron		E12	N01 21.5 E103 59.6
B1	N01 21.4 E103 59.1	E20, E22	N01 21.4 E103 59.5
B2 thru B4	N01 21.5 E103 59.1	E24 thru E26	N01 21.5 E103 59.5
B5 thru B7	N01 21.6 E103 59.2	E27, E28	N01 21.6 E103 59.5
B8 thru B10	N01 21.7 E103 59.3	T2 South Apron	
T1 West Apron		F37	N01 21.0 E103 59.4
C1, C20	N01 21.8 E103 59.3	F40, F41	N01 21.1 E103 59.4
C22	N01 21.9 E103 59.3	F42	N01 21.0 E103 59.4
C23	N01 21.9 E103 59.4	F50	N01 21.2 E103 59.4
C24	N01 21.9 E103 59.5	F52L, F52R	N01 21.0 E103 59.3
C25	N01 22.0 E103 59.4	F52, F56R, F56L	N01 21.1 E103 59.3
C26	N01 22.0 E103 59.5	F54, F56	N01 21.1 E103 59.3
T1 Central Apron		F58, F59, F59R	N01 21.0 E103 59.3
C11, C13	N01 21.8 E103 59.4	F59L, F60	N01 21.0 E103 59.3
C15	N01 21.9 E103 59.4	East Remote Apron	
C16, C17	N01 21.9 E103 59.5	200, 200L, 200R	N01 20.8 E103 59.2
C18	N01 22.0 E103 59.5	201	N01 20.8 E103 59.2
C19	N01 22.1 E103 59.5	202, 202L, 202R	N01 20.9 E103 59.2
D30	N01 21.7 E103 59.5	203	N01 20.9 E103 59.2
D32, D34	N01 21.8 E103 59.5	South-East Remote Apron	
D35 thru D38	N01 21.9 E103 59.7	1103, 104	N01 20.5 E103 59.2
T1 East Apron		205	N01 20.7 E103 59.3
D40	N01 21.6 E103 59.5	206 thru 208	N01 20.8 E103 59.3
D41, D42, D44	N01 21.7 E103 59.6	209	N01 20.9 E103 59.3
D46	N01 21.8 E103 59.6	North-East Remote Apron	
D47, D48	N01 21.8 E103 59.8	400	N01 21.6 E103 59.7
D49	N01 21.9 E103 59.8	401 thru 403	N01 21.7 E103 59.7
		404	N01 21.8 E103 59.7
		North Remote Apron	
		300, 301	N01 22.1 E103 59.5
		302, 303	N01 22.1 E103 59.6
		304	N01 22.1 E103 59.7
		305, 306	N01 22.0 E103 59.7
		307 thru 309	N01 22.0 E103 59.8
		310	N01 22.0 E103 59.9

1 For Parking Positions see 10-9C1.



TAXIING GUIDANCE SYSTEM AT SINGAPORE CHANGI AIRPORT

The taxiing guidance system at Singapore Changi Airport consists of stop bars and selectable segments of green taxiway centerline lights. The system is designed to provide pilots with visual guidance while taxiing during night operations and during periods of low visibility. It is controlled by the Ground Movement Controller (GMC) at Changi Control Tower using the Taxiway Lighting Control Panel (TLCP).

Route Selection and Priority

When a taxiing route is selected on the TLCP, corresponding segments of taxiway centerline lights on the maneuvering area are switched on automatically. When two or more routes are selected, the system will give priority to the first route and activate red stopbar lights across conflicting routes, as necessary. A segment of the centerline lights of the conflicting routes that cut across the first route will also be suppressed. The GMC has the option of overriding the taxiing route priority by selecting or deselecting the appropriate stopbar lights.

All taxiing guidance lights on taxiways leading to the runways terminate at the runway holding positions where, by default, red stopbar lights remain on unless deselected by the runway controller. When deselected, these stopbar lights will re-activate automatically after 50 seconds.

Information and Mandatory Signs/Markings

When following the directional guidance provided by the green taxiway centerline lights and red stopbar lights, pilots are advised to also navigate their taxi route with reference to information and mandatory sign/markings provided at the airport so as to maintain situational awareness of their whereabouts at all times.

**ADVANCED- SURFACE MOVEMENT GUIDANCE
AND CONTROL SYSTEM
(A-SMGCS)- MULTILATERATION SYSTEM DEPLOYMENT
AT SINGAPORE CHANGI AIRPORT**

1 Introduction

- 1.1 The Multilateration System is a new surveillance system which is able to detect and identify all Mode S equipped aircraft and vehicles moving on the airport surface even during bad weather conditions such as heavy rain. It will integrate with the current radar-based ground surveillance system as a part of the Advanced- Surface Movement Guidance and Control System (A-SMGCS) at Singapore Changi Airport. This will enhance the efficiency and safety at the airport.

2 Carriage of Mode-S SSR Transponder

- 2.1 Carriage and operation of Mode-S transponder is required for all civil aircraft operating at Singapore Changi Airport. The Mode-S transponder shall comply, at least, to the requirements of Level 2 as prescribed in ICAO Annex 10 Volume IV (Amendment 77 or later) Standards and Recommended Practices.

3 Multilateration System Outline

- 3.1 The Multilateration System uses multiple receivers to pick up ``squitters`` transmitted by aircraft or vehicle Mode S transponders. It calculates the position of an aircraft or a vehicle by comparing the time its ``squitter`` arrives at each receiver.
- 3.2 The system will derive the identity of an aircraft by selectively interrogating its transponder to receive its assigned Mode A code or extracting its aircraft identification (that is, the ICAO callsign used in flight and inserted in the Flight Management System (FMS) or Transponder Control Panel), if available, from its squitter. For transponder equipped vehicles, the system will derive their respective identities from the unique Mode S addresses contained in their squitters.

4 Aircraft Requirements

- 4.1 The Multilateration System is essentially passive. It relies on aircraft transponders squittering at all times when moving on the airfield. At present, some aircraft checklist procedures instruct pilots to turn off the transponder shortly after leaving the runway on arrival and, not to switch it on until reaching the runway holding point for departure. This is in line with the requirement that Mode A/C transponders should not transmit on the ground, which does not apply to Mode S transmissions.
- 4.2 For the Multilateration System to work effectively, all aircraft Mode S transponders need to transmit Mode S squitters at all times when moving on the airfield, starting immediately prior to pushback, and for arrival aircraft until they are stationary at the aircraft stands. The Mode S transponders should not respond to All-Call interrogations, but should respond to addressed interrogations.

5 Procedures / Actions Required By Pilots

5.1 The Multilateration System needs to receive squitters and to acquire the Mode A code of a Mode S equipped aircraft at all times when it is on the ground. This is to enable detection and identification of the aircraft (from its Mode A code or ICAO callsign) as soon as it pushes back. Hence, the following actions from pilots are required.

5.2 Pre-Push back / Taxi

- a) Pilots will be required to enter an assigned Mode A code at start-up. This code will be either a discrete or non-discrete code (a conspicuity code, e.g. 1000).
- b) Pilots shall ensure that the aircraft transponder is operating (that is, XPNDR or the equivalent according to specific installation, AUTO if available, not OFF or STBY) and the assigned Mode A code is selected prior to the request for pushback or taxi, whichever is earlier.
- c) Whenever the aircraft is capable of reporting aircraft identification, the aircraft identification must also be entered prior to the request for pushback or taxi, whichever is earlier, through the FMS or the Transponder Control Panel. Flight crew must use the 3-letter ICAO designator of the operator, followed by flight identification number (for example, BAW123, SIA002).

5.3 After Landing

- a) Pilots shall ensure that the aircraft transponder is operating (that is, XPNDR or the equivalent according to specific installation, AUTO if available, not OFF or STBY) after landing, and continuously until the aircraft is stationary at the aircraft stand.
- b) Pilots shall ensure that the assigned Mode A code is not changed until the aircraft is stationary at the aircraft stand. (The system requires it for identification of the aircraft).

**PROCEDURES FOR PUSH BACK AND ASSIGNMENT OF
FLIGHT LEVELS TO DEPARTING AIRCRAFT****GENERAL**

- a. Aircraft departing Singapore Changi Airport shall adhere to the procedures for push back and assignment of flight levels.
- b. Assignment of flight levels to departing aircraft is made on a first-come-first-served basis. Aircraft will normally be assigned the level requested unless an alternate level is offered after coordination with the adjacent ATC centers.
- c. Departing flights from Singapore requesting FL280 or FL320 on L759, M770, N571, N571/N877 or P628 will be cleared as follows:
 1. Aircraft departing Singapore will be cleared to FL280.
 2. Succeeding aircraft on the same route will be cleared to FL280 with 10 min longitudinal separation provided there is no closing speed with the preceding aircraft.
 3. Additional longitudinal separation as appropriate shall be provided by ATC for the faster aircraft following a slower aircraft on the same route.
 4. The first aircraft from either Singapore or Kuala Lumpur to be over GUNIP on N571 or N571/N877, the Kuala Lumpur/Bangkok FIR boundary on M770 or L759 and VPL on P628 can expect its requested flight level.
- d. To avoid confusion, pilots shall use the correct phraseology as detailed in **PROCEDURES** paragraph a. when ready for push back.

PROCEDURES

- a. The pilot shall notify ATC when the aircraft is ready to push back within 5 min using the following phraseology:
 - call sign
 - destination
 - proposed flight level and alternate level, if any
 - parking position
- b. On receipt of the 'ready to push back' call, ATC will advise the pilot whether the proposed flight level or other alternate flight level is available and an ATC clearance will be issued accordingly. If pre-departure coordination with an adjacent unit or center is required, the pilot will be instructed to standby.
- c. Once the flight level is accepted by the pilot and an ATC clearance issued, the aircraft must be pushed back within 5 minutes from the time the ATC clearance is accepted unless other ATC restrictions are imposed. The ATC clearance will be cancelled upon expiration of the 5 minute grace period.
- d. At the end of the push back, the departing aircraft must have all engines started and be ready to taxi immediately, unless otherwise instructed by ATC.

NOTE: The first aircraft to taxi may not necessarily be the first aircraft to take-off as distances between aircraft stands and the departure runway vary.

GATE HOLD PROCEDURES FOR DEPARTING AIRCRAFT

- a. Whenever there are about five to seven departing aircraft at the Rwy holding point, subsequent push backs of departures will be regulated such that the Ground Movement Planner (GMP) on frequency 121.65 will start to issue pilots with Expected Pushback Time (EPT). The determination of EPT will take into account an aircraft's parking stand as well as taxi time to the Rwy-in-use holding point.
- b. When an EPT is issued, pilots will be instructed to either remain on GMP frequency or to monitor Singapore Ground Control (frequencies 124.3 or 121.72). It should be noted that when instructed to monitor Singapore Ground frequencies, pilots shall not establish contact with the Singapore Ground Control, rather, pilots shall maintain a listening watch on the assigned Singapore Ground Control frequency and wait for pushback instruction. This is to prevent unnecessary frequency congestion.
- c. A flight issued with an EPT but chooses to commence pushback before the assigned time will be allowed to do so. However, the flight should not expect an earlier departure time as the planned departure sequences will be maintained.
- d. In a situation when a departing aircraft is occupying a gate that has been assigned to an arriving aircraft, the departing aircraft will be instructed by the GMP to contact Singapore Ground for pushback for the purpose of better gate utilization.
- e. To maximize runway utilization, departure sequence will be planned on the basis of increasing runway throughput so as to enhance overall efficiency.

DELAY IN PUSH BACK AND/OR TAXI DUE TO OTHER AIRCRAFT

Delays may be expected for the second aircraft to push back and to taxi when two or more aircraft are parked either adjacent to one another or close together. However, it will retain its ATC clearance even if the 5 minutes grace period allowed for under **PROCEDURES** paragraph c. is exceeded.

DELAY IN TAKE-OFF DUE TO RESTRICTIONS IN THE ATC CLEARANCE

The ATC clearance may require an aircraft to arrive at a reporting point at a specific time and level or to depart a number of minutes behind a preceding traffic to establish longitudinal separation. Such a delay will not deprive a departing aircraft of its ATC clearance even though the 5 minutes grace period would have been exceeded.

DELAY DUE TO OVERFLIGHTS

These are flights operating through Singapore FIR without landing at Changi Airport. Depending on their positions, a departing aircraft requesting the same level may have to accept an alternate level or may have to delay its departure in order to establish the prescribed separation.

FLIGHTS EXEMPTED

The above procedures are not applicable to VIP, CASEVAC, SAR and other special tasks aircraft. ATC shall have full discretion in the conduct of such operations.

CANCELLATION OF ATC CLEARANCE/ OBTAINING A FRESH CLEARANCE

- a. A departing aircraft may have its ATC clearance cancelled under the following circumstances:
 1. on expiry of the 5 minutes grace period under **PROCEDURES** paragraph c., it is still unable to push back; or
 2. after pushing back, the pilot advises that it is returning to blocks; or
 3. it develops a technical problem and is unable to continue taxiing.
- b. ATC will inform the aircraft when a clearance is cancelled using the following phraseology:
'(Call sign of aircraft) your ATC clearance is cancelled (reason)'.
- c. Pilots who are ready to depart following the cancellation of an ATC clearance will adopt the normal procedures as if it is the first time they are ready to depart.

GROUND MOVEMENT PLANNER ON VHF 121.65

The frequency shall be used for aircraft pre-flight checks and ATC clearances. Pilot-in-command to make his initial call from the parked position of the frequency.

GROUND MOVEMENT CONTROL ON 124.3

- a. This frequency shall be used for aircraft start-up/push-back clearance.
- b. Unless otherwise instructed by ATC, the pilot-in-command shall prior to starting engines listen out on the Ground Movement Control frequency on 124.3.
- c. The pilot-in-command shall:
 1. Request and obtain taxi instructions prior to taxiing;
Note: ATC clearance, including the assigned SSR code will normally be issued prior to push back. Pilot shall squawk the SSR code immediately when airborne.
 2. Change from Ground Movement Control frequency to the Runway Control frequency (118.6) when nearing the taxiway holding position.
 3. Request for take-off clearance on 118.6.
- d. The pilot-in-command stopping for a pre-flight check at the taxiway holding position shall change over from 124.3 to 118.6 and request for further clearance before recommencing taxiing.
- e. Departing aircraft will be instructed when to change from 118.6 to Singapore Approach frequency of 120.3.
- f. In the case of the aircraft having landed, the pilot-in-command shall change from 118.6 to 124.3 immediately after clearing the runway. He shall maintain watch on 124.3 for taxiing and parking instructions until he arrives at his aircraft stand.

TAXIING

- a. Taxi clearance given by Ground Movement Control will relate to movement on the maneuvering area, but excluding the marshalling area.
- b. Aircraft taxiing on the maneuvering area will be regulated by ATC to avoid or reduce possible conflict and will be provided with traffic information and alerting service. ATC shall apply taxiing clearance limits whenever necessary.
- c. The taxiway routes to be used by aircraft after landing or when taxiing for departure will be specified by ATC. The issuance by ATC of a taxi route to an aircraft does not relieve the pilot-in-command of the responsibility to maintain separation with other aircraft on the maneuvering area or to comply with ATC directions intended to regulate aircraft on the maneuvering area.
- d. Pilots are reminded to always use minimum power when starting engines, when maneuvering within the apron area or when maneuvering from apron taxiways to other parts of the aerodrome. It is especially critical when commencing to taxi that break-away thrusts are kept to an absolute minimum and then be reduced to idle thrusts as soon as possible.

TAKE-OFF AND LANDING

- a. Departing aircraft will normally be directed by ATC to use the full length of the runway for take-off. On obtaining an ATC clearance the aircraft shall enter the runway via designated taxiways:
Rwy 02C - Twy E10 or E11
Rwy 02L - Twy W8, W9 OR W10
Rwy 20C - Twy E1, E2
Rwy 20R - Twy W1, W2
- b. The pilot-in-command shall not take-off or land without a clearance from Aerodrome Control.
- c. The pilot-in-command shall not run-up on the runway in use unless authorized by Aerodrome Control. Engines run-ups in the holding pan or taxiway holding point clear of the runway in use may be carried out subject to approval by Aerodrome Control.
- d. After landing, the pilot-in-command shall vacate the runway by the shortest suitable route and to contact Ground Control who will issue specific taxi route instructions to its assigned aircraft stand.
- e. Aircraft with radio communication failure shall vacate the runway and stop on the taxiway and watch for light signals from Aerodrome Control.

ARRIVING AIRCRAFT

The pilot-in-command of an arriving aircraft shall contact the appropriate Approach Control Unit 10 minutes before entering the CTR or ATZ.

PROCEDURES FOR START-UP AND PUSHBACK OF AIRCRAFT

1. Ground crew must ensure that the area behind an aircraft is clear of vehicles, equipment and other obstructions before the start-up or pushback of aircraft commences.
2. When the pilot is ready for start-up and pushback, he/she shall seek confirmation from the ground crew that there is no hazard to the aircraft starting up. The pilot shall then notify the Ground Movement Controller (Callsign: Singapore Ground) that the aircraft is ready for pushback. On being informed by Singapore Ground that pushback is approved, the pilot shall coordinate with the ground crew for the start-up and pushback of the aircraft.
3. The following table describes the procedures for the pushback of aircraft from the various aircraft stands. When it becomes necessary to vary a procedure to expedite aircraft movements, Singapore Ground will issue specific instructions to the pilot.

APRON/ACFT STANDS	PUSHBACK PROCEDURES	PHRASEOLOGY USED BY SINGAPORE GROUND
T3 WEST		
A1	The aircraft shall be pushed back onto Taxilane V6 to face West such that the pushback line is always kept midway between the aircraft main gear until its nosewheel is at the "END OF PUSH (for A1 nose gear)" position. The aircraft shall then be towed forward along the pushback line until its nosewheel is at the "END OF TOW (for A1, A2, B1, B2)" position. The aircraft may breakaway from there. Engine start up is not permitted during standard pushback. <u>Alternate Pushback</u> The aircraft (on idle thrust) shall be pushed back onto Taxilane V6 to face East, followed by TWY WA, such that the alternate pushback line is always kept midway between the aircraft main gear until the nose of the aircraft is behind the stopbar behind aircraft stand A3 or B2. The aircraft may breakaway from there. This alternate pushback procedure can only be exercised if the auxiliary power unit of aircraft is unserviceable.	Standard pushback approved. Pushback approved, to face North (or South) on TWY WA.
A2	The aircraft (on idle thrust) shall be pushed back onto Taxilane V6 to face West such that the pushback line is always kept midway between the aircraft main gear until its main gear is at the intersection of the pushback line and Taxilane V6 centerline and the nosewheel stops at the "END OF PUSH (A2, B2)" position. The aircraft shall then be towed forward along Taxilane V6 centerline until its nosewheel is at the "END OF TOW (for A1, A2, B1, B2)" position. The aircraft may breakaway from there.	Standard pushback approved.
A3	The aircraft (on idle thrust) shall be pushed back onto TWY WA until its nosewheel is at the intersection of the aircraft stand lead-in line and TWY WA centerline. The aircraft may breakaway from there.	Pushback approved, to face North (or South).
A4	The aircraft (on idle thrust) shall be pushed back onto TWY WA to face North (or South) such that the pushback line is always kept midway between the aircraft main gear until its nosewheel is at TWY WA centerline. The aircraft may breakaway from there.	Pushback approved, to face North (or South).

GATE HOLD PROCEDURES FOR DEPARTING AIRCRAFT

GATE HOLD PROCEDURES

1. Whenever there are about five to seven departing aircraft at the runway holding point, subsequent push-backs of departures will be regulated such that the Ground Movement Planner (GMP) on VHF frequency 121.65 will start to issue pilots with Expected Pushback Time (EPT). The determination of EPT will take into account an aircraft's parking bay as well as taxi time to the runway-in-use holding point.
2. When an Expected Pushback Time (EPT) is issued, pilots will be instructed to either remain on Ground Movement Planner (GMP) frequency or to monitor Singapore Ground Control (frequencies 124.3 or 121.72). It should be noted that when instructed to monitor Singapore Ground frequencies, pilots shall not establish contact with the Singapore Ground Control, rather, pilots shall maintain a listening watch on the assigned Singapore Ground Control frequency and await for pushback instruction. This is to prevent unnecessary frequency congestion.
3. A flight issued with an Expected Pushback Time (EPT) but chooses to commence pushback before the assigned time will be allowed to do so. However, the flight should not expect an earlier departure time as the planned departure sequences will be maintained.

MAXIMIZING GATE AND RUNWAY UTILIZATION

4. In a situation when a departing aircraft is occupying a gate that has been assigned to an arriving aircraft, the departing aircraft will be instructed by the Ground Movement Planner (GMP) to contact Singapore Ground for pushback for the purpose of better gate utilization.
5. To maximize runway utilization, departure sequence will be planned on the basis of increasing runway throughput so as to enhance overall efficiency.

APRON/ACFT STANDS	PUSHBACK PROCEDURES	PHRASEOLOGY USED BY SINGAPORE GROUND
A5, A9	The aircraft (on idle thrust) shall be pushed back onto TWY U2 to face North such that the pushback line is always kept midway between the aircraft main gear until the nose of the aircraft is behind the stopbar behind aircraft stand A11. The aircraft may breakaway from there. OR The aircraft (on idle thrust) shall be pushed back onto TWY WA to face South until nose of the aircraft is behind the stopbar behind aircraft stand A4. The aircraft may breakaway from there.	Pushback approved, to face North. Pushback approved, to face South.
A10	The aircraft (on idle thrust) shall be pushed back onto TWY U2 to face North until the nose of the aircraft is behind the stopbar behind aircraft stand A11. The aircraft may breakaway from there. OR The aircraft (on idle thrust) shall be pushed back onto TWY WA to face South until the nose of the aircraft is behind the stopbar behind aircraft stand A4. The aircraft may breakaway from there.	Pushback approved, to face North. Pushback approved, to face South.
A11	The aircraft (on idle thrust) shall be pushed back onto TWY U2 to face North until the nose of the aircraft is at the intersection of the aircraft stand lead-in line and TWY U2 centerline. The aircraft shall then be towed forward until the nose of the aircraft is behind the stopbar behind aircraft stand A11. The aircraft may breakaway from there. OR The aircraft (on idle thrust) shall be pushed back onto TWY U2 to face South until the nose of the aircraft is at the intersection of the aircraft stand lead-in line and TWY U2 centerline. The aircraft shall then be towed forward until its nosewheel is behind the stopbar behind aircraft stand A12. The aircraft may breakaway from there.	Pushback approved, to face North. Pushback approved, to face South.
A12	The aircraft (on idle thrust) shall be pushed back onto TWY U2 to face North until the nose of the aircraft is at the intersection of the aircraft stand lead-in line and TWY U2 centerline. The aircraft shall then be towed forward until its nosewheel is behind the stopbar behind aircraft stand 11. The aircraft may breakaway from there. OR The aircraft (on idle thrust) shall be pushed back onto TWY U2 to face South until its nosewheel is at the intersection of the aircraft stand lead-in line and TWY U2 centerline. The aircraft may breakaway from there.	Pushback approved, to face North. Pushback approved, to face South.
A13, A14, A15	The aircraft (on idle thrust) shall be pushed back onto TWY WA to face North until the nose of the aircraft is behind the stopbar behind aircraft stand A16. The aircraft may breakaway from there. OR The aircraft (on idle thrust) shall be pushed back onto TWY U2 to face South until the nose of the aircraft is behind the stopbar behind aircraft stand A12. The aircraft may breakaway from there.	Pushback approved to face North. Pushback approved, to face South.
A16	The aircraft (on idle thrust) shall be pushed back onto TWY WA until its nosewheel is at the intersection of the aircraft stand lead-in line and TWY WA centerline. The aircraft may breakaway from there.	Pushback approved to face North (or South).

APRON/ACFT STANDS	PUSHBACK PROCEDURES	PHRASEOLOGY USED BY SINGAPORE GROUND
A17	<u>Pushback facing West</u> The aircraft (on idle thrust) shall be pushed back onto Taxiway V8 to face West until its nosewheel is at the "END OF PUSH" position behind aircraft stand A17. The aircraft may breakaway from there. <u>Pushback facing South</u> The aircraft (on idle thrust) shall be pushed back onto TWY WA to face South until the nose of the aircraft is behind the stopbar behind aircraft stand A16. The aircraft may breakaway from there.	Pushback approved to face West. Pushback approved to face South.
A18	The aircraft (on idle thrust) shall be pushed back onto Taxiway U4 to face West such that the pushback line is always kept midway between the aircraft main gear until its main gear is aligned with the centerline of Taxiway U4 and the nose of the aircraft is behind the stopbar behind aircraft stand A18. The aircraft may breakaway from there. Pushback to face East is not permitted.	Standard pushback approved.
A19	The aircraft (on idle thrust) shall be pushed back onto Taxiway U4 to face West such that the pushback line is always kept midway between the aircraft main gear until its main gear is aligned with the centerline of Taxiway U4 and the nose of the aircraft is behind the stopbar behind the "END OF PUSH" line. The aircraft may breakaway from there. Pushback to face East is not permitted.	Standard pushback approved.
A20	The aircraft (on idle thrust) shall be pushed back onto Taxiway U4 to face West such that the pushback line is always kept midway between the aircraft main gear until its main gear is aligned with the centerline of Taxiway U4 and the nose of the aircraft is behind the stopbar behind the "END OF PUSH (for A20 nose gear)" position. The aircraft may breakaway from there. Pushback to face East is not permitted.	Standard pushback approved.
A21	The aircraft (on idle thrust) shall be pushed back onto Taxilane U4 to face East such that the pushback line is always kept midway between the aircraft main gear until its nosewheel is at the "END OF PUSH (for A21 nose gear)" position. The aircraft shall then be towed forward to face West until its nose is behind the stopbar behind aircraft stand A18. The aircraft may breakaway from there.	Standard pushback approved.
B1	The aircraft shall be pushed back onto Taxilane V6 to face West such that the pushback line is always kept midway between the aircraft main gear until its nosewheel is at the "END OF PUSH (for B1 nose gear)" position. The aircraft shall then be towed forward along the pushback line until its nosewheel is at the "END OF TOW (for A1, A2, B1, B2)" position. The aircraft may breakaway from there. Engine startup is not permitted during standard pushback. <u>Alternate Pushback</u> The aircraft (on idle thrust) shall be pushed back onto Taxilane V6 to face East, followed by TWY WA, such that the alternate pushback line is always kept midway between the aircraft main gear until the nose of the aircraft is behind the stopbar behind aircraft stand A3 or B2. The aircraft may breakaway from there. This alternate pushback procedure can only be exercised if the auxiliary power unit of aircraft is unserviceable.	Standard pushback approved. Pushback approved, to face North (or South) on TWY WA.

APRON/ACFT STANDS	PUSHBACK PROCEDURES	PHRASEOLOGY USED BY SINGAPORE GROUND
B2	The aircraft (on idle thrust) shall be pushed back onto Taxilane V6 to face West such that the pushback line is always kept midway between the aircraft main gear until its main gear is at the intersection of the pushback line and Taxilane V6 centerline and the nosewheel stops at the "END OF PUSH (A2, B2)" position. The aircraft shall then be towed forward along Taxilane V6 centerline until its nosewheel is at the "END OF TOW (for A1, A2, B1, B2)" position. The aircraft may breakaway from there.	Standard pushback approved.
B3	The aircraft (on idle thrust) shall be pushed back onto TWY WA until its nosewheel is at the intersection of the aircraft stand lead-in line and TWY WA centerline. The aircraft may breakaway from there.	Pushback approved, to face North (or South).
B4	The aircraft (on idle thrust) shall be pushed back onto TWY WA to face North (or South) such that the pushback line is always kept midway between the aircraft main gear until its nosewheel is at TWY WA centerline. The aircraft may breakaway from there.	Pushback approved, to face North (or South).
B5, B6	The aircraft (on idle thrust) shall be pushed back onto TWY WA to face North until the nose of the aircraft is behind the stopbar behind aircraft stand B4. The aircraft may breakaway from there. OR The aircraft (on idle thrust) shall be pushed back onto TWY U1 to face South such that the pushback line is always kept midway between the aircraft main gear until the nose of the aircraft is behind the stopbar behind aircraft stand B7. The aircraft may breakaway from there.	Pushback approved, to face North. Pushback approved, to face South.
B7	The aircraft (on idle thrust) shall be pushed back onto TWY U1 to face South until the nose of the aircraft is behind the stopbar behind aircraft stand B7. The aircraft may breakaway from there. OR The aircraft (on idle thrust) shall be pushed back onto TWY WA to face North until the nose of the aircraft is behind the stopbar behind aircraft stand B4. The aircraft may breakaway from there.	Pushback approved, to face South. Pushback approved, to face North.
B8	The aircraft (on idle thrust) shall be pushed back onto TWY U1 to face South until its nosewheel is at the intersection of the aircraft stand lead-in line and TWY U1 centerline. The aircraft may breakaway from there. OR The aircraft (on idle thrust) shall be pushed back onto TWY U1 to face North until its nosewheel is at the intersection of the lead-in line and TWY U1 centerline. The aircraft shall then be towed forward until its nosewheel is at the intersection of the aircraft stand B9 lead-in line and Twy U1 centerline. The aircraft may breakaway from there.	Pushback approved, to face South. Pushback approved, to face North.
B9, B10	The aircraft (on idle thrust) shall be pushed back onto TWY U1 until its nosewheel is at the intersection of the aircraft stand lead-in line and TWY U1 centerline. The aircraft may breakaway from there.	Pushback approved to face North (or South).

APRON/ACFT STANDS	PUSHBACK PROCEDURES	PHRASEOLOGY USED BY SINGAPORE GROUND
<u>EAST REMOTE</u>		
200, 201, 202, 203	The aircraft (on idle thrust) shall be pushed back onto Twy C6 to face North (or South).	Pushback approved, to face North (or South).
200L	The aircraft (on idle thrust) shall be pushed back onto Twy C6 centerline to face North until its nosewheel is on the end of push behind acft stand 200L. The acft may breakaway from there. OR The aircraft (on idle thrust) shall be pushed back onto Twy C6 centerline to face South.	Pushback approved, to face North. Pushback approved, to face South.
200R, 202L 202R	The aircraft (on idle thrust) shall be pushed back onto Twy C6 centerline to face North (or South).	Pushback approved, to face North (or South).
<u>SOUTH-EAST REMOTE</u>		
103, 104	The aircraft (on idle thrust) shall be pushed back onto Twy L4 centerline to face East until the aircraft nose is behind the stopbar behind aircraft stand 102. The aircraft may break away from there.	Standard pushback approved
205, 206, 207, 208	The aircraft (on idle thrust) shall be pushed back onto Twy C7 to face North (or South).	Pushback approved, to face North (or South).
209	The aircraft (on idle thrust) shall be pushed back to face North (or South) until its nose wheel is at the intersection of the lead-in line and Twy C7 centerline.	Pushback approved, to face North (or South).
<u>NORTH REMOTE</u>		
300, 303	The aircraft (on idle thrust) shall be pushed back facing West until its nose wheel is at the intersection of the lead-in line and taxiway centerline. OR The aircraft (on idle thrust) shall be pushed back facing East until its nose wheel is at the intersection of the lead-in line and taxiway centerline.	Pushback approved, to face West. Pushback approved, to face East.
301, 304, 305	The aircraft (on idle thrust) shall be pushed back to face East (or West) until its nose wheel is at the intersection of the lead-in line and the taxiway centerline.	Pushback approved, to face East (or West).
302, 306	The aircraft (on idle thrust) shall be pushed back to face East until its nose wheel is at the intersection of the lead-in line and taxiway centerline. OR The aircraft (on idle thrust) shall be pushed back to face West until its nose wheel is at the intersection of the lead-in line and Twy A6 centerline.	Pushback approved, to face East. Pushback approved, to face West.
307, 308, 309, 310	The aircraft (on idle thrust) shall be pushed back to face East (or West) until its nose wheel is at the intersection of the lead-in line and Twy NC2 centerline.	Pushback approved, to face East (or West).
<u>NORTH-EAST REMOTE</u>		
400, 401 402, 403 404	The aircraft (on idle thrust) shall be pushed back to face North (or South) until its nose wheel is at the intersection of the lead-in line and Twy A6 centerline.	Pushback approved, to face North (or South).
<u>WEST CARGO</u>		
502	The aircraft (on idle thrust) shall be pushed back to face North (or South). The aircraft may breakaway from here. There shall be no simultaneous pushback of aircraft unless with two aircraft stands separation.	Pushback approved, to face North (or South).
503, 504, 505, 506	The aircraft (on idle thrust) shall be pushed back to face North (or South).	Pushback approved, to face North (or South).
507, 508	The aircraft (on idle thrust) shall be pushed back to face South.	Standard pushback approved.
509	The aircraft (on idle thrust) shall be pushed back to face South until its nose wheel is at the intersection of the pushback line and Twy WC centerline.	Standard pushback approved.

APRON/ACFT STANDS	PUSHBACK PROCEDURES	PHRASEOLOGY USED BY SINGAPORE GROUND
<u>EAST CARGO</u>		
601, 602	The aircraft (on idle thrust) shall be pushed back to face South until its nose wheel is at the intersection of the lead-in line and taxilane EA centerline.	Standard pushback approved.
603	The aircraft (on idle thrust) shall be pushed back to face South until its nose wheel is at the intersection of the lead-in line and taxilane EA centerline. The aircraft shall then be towed forward along the centerline of taxilane EA until its nose wheel is on the "END OF TOW" marking behind aircraft stand 602.	Standard pushback approved.
604	The aircraft (on idle thrust) shall be pushed back to face South until its nose wheel is at the position of "END OF PUSH". The aircraft shall then be towed forward along the centerline of taxilane EA until its nose wheel is on the "END OF TOW" marking behind aircraft stand 602.	Standard pushback approved.
611, 612	The aircraft shall be pushed back to face North until its nosewheel is at the "END OF PUSH" position. The aircraft shall then be towed forward along the centerline of taxilane EC and turn Left onto the centerline of taxilane EA until its nosewheel is on the "END OF TOW" marking behind stand 602. The aircraft may breakaway from there. Engine start up is not permitted during standard push back. OR The aircraft shall be pushed back to face North until its nosewheel is at the "END OF PUSH" position. Engine start up is permitted only on the port engine. The aircraft shall then be towed forward along the centerline of taxilane EC and turn Left onto the centerline of taxilane EA until its nosewheel is on the "END OF TOW" marking behind stand 602. The aircraft may breakaway from there. This alternate pushback procedure can only be exercised if the Auxiliary Power Unit of the aircraft is unserviceable.	Standard pushback approved. Alternate pushback approved.
<u>T1 WEST</u>		
C1, C20, C22, C23, C24, C25	The aircraft (on idle thrust) shall be pushed back onto Twy U1 to face North (or South).	Pushback approved, to face North (or South).
C26	The aircraft (on idle thrust) shall be pushed back onto Twy WA to face North. The aircraft may breakaway from there. OR The aircraft (on idle thrust) shall be pushed back onto Twy WA to face South until its nose wheel is at the intersection of the aircraft stand lead-in line towed forward along the centerline of the taxilane EC and turn left onto the centerline of taxilane EA until its nose wheel is at the "END OF TOW" marking behind aircraft stand 602.	Pushback approved, to face North. Pushback approved, to face South.
<u>T1 CENTRAL</u>		
C11	The aircraft (on idle thrust) shall be pushed back such that the pushback line is always kept midway between the aircraft main gear until the nose wheel of the aircraft is at the "EOP 21" position. The aircraft shall then be towed forward until its nose wheel is at the "EOT 22A" position.	Standard pushback approved.
<u>BUDGET TERMINAL</u>		
15, 16	The aircraft (on idle thrust) shall be pushed back onto taxiway L5 centreline to face North. The aircraft shall then be towed forward until its nosewheel is at the position between aircraft stands 12 and 13. The aircraft may breakaway from there.	Pushback approved, to face North.
17	The aircraft (on idle thrust) shall be pushed back to face West until its nosewheel is at the "END OF PUSHBACK" position. The aircraft shall then be towed forward onto taxiway L5 to face North until its nosewheel is at the position between aircraft stands 12 and 13. The aircraft may breakaway from there.	Standard pushback approved.
701, 702	The aircraft (on idle thrust) shall be pushed back onto taxiway L5 centreline to face North. The aircraft shall then be towed forward until its nosewheel is at the position between aircraft stands 12 and 13. The aircraft may breakaway from there.	Pushback approved, to face North.

APRON/ACFT STANDS	PUSHBACK PROCEDURES	PHRASEOLOGY USED BY SINGAPORE GROUND
C13	The aircraft (on idle thrust) shall be pushed back to face North such that the pushback line is always kept midway between the aircraft main gear until its nose wheel is at the "END OF PUSH (Stopbar 22)" position. The aircraft shall be towed forward until its nose wheel is at the "END OF TOW (Stopbar 22A)" position. OR Alternate Pushback Procedure The aircraft (on idle thrust) shall be pushed back onto Twy N2 to face South followed by Twy N3 until the nose of the aircraft is behind the stopbar line behind the aircraft stand D35. The aircraft may break away from there. OR Alternate Pushback Procedure The aircraft (on idle thrust) shall be pushed back onto Twy N2 to face South followed by Twy N1 until the nose of the aircraft is behind the stopbar line behind the aircraft stand C16. The aircraft may break away from there.	Standard pushback approved. Pushback approved, onto Twy N3 to face South. Pushback approved, onto Twy N1 to face South.
D32	The aircraft (on idle thrust) shall be pushed back to face North such that the pushback line is always kept midway between the aircraft main gear until its nose wheel is at the "END OF PUSH (Stopbar 22)" position. The aircraft shall be towed forward until its nose wheel is at the "END OF TOW (Stopbar 22A)" position. OR Alternate Pushback Procedure The aircraft (on idle thrust) shall be pushed back onto Twy N2 to face South followed by Twy N3 until the nose of the aircraft is behind the stopbar line behind the aircraft stand D35. The aircraft may break away from there. OR Alternate Pushback Procedure The aircraft (on idle thrust) shall be pushed back onto Twy N2 to face South followed by Twy N1 until the nose of the aircraft is behind the stopbar line behind the aircraft stand C16. The aircraft may break away from there.	Standard pushback approved. Pushback approved, onto Twy N3 to face South. Pushback approved, onto Twy N1 to face South.
C15, D34	The aircraft (on idle thrust) shall be pushed back facing North until its nose wheel is at the intersection of the lead-in line and Twy N2 centerline. OR Alternate Pushback Procedure The aircraft (on idle thrust) shall be pushed back onto Twy N2 to face South followed by Twy N3 until the nose of the aircraft is behind the stopbar line behind the aircraft stand D35. The aircraft may break away from there. OR Alternate Pushback Procedure The aircraft (on idle thrust) shall be pushed back onto Twy N2 to face South followed by Twy N1 until the nose of the aircraft is behind the stopbar line behind the aircraft stand C16. The aircraft may break away from there.	Standard pushback approved. Pushback approved, onto Twy N3 to face South. Pushback approved, onto Twy N1 to face South.
C16, C17	The aircraft (on idle thrust) shall be pushed back to face North (or South) until its nose wheel is at the intersection of the lead-in line and Twy N1 centerline.	Pushback approved, to face North (or South).
C18	The aircraft (on idle thrust) shall be pushed back to face North until its nose wheel is at the intersection of the lead-in line and Twy N1 centerline.	Standard pushback approved.
C19	The aircraft (on idle thrust) shall be pushed back to face North along Twy N1 until the "END OF PUSHBACK" position.	Standard pushback approved.

APRON/ACFT STANDS	PUSHBACK PROCEDURES	PHRASEOLOGY USED BY SINGAPORE GROUND
D30	The aircraft (on idle thrust) shall be pushed back such that the pushback line is always kept midway between the aircraft main gear until its nose wheel of the aircraft is at the "END OF PUSH (Stopbar 20)" position. the aircraft shall then be towed forward until its nose wheel is at the "END OF TOW (Stopbar 22A)" position.	Standard pushback approved.
D35, D36	The aircraft (on idle thrust) shall be pushed back to face North (or South) until its nose wheel is at the intersection of the lead-in line and Twy N3 centerline.	Pushback approved, to face North (or South).
D37	The aircraft (on idle thrust) shall be pushed back to face North until its nose wheel is at the intersection of the lead-in line and Twy N3 centerline.	Standard pushback approved.
D38	The aircraft (on idle thrust) shall be pushed back to face North along Twy N3 until the "END OF PUSHBACK" position.	Standard pushback approved.
<u>T1 EAST</u>		
D40, D41, D42, D44, D46, D47, D48, D49	The aircraft (on idle thrust) shall be pushed back to face North (or South) until its nose wheel is at the intersection of the lead-in line and Twy A6 centerline.	Pushback approved, to face North (or South).
<u>T2 CENTRAL</u>		
E1	The aircraft (on idle thrust) shall be pushed back such that the pushback line is always kept midway between the aircraft main gear until its nose wheel is at Stopbar 12. This is marked as "END OF PUSHBACK" on the ground. The aircraft shall then be towed forward to Stopbar 9. this is marked as "END OF TOW" on the ground.	Standard pushback approved.
E2	The aircraft (on idle thrust) shall be pushed back until its nose wheel is at the intersection of the lead-in line and Twy B2 centerline. The aircraft shall then be towed forward to Stopbar 9. This is marked as "END OF TOW" on the ground.	Standard pushback approved.
E3	The aircraft (on idle thrust) shall be pushed back until its nose wheel is at Stopbar 9. This is marked as "END OF TOW" on the ground.	Standard pushback approved.
E4	The aircraft (on idle thrust) shall be pushed back until its nose wheel is at "END OF PUSHBACK" 8 position. OR The aircraft (on idle thrust) shall be pushed back onto Twy B1 until its nose wheel is at "END OF PUSHBACK" 13A position. OR The aircraft (on idle thrust) shall be pushed back onto Twy B3 until its nose wheel is at "END OF PUSHBACK" 7A position.	Standard pushback approved. Pushback approved, to pushback onto Twy B1. Pushback approved, to pushback onto Twy B3.
E5, E6	The aircraft (on idle thrust) shall be pushed back until its nose wheel is at the intersection of the lead-in line and Twy B1 centerline. The aircraft shall then be towed forward to Stopbar 13. This is marked as "END OF TOW" on the ground.	Standard pushback approved.
E7	The aircraft (on idle thrust) shall be pushed back until its nose wheel is at Stopbar 13. This is marked as "END OF TOW" on the ground.	Standard pushback approved.

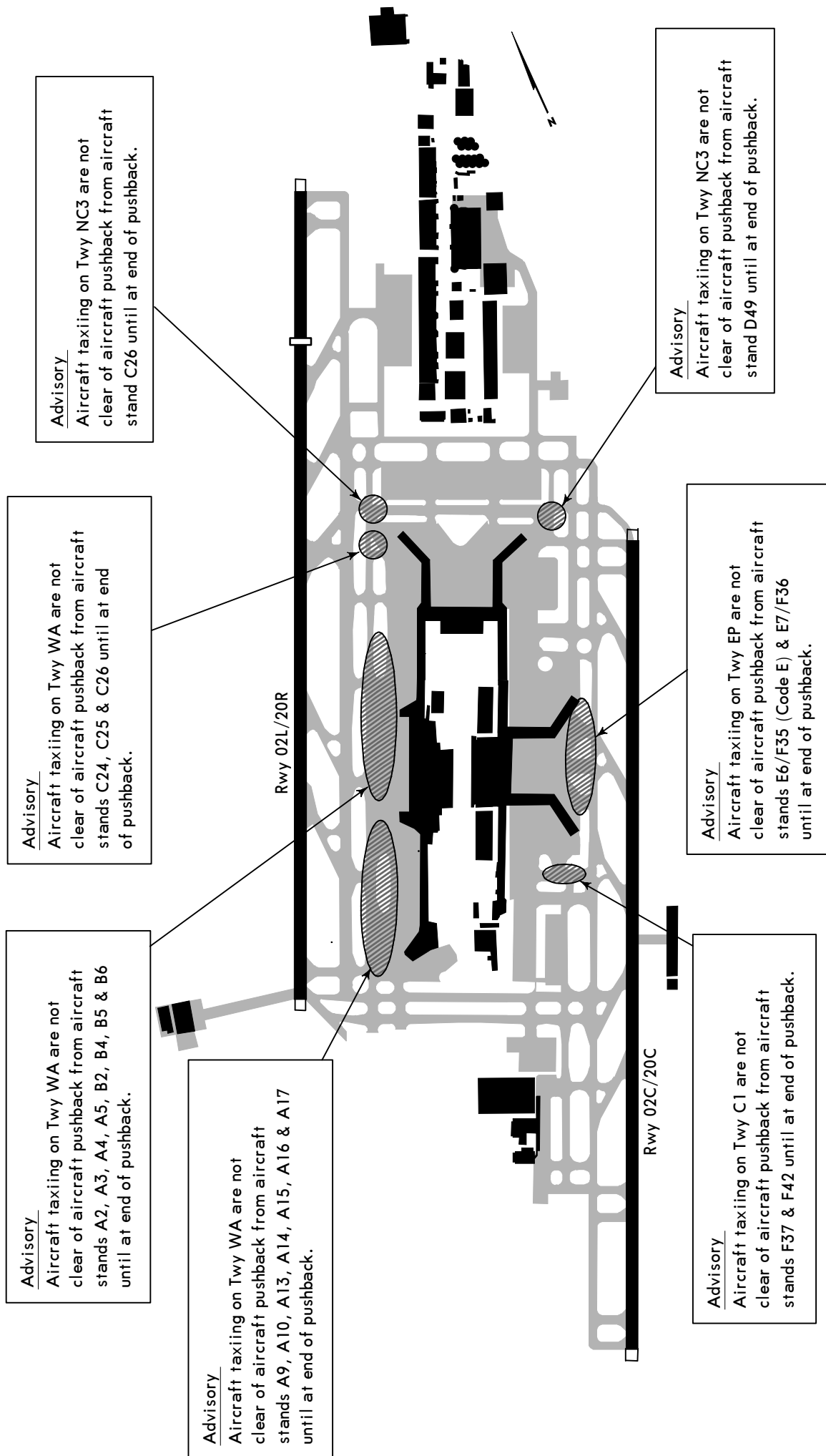
APRON/ACFT STANDS	PUSHBACK PROCEDURES	PHRASEOLOGY USED BY SINGAPORE GROUND
F30	The aircraft (on idle thrust) shall be pushed back such that the pushback line is always kept midway in between the aircraft main gear until its nose wheel is at Stopbar 11. This is marked as "END OF PUSHBACK" on the ground. The aircraft shall then be towed forward to Stopbar 9. This is marked as "END OF TOW" on the ground.	Standard pushback approved.
F31	The aircraft (on idle thrust) shall be pushed back until its nose wheel is at Stopbar 10. This is marked as "END OF PUSHBACK" on the ground. The aircraft shall then be towed forward to Stopbar 9. This is marked as "END OF TOW" on the ground.	Standard pushback approved.
F32	The aircraft (on idle thrust) shall be pushed back until its nose wheel is at Stopbar 9. This is marked as "END OF PUSHBACK" on the ground.	Standard pushback approved.
F33	The aircraft (on idle thrust) shall be pushed back until its nose wheel is at Stopbar 8. This is marked as "END OF PUSHBACK" on the ground. OR The aircraft (on idle thrust) shall be pushed back onto Twy B1 until its nose wheel is at Stopbar 13A. OR The aircraft (on idle thrust) shall be pushed back onto Twy B3 until its nose wheel is at Stopbar 7A.	Standard pushback approved. Pushback approved, to pushback onto Twy B1. Pushback approved, to pushback onto Twy B3.
F34, F35	The aircraft (on idle thrust) shall be pushed back until its nose wheel is at the intersection of the lead-in line and Twy B3 centerline. The aircraft shall then be towed forward to Stopbar 7. This is marked as "END OF TOW" on the ground.	Standard pushback approved.
F36	The aircraft (on idle thrust) shall be pushed back until its nose wheel is at Stopbar 7. This is marked as "END OF PUSHBACK" on the ground.	Standard pushback approved.
T2 NORTH		
E8	The aircraft (on idle thrust) shall be pushed back until its nose wheel is at Stopbar 14. This is marked as "END OF PUSHBACK" on the ground. The aircraft shall then be towed forward to Stopbar 15. This is marked as "END OF TOW" on the ground.	Standard pushback approved.
E10	The aircraft (on idle thrust) shall be pushed back with the main gear mid-point following the pushback line until its nose wheel is at position EOP 19.	Standard pushback approved.
E11	The aircraft (on idle thrust) shall be pushed back with the main gear mid-point following the main gear pushback line onto Twy A6 centerline. The aircraft shall then be towed forward to Stopbar 16 on Twy A5. This is marked as "END OF TOW" on the ground. Alternate pushback procedure for aircraft with wingspan of less than 213' (65m): The aircraft (on idle thrust) shall be pushed back with the main gear mid-point following the main gear pushback line until its body is aligned with Twy A6 centerline. Alternate pushback procedure for aircraft with wingspan of more than 213' (65m): The aircraft (on idle thrust) shall be pushed back with the main gear mid-point following the main gear pushback line until its nose wheel is at the "END OF PUSH 19A" position behind aircraft stand E24. The aircraft shall then be towed forward to "END OF TOW 18B" behind aircraft Stand E26.	Standard pushback approved. Pushback approved, to pushback onto Twy A6. Pushback approved, to pushback onto Twy A6.

APRON/ACFT STANDS	PUSHBACK PROCEDURES	PHRASEOLOGY USED BY SINGAPORE GROUND
E12	The aircraft (on idle thrust) shall be pushed back: - until its nose wheel is at the intersection of the lead-in line and Twy A5 centerline. The aircraft shall then be towed forward to Stopbar 16. This is marked as "END OF TOW" on the ground. OR - onto Twy A6 until its nose wheel is at the intersection of Twy A5 and A6 centerline.	Standard pushback approved. Pushback approved, to pushback onto Twy A6.
E20	The aircraft (on idle thrust) shall be pushed back with the main gear mid-point following the main gear pushback line until its nose wheel is at Stopbar 17. The aircraft shall then be towed forward to "END OF TOW" Stopbar 18A. Aircraft may breakaway from here.	Standard pushback approved.
E22	The aircraft (on idle thrust) shall be pushed back with the main gear mid-point following the main gear pushback line until its nose wheel is at Stopbar 19. This is marked as "END OF PUSHBACK" on the ground. The aircraft shall then be towed forward to Stopbar 18. This is marked as "END OF TOW" on the ground.	Standard pushback approved.
E24, E24L/R	The aircraft (on idle thrust) shall be pushed back facing North until its body is aligned with Twy A6 centerline. Aircraft may breakaway from there.	Standard pushback approved.
E26	The aircraft (on idle thrust) shall be pushed back to face North until its body is aligned with Twy A6 centerline.	Standard pushback approved.
E27, E28	The aircraft (on idle thrust) shall be pushed back to face North (or South) until its body is aligned with Twy A6 centerline.	Pushback approved, to face North (or South).
T2 SOUTH		
F37	The aircraft (on idle thrust) shall be pushed back with the main gear following the main gear pushback gear pushback line, until its nose wheel is on the "END OF TOW (EOP)" Stopbar 4 behind aircraft Stand F42. OR The aircraft (on idle thrust) shall be pushed back with the main gear following the main gear pushback gear pushback line, until its nose wheel is on the "END OF TOW (EOP)" Stopbar 5 on Twy C1.	Standard pushback approved. Pushback approved, to face East on Twy C1
F40, F52	The aircraft (on idle thrust) shall be pushed back until its nose wheel is at Stopbar 2. This is marked as "END OF PUSHBACK" on the ground. The aircraft shall then be towed forward to Stopbar 3. This is marked as "END OF TOW" on the ground.	Standard pushback approved.
F41	The aircraft (on idle thrust) shall be pushed back until its nose wheel is at the intersection of the lead-in line and Twy C2 centerline. The aircraft shall then be towed forward to Stopbar 4. This is marked as "END OF TOW 4" on the ground. OR The aircraft (on idle thrust) shall be pushed back onto Twy C6 until its nose wheel is at the intersection of Twy C2 and Twy C6 centerline.	Standard pushback approved. Pushback approved, to pushback onto Twy C6.
F42	The aircraft (on idle thrust) shall be pushed back until its nose wheel is at the intersection of the lead-in line and Twy C2 centerline. The aircraft shall then be towed forward to Stopbar 4. This is marked as "END OF TOW 4" on the ground. Alternate pushback procedure for aircraft with wingspan of less than 213' (65m): The aircraft (on idle thrust) shall be pushed onto Twy C6 until its nose wheel is at the intersection of Twy C2 and Twy C6 centerline.	Standard pushback approved. Pushback approved, to pushback onto Twy C6.

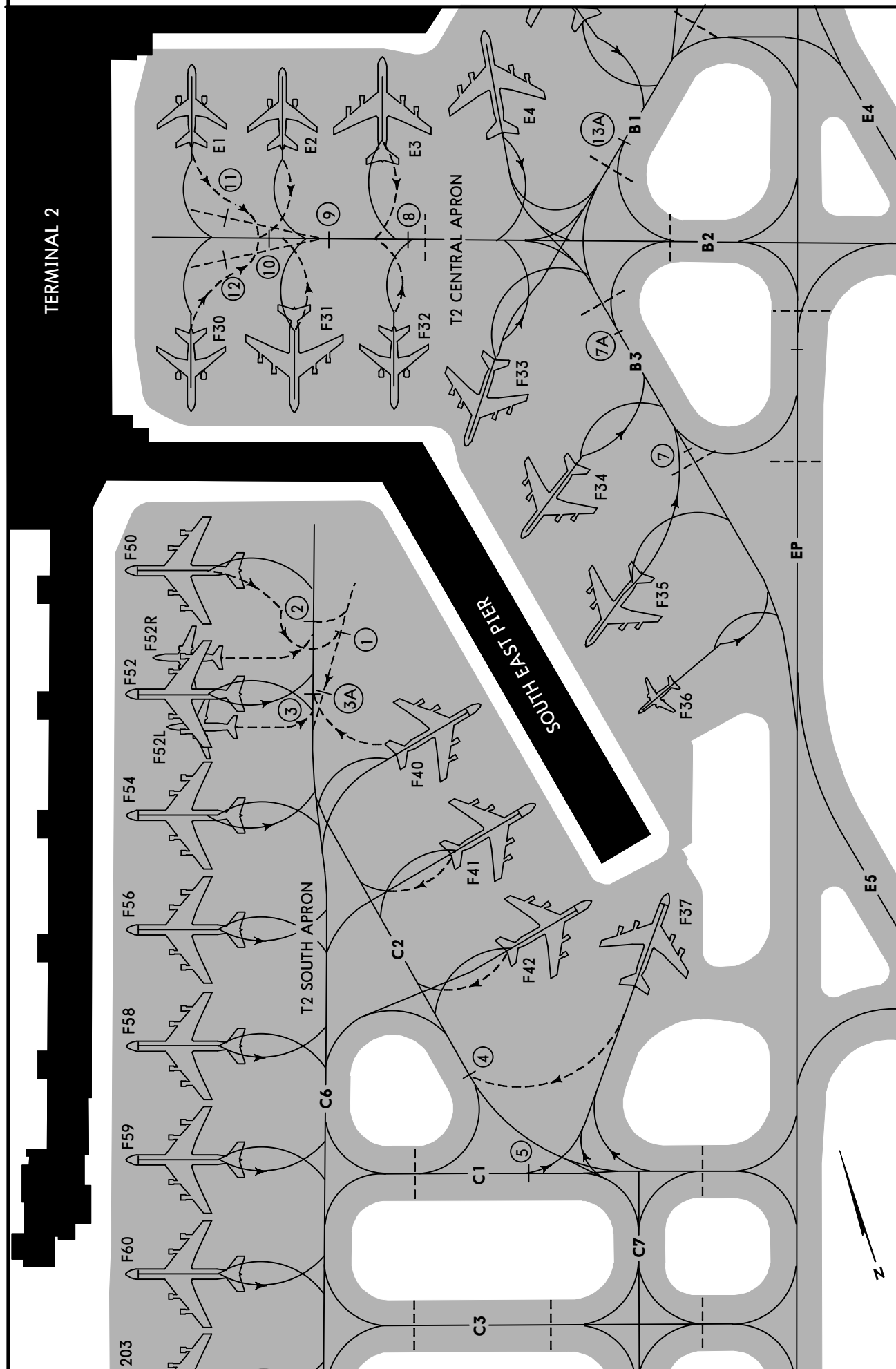
APRON/ACFT STANDS	PARKING PROCEDURES	PHRASEOLOGY USED BY SINGAPORE GROUND
F42 (continued)	Alternate pushback procedure for aircraft wingspan of more than 213' (65m): The aircraft (on idle thrust) shall be pushed back until its nose wheel is at the "END OF PUSH 4A" position. The aircraft shall then be towed forward with its nose wheel following the towed forward line until its nose wheel is on the "END OF TOW 4B" position behind aircraft Stand F59.	Pushback approved, to pushback onto Twy C6.
F50	The aircraft shall be pushed back with the main gear following the main gear pushback line, facing South until its nosewheel is on the "END OF PUSH" Stopbar 1 marking painted on the ground behind aircraft stand F50. The aircraft shall then be towed forward with the nosewheel following the tow-forward line until its nosewheel is on the "END OF TOW" Stopbar 3 marking painted on the ground behind aircraft stand F52.	Standard pushback approved.
F52L	The aircraft (on idle thrust) shall be pushed back to face South until its nosewheel is at the intersection of the aircraft push back line and Taxilane C6.	Standard pushback approved.
F52R	The aircraft (on idle thrust) shall be pushed back to face South until its nosewheel is at the intersection of the aircraft push back line and Taxilane C6. The aircraft shall then be towed forward until its nosewheel is on the "END OF TOW" position.	Standard pushback approved.
F54	The aircraft (on idle thrust) shall be pushed back until its nosewheel is at a point on Twy C6 in line with the mid-point of aircraft stands F52 and F54. It shall breakaway from this position.	Standard pushback approved.
F56, F56L, F56R	The aircraft (on idle thrust) shall be pushed back to face South until its nosewheel is at the intersection of the aircraft pushback line and taxilane C6. The aircraft shall then be towed forward until its nosewheel is abeam stand F56.	Standard pushback approved.
F58, F60	The aircraft (on idle thrust) shall be pushed back to face North (or South), on Twy C6 centerline.	Pushback approved, to face North (or South).
F59, F59L, F59R	The aircraft (on idle thrust) shall be pushed back to face North on taxilane C6 centerline until its nosewheel is abeam Bay F60. OR The aircraft (on idle thrust) shall be pushed back to face South on taxilane C6 centerline.	Pushback approved, to face North. Pushback approved, to face South.
BUDGET TERMINAL		
1, 2	The aircraft (on idle thrust) shall be pushed back to face West onto Twy L7 until its nosewheel is at the stopbar marked "END OF PUSH" behind aircraft stand 2. The aircraft may breakaway from there. Simultaneous pushback is not permitted for aircraft stands 1, 2 and 3. OR The aircraft (on idle thrust) shall be pushed back onto Twy L5 to face North until its nosewheel is behind the stopbar behind aircraft stand 3. The aircraft may breakaway from there. Simultaneous pushback is not permitted for aircraft stands 1, 2 and 3. Pushback from aircraft stands 1 and 2 to face South is not permitted.	Pushback approved, to face West. Pushback approved, to face North.
3, 4, 5, 6, 7, 8, 9, 10	The aircraft (on idle thrust) shall be pushed back onto Twy L5 to face North or South until its nosewheel is at the intersection of the aircraft stand lead-in line and the centerline of Twy L5. The aircraft may breakaway from there. There shall be no simultaneous pushback of aircraft unless there is at least one aircraft stand separation. Simultaneous pushback is not permitted for aircraft stands 1, 2 and 3.	Pushback approved, to face North (or South).

APRON/ACFT STANDS	PUSHBACK PROCEDURES	PHRASEOLOGY USED BY SINGAPORE GROUND
11,12,13	The aircraft (on idle thrust) shall be pushed back onto Twy L5 to face North or South until its nosewheel is at the "END OF PUSH (EOP)" position and the centerline of Twy L5. The aircraft may breakaway from there. There shall be no simultaneous pushback of aircraft unless there is at least one aircraft stand separation.	Pushback approved, to face North or South.
14	The aircraft (on idle thrust) shall be pushed back onto Twy L5 to face North until its nosewheel is at the "END OF PUSH (EOP)" position and the centerline of Twy L5. The aircraft may breakaway from there. There shall be no simultaneous pushback of aircraft unless there is at least one aircraft stand separation.	Pushback approved, to face North.

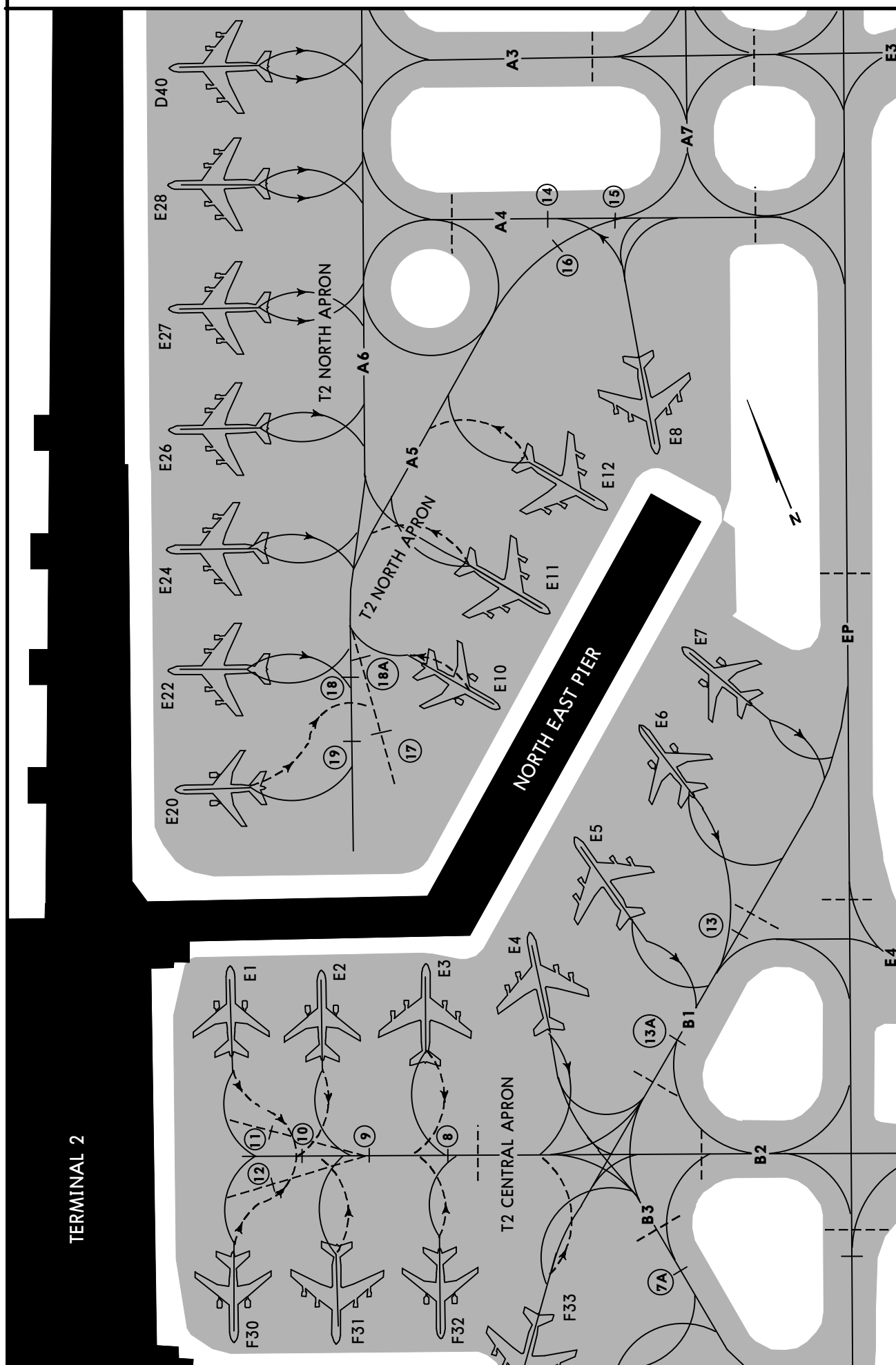
AERODROME ADVISORY CHART



PUSHBACK PROCEDURES



PUSHBACK PROCEDURES



SAFEGATE AIRCRAFT DOCKING GUIDANCE SYSTEM - SAFEDOCK

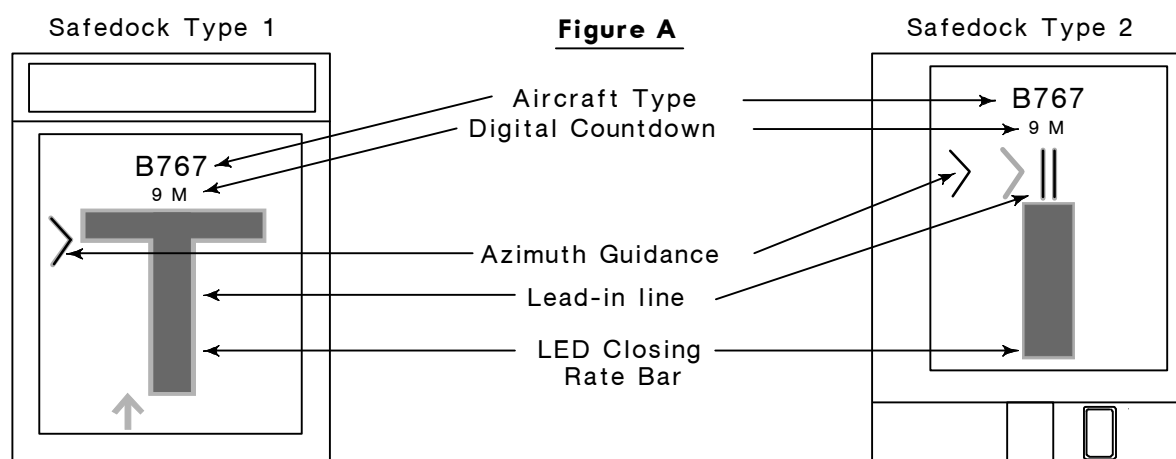
1. INTRODUCTION

1.1 The Safegate Aircraft Docking Guidance System - SAFEDOCK is a fully automatic aircraft docking guidance system installed at the fixed gates in Terminals 1, 2, and 3 of Singapore Changi Airport. There are two types of ADGS in Singapore Changi Airport, Safedock Type 1 ADGS and Safedock Type 2 ADGS.

2. DESCRIPTION OF SYSTEM

- 2.1 The system is based on a laser scanning technique and it tracks both the lateral and longitudinal position of the aircraft. This 3D technique allows the system to identify the incoming aircraft and check it against the one selected by the operator to ensure that the pilot is provided with the correct stop indication for the aircraft.
- 2.2 The system is operated only in Automatic Mode. When the system fails, the aircraft is to be marshalled into the stand manually.
- 2.3 Azimuth guidance, continuous closing rate information, aircraft type, etc., are shown to the pilot on a single display clearly visible for both pilot and co-pilots. Figure A shows the Display and Laser Scanning Unit mounted on the terminal or pole in front of the aircraft stand.

LED DISPLAY AND LASER SCANNING UNIT



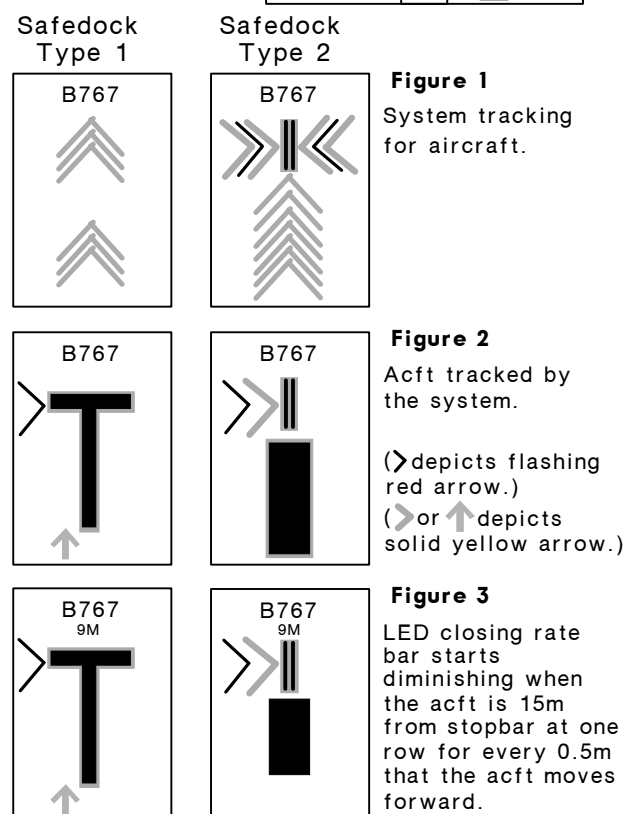
3. DOCKING PROCEDURES

3.1 Check that the correct aircraft type is displayed. The scrolling arrows indicate that the system is activated (see figure 1).

3.2 Follow the lead-in line.

3.3 When the aircraft has been caught by the scanning unit, the scanning unit checks that the aircraft is the correct type and the display provides azimuth guidance information. When the solid yellow closing rate bar appears, the aircraft is being tracked by the system (see figure 2).

3.4 Look for the flashing red arrow and solid yellow arrow which provide azimuth guidance information. The flashing red arrow shows which direction to steer, while the solid yellow arrow gives an indication of how far the aircraft is off the centerline (see figures 2 and 3).



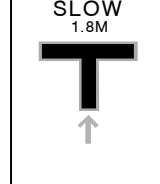
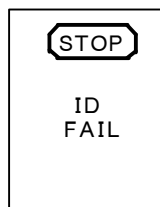
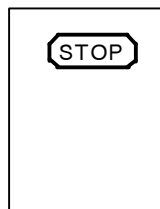
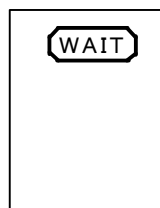
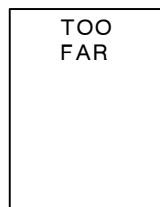
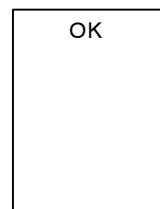
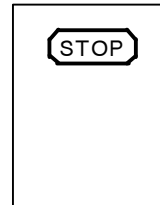
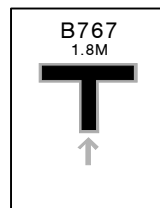
SAFEDOCK-Continued.

- 3.5 When the aircraft is 15m from the stop position, closing rate information is given. "Distance to go" is indicated by turning off one row of LEDs (Laser Electronic Displays) for every half meter that the aircraft advances towards the stop position. From 15m to the stop position, a digital display will indicate the distance from the stop position for every 1m. At 3m from the stop position, the display will indicate the distance from the stop position for every 0.2m (see figures 3 and 4).
- 3.6 When the correct stop position is reached, all of the LEDs for the closing rate bar will be off, the word "STOP" will appear in the display. For Safedock Type 1 ADGS, the word "STOP" will be displayed in red with red border. For Safedock Type 2 ADGS, the word "STOP" will be displayed in yellow and two red, rectangular fields will light in the azimuth guidance area of the display (see figure 5).
- 3.7 If the aircraft stops in the correct position, "OK" will be displayed after a few seconds (see figure 6).
- 3.8 If the aircraft has gone past the correct stop position, the display will show "TOO FAR" (see figure 7).
- 3.9 If some object is blocking the view towards the approaching aircraft or the detected aircraft is lost before 12m to the correct stop position, the system will show "WAIT" (see figure 8).
- 3.10 The aircraft must be identified at least 12m before the correct stop position. Otherwise, the display will show "WAIT", "STOP" and "ID FAIL" (see figures 8, 9 and 10).

4. SAFETY MEASURES

- 4.1 Pilot should not turn an aircraft into the parking stand if the docking system is not activated or on seeing a wrong aircraft type displayed on the system.
- 4.2 Pilot should not proceed beyond the passenger loading bridges unless the scrolling arrows (see figure 1) have been superseded by the solid yellow closing rate bar (see figure 2).
- 4.3 When using the docking system, pilots are to taxi into the aircraft stand at minimum speed. The system will display "SLOW" to inform the pilot if the aircraft's taxiing speed exceeded 1.2 m/s (see figure 11).
- 4.4 In bad weather conditions, the docking system may go into downgrade mode. The display will show the aircraft type and "SLOW" and the scrolling arrows are disabled (see figure 12). When the system has detected the aircraft, the solid yellow closing rate bar appears. Docking process is allowed to continue but pilots should exercise caution.

Safedock
Type 1 (T1)



Safedock
Type 2 (T2)

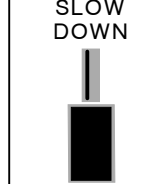
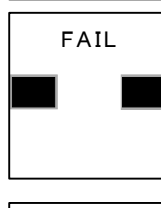
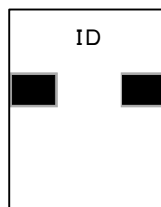
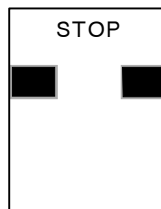
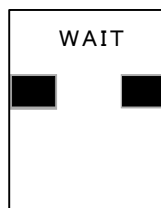
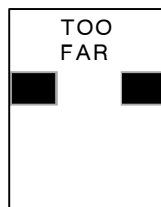
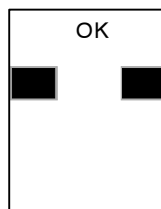
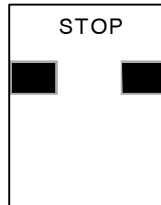
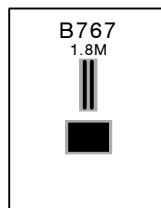


Figure 4

LED closing rate bar getting shorter as acft moves nearer to stopbar.

Figure 5

Pilot to stop acft when "STOP" is displayed.

Figure 6

Informs the pilot that everything is in order and he can shutdown engine.

Figure 7

Indicates that the acft has gone beyond the stopbar. Pilot to check with ground engineer on the next move.

Figure 8

Pilot to hold acft and wait for other instructions from the display.

Figure 9

"STOP" may appear suddenly in the process of docking. Pilot to stop immediately and wait for further instructions.

Figure 10

Indicates the system failed to identify the acft.

Figure 11

Informs the pilot that the acft traveling speed is too fast. Pilot to slow down the speed.

SAFEDOCK-Continued.

Similar for both
Safedock
Type 1 & Type 2

B767
SLOW

Figure 12

The system goes into 'downgrade' mode due to bad weather conditions, pilot will be prompted to slow down. Docking process will continue when the aircraft is detected but pilot should exercise caution.

4. SAFETY MEASURES (continued)

4.5 To avoid overshooting, pilots are advised to approach the stop position slowly and observe the closing rate information displayed. Pilots should stop the aircraft immediately when seeing the "STOP" or "WAIT" display, when given the stop sign by the aircraft marshaller or is unsure of the information displayed during the docking process.

4.6 Pilot should stop the aircraft immediately if the display goes black during the docking process. The aircraft is to be marshalled into the stand manually.

Aircraft types that can be parked at stands (o) are as follows:

Aircraft Type	TERMINAL 1 AIRCRAFT STANDS													
	C1	C11	C13	C15	C16	C17	C18	C19	C20	C22	C23	C24	C25	C26
A300	o		o	o	o	o	o					o	o	o
A310	o		o	o	o	o	o		o	o	o	o	o	o
A319	o	o	o	o	o	o	o	o	o	o	o	o	o	o
A320	o	o	o	o	o	o	o	o	o	o	o	o	o	o
A321	o	o	o	o	o	o	o	o	o	o	o	o	o	o
A332	o		o	o		o	o		o	o	o	o	o	o
A333	o		o	o		o	o		o	o	o	o	o	o
A342	o		o	o		o	o		o	o	o	o	o	o
A343	o		o	o		o	o		o	o	o	o	o	o
A345	o		o	o					o	o	o	o	o	o
A346			o									o		o
A380											o		o	o
B707	o		o	o										
B717	o		o	o	o	o	o	o						
B727	o		o						o	o				
B737	o	o	o	o	o	o	o	o	o	o	o	o	o	o
B747	o		o	o					o	o	o	o	o	o
B74S	o		o	o									o	o
B757	o		o	o	o	o	o		o	o	o	o	o	o
B762	o		o	o	o	o	o		o	o	o	o	o	o
B763	o		o	o	o	o	o		o	o	o	o	o	o
B772	o		o	o		o	o		o	o	o	o	o	o
B773	o		o	o					o	o	o	o	o	o
B773ER	o		o	o					o	o	o	o	o	o
B788	o			o		o			o	o	o		o	o
BA146			o											
DC10	o			o		o	o						o	o
DC9			o	o										
F100	o		o	o	o	o	o	o						
IL62	o		o	o	o	o	o						o	o
IL86	o		o	o	o	o	o						o	o
IL96	o		o	o	o	o	o						o	o
L101	o			o		o	o						o	o
MD11	o			o		o	o		o	o	o	o	o	o
MD80	o		o	o	o	o	o	o					o	o
MD82	o		o	o	o	o	o	o					o	o
MD88	o		o	o	o	o	o	o					o	o

Aircraft types that can be parked at stands (o) are as follows:

Aircraft Type	TERMINAL 1 AIRCRAFT STANDS (contd)														
	D30	D32	D34	D35	D36	D37	D38	D40	D41	D42	D44	D46	D47	D48	D49
A300		o	o	o	o	o		o	o	o	o	o	o	o	o
A310		o	o	o	o	o		o	o	o	o	o	o	o	o
A319	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
A320	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
A321	o	o	o	o		o	o	o	o	o	o	o	o	o	o
A332		o	o		o	o		o	o	o	o	o	o	o	o
A333		o	o		o	o		o	o	o	o	o	o	o	o
A342		o	o		o	o		o	o	o	o	o	o	o	o
A343		o	o		o	o		o	o	o	o	o	o	o	o
A345		o	o					o	o	o	o	o	o	o	o
A346		o	o									o			o
A380												o			o
B707		o	o					o	o	o	o				
B717		o	o	o	o	o	o	o	o	o	o	o	o	o	
B727		o	o					o	o	o	o				
B737	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
B747		o	o					o	o	o	o	o	o	o	o
B74S		o	o					o	o	o	o	o	o	o	o
B757		o	o	o	o	o		o	o	o	o	o	o	o	o
B762		o	o	o	o	o		o	o	o	o	o	o	o	o
B763		o	o	o	o	o		o	o	o		o	o	o	o
B772		o	o		o	o		o	o	o	o	o	o	o	o
B773		o	o						o	o	o				o
B773ER		o	o						o	o	o				o
B788								o	o	o	o	o			o
BA146		o	o												
DC10			o		o	o		o	o	o	o	o	o	o	o
DC9		o	o												
F100		o	o	o	o	o	o	o	o	o	o		o	o	
IL62		o	o	o	o	o		o	o	o	o	o	o	o	o
IL86		o	o	o	o	o		o	o	o	o	o	o	o	o
IL96		o	o	o	o	o		o	o	o	o	o	o	o	o
L101			o		o	o		o	o	o	o	o	o	o	o
MD11			o		o	o		o	o	o	o	o	o	o	o
MD80		o	o	o	o	o	o	o	o	o	o	o	o	o	o
MD82		o	o	o	o	o	o	o	o	o	o	o	o	o	o
MD88		o	o	o	o	o	o	o	o	o	o	o	o	o	o
YK42										o					

Aircraft types that can be parked at stands (o) are as follows:

Aircraft Type	TERMINAL 2 AIRCRAFT STANDS																			
	E1	E2	E3	E4	E5	E6	E7	E8	E10	E11	E12	E20	E22	E24	E24L	E24R	E26	E27	E28	F30
A300		o	o	o	o	o		o		o	o	o	o	o			o	o	o	
A310	o	o	o	o	o	o	o	o		o	o	o	o	o			o	o	o	
A319	o	o	o	o	o	o	o	o	o	o	o	o	o		o	o	o	o	o	o
A320	o	o	o	o	o	o	o	o		o	o	o	o		o	o	o	o	o	o
A321			o		o								o		o	o	o	o	o	
A332			o	o	o			o		o	o	o	o	o			o	o	o	
A333			o	o	o			o		o	o	o	o	o			o	o	o	
A342			o	o	o			o		o	o		o	o			o	o	o	
A343			o	o	o			o		o	o		o	o			o	o	o	
A345			o	o	o			o		o	o		o	o			o	o	o	
A346				o	o			o												
A380					o			o		o										
B707																	o	o	o	
B727	o	o	o	o	o	o		o		o	o	o	o	o			o	o	o	o
B737	o	o	o	o	o	o	o	o		o	o	o	o		o	o	o	o	o	o
B747			o	o	o			o		o	o	o	o	o			o	o	o	
B74S			o	o	o			o		o	o		o	o			o	o	o	
B757	o	o	o	o	o	o		o		o	o	o	o	o			o	o	o	
B762	o	o	o	o	o	o		o		o	o	o	o	o			o	o	o	
B763	o	o	o	o	o	o		o		o	o	o	o	o			o	o	o	
B772			o	o	o			o		o	o	o	o	o			o	o	o	
B773				o	o	o		o		o	o		o	o			o	o	o	
B773ER				o	o			o		o	o		o	o			o	o	o	
B788												o	o				o	o	o	
DC10				o	o	o		o		o	o						o	o	o	
DC9												o								
F70	o	o	o	o	o	o	o	o	o	o	o	o	o	o						o
F100																	o	o	o	
IL62																	o	o	o	
IL86																	o	o	o	
IL96																	o	o	o	
L101				o	o	o		o		o	o						o	o	o	
MD11				o	o	o		o		o	o						o	o	o	
MD80																	o	o	o	
MD82																	o	o	o	
MD87												o								
MD88																	o	o	o	

Aircraft types that can be parked at stands (o) are as follows:

Aircraft Type	TERMINAL 2 AIRCRAFT STANDS (contd)																			
	F31	F32	F33	F34	F35	F36	F37	F40	F41	F42	F50	F52	F52 L/R	F54	F56	F56 L/R	F58	F59	F59L	F59R
A300	o	o		o	o			o	o	o	o	o		o	o		o	o		o
A310	o	o	o	o	o	o		o	o	o	o	o		o	o		o	o		o
A319	o	o	o	o	o	o	o	o	o	o	o		o	o		o	o		o	o
A320	o	o	o	o	o	o	o	o	o	o	o		o	o		o	o		o	o
A321													o			o			o	o
A332	o			o				o	o	o	o	o		o	o		o	o		o
A333	o			o				o	o	o	o	o		o	o		o	o		o
A342	o			o				o	o	o		o		o	o		o	o		o
A343	o			o				o	o	o		o		o	o		o	o		o
A345	o			o				o	o	o		o		o	o		o	o		o
A346										o										o
A380	o									o										o
B707											o			o				o		o
B727	o	o	o	o	o		o	o	o	o	o			o	o		o	o		o
B737	o	o	o	o	o	o	o	o	o	o	o		o	o		o	o		o	o
B747	o			o	o			o	o	o	o	o		o	o		o	o		o
B74S	o			o				o	o	o				o	o		o	o		o
B757	o	o	o	o	o			o	o	o	o	o		o	o		o	o		o
B762	o	o		o	o			o	o	o	o	o		o	o		o	o		o
B763	o	o		o	o			o	o	o	o	o		o	o		o	o		o
B772	o		o	o				o	o	o	o	o		o	o		o	o		o
B773									o	o				o	o		o	o		o
B773ER									o	o				o	o		o	o		o
B788	o										o	o		o	o		o	o		o
DC10				o	o				o	o				o	o		o	o		o
DC8																				
DC9											o			o	o		o			
F70	o	o	o	o	o	o	o	o	o	o	o			o	o		o	o		o
L101				o	o				o	o				o	o		o	o		o
MD11				o	o				o	o				o	o		o	o		o
MD87											o			o						

Aircraft types that can be parked at stands (o) are as follows:

TERMINAL 3 Aircraft Type / Stands	A1	A2	A3	A4	A5	A9	A10	A11	A12
A300, A310, A319, A320, A321		o	o	o	o	o	o	o	o
A332, A333, A343	o	o	o	o	o	o	o	o	o
A345	o	o	o	o	o		o	o	o
A346		o		o	o		o	o	o
A380		o		o	o		o		
B737			o					o	o
B744	o	o	o	o	o		o	o	o
B74S									
B757, B767		o	o	o	o	o	o	o	o
B772	o	o	o	o	o	o	o	o	o
B773, B773ER		o		o	o		o	o	o
B788		o		o			o		

TERMINAL 3 (contd) Aircraft Type / Stands	A13	A14	A15	A16	A17	A18	A19	A20	A21
A300, A310, A319, A320, A321	o	o	o	o	o	o	o		
A332	o	o	o	o	o	o	o		o
A333, A343	o	o	o	o	o	o	o	o	o
A345	o	o	o	o	o				
A346	o	o							
A380									
B737	o	o		o	o	o	o		
B744	o	o	o	o	o				
B74S									
B757, B767	o	o	o	o	o	o	o		
B772	o	o	o	o	o	o	o	o	o
B773, B773ER	o	o							
B788							o	o	o

TERMINAL 3 (contd) Aircraft Type / Stands	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
A300, A310, A319, A320, A321		o	o	o	o	o	o	o	o	o
A332, A333, A343, A345	o	o	o	o	o	o	o	o	o	o
A346, A380		o		o	o		o			
B707									o	o
B737						o				
B744	o	o	o	o	o	o	o	o	o	o
B74S										
B757, B767		o	o	o	o	o	o	o	o	o
B772	o	o	o	o	o	o	o	o	o	o
B773, B773ER		o		o	o	o	o	o	o	o
B788								o	o	o

BUDGET TERMINAL - Aircraft types that can be parked at stands (o) are as follows:

Aircraft Type / Stands	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	701	702
A319, A320, AT72, B737, DHC7	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
A321												o	o	o	o	o	o	o	o

REMOTE STANDS - Aircraft types that can be parked at stands (o) are as follows:

Aircraft Type / Stands	103	104	200	200L/R	201	202	202L/R	203	205	206	207	208	209
A300, A310	o	o	o		o	o		o	o	o	o	o	o
A319, A320	o	o		o	o		o	o	o	o	o	o	o
A321				o			o						
A330, A342, A343, A345	o	o	o		o	o		o	o	o			
A380	o	o											
AT72			o		o	o		o	o	o	o	o	o
B707, B727	o	o	o		o	o		o	o	o	o	o	o
B737	o	o		o	o		o	o	o	o	o	o	o
B747, B74S, B788	o	o	o		o	o		o	o	o			
B748	o	o											
B757	o	o	o		o	o		o	o	o	o	o	o
B767, B772, B773, B773ER	o	o	o		o	o		o	o	o			
DC8	o	o											
DC10	o	o	o		o	o		o	o	o			
DHC7											o	o	o
F70	o	o	o		o	o		o	o	o	o	o	o
IL62			o		o	o		o	o	o			
L101	o	o	o		o	o		o	o	o			
MD11	o	o	o		o	o		o	o	o			

REMOTE STANDS - Aircraft types that can be parked at stands (o) are as follows:

Acft Type \ Stands	300	301	302	303	304	305	306	307	308	309	310	400	401	402	403	404
A300, A310	o	o	o	o	o	o	o			o	o	o	o	o	o	
A319, A320	o	o	o	o	o	o	o			o	o	o	o	o	o	
A330, A342	o		o								o	o	o			
A343, A345	o		o								o	o	o			
AT72				o	o	o	o									
B707	o	o	o	o	o	o	o			o	o	o	o	o	o	
B727	o	o	o	o	o	o	o			o	o	o	o	o	o	o
B737	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
B747	o		o								o	o	o			
B74S, B788	o		o								o	o	o			
B757, B767	o	o	o	o	o	o	o			o	o	o	o	o	o	
B772, B773	o		o								o	o	o			
B773ER	o		o								o	o	o			
DC10	o		o				o				o	o	o			
DC8	o	o	o	o	o	o	o			o	o					
F70	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
L101	o		o				o				o	o	o			
MD11	o		o				o				o	o	o			

MARS STANDS - Aircraft types that can be parked at stands (o) are as follows:

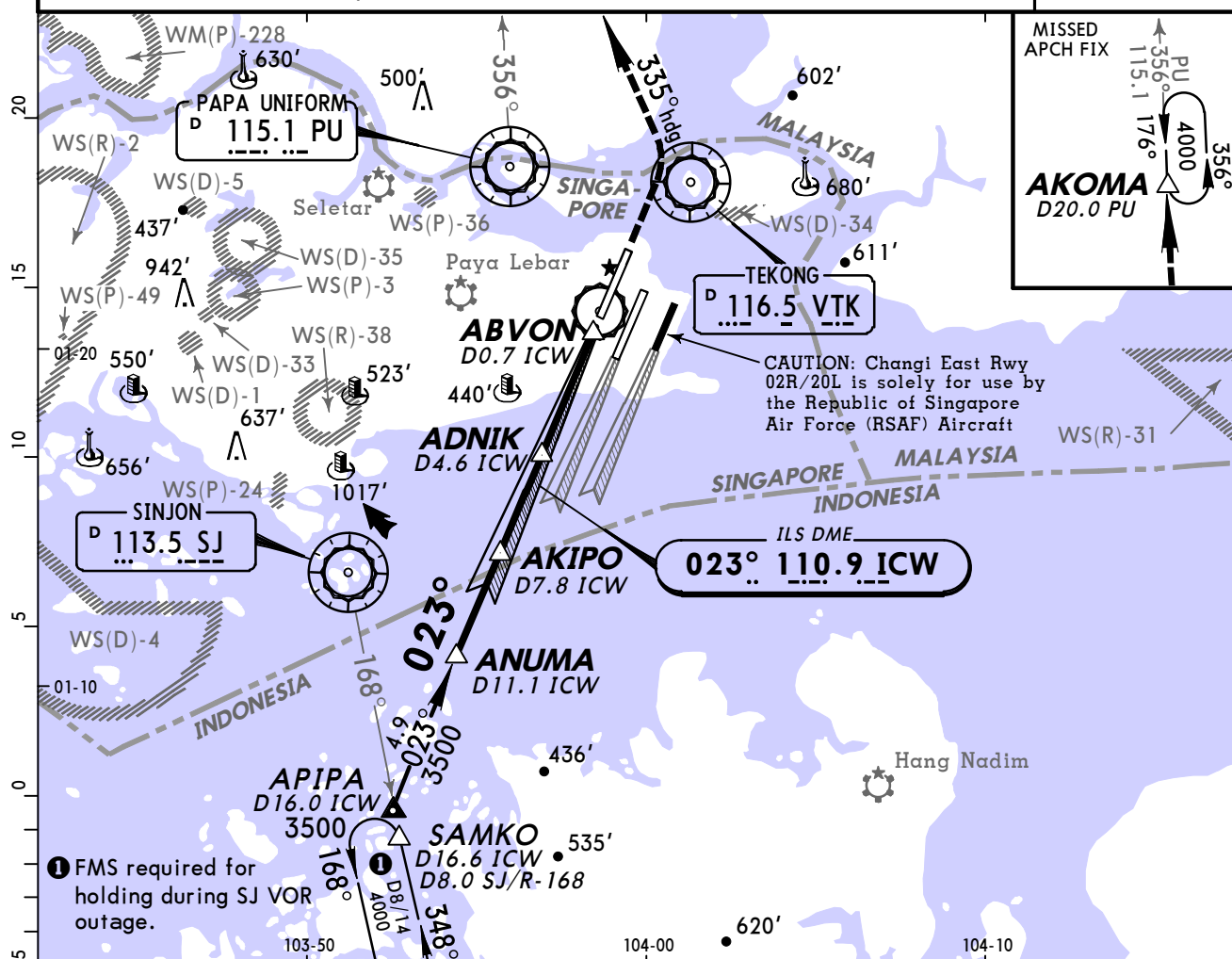
Aircraft Type / Stands	101	101L	101R	102	102L	102R
A300	o			o		
A310	o			o		
A319		o	o		o	o
A320		o	o		o	o
A321		o	o		o	o
A332	o			o		
A333	o			o		
A342	o			o		
A343	o			o		
A345	o			o		
A380	o			o		
B737		o	o		o	o
B747	o			o		
B748	o			o		
B757	o			o		
B762	o			o		
B763	o			o		
B772	o			o		
B773	o			o		
B773ER	o			o		
B787-8	o			o		

Aircraft types that can be parked at stands (o) are as follows:

Aircraft Type	CARGO STANDS													
	502	503	504	505	506	507	508	509	601	602	603	604	611	612
A300	o	o	o	o	o	o	o	o	o	o	o	o		
A306													o	o
A310	o	o	o	o	o	o	o	o	o	o	o	o	o	o
A330									o	o	o	o	o	o
A332	o	o	o	o	o	o	o	o	o	o	o	o		
A333	o	o	o	o	o	o	o	o	o	o	o	o		
A342	o	o	o	o	o	o	o	o	o	o	o	o	o	o
A343	o	o	o	o	o	o	o	o	o	o	o	o	o	o
A345	o							o						
A346	o							o						
A380	o							o						
B707	o	o	o	o	o	o	o	o	o	o	o	o		
B727	o	o	o	o	o	o	o	o	o	o	o	o	o	o
B737	o	o	o	o	o	o	o	o	o	o	o	o	o	o
B744	o	o	o	o	o	o	o	o	o	o				
B747	o	o	o	o	o	o	o	o	o	o	o	o		
B748						o	o	o			o	o		
B74S	o	o	o	o	o	o	o	o	o	o	o	o		
B752													o	o
B753													o	o
B757	o	o	o	o	o	o	o	o	o	o	o	o		
B762	o	o	o	o	o	o	o	o	o	o	o	o	o	o
B763	o	o	o	o	o	o	o	o	o	o	o	o	o	o
B764	o	o	o					o			o	o		
B772	o	o	o	o	o	o	o	o	o	o	o	o	o	o
B772LR													o	o
B773	o	o	o	o	o	o	o	o	o	o	o	o		
B773ER	o	o	o	o	o	o	o	o	o	o	o	o		
B777F													o	o
DC8	o	o	o	o	o	o	o	o	o	o	o	o	o	o
DC10	o	o	o	o	o	o	o	o	o	o	o	o	o	o
IL62	o	o	o	o	o	o	o	o	o	o	o	o	o	o
IL86	o	o	o	o	o	o	o	o	o	o	o	o	o	o
L101	o	o	o	o	o	o	o	o	o	o	o	o	o	o
MD11	o	o	o	o	o	o	o	o	o	o	o	o	o	o

MSA VTK VOR

1. **RADAR required.** 2. Simultaneous approaches authorized with Rwy 02R or 02C. 3. ILS DME co-located with glideslope. 4. Maritime vessels of variable heights in water north and south of Rwy.



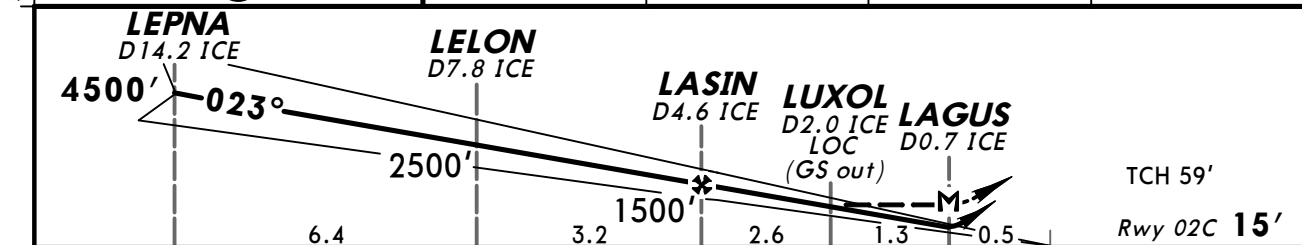
Gnd speed-Kts	70	90	100	120	140	160	
GS 3.00°	372	478	531	637	743	849	
1 FAF to MAP 3.9	3:21	2:36	2:20	1:57	1:40	1:28	
MAP at ABYON/D0.7 ICW							

STRAIGHT-IN LANDING RWY02L						CIRCLE-TO-LAND	
ILS DA(H) 222' (200')				LOC (GS out) MDA(H) 420' (398')			
FULL		TDZ or CL out	ALS out			ALS out	
A	RVR 550m VIS 800m	RVR 720m VIS 800m	1200m	RVR 720m	RVR 1500m	A	NA
B				VIS 800m	VIS 1600m	B	
C						C	
D				1200m	RVR 1800m VIS 2000m	D	

1 Timing not authorized when GS inop.

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D-ATIS 128.6	SINGAPORE Approach (R) 120.3	SINGAPORE Arrival (R) 119.3	SINGAPORE Tower 118.6 *118.25	Ground 124.3
LOC ICE 108.3	Final Apch Crs 023°	GS LEPNA 4500' (4485')	ILS DA(H) 215' (200')	Apt Elev 22' Rwy 02C 15'
MISSED APCH: Climb to 3000' via heading 023° and VTK R-023 to NYLON (VTK R-023/D13.0) and hold or as directed by ATC.				
Alt Set: hPa Rwy Elev: 1 hPa Trans level: FL 130 Trans alt: 11000' 1. RADAR required. 2. Simultaneous approaches authorized with Rwy 2R or 2L. 3. ILS DME co-located with glide slope. 4. Maritime vessels of variable heights in water north and south of Rwy.				



Gnd speed-Kts	70	90	100	120	140	160	ALSFI	3000'	023°	VTK
GS	3.00°	372	478	531	637	743	PAPI	↑	hdg	and 116.5
FAF to MAP	3.9	3:21	2:36	2:20	1:57	1:40	REIL			R-023
MAP at LAGUS/D0.7 ICE										

STRAIGHT-IN LANDING RWY02C						CIRCLE-TO-LAND	
ILS			LOC (GS out)				
DA(H) 215' (200')			MDA(H) 420' (405')			MDA(H) 660' (645')	
FULL			With LUXOL/D2.0 ICE			Without LUXOL/D2.0 ICE	
ALS out			ALS out			ALS out	
A	RVR 720m		RVR 720m	RVR 1500m	RVR 720m	RVR 1500m	NA
B	VIS 800m	1200m	VIS 800m	VIS 1600m	VIS 800m	VIS 1600m	
C			1200m	RVR 1800m	RVR 1800m	2800m	
D				VIS 2000m	VIS 2000m	3200m	

Timing not authorized when GS inop.

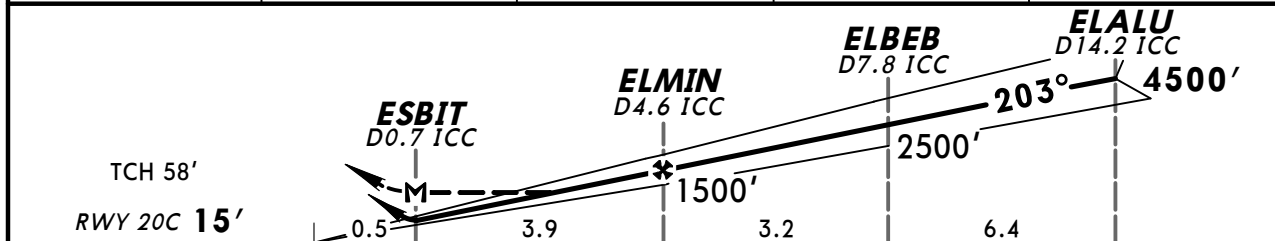
CHANGES: Tower frequency, notes.

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D-ATIS 128.6	SINGAPORE Approach (R) 120.3	SINGAPORE Arrival (R) 119.3	SINGAPORE Tower 118.6 *118.25	Ground 124.3
LOC ICC 109.7	Final Apch Crs 203°	GS ELALU 4500' (4485')	ILS DA(H) 215' (200')	Apt Elev 22' RWY 20C 15'
MISSED APCH: Climb to 4000' via VTK R-203 to ESLUX (D6.7 VTK). At ESLUX (1000' or above) turn LEFT heading 130° to intercept VTK R-158 to EXOMO (VTK R-158/D22.0) and hold or as directed by ATC.				
Alt Set: hPa Rwy Elev: 1 hPa Trans level: FL 130 Trans alt: 11000'				
1. RADAR required. 2. Simultaneous approaches authorized with Rwy 20L or 20R. 3. ILS DME co-located with glide slope. 4. Maritime vessels of variable heights in water north and south of Rwy.				
MSA VTK VOR				



LOC (GS out)	ICC DME ALTITUDE	2.0 650'	3.0 970'	4.0 1290'
-----------------	---------------------	-------------	-------------	--------------



Gnd speed-Kts	70	90	100	120	140	160	ALSIF-II	4000'	VTK	ESLUX
GS	3.00°	372	478	531	637	743	849	PAPI	via 116.5	
FAF to MAP	3.9	3:21	2:36	2:20	1:57	1:40	1:28	REIL	R-203	
MAP at ESBIT/D0.7 ICC										

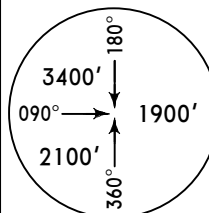
STRAIGHT-IN LANDING RWY20C					CIRCLE-TO-LAND	
ILS DA(H) 215' (200')			LOC (GS out) MDA(H) 420' (405')			
FULL	TDZ or CL out	ALS out	FULL	TDZ or CL out	ALS out	
A						A
B	RVR 550m	RVR 720m	RVR 720m	RVR 720m	RVR 1500m	B
C	VIS 800m	VIS 800m	1200m	1200m	VIS 1600m	C
D					RVR 1800m	D
					VIS 2000m	

Timing not authorized when GS inop.

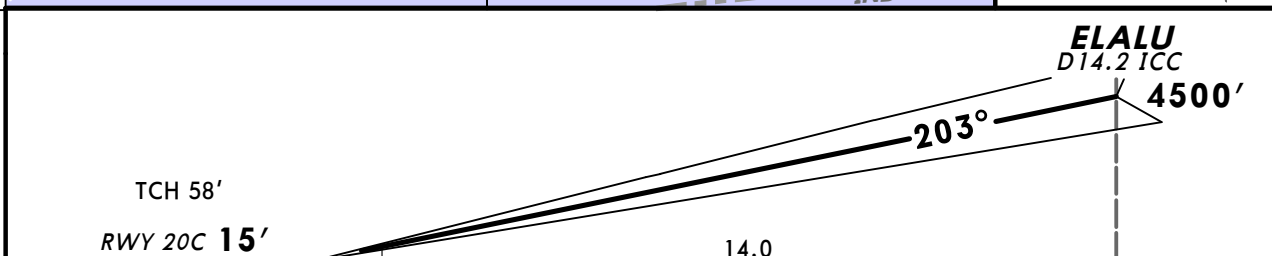
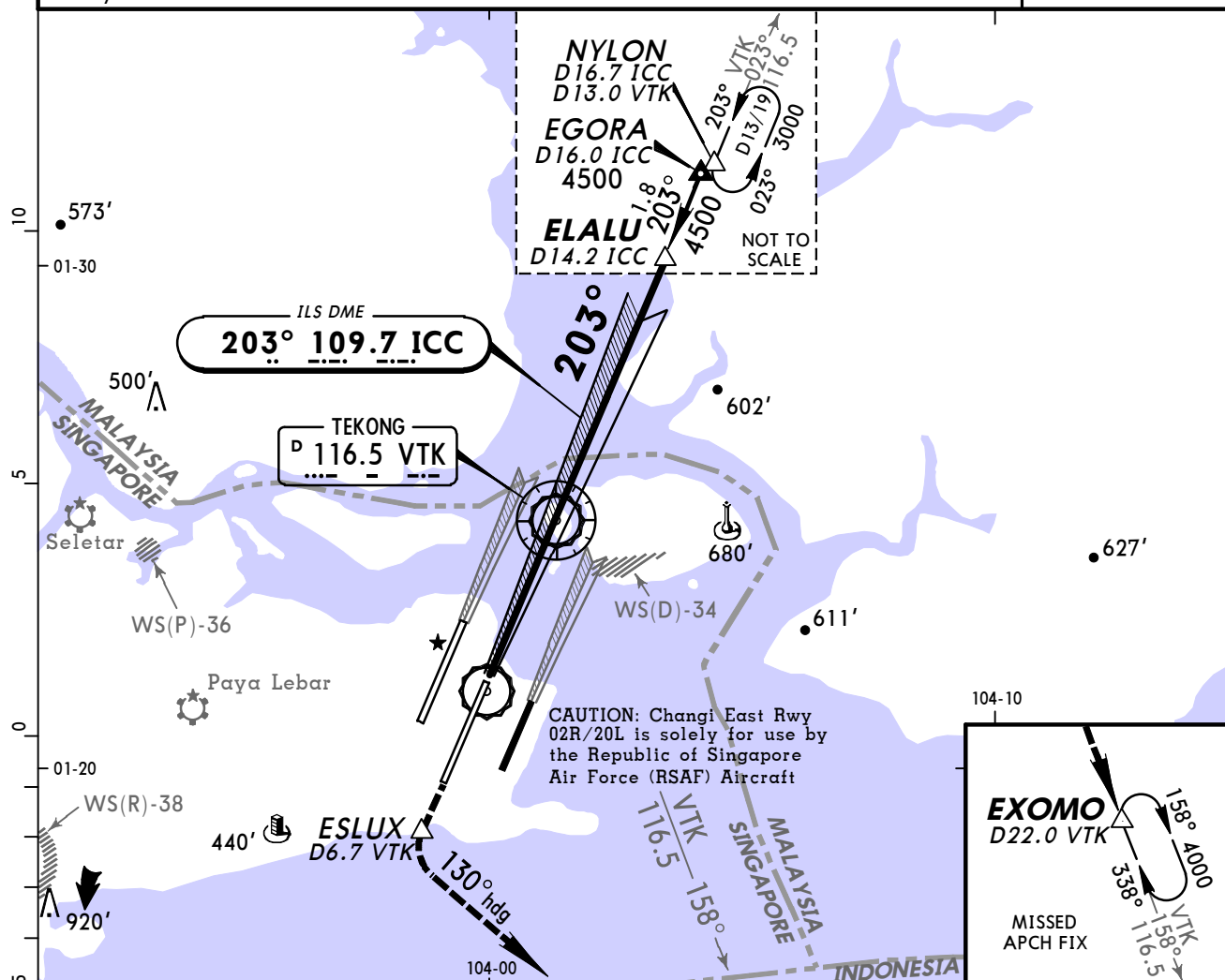
CHANGES: Tower communications, aircraft speed restriction note removed.

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D-ATIS 128.6	SINGAPORE Approach (R) 120.3	SINGAPORE Arrival (R) 119.3	SINGAPORE Tower 118.6 *118.25	Ground 124.3
LOC ICC 109.7	Final Apch Crs 203°	GS ELALU 4500' (4485')	CAT II ILS RA 102' DA(H)115' (100')	Apt Elev 22' RWY 20C 15'
MISSED APCH: Climb to 4000' via VTK R-203 to ESLUX (D6.7 VTK). At ESLUX (1000' or above) turn LEFT heading 130° to intercept VTK R-158 to EXOMO (VTK R-158/D22.0) and hold or as directed by ATC.				
Alt Set: hPa Rwy Elev: 1 hPa Trans level: FL 130 Trans alt: 11000' 1. RADAR required. 2. Simultaneous approaches authorized with Rwy 20L or 20R. 3. ILS DME co-located with glide slope. 4. Maritime vessels of variable heights in water north and south of Rwy.				



MSA VTK VOR



Gnd speed-Kts	70	90	100	120	140	160	ALSF-II	4000'	VTK	ESLUX
GS	3.00°	372	478	531	637	743	849	↑	via 116.5	R-203

STRAIGHT-IN LANDING RWY20C

CAT II ILS

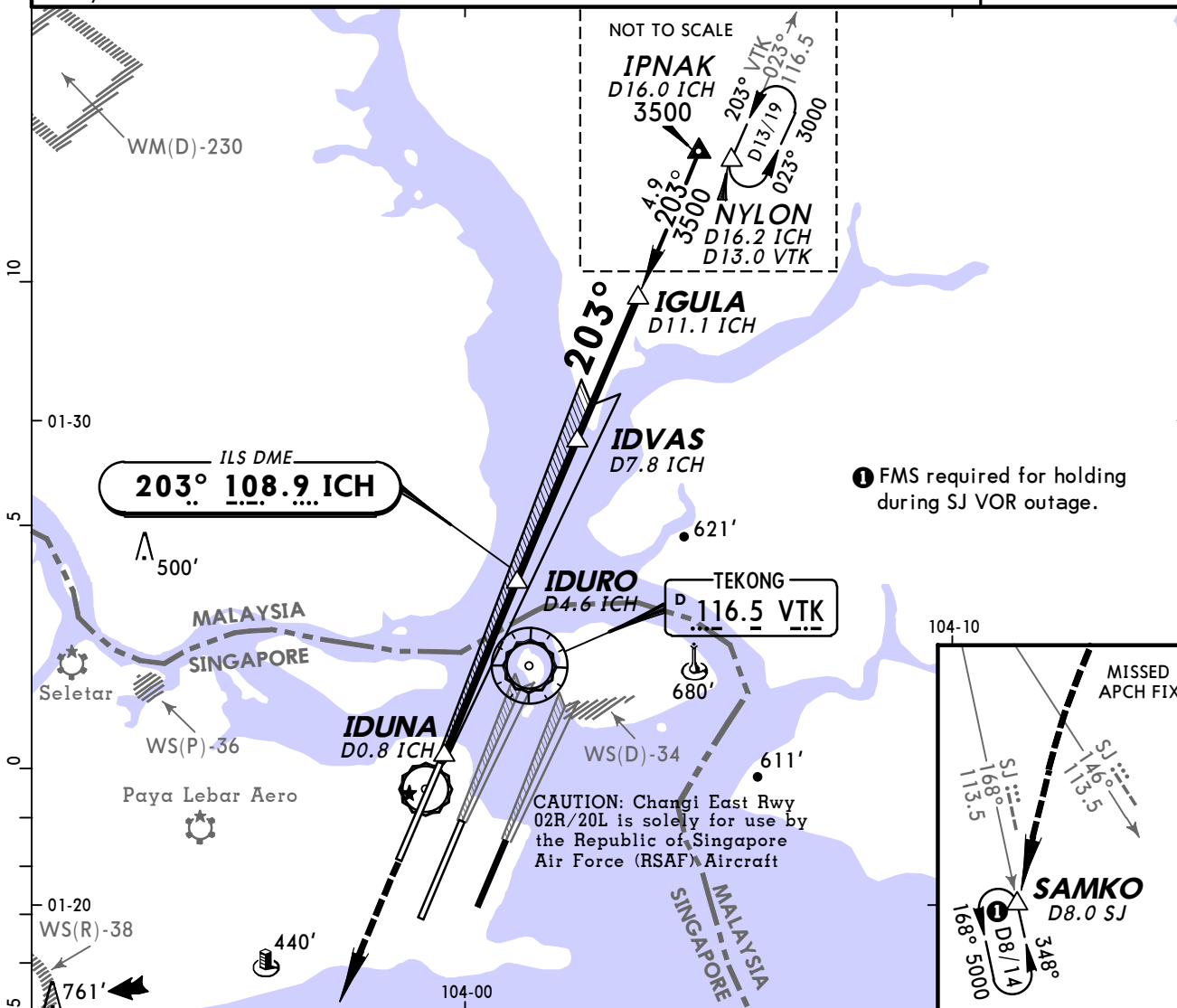
RA 102'

DA(H) 115' (100')

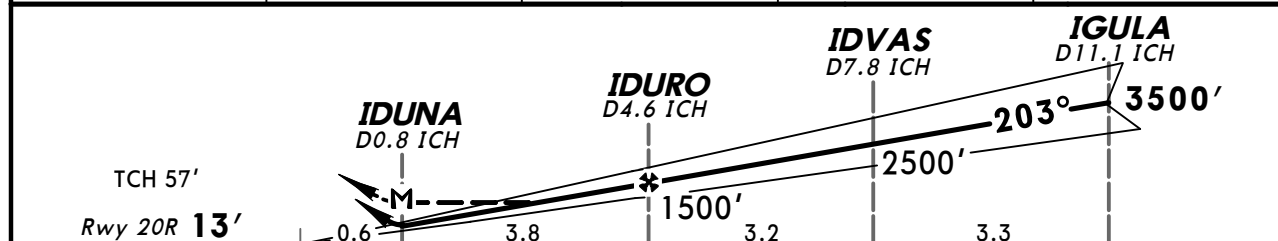
RVR 350m

PANS OPS

D-ATIS 128.6	SINGAPORE Approach (R) 120.3	SINGAPORE Arrival (R) 119.3	SINGAPORE Tower 118.6 *118.25	Ground 124.3
LOC ICH 108.9	Final Apch Crs 203°	GS IGULA 3500' (3487')	ILS DA(H) 213' (200')	Apt Elev 17' Rwy 20R 13'
MISSED APCH: Climb straight ahead to 5000'. On crossing SJ R-146, proceed direct SAMKO holding area and hold or as directed by ATC.				
Alt Set: hPa Rwy Elev: 1 hPa Trans level: FL 130 Trans alt: 11000'				
1. RADAR required. 2. Simultaneous approaches authorized with Rwy 20L or 20C. 3. ILS DME co-located with glide slope. 4. Maritime vessels of variable heights in water north and south of rwy.				



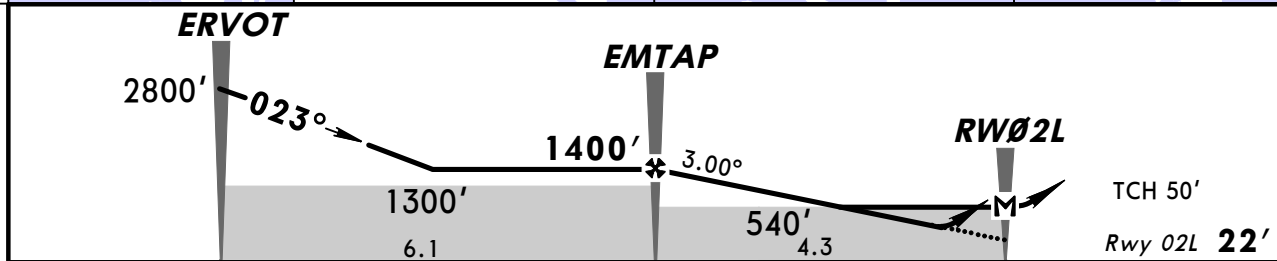
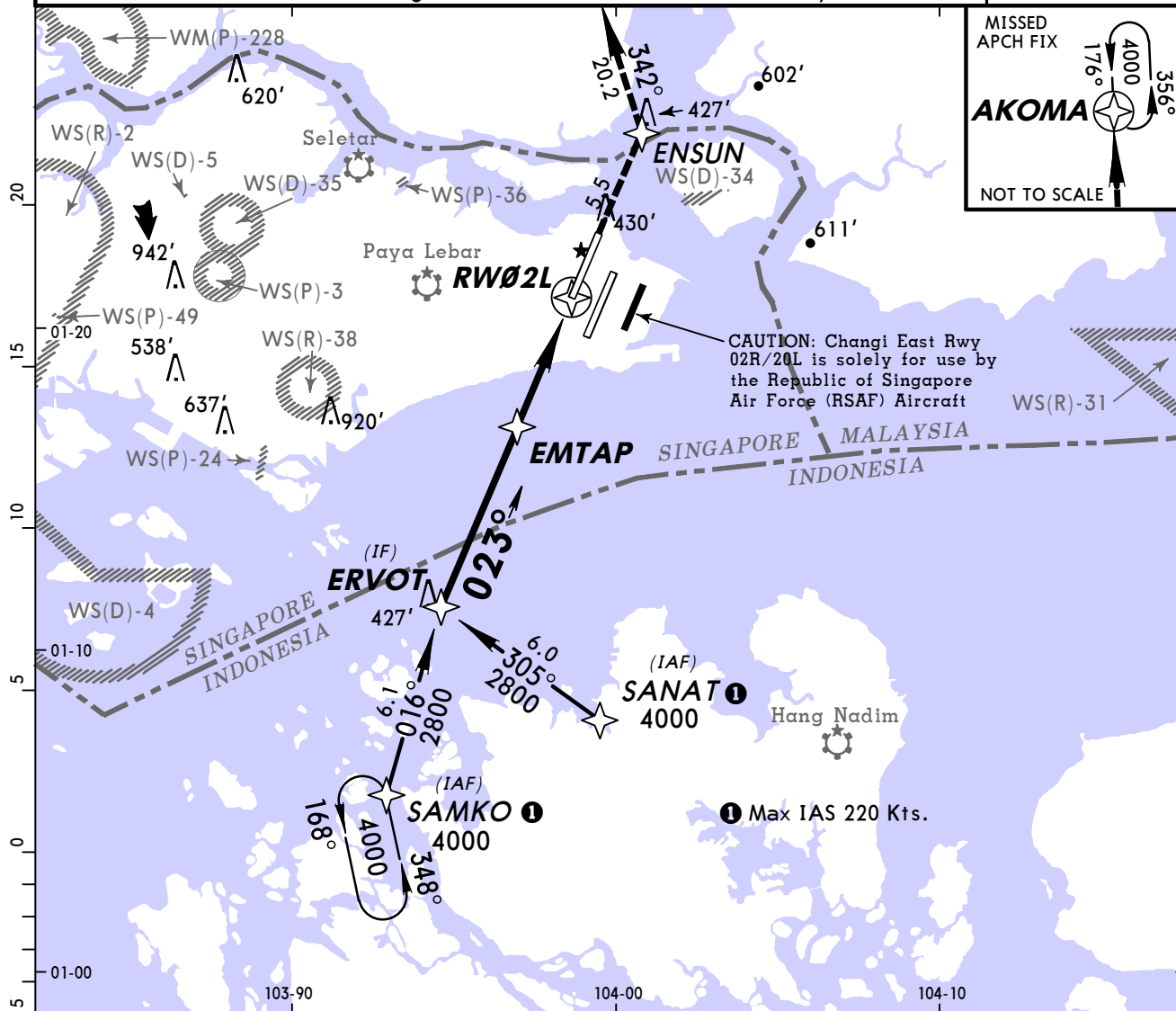
LOC (GS out)	ICH DME ALTITUDE	2.0 650'	3.0 970'	4.0 1290'
-----------------	---------------------	-------------	-------------	--------------



Gnd speed-Kts	70	90	100	120	140	160	HIALS	5000'	SJ		
GS	3.00°	372	478	531	637	743	849	REIL	on crossing	113.5	
FAF to MAP	3.9	3:21	2:36	2:20	1:57	1:40	1:28	PAPI			
MAP at IDUNA/D0.8 ICH											

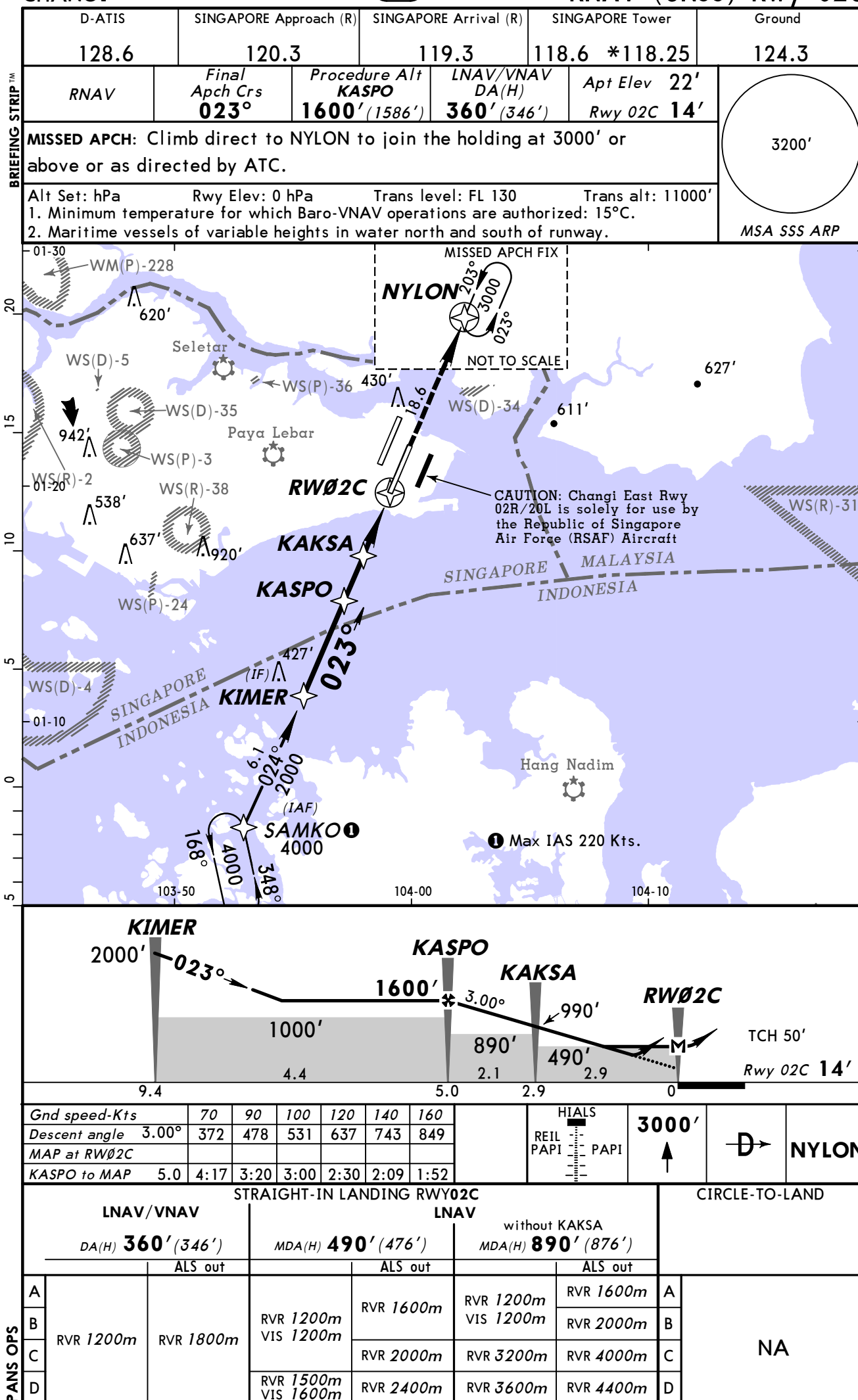
STRAIGHT-IN LANDING RWY 20R				CIRCLE-TO-LAND	
ILS		LOC (GS out)			
DA(H) 213' (200')		MDA(H) 420' (407')			
FULL		ALS out			
A	RVR 720m		RVR 720m	A	NA
B	VIS 800m		VIS 800m	B	
C		1200m	1200m	C	
D			1200m	D	

D-ATIS 128.6	SINGAPORE Approach (R) 120.3	SINGAPORE Arrival (R) 119.3	SINGAPORE Tower 118.6 *118.25	Ground 124.3
RNAV	Final Apch Crs 023°	Procedure Alt EMTAP 1400' (1378')	LNAV/VNAV DA(H) 450' (428')	Apt Elev 22' Rwy 02L 22'
MISSED APCH: Climb direct to ENSUN. Turn LEFT to AKOMA to join the holding at 4000' or above or as directed by ATC.				
Alt Set: hPa Rwy Elev: 1 hPa Trans level: FL 130 Trans alt: 11000' 1. Minimum temperature for which Baro-VNAV operations are authorized: 5°C (41°F). 2. Maritime vessels of variable heights in water north and south of runway.				
				3200'
				MSA SSS ARP



Gnd speed-Kts	70	90	100	120	140	160	ALSF-II	4000'	ENSUN
Descent angle	3.00°	372	478	531	637	743	REIL PAPI		
MAP at RWY 02L							PAPI		
EMTAP to MAP	4.3	3:41	2:52	2:35	2:09	1:51			

STRAIGHT-IN LANDING RWY02L				CIRCLE-TO-LAND	
LNAV/VNAV DA(H) 450' (428')		LNAV MDA(H) 540' (518')			
ALS out		ALS out			
A		RVR 1200m	RVR 1600m	A	NA
B	RVR 1400m	VIS 1200m		B	
C		RVR 1600m	RVR 2400m	C	
D		RVR 2000m	RVR 2800m	D	

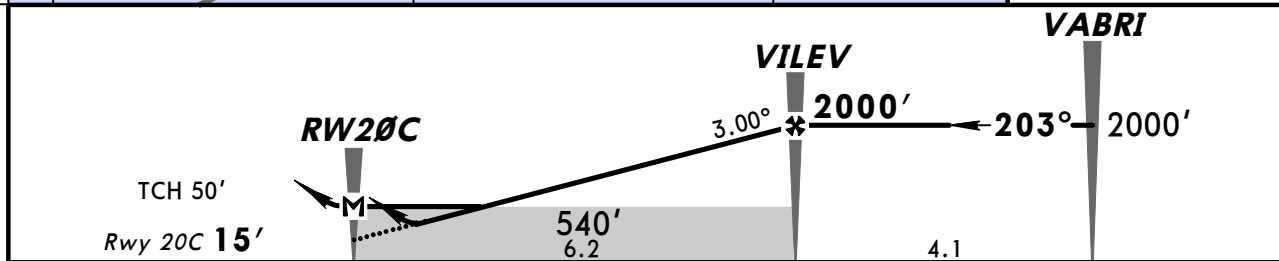


WSSS/SIN
CHANGI

15 AUG 14 (12-3) Eff 21 Aug

SINGAPORE, SINGAPORE
RNAV (GNSS) Rwy 20C

D-ATIS 128.6	SINGAPORE Approach (R) 120.3	SINGAPORE Arrival (R) 119.3	SINGAPORE Tower 118.6 *118.25	Ground 124.3
RNAV	Final Apch Crs 203°	Procedure Alt VILEV 2000' (1985')	LNAV/VNAV DA(H) 490' (475')	Apt Elev 22' Rwy 20C 15'
MISSED APCH: Climb direct to ESLUX. Turn LEFT to magnetic course 142° to join the holding at 3600' or above or as directed by ATC.				
Alt Set: hPa Rwy Elev: 1 hPa Trans level: FL 130 Trans alt: 11000' 1. Minimum temperature for which Baro-VNAV operations are authorized: 15°C. 2. Maritime vessels of variable heights in water north and south of runway.				
				3200'
				MSA SSS ARP



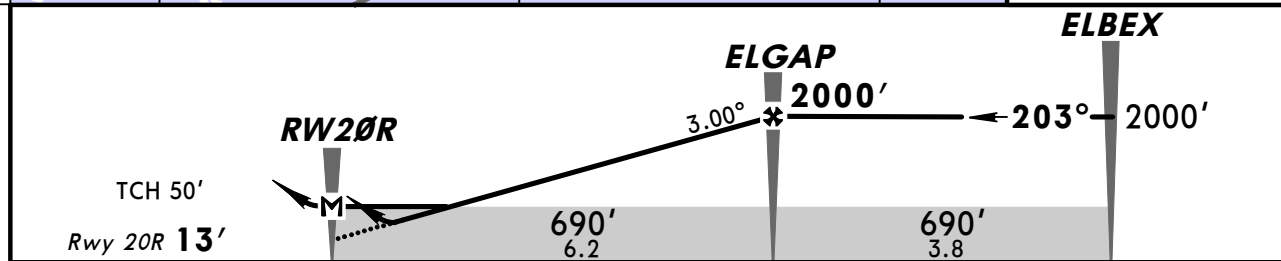
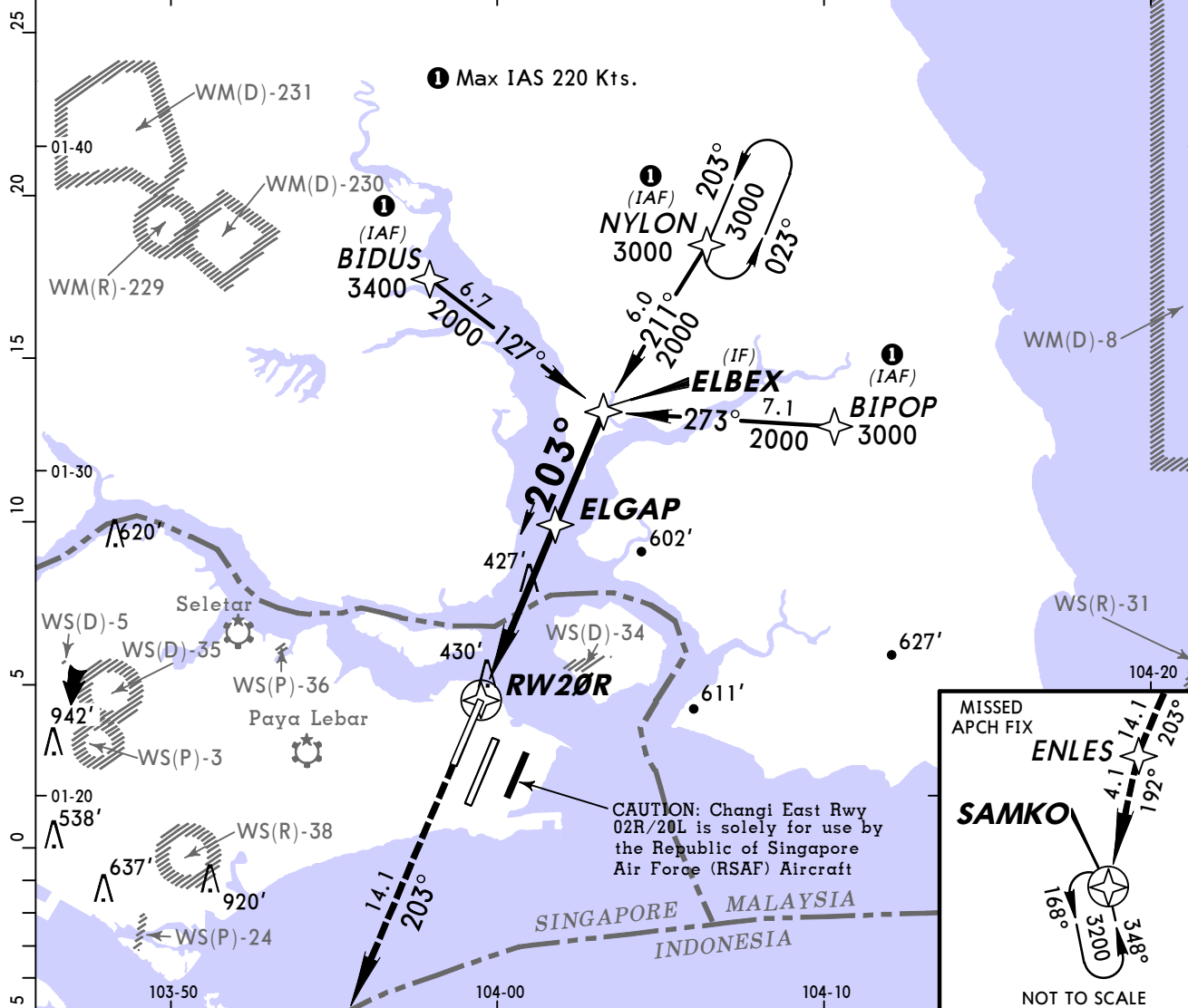
Gnd speed-Kts	70	90	100	120	140	160	ALSF-II	3600'	ESLUX
Descent angle	3.00°	372	478	531	637	743	REIL PAPI		
MAP at RW20C							PAPI		
VILEV to MAP	6.2	5:19	4:08	3:43	3:06	2:39	2:20		

STRAIGHT-IN LANDING RWY20C				CIRCLE-TO-LAND			
LNAV/VNAV		LNAV					
DA(H) 490' (475')		MDA(H) 540' (525')					
ALS out		ALS out					
A		RVR 1200m	RVR 1600m	A			
B	RVR 1600m	RVR 2400m	RVR 2400m	B			
C		RVR 1600m	RVR 2400m	C			
D		RVR 2000m	RVR 2800m	D			

CHANGES: New procedure.

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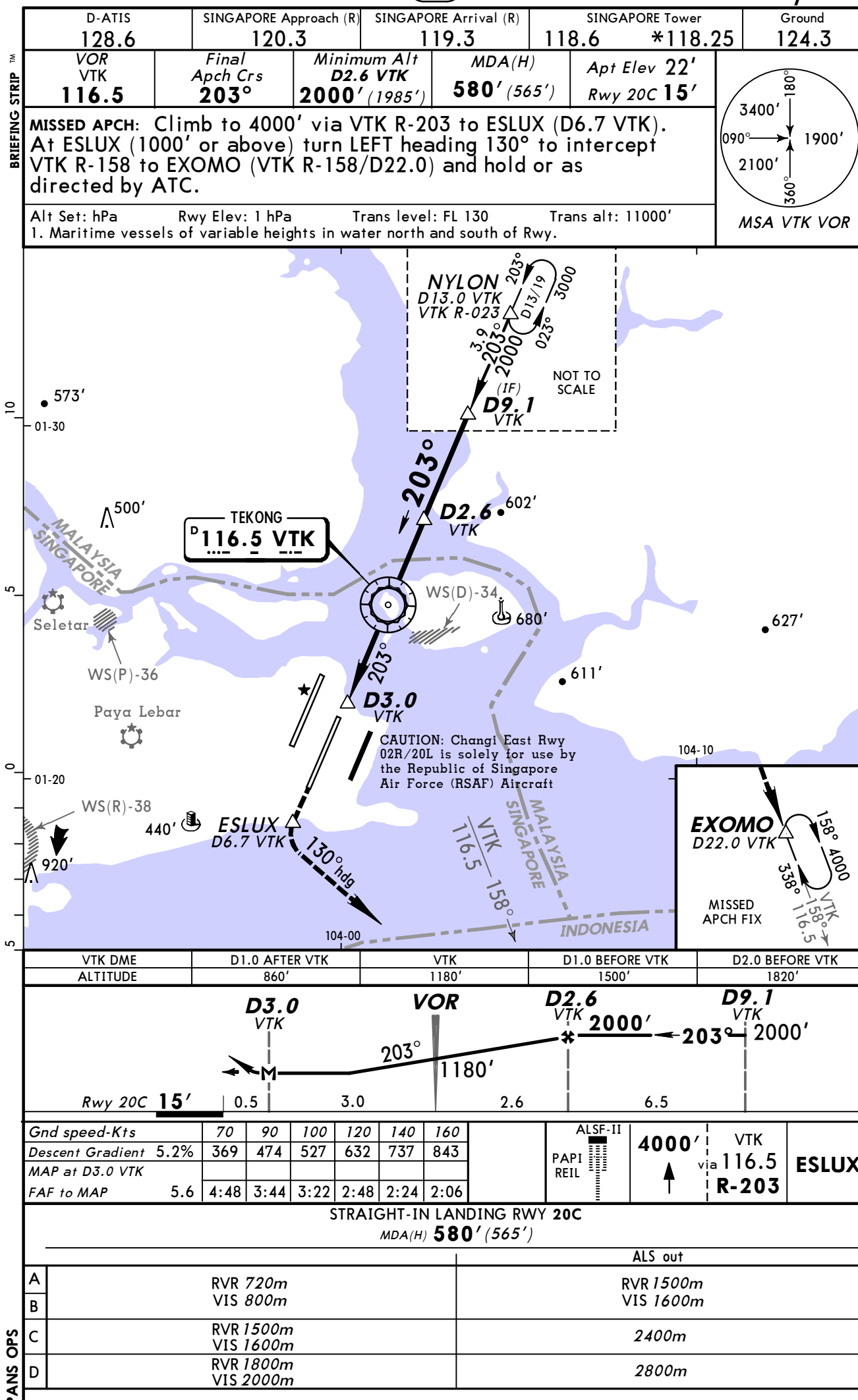
D-ATIS 128.6	SINGAPORE Approach (R) 120.3	SINGAPORE Arrival (R) 119.3	SINGAPORE Tower 118.6 *118.25	Ground 124.3
RNAV	Final Apch Crs 203°	Procedure Alt ELGAP 2000' (1987')	LNAV/VNAV DA(H) 690' (677')	Apt Elev 22' Rwy 20R 13'
MISSED APCH: Climb direct to ENLES. Turn LEFT to SAMKO to join the holding at 3200' or above or as directed by ATC.				
Alt Set: hPa Rwy Elev: 1 hPa Trans level: FL 130 Trans alt: 11000'				
1. Minimum temperature for which Baro-VNAV operations are authorized: 15°C. 2. Maritime vessels of variable heights in water north and south of runway.				
MSA SSS ARP				



Gnd speed-Kts	70	90	100	120	140	160	ALSF-II	3200'	ENLES
Descent angle	3.00°	372	478	531	637	743	REIL PAPI	↑	→
MAP at RW20R							PAPI		
ELGAP to MAP	6.2	5:19	4:08	3:43	3:06	2:39			

STRAIGHT-IN LANDING RWY20R				CIRCLE-TO-LAND			
LNAV/VNAV		LNAV					
DA(H) 690' (677')		MDA(H) 690' (677')					
ALS out		ALS out					
A		RVR 1200m	RVR 1600m	A		NA	
B	RVR 2800m	RVR 3600m		B			
C		RVR 2400m	RVR 3200m	C			
D		RVR 2800m	RVR 3600m	D			





SINGAPORE, (CHANGI - WSSS)

TERMINAL CHART CHANGE NOTICES

Chart Change Notices for Airport WSSS

Type: Terminal

Effectivity: Temporary

Begin Date: Immediately

End Date: Until Further Notice

Airport elevation changed to 22', Rwy 02L threshold elevation changed to 22', Rwy 02C threshold elevation changed to 14'.