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AMDT
02/2024
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21 MAR 2024
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21 MAR 2024

wp-AMDT-2024-02**1. Significant information and changes****1.1 Singapore FIR**

- a. Updated AIP Sections GEN, ENR and AD incorporating AIRAC AIP Supplement 018/2024 – Realignment of the Singapore and Jakarta Flight Information Regions (FIRs).
- b. Updated ENR 1.3 - Revision in waypoint for Direct Routing Operations for ATS route L644.
- c. Updated GEN 3.5 – Meteorological Services.

1.2 Singapore Changi Airport

- a. Incorporated AIRAC AIP Supplement 019/2024 – Departure, Arrival and Approach Procedures for Singapore Changi Airport
- b. Updated WSSS – AD-2-WSSS-ADC-2 and AD-2-WSSS-ADC-3.
- c. Incorporated AIRAC AIP Supplement 152/2023 – Singapore Changi Airport – Opening of Taxiway C (Between Taxiway C1 and Taxiway J), and re-designation of Taxiway K1 to Taxiway C

1.3 Seletar Airport

- a. Updated WSSL – AD-2-WSSL-ADC-1, AD-2-WSSL-ADC-2 and WSSL AD 2.12.

2. This amendment incorporates information contained in the listed AIRAC AIP Supplements and NOTAMs which are hereby superseded:**AIRAC AIP Supplements**

152/2023 dated 16/11/2023

018/2024 dated 11/01/2024

019/2024 dated 11/01/2024

NOTAMs

A0836/24 dated 06/03/2024

A0522/24 dated 15/02/2024

Amended Pages

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AD 2.WSSS-43/44: : *replace.*
AD 2.WSSS-45/46: : *replace.*
AD 2.WSSS-47/48: : *replace.*
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AD-2-WSSS-AOC-2: : *replace.*
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AIP AMENDMENT

NR/Year	Publication date	Date inserted	Inserted by
02/2023	20 APR 2023	20 APR 2023	
03/2023	15 JUN 2023	15 JUN 2023	
04/2023	10 AUG 2023	10 AUG 2023	
05/2023	05 OCT 2023	05 OCT 2023	
06/2023	30 NOV 2023	30 NOV 2023	
01/2024	25 JAN 2024	25 JAN 2024	
02/2024	21 MAR 2024	21 MAR 2024	

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GEN 0.3 RECORD OF CURRENT AIP SUPPLEMENTS

NR/Year	Subject	AIP section(s) affected	Period of validity (from/to)	Cancellation record
021/2020	Singapore Changi Airport - Long term closure of aircraft stand E5 at Terminal 2, Singapore Changi Airport	AD	30 MAR 2020 / 30 DEC 2024	
059/2020	Singapore Changi Airport - Long term closure of aircraft stand E20 at Terminal 2, Singapore Changi Airport	AD	25 AUG 2020 / 30 DEC 2026	
161/2021	Singapore Changi Airport - Steel Frame	AD	17 JAN 2022 / 17 DEC 2024	
055/2023	Paya Lebar Airport - Crawler Cranes	AD	13 APR 2023 / 01 APR 2024	
057/2023	Paya Lebar Airport - Cranes	AD	13 APR 2023 / 31 MAR 2024	
061/2023	Paya Lebar Airport - Mobile Crane	AD	13 APR 2023 / 23 MAR 2024	
062/2023	Paya Lebar Airport - Luffing Cranes	AD	13 APR 2023 / 23 MAR 2024	
065/2023	Paya Lebar Airport - Luffing Tower Crane	AD	11 MAY 2023 / 31 DEC 2024	
066/2023	Paya Lebar Airport - Cranes	AD	11 MAY 2023 / 30 APR 2024	
067/2023	Paya Lebar Airport - Cranes	AD	11 MAY 2023 / 30 APR 2024	
068/2023	Paya Lebar Airport - Cranes	AD	11 MAY 2023 / 31 DEC 2024	
070/2023	Paya Lebar Airport - Luffing Tower Cranes	AD	11 MAY 2023 / 30 APR 2024	
073/2023	Paya Lebar Airport - Luffing Cranes	AD	08 JUN 2023 / 31 MAY 2024	
074/2023	Paya Lebar Airport - Cranes	AD	08 JUN 2023 / 26 MAY 2024	
075/2023	Paya Lebar Airport - Topless Crane	AD	08 JUN 2023 / 30 DEC 2024	
076/2023	Paya Lebar Airport - Luffing Cranes	AD	08 JUN 2023 / 30 DEC 2024	
077/2023	Paya Lebar Airport - Topless Tower Cranes	AD	08 JUN 2023 / 31 MAY 2024	
079/2023	Paya Lebar Airport - Mobile Crane	AD	08 JUN 2023 / 31 DEC 2024	
080/2023	Paya Lebar Airport - Mobile Cranes	AD	08 JUN 2023 / 31 DEC 2024	
083/2023	Paya Lebar Airport - Luffing Crane	AD	08 JUN 2023 / 31 DEC 2024	
084/2023	Paya Lebar Airport - Luffing Tower Crane	AD	08 JUN 2023 / 31 MAY 2024	
086/2023	Paya Lebar Airport - Crawler Crane	AD	08 JUN 2023 / 01 MAY 2024	
088/2023	Paya Lebar Airport - Lorry Crane	AD	08 JUN 2023 / 12 MAY 2024	
092/2023	Paya Lebar Airport - Luffer Tower Crane	AD	13 JUL 2023 / 31 DEC 2024	
093/2023	Paya Lebar Airport - Luffer Tower Crane	AD	13 JUL 2023 / 27 JUN 2024	
094/2023	Paya Lebar Airport - Cranes	AD	13 JUL 2023 / 30 JUN 2024	
095/2023	Paya Lebar Airport - Cranes	AD	13 JUL 2023 / 10 APR 2024	

NR/Year	Subject	AIP section(s) affected	Period of validity (from/to)	Cancellation record
097/2023	Paya Lebar Airport - Topless Tower Cranes	AD	13 JUL 2023 / 14 JUN 2024	
098/2023	Paya Lebar Airport - Mobile Cranes	AD	13 JUL 2023 / 12 JUN 2024	
107/2023	Paya Lebar Airport - Mobile Crane	AD	10 AUG 2023 / 31 JUL 2024	
109/2023	Paya Lebar Airport - Mobile Crane	AD	10 AUG 2023 / 31 AUG 2024	
113/2023	Paya Lebar Airport - Flat-Top Cranes	AD	10 AUG 2023 / 30 JUN 2024	
114/2023	Paya Lebar Airport - Cranes	AD	10 AUG 2023 / 31 DEC 2024	
115/2023	Paya Lebar Airport - Mobile Crane	AD	10 AUG 2023 / 31 JUL 2024	
116/2023	Paya Lebar Airport - Cranes	AD	10 AUG 2023 / 09 JUL 2024	
117/2023	Paya Lebar Airport - Mobile Crane	AD	07 SEP 2023 / 10 SEP 2024	
121/2023	Paya Lebar Airport - Crawler Cranes	AD	07 SEP 2023 / 31 DEC 2024	
123/2023	Paya Lebar Airport - Tower Crane	AD	07 SEP 2023 / 10 JUL 2024	
127/2023	Singapore Changi Airport - Closure of aircraft stand 604 at East Cargo Apron	AD	02 NOV 2023 / 30 MAY 2025	
129/2023	Seletar Airport - Closure of Helicopter Landing Area	AD	28 SEP 2023 / 30 SEP 2024	
130/2023	Paya Lebar Airport - Mobile Crane	AD	12 OCT 2023 / 06 OCT 2024	
131/2023	Paya Lebar Airport - Flat-Top Cranes	AD	12 OCT 2023 / 31 OCT 2024	
132/2023	Paya Lebar Airport - Topless Cranes	AD	12 OCT 2023 / 30 SEP 2024	
133/2023	Paya Lebar Airport - Mobile Cranes	AD	12 OCT 2023 / 12 SEP 2024	
134/2023	Paya Lebar Airport - Mobile Crane	AD	12 OCT 2023 / 30 OCT 2024	
135/2023	Paya Lebar Airport - Cranes	AD	12 OCT 2023 / 10 SEP 2024	
136/2023	Paya Lebar Airport - Cranes	AD	12 OCT 2023 / 01 SEP 2024	
138/2023	Singapore Changi Airport - Closure of Runway 02R/20L, Taxiway closures and restrictions	AD	30 NOV 2023 / 15 MAY 2024	
139/2023	Singapore Changi Airport - Steel and Frangible Frames and Frangible Posts	AD	30 NOV 2023 / 28 FEB 2025	
140/2023	Singapore Changi Airport - Downgrade of Taxilane N4 behind aircraft stand 604 to max wingspan 36m (Code C) and downgrade of aircraft stand 603 to Code C	AD	30 NOV 2023 / 30 MAY 2025	
141/2023	Singapore Changi Airport - Apply minimum thrust at East Cargo Apron	AD	23 OCT 2023 / 30 MAY 2025	
142/2023	Singapore Changi Airport - Temporary fixed objects in the runway strip of Runway 02C/20C	AD	30 NOV 2023 / 30 JUN 2024	
143/2023	Paya Lebar Airport - Luffing Cranes	AD	09 NOV 2023 / 31 DEC 2024	
144/2023	Paya Lebar Airport - Mobile Cranes	AD	09 NOV 2023 / 20 OCT 2024	
145/2023	Paya Lebar Airport - Mobile Crane	AD	09 NOV 2023 / 21 OCT 2024	

NR/Year	Subject	AIP section(s) affected	Period of validity (from/to)	Cancellation record
146/2023	Paya Lebar Airport - Tower Luffer Cranes	AD	09 NOV 2023 / 31 DEC 2024	
147/2023	Paya Lebar Airport - Tower Cranes	AD	09 NOV 2023 / 31 DEC 2024	
148/2023	Paya Lebar Airport - Mobile Cranes	AD	09 NOV 2023 / 05 JUN 2024	
149/2023	Paya Lebar Airport - Topless Cranes	AD	09 NOV 2023 / 31 OCT 2024	
150/2023	Paya Lebar Airport - Mobile Crane	AD	09 NOV 2023 / 13 APR 2024	
151/2023	Paya Lebar Airport - Cranes	AD	09 NOV 2023 / 08 OCT 2024	
153/2023	Paya Lebar Airport - Tower Cranes	AD	09 DEC 2023 / 08 DEC 2024	
154/2023	Paya Lebar Airport - Topless Cranes	AD	07 DEC 2023 / 01 DEC 2024	
155/2023	Paya Lebar Airport - Luffing Cranes	AD	07 DEC 2023 / 01 DEC 2024	
156/2023	Paya Lebar Airport - Cranes	AD	07 DEC 2023 / 31 JUL 2024	
157/2023	Paya Lebar Airport - Mobile Cranes	AD	07 DEC 2023 / 30 APR 2024	
158/2023	Paya Lebar Airport - Mobile Crane	AD	07 DEC 2023 / 26 MAY 2024	
159/2023	Paya Lebar Airport - Cranes	AD	07 DEC 2023 / 30 NOV 2024	
160/2023	Paya Lebar Airport - Tower Cranes	AD	08 DEC 2023 / 08 DEC 2024	
161/2023	Paya Lebar Airport - Cranes	AD	07 DEC 2023 / 30 NOV 2024	
162/2023	Paya Lebar Airport - Luffing Tower Crane	AD	07 DEC 2023 / 30 NOV 2024	
163/2023	Paya Lebar Airport - Mobile Crane	AD	07 DEC 2023 / 09 MAY 2024	
164/2023	Paya Lebar Airport - Mobile Crane	AD	07 DEC 2023 / 30 APR 2024	
165/2023	Singapore Changi Airport - Decommissioning of aircraft stands E1 and F30 and temporary closure of taxilanes R1, R2, R3 and aircraft stands E2, E3, E4, F31, F32, F33 and F34 due to construction work activities at Terminal 2	AD	08 FEB 2024 / 03 JAN 2028	
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006/2024	Paya Lebar Airport - Cranes	AD	11 JAN 2024 / 31 DEC 2025	
007/2024	Paya Lebar Airport - Luffing Cranes	AD	11 JAN 2024 / 31 DEC 2025	
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009/2024	Paya Lebar Airport - Luffing Crane	AD	11 JAN 2024 / 31 DEC 2024	

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013/2024	Paya Lebar Airport - Flat-Top Cranes	AD	11 JAN 2024 / 31 DEC 2024	
014/2024	Paya Lebar Airport - Luffing Crane	AD	11 JAN 2024 / 31 DEC 2024	
015/2024	Paya Lebar Airport - Cranes	AD	11 JAN 2024 / 30 DEC 2024	
016/2024	Paya Lebar Airport - Luffer Crane	AD	11 JAN 2024 / 31 DEC 2024	
017/2024	Singapore Changi Airport - Closure of aircraft stand 504 at West Cargo Apron	AD	22 FEB 2024 / 31 OCT 2025	
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021/2024	Paya Lebar Airport - Mobile Cranes	AD	08 FEB 2024 / 30 APR 2024	
022/2024	Paya Lebar Airport - Topless Cranes	AD	08 FEB 2024 / 30 NOV 2024	
023/2024	Paya Lebar Airport - Luffing Tower Crane	AD	08 FEB 2024 / 30 JUN 2025	
024/2024	Paya Lebar Airport - Luffing Crane	AD	08 FEB 2024 / 29 JAN 2025	
025/2024	Paya Lebar Airport - Crawler Cranes	AD	08 FEB 2024 / 31 JUL 2024	
026/2024	Paya Lebar Airport - Mobile Crane	AD	08 FEB 2024 / 31 MAY 2024	
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028/2024	Paya Lebar Airport - Crawler Crane	AD	08 FEB 2024 / 27 NOV 2024	
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044/2024	Paya Lebar Airport - Luffer Cranes	AD	08 FEB 2024 / 31 AUG 2025	
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046/2024	Paya Lebar Airport - Tower Cranes	AD	08 FEB 2024 / 16 FEB 2025	
047/2024	Paya Lebar Airport - Luffing Cranes	AD	08 FEB 2024 / 30 DEC 2025	
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070/2024	Paya Lebar Airport - Crawler Tower Cranes	AD	21 MAR 2024 / 31 MAR 2025	

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GEN 1.2 ENTRY, TRANSIT AND DEPARTURE OF AIRCRAFT

1 INTRODUCTION

- 1.1 International flights into, from or over Singapore territory shall be subject to the current Singapore regulations relating to civil aviation. These regulations correspond in all essentials to the Standards and Recommended Practices contained in Annex 9 to the Convention on International Civil Aviation.
- 1.2 Aircraft flying into or departing from Singapore territory shall make their first landing at, or final departure from an international aerodrome (see AIP Singapore page AD 1.3-1 and section AD 2).
- 1.3 Notwithstanding the regulations relating to civil aviation over Singapore territory, aircraft operators should consult the respective AIPs for other documentary and / or permit requirements for flights intending to enter, depart, and / or overfly the sovereign airspaces of States along the planned flight routes.
- ← 1.4 In particular, for Indonesian sovereign airspace within portions of airspace in which Singapore provides Air Traffic Services (ATS) (see ENR 2.1), aircraft operators should also consult AIP Indonesia GEN 1.2 Entry, Transit and Departure of Aircraft at <https://aimindonesia.dephub.go.id> for Indonesia's requirements for flights intending to enter, depart, and/or overfly its sovereign airspace. Please note that this AIP's reference to these requirements is without prejudice to Singapore's legal position on such requirements.

2 APPLICATION FOR SLOTS AT SINGAPORE CHANGI AIRPORT

- 2.1 Singapore Changi Airport is a slot coordinated airport, with Changi Airport Group (CAG) as the Slot Coordinator. To ensure efficiency of aircraft operations and optimisation of airport resources, all operators of scheduled and non-scheduled (commercial and non-commercial) flights must obtain slots from the Changi Slot Coordinator prior to the operation of such flights.
- 2.2 To apply for slots for access to Singapore Changi Airport, all operators or agents of non-scheduled, commercial and non-commercial flights shall submit applications for slots via either a Slot Clearance Request (SCR), or for operators without a 2-letter IATA airline code, a General (Aviation) Clearance Request (GCR) to the Changi Slot Coordinator at csc@changiairport.com.
Changi Slot Coordinator
c/o Changi Airport Group (Singapore) Pte Ltd
Singapore Changi Airport
P.O. Box 168
Singapore 918146
Tel: +65 6541 2378 or +65 6541 3064
- 2.3 Operators or agents of non-scheduled, commercial and non-commercial flights shall submit their slot requests to the Changi Slot Coordinator no later than 72 hours prior to the operation of the flight, for which the slot will be utilised.
- 2.4 To facilitate the optimisation of aircraft parking resources at Singapore Changi Airport, operators or agents of non-scheduled, commercial and non-commercial flights are strongly advised to limit their ground time to no more than 24 hours from the arrival slot timing.
- 2.5 For urgent non-scheduled, commercial and non-commercial flight operations that are less than 24 hours from the proposed date of operation, in addition to submitting the SCR/GCR, operators/agents must also inform the Airside Operations Section of CAG (Airside Control Centre) at +65 8533 4558 / +65 6541 2151.

2.6 EXEMPT FLIGHTS

- 2.6.1 Notwithstanding paragraph 2.1, the following types of flights may operate to / from Singapore Changi Airport without obtaining slots from the Changi Slot Coordinator:
- Emergency landings. e.g. diversions or quick returns after takeoff, oil spill response operations
 - Flights operating under diplomatic cover
 - Flights operated by the military, including those carrying supplies but excluding those chartered on a commercial basis by the military
 - Humanitarian flights including those responding to medical emergencies where the safety of human life is concerned or involved in search and rescue operations
 - Technical flights including radar and NAVAID calibration / check flights

2.7 RESTRICTIONS ON OPERATIONS AT SINGAPORE CHANGI AIRPORT

2.7.1 All scheduled operations using passenger aircraft with a capacity of less than 150 seats are not permitted at Singapore Changi Airport during the following peak hours. Exceptions may be granted for scheduled operations going to/coming from airports with restrictions on larger aircraft types.

Arrival Peak Hours		Departure Peak Hours	
In UTC	In Local Time	In UTC	In Local Time
0900 to 1059	1700 to 1859	1600 to 1759	0000 to 0159
1600 to 1759	0000 to 0159	2300 to 0159	0700 to 0959

2.7.2 All scheduled and non-scheduled (commercial and non-commercial) propeller aircraft operations are not permitted at Singapore Changi Airport.

3 SUBMISSION OF FLIGHT DETAILS AND APPLICATION FOR SLOTS AT SELETAR AIRPORT

3.1 Seletar Airport is a schedules facilitated airport, with Changi Airport Group (CAG) as the Seletar Schedules Facilitator. To ensure efficiency of aircraft operations and optimisation of airport resources, all operators of non-scheduled (commercial and non-commercial) flights must submit details of their planned operations to the Seletar Schedules Facilitator prior to these operations. Operators shall also be prepared to make adjustments to their schedules when necessary as advised by the Seletar Schedules Facilitator to ensure that airport capacity parameters are not exceeded. In addition, all operators of scheduled flights must obtain slots from the Seletar Schedules Facilitator prior to the operation of such flights. No operation will be permitted without the approval of the Seletar Schedules Facilitator.

3.2 For non-scheduled (commercial and non-commercial) flight operations, operators or agents shall submit details of their planned operations to seletar.airside@changiairport.com during the flights submission window, defined as no earlier than 7 calendar days but no later than 1400 UTC / 2200 LT on the day prior to the planned operations.

3.3 For urgent non-scheduled (commercial and non-commercial) flight operations of which details were not submitted during the flights submission window, operators or agents must submit the details to seletar.airside@changiairport.com and call to inform the Airside Operations Section of Seletar Airport at +65 6481 5077.

3.4 Operators or agents shall include the following details of the flight operations in their submission:

- Name of operator and appointed ground handling agent;
- Date and time of arrival and departure (in local time);
- Aircraft type and seat capacity;
- Origin and destination;
- Aircraft registration number; and
- Purpose of flight (e.g. business aviation; general aviation; cargo; maintenance, repair and operations (MRO); etc.).

3.5 For scheduled flight operations, operators shall submit applications for slots via a Slot Clearance Request (SCR) to csc@changiairport.com.

3.6 All operators shall adhere to the IATA Worldwide Slot Guidelines (WSG). A copy of this document can be obtained from www.iata.org/wsg

3.7 EXEMPT FLIGHTS

3.7.1 Notwithstanding paragraph 3.1, the following types of flights may operate to / from Seletar Airport without submitting details of their flight operations to the Seletar Schedules Facilitator during the flights submission window as stipulated in paragraph 3.2:

- Emergency landings, e.g. diversions or quick returns after takeoff, oil spill response operations;
- Flights operating under diplomatic cover;
- Flights operated by the military, including those carrying supplies but excluding those chartered on a commercial basis by the military;
- Humanitarian flights including those responding to medical emergencies where the safety of human life is concerned or involved in search & rescue operations; and
- Technical flights including radar and NAVAID calibration /check flights.

3.7.2 However, operators or agents of exempt flights shall call to inform the Airside Operations Section of Seletar Airport at +65 6481 5077 of their flight operations in advance.

5.1.3.3 All applications must be submitted via <https://flightsg.caas.gov.sg>

The complete application and its supporting documents must reach the Civil Aviation Authority of Singapore Air Transport Division via the weblink provided at least 3 working days prior to the aircraft's arrival or departure into/from Singapore to be considered for a "normal permit". Operators who wish to obtain a permit under 3 working days may submit their applications. Such applications must reach the Air Transport Division at least 24 hours before the proposed flight to be considered for an "express permit". Applicants for express permits should alert the Air Transport Duty Officer at +65 98331775. Applications will not be considered if insufficient notice is given (not applicable for emergency flights e.g. flights on humanitarian grounds).

5.1.3.4 Operators, other than operators of business aviation aircraft as stated in paragraph 5.1.3.5, should schedule their arrivals and departures at Singapore Changi Airport outside the hours 0001 to 0200 UTC (0801-1000 LT) and 0900 to 1559 UTC (1700-2359 LT). Subject to approval (depending on aircraft stand availability), aircraft may be permitted to remain on the ground during the above times on condition that the aircraft vacates the aircraft stand if the need arises. *(Please see GEN 4.1 paragraph 1.5 b) regarding off-peak discount of 40% on landing charges).*

5.1.3.5 All business aviation aircraft operating as executive jet charter may be permitted to remain on the ground or layover at Singapore Changi Airport.

5.1.3.6 All business aviation aircraft shall park in a nose-in position and be pushed back with the aid of an aircraft tow-bar and tow-tractor. Reverse thrust or variable pitch propellers shall not be used when parking or pushing back aircraft. The aircraft operator must ensure that an appropriate tow-bar for the aircraft type is available to facilitate push back operations from the aircraft stand. The aircraft operators may use their own tow-bar or approach ground handling agents in either Seletar or Singapore Changi Airport to secure the appropriate tow-bar.

5.1.3.7 All passengers of the business aviation flight will have to clear CIQ via the Commercially-Important-Persons facility located beside Terminal 2.

5.1.3.8 Requests to handle executive jet charter or charter flights via the main terminals are to be sent via email to csc@changiairport.com for exceptional consideration at all times.

5.1.3.9 All business aviation flights must engage a ground handling agent at Singapore Changi Airport.

5.1.3.10 The appropriate legislation dealing with non-scheduled flights for hire or reward is contained in PART III - *Permits For Journeys Other Than Scheduled Journeys* of the Air Navigation (Licensing of Air Services) Regulations. Any person who uses any aircraft in contravention of the provisions of Regulation 15 of the legislation shall be guilty of an offence and shall be liable on conviction to a fine not exceeding S\$2,500 or to imprisonment for a term not exceeding 3 months or to both and in the case of a second or subsequent offence, to a fine not exceeding S\$20,000 or to imprisonment for a term not exceeding 2 years or to both.

5.1.3.11 **Permit Fees**

(a) Normal Permits

The following fees shall be paid to the Authority [in accordance with Regulation 18 of the Air Navigation (Licensing of Air Services) Regulations] to obtain a permit which must be applied at least 3 whole working days before the first flight:

- i. S\$84 for a single one-way or return flight;
- ii. S\$162 for 2 or more one-way or return flights but not more than 5 such flights;
- iii. S\$326 for 5 one-way or return flights but not more than 10 such flights; or
- iv. S\$810 for more than 10 one-way or return flights.

(b) Express Permits

Operators who wish to obtain a permit under 3 working days, but at least 24 hours before the flight, should contact the Duty Officer at +65 98331775 and submit a complete application via this weblink: <https://flightsg.caas.gov.sg> The following fee shall be paid:

- i. S\$252 for a single one-way or return flight.

Note 1: "Working Day" means:

- i. a period that begins at 8.30am and ends at 6pm on any Monday to Thursday that CAAS is open for business; and
- ii. a period that begins at 8.30am and ends at 5.30pm on any Friday that CAAS is open for business.

Note 2: Any application that is made after the close of business shall be deemed to have been made on the next working day.

Definitions:

Non-scheduled flight - a flight for the carriage of passengers, mail or cargo by air for hire and reward on journeys other than scheduled.

Business aviation flight - a flight that is owned and operated privately by a business corporation or chartered privately by business or corporate executives for non-revenue purposes.

Charterer - a person, company or corporate body who charters the aircraft and whose name and address appear in the Aircraft Charter Agreement.

Operator - in relation to an aircraft, the person for the time being having the business management of that aircraft.

5.2 DOCUMENTARY REQUIREMENTS FOR CLEARANCE OF AIRCRAFT

5.2.1 Same requirements as for SCHEDULED FLIGHTS.

5.3 PERMIT CONDITIONS

5.3.1 The Director-General of Civil Aviation may attach such conditions to a permit as he considers necessary.

5.4 APPLICATION FOR DIPLOMATIC CLEARANCE FOR FOREIGN STATE AIRCRAFT

5.4.1 Procedures for Applying Diplomatic Clearance for Landing and Overflight for Foreign State Aircraft in Singapore

5.4.1.1 Except where otherwise agreed, all Foreign State aircraft intending to land at or overfly Singapore are to obtain diplomatic clearance for such landing or overflight from the Ministry of Foreign Affairs, giving information as in para 5.4.2.

5.4.1.2 The application is to be made giving at least 14 days' notice.

5.4.2 Information to be provided when applying for Diplomatic Clearance

5.4.2.1 All applications for diplomatic clearance should contain the following information:

- a. Name of Mission/Organisation;
- b. Liaison Officer;
- c. Telephone Number;
- d. Number and Type of Aircraft;
- e. Callsign;
- f. Aircraft Registration;
- g. Full flight itinerary;
- h. Route after entering and before leaving Singapore FIR;
- i. Date of Arrival;
- j. Time of Arrival;
- k. Date of Departure;
- l. Time of Departure;
- m. Arrival from;
- n. Departing to;
- o. Airfield requested;
- p. Name of Pilot;
- q. Number of Crew;
- r. Number of Passengers;
- s. If VIP flight, Name of VIP and number of other officials;
- t. Purpose;
- u. Photograph and sensory equipment if any;
- v. Nature of freight or cargoes carried if any;
- w. Dangerous cargoes, if any (e.g. arms, ammunition, explosives, toxic chemicals);
- x. Types of services required (e.g. type of fuel, APU/GPU, ground handling etc.);
- y. Additional/Special request

Note: Aircraft used in military, customs or police services are deemed to be State aircraft.

- ← **6 APPLICATION FOR FUNCTIONAL CHECK FLIGHTS**
- ← 6.1 All applications for functional check flights are subject to prior approval.
- ← 6.2 All applications for functional check flights are to be made at least 5 working days but not more than 2 weeks in advance; if this is not complied with, the application may not be considered. Applicants shall seek the necessary approvals from DGCA Indonesia for compliance with Indonesia's domestic requirements (see AIP Indonesia GEN 1.2), and submit the applications for functional check flights to CAAS with the prior necessary approvals from Indonesia.
- ← 6.3 Applicants should provide details as listed in items a. to e. below and ensure that the documents as listed in items f. to h. of the aircraft undergoing functional check flights remain valid during the period of operation:
- a. Aircraft Registration;
 - b. Aircraft Callsign;
 - c. Aircraft Type;
 - d. Date / Time / Duration of flight;
 - e. Point of Departure and Arrival;
 - f. Certificate of Registration;
 - g. Certificate of Airworthiness;
 - h. A Permit to Fly, issued by CAAS, in the absence of a valid Certificate of Airworthiness.
- 6.4 All applications should be submitted to:
- Post:
Duty Manager, Singapore Air Traffic Control Centre
Civil Aviation Authority of Singapore
60 Biggin Hill Road, Singapore 509950
Email: caas_atsops@caas.gov.sg
Fax: 65457526
- ← 6.5 Details on flight planning for functional check flights are listed at ENR 1.10 FLIGHT PLANNING.
- 7 AIRCRAFT BANNED FROM OPERATIONS AT SINGAPORE AERODROMES**
- 7.1 The Antonov-12 aircraft is banned from all operations to/from Singapore aerodromes due to concerns over its continuing airworthiness.

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- Arms and explosives
- Bulletproof clothing
- Toy guns, pistols, and revolvers
- Weapons, kris, spears and swords
- Medicines and pharmaceutical products
- Poisons
- Dangerous Cargo
- Ionising Radiation (IR) irradiating apparatus & Radioactive material (e.g. x-ray equipment)
- Non-ionising Radiation (IR) irradiating apparatus (e.g. ultraviolet sunlamps)
- Telecommunication and radio communication equipment

Please visit the Immigration & Checkpoints Authority (ICA) website for more information on controlled and prohibited goods .

2 IMMIGRATION REQUIREMENTS

2.1 All passengers are required to present themselves with their travel documents, and endorsements (if necessary).

All travellers, including Singapore Citizens, Permanent Residents, Long-Term Pass holders and foreign visitors, are required to electronically submit their pre-trip health and travel history declarations to the Immigration & Checkpoints Authority (ICA) via the SG Arrival Card (SGAC) e-Service, before arriving in Singapore. This does not apply to those transiting/transferring through Singapore without seeking immigration clearance.

All travellers seeking entry into Singapore are required to comply with Singapore's border control requirements, which can be found at [ICA | Entering, Transiting and Departing](#).

← 2.2

Any person entering Singapore from a place outside Singapore, or is leaving Singapore for a place outside Singapore (including aircrew entering or leaving Singapore on functional check flights) shall present to an immigration officer at an authorised airport, a valid passport or a valid travel document recognised by the Government of Singapore (in the case of an alien, a visa for Singapore where such a visa is required) with the exception of the following persons:

- a. A member of the Singapore Armed Forces travelling on duty;
- b. A member of such Visiting Forces as the Minister may determine;
- c. Any child or person who is included in the passport or other travel document of a parent of the child, or of a spouse or other relative of the person and is accompanying that parent, spouse or relative (as the case may be) when travelling to and leaving from Singapore.

2.3 Nationals of the following countries require visas for the purpose of social visits in Singapore (with exception of an aircrew who is an airline crew member that, in the course of a journey on duty from a place outside Singapore to Singapore, or from a place outside Singapore to a place outside Singapore, calls at an authorised airport):

- Afghanistan
- Algeria
- Bangladesh*
- Commonwealth of Independent States**
- Democratic People's Republic of Korea (North Korea)
- Egypt
- Georgia
- India*
- Iran
- Iraq
- Jordan*
- Kosovo
- Lebanon
- Libya
- Mali
- Morocco*
- Nigeria*
- People's Republic of China*
- Pakistan
- Somalia
- South Sudan^
- Sudan
- Syria
- Tunisia*

- Turkmenistan*
- Ukraine*
- Yemen
- Holders of Alien's passport

Visitors holding Hong Kong Document of Identity, Macao Special Administrative Region (MSAR) Travel Permit, Palestinian Authority Passport, Refugee Travel Document** issued by the Middle-East countries and Temporary Passport issued by United Arab Emirates will also require a visa to enter Singapore.

* Holders of diplomatic, official and service passports do not need a visa for entry, unless otherwise stated below:

- CIS (except Armenia, Belarus, Russia and Uzbekistan) - Holders of Diplomatic, Official or Service passports are exempted from visa requirements for a stay of up to 30 days
- Armenia - Holders of Diplomatic passports are exempted from visa requirements for a stay of up to 90 days
- Belarus - Holders of Diplomatic or Official passports are exempted from visa requirements for a stay of up to 90 days
- Russia - Holders of Diplomatic or Service passports are exempted from visa requirements for a stay of up to 90 days
- Uzbekistan - Holders of Diplomatic passports are exempted from visa requirements for a stay of up to 90 days
- Georgia - Holders of Diplomatic or Service passports are exempted from visa requirements for a stay of up to 30 days
- Indonesia - Holders of Diplomatic or Official passports are exempted from visa requirements
- Morocco - Holders of Diplomatic passports are exempted from visa requirements for a stay of up to 30 days
- PRC - Holders of Diplomatic, Service or Public Affairs passports are exempted from visa requirements for a stay of up to 30 days
- Saudi Arabia - Holders of Diplomatic passports are exempted from visa requirements
- Thailand - Holders of Diplomatic or Official passports are exempted from visa requirements
- Turkmenistan - Holders of Diplomatic, Official or Service passports are exempted from visa requirements for a stay of up to 30 days
- Ukraine - Holders of Diplomatic, Official and Service passports are exempted from visa requirements for a stay of up to 90 days
- Vietnam - Holders of Diplomatic or Official passports are exempted from visa requirements

^ South Sudan has been recognised as a sovereign state, with AL2 visa to be imposed. Only the ordinary and official South Sudan TDs has been assessed to be recognised for entry.

+ Commonwealth of Independent States (CIS): Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, and Uzbekistan.

** Refugee Travel Documents issued by Middle-East countries are subjected to assessment of recognition for entry into Singapore.

Nationals of Commonwealth of Independent States (Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, and Uzbekistan), Georgia, Turkmenistan, and Ukraine may qualify for the 96-hour visa free transit facility (VFTF) provided that:

- a. the person is in transit to a third country;
- b. the person holds a valid passport, confirmed onward air-ticket, entry facilities (including visa) to the third country and have sufficient funds for the period of stay in Singapore;
- c. the person continues his journey to the third country within 96 hours visa free period granted; and
- d. the person satisfies Singapore's entry requirements.

GEN 1.5 AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS**1 MANDATORY CARRIAGE AND OPERATION OF AIRBORNE COLLISION AVOIDANCE SYSTEM (ACAS II)**

- 1.1 In pursuant to ICAO Annex 6, Part 1, Chapter 6, all turbine-engined aeroplanes of a maximum certified take-off mass in excess of 5700 kg or authorised to carry more than 19 passengers flying within the Singapore FIR and the airspace within the Jakarta FIR where ATS is provided by Singapore (see ENR 2.1) shall be equipped with an airborne collision avoidance system (ACAS II) and to operate the ACAS system in accordance with the relevant provisions of Annex 10, Volume IV, Chapter 4.

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GEN 1.6 SUMMARY OF NATIONAL REGULATIONS AND INTERNATIONAL AGREEMENTS/CONVENTIONS

1 LIST OF CIVIL AVIATION LEGISLATION, AIR NAVIGATION REGULATIONS AND ORDERS

The following is a list of legislation (Acts and subsidiary legislation) affecting aviation and air navigation in the Republic of Singapore together with the International Agreements/Conventions ratified or acceded to by the Republic of Singapore. It is essential that anyone engaged in air operations be acquainted with the relevant legal documents.

Copies of the legislation may be obtained as follows:

Electronic versions of the legislation may be freely accessed at

<https://sso.agc.gov.sg>

<https://www.caas.gov.sg/legislation-regulations/legislation>

Electronic versions of all Singapore legislation may be accessed via subscription to Lawnet at

<https://www.lawnet.sg>

Print copies of all the legislation may be purchased (by post) from:

Post:

Toppan Leefung Pte. Ltd.,
No. 1 Kim Seng Promenade, #18-01,
Great World City, East Lobby
Singapore 237994.

Tel: (65) 68269600

Fax: (65) 68203341

URL: www.toppanleefung.com

1.1 CIVIL AVIATION LEGISLATION

No	Legislation	Citation
<i>Civil Aviation Authority of Singapore Act & related legislation</i>		
1	Civil Aviation Authority of Singapore Act 2009	
2	Civil Aviation Authority of Singapore (Airport Development Levy) Order 2018	S437/2018
3	Civil Aviation Authority of Singapore (Aviation Levy) Order 2018	S522/2018
4	Civil Aviation Authority of Singapore (Changi Airport) By-laws 2009	S313/2009
5	Civil Aviation Authority of Singapore (Changi Airport) Notification 2009	S293/2009
6	Civil Aviation Authority of Singapore (Composition of Offences) Regulations 2009	S315/2009
7	Civil Aviation Authority of Singapore (Licensing of Airport Operators) Regulations 2009	S311/2009
8	Civil Aviation Authority of Singapore (Price Control of Aeronautical Charges) Rules 2009	S298/2009
9	Civil Aviation Authority of Singapore (Seletar Airport) By-laws 2009	S314/2009
10	Civil Aviation Authority of Singapore (Seletar Airport) Notification 2009	S294/2009
11	Delegation of Powers	Cap. 41, N1
<i>Air Navigation Act & related legislation</i>		
12	Air Navigation Act 1966	
13	Air Navigation Order	Cap. 6, O2 (1990 Rev Ed.)
14	Air Navigation (101 - Unmanned Aircraft Operations) Regulations 2019	S833/2019
15	Air Navigation (119 - Air Operator Certification) Regulations 2018	S443/2018
16	Air Navigation (121 - Commercial Air Transport by Large Aeroplanes) Regulations 2018	S444/2018
17	Air Navigation (125 - Complex General Aviation) Regulations 2018	S501/2018

No	Legislation	Citation
18	Air Navigation (135 – Commercial Air Transport by Helicopters and Small Aeroplanes) Regulations 2018	S445/2018
19	Air Navigation (137 – Aerial Work) Regulations 2018	S502/2018
20	Air Navigation (139 – Aerodromes) Regulations 2023	S10/2023
21	Air Navigation (91 – General Operating Rules) Regulations 2018	S441/2018
22	Air Navigation (92 – Carriage of Dangerous Goods) Regulations 2022	S998/2022
23	Air Navigation (98 – Special Operations) Regulations 2018	S442/2018
24	Air Navigation (99 - Breath Testing for Alcohol) Regulations 2019	S177/2019
25	Air Navigation (Aviation Security) Order	Cap. 6, O5
26	Air Navigation (Carbon Emissions and Reporting) Regulations 2022	S997/2022
27	Air Navigation (Composition of Offences) Rules 2017	S667/2017
28	Air Navigation (Licensing of Air Services) Regulations	Cap. 6, RG 2
29	Air Navigation (Paya Lebar and Tengah Aerodrome Fees) Order	Cap. 6, O1
30	Air Navigation (Prohibited Flights) Order	Cap. 6, O6
31	Air Navigation (Protected Areas) (No. 2) Order 2015	S435/2015
32	Air Navigation (Protected Areas) Order 2015	S350/2015
33	Air Navigation (Regulated Air Cargo Agents and Known Consignors) Regulations 2017	S166/2017
34	Air Navigation (Wreck and Salvage of Aircraft) Regulations	Cap. 6, RG 1
35	Designation of Authorised Persons	Cap. 6, N2
36	Use of Seletar Aerodrome	Cap. 6, N1
<u>Other Acts & related legislation</u>		
37	Carriage by Air Act 1988	2020 Rev Ed.
38	Carriage by Air (Parties to Conventions) Order	Cap. 32A, O1
39	Carriage by Air (Singapore Currency Equivalents) Order	Cap. 32A, O2
40	Carriage by Air (Montreal Convention, 1999) Act 2007	2020 Rev Ed.
41	Carriage by Air (Montreal Convention, 1999) (Exclusion from Convention) Order	Cap. 32B, O1
42	Tokyo Convention Act 1971	2020 Rev Ed.
43	Tokyo Convention (Convention Countries) Notification	Cap. 327, N1
44	Tokyo Convention (Protocol Countries) Notification 2019	S893/2019
45	Hijacking of Aircraft and Protection of Aircraft and International Airports Act 1978	2020 Rev Ed.
46	Infrastructure Protection Act 2017	Act 41 of 2017
47	International Interests in Aircraft Equipment Act 2009	2020 Rev Ed.
48	Immigration Act 1959	2020 Rev Ed.
49	Immigration (Authorised Places of Entry and Departure, and Rates) Notification 2012	S627/2012
50	Immigration Regulations	Cap. 133, RG 1
51	Arms and Explosives Act 1913	2020 Rev Ed.
52	Arms and Explosives (Aircraft Exemption) Rules	Cap. 13, R3
53	Arms and Explosives (Explosives) Rules	Cap. 13, R2
54	Arms and Explosives (Movement Control) Rules	Cap. 13, R4
55	International Organisations (Immunities and Privileges) Act 1948	2020 Rev Ed.
56	International Organisations (Immunities and Privileges) (International Civil Aviation Organisation) Order	Cap. 145, OR 4
57	Transport Safety Investigations Act 2018	
58	Transport Safety Investigations (Aviation Occurrences) Regulations 2023	S870/2023
59	Transport Safety Investigations (Responsible Persons – Exemption) Order 2023	S874/2023

1.2 OTHER RELEVANT LEGISLATION

No	Legislation	Citation
1	Infectious Diseases Act 1976	
2	Infectious Diseases (Certificates of Vaccination or Other Prophylaxis) Regulations 2008	S611/2008
3	Infectious Diseases (Quarantine) Regulations	Cap. 137, RG 1
4	Arms and Explosives (Arms) Rules	Cap. 13, R1
5	Inspector of Explosives	Cap. 13, N1
6	Arms Offences Act 1973	

Note: “Cap.” means “Chapter”, unless otherwise stated.

1.3 INTERNATIONAL CONVENTIONS AND PROTOCOLS

No	Legislation
1	Convention on International Civil Aviation, done at Chicago on 7 December 1944
2	Protocol Relating to an Amendment to the Convention on International Civil Aviation [Article 83 bis], signed at Montreal on 6 October 1980
3	International Air Services Transit Agreement, signed at Chicago on 7 December 1944
4	Convention on Offences and Certain Other Acts Committed on Board Aircraft, signed at Tokyo on 14 September 1963
5	Protocol to Amend the Convention on Offences and Certain Other Acts Committed on Board Aircraft, done at Montreal on 4 April 2014
6	Convention for the Suppression of Unlawful Seizure of Aircraft, signed at The Hague on 16 December 1970
7	Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation, signed at Montreal on 23 September 1971
8	Protocol for the Suppression of Unlawful Acts of Violence at Airports Serving International Civil Aviation, Supplementary to the Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation, done at Montreal on 23 September 1971, signed at Montreal on 24 February 1988
9	Convention on the Marking of Plastic Explosives for the Purpose of Detection, signed at Montreal on 1 March 1991
10	Convention for the Unification of Certain Rules Relating to International Carriage by Air, signed at Warsaw on 12 October 1929
11	Protocol to Amend the Convention for the Unification of Certain Rules Relating to International Carriage by Air signed at Warsaw on 12 October 1929, done at The Hague on 28 September 1955
12	Montreal Protocol No. 4 to Amend the Convention for the Unification of Certain Rules Relating to International Carriage by Air, signed at Warsaw on 12 October 1929, signed at Montreal on 25 September 1975
13	Convention for the Unification of Certain Rules for International Carriage by Air, signed at Montreal on 28 May 1999
14	Convention on International interests in Mobile Equipment, signed at Cape Town on 16 November 2001
15	Protocol to the Convention on International Interests in Mobile Equipment on Matters Specific to Aircraft Equipment, signed at Cape Town on 16 November 2001
16	Protocol for the Amendment Agreement on the Joint Financing of Certain Air Navigation Services in Iceland (1956) as amended in 1982 and 2008
17	Protocol for the Amendment Agreement on the Joint Financing of Certain Air Navigation Services in Greenland (1956) as amended in 1982 and 2008
18	The International COSPAS-SARSAT Programme Agreement, done at Paris on 1 July 1988
19	Protocol Supplementary to the Convention for the Suppression of Unlawful Seizure of Aircraft, done at Beijing on 10 September 2010
20	Convention on the Suppression of Unlawful Acts Relating to International Civil Aviation, done at Beijing on 10 September 2010

2 TAXATION IN THE FIELD OF INTERNATIONAL AIR TRANSPORT

2.1 *Petroleum exemptions and income tax*

- a. Petroleum for aircraft is granted Goods and Services Tax (GST) relief under item 11 of the Schedule to the GST (Imports Relief) Order (2001 Rev Ed.).
- b. The matter of income tax on air transport is contained within Section 12(2) of the Income Tax Act (2014 Rev Ed.).

Where a non-resident person carries on either:

- i. the business of shipowner or charterer, or
- ii. the business of air transport,

and any ship or aircraft owned or chartered by him calls at a port, an aerodrome or an airport in Singapore, his full profits arising from the carriage of passengers, mail, livestock or goods shipped, or loaded into an aircraft, in Singapore shall be deemed to accrue in Singapore.

This subsection shall not apply to passengers, mail, livestock or goods which are brought to Singapore solely for transshipment, or for transfer from one aircraft to another or from an aircraft to a ship or from a ship to an aircraft.

2.2 *Capital gains tax, or income on wealth, etc.*

There is no capital gains tax, or income on wealth, etc., which are chargeable on the sale or use of international air transport.

INS	Inertial navigation system	MNM	Minimum
INSTL	Install or installed or installation	MNPS	Minimum navigation performance specifications
INSTR	Instrument	MNT	Monitor or monitoring or monitored
INT	Intersection	MNTN	Maintain
INTL	International	MOA	Military operating area
INTRG	Interrogator	MOC	Minimum obstacle clearance (required)
INTRP	Interrupt or interruption or interrupted	MOCA	Minimum obstacle clearance altitude
INTST	Intensity	MON	Monday
IRS	Inertial reference system	MOPS	Minimum operational performance standards
ISA	International standard atmosphere	MOV	Move or moving or movement
J			
JAN	January	MPS	Metres per second
JUL	July	MSA	Minimum sector altitude
JUN	June	MSAW	Minimum safe altitude warning
K			
KG	Kilograms	MSG	Message
KHZ	Kilohertz	MSL	Mean sea level
KM	Kilometres	MWO	Meteorological watch office
KMH	Kilometres per hour	N	
KPA	Kilopascal	N	North or northern latitude
KT	Knots	NAV	Navigation
KW	Kilowatts	NAVAID	Navigation aid
.			
... L	Left (preceded by runway designation number to identify a parallel runway)	NC	No change
L			
L	Locator (see LM, LO)	NDB	Non-directional radio beacon
LAT	Latitude	NGT	Night
LDA	Landing distance available	NM	Nautical miles
LDAH	Landing distance available, helicopter	NML	Normal
LDG	Landing	NOF	International NOTAM Office
LDI	Landing direction indicator	NONSTD	Non-standard
LEN	Length	NOSIG	No significant change (used in trend-type landing forecasts)
LGT	Light or lighting	NOTAM	A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations
LGTD	Lighted	NOV	November
LIH	Light intensity high	NR	Number
LIL	Light intensity low	O	
LIM	Light intensity medium	OAS	Obstacle assessment surface
LLZ	Localizer	OBS	Observe or observed or observation
LM	Locator middle	OBST	Obstacle
LNAV	Lateral navigation	OCA	Obstacle clearance altitude
LO	Locator, outer	OCC	Occulting (light)
LONG	Longitude	OCH	Obstacle clearance height
LORAN	LORAN (Long range air navigation system)	OCNL	Occasional or occasionally
LRG	Long range	OCS	Obstacle clearance surface
LT*	Local time	OCT	October
LTD	Limited	OFZ	Obstacle free zone
LVL	Level	OHD	Overhead
LVP	Low visibility procedures	OM	Out marker
M			
M	Mach number (followed by figures) or Metres (preceded by figures)	OPMET	Operational meteorological (information)
MAD*	Maximum Acceptable Delay	OPR	Operator or operate or operative or operating or operational
MAG	Magnetic	OPS	Operations
MAINT	Maintenance	O/R	On request
MAP	Aeronautical maps and charts	OTP	On top
MAPT	Missed approach point	OTS	Organized track system
MAR	March	OUBD	Outbound
MAX	Maximum	P	
MAY	May	P ...	Prohibited area (followed by identification)
MCA	Minimum crossing altitude	PA	Precision approach
MDA	Minimum descent altitude	PALS	Precision approach lighting system (specify category)
MDH	Minimum descent height	PANS	Procedures for air navigation services
MEA	Minimum en-route altitude	PAPI	Precision approach path indicator
MEDEVAC	Medical evacuation flight	PAR	Precision approach radar
MEHT	Minimum eye height over threshold (for visual approach slope indicator systems)	PARA*	Paragraph
MET	Meteorological or meteorology	PARL	Parallel
METAR	Aerodrome routine meteorological report (in meteorological code)	PAX	Passenger(s)
MHA	Minimum holding altitude	PBC	Performance-based communication
MHZ	Megahertz	PBN	Performance-based navigation
MID	Mid-point (related to RVR)	PBS	Performance-based surveillance
MIL	Military	PCD	Proceed or proceeding
MIN	Minutes	PCL	Pilot-controlled lighting
MINDEF*	Ministry of Defence	PCN	Pavement classification number
MLS	Microwave landing system	PDC	Pre-departure clearance
MM	Middle marker	PER	Performance
		PERM	Permanent
		PIB	Pre-flight information bulletin
		PJE	Parachute jumping exercise
		PLA	Practice low approach

PN	Prior notice required
PNR	Point of no return
POB	Persons on board
PPR	Prior permission required
PRI	Primary
PRKG	Parking
PROC	Procedure
PSN	Position
PSP	Pierced steel plank
PSR	Primary surveillance radar
PT*	Point(s)
PTN	Procedure turn
PVT*	Private
PWR	Power

Q

QDM	Magnetic heading (zero wind)
QDR	Magnetic bearing
QFE	Atmospheric pressure at aerodrome elevation (or at runway threshold)
QFU	Magnetic orientation of runway
QNH	Altimeter sub-scale setting to obtain elevation when on the ground
QTE	True bearing
QUAD	Quadrant

R

R ...	Restricted area (followed by identification)
R ...	Radial from VOR (followed by three figures)

.

... R	Right (preceded by runway designation number to identify a parallel runway)
-------	---

R

RA	Rain
RAD*	Radius
RAF*	Royal Air Force
RAG	Runway arresting gear
RAI	Runway alignment indicator
RAIM	Receiver autonomous integrity monitoring
RB	Rescue boat
RCC	Rescue coordination centre
RCF	Radiocommunication failure (message type designator)
RCL	Runway centre line
RCLL	Runway centre line light(s)
RCP	Required communication performance
RDH	Reference datum height
RDL	Radial
RDO	Radio
REC	Receive or receiver
REDL	Runway edge light(s)
REF	Reference to ... or refer to ...
REG	Registration
RENL	Runway end light(s)
REP	Report or reporting or reporting point
REQ	Request or requested
RESA	Runway end safety area
RFC*	Radio facility chart
RFFS	Rescue and fire fighting services
RH*	Rescue helicopter
RHC	Right-hand circuit
RIF	Reclearance in flight
RLLS	Runway lead-in lighting system
RMAF*	Royal Malaysian Air Force
RMK	Remark
RNAV	(to be pronounced "AR-NAV") Area navigation
RNP	Required navigation performance
ROC	Rate of climb
ROD	Rate of descent
RPI	Receiving only
RPLC	Replace or replaced
RPS	Radar position symbol
RQMNTS	Requirements
RQP	Request flight plan (message type designator)
RQS	Request supplementary flight plan (message type designator)
RSAF*	Republic of Singapore Air Force
RSC	Rescue sub-centre
RSCD	Runway surface condition
RSFC*	Republic of Singapore Flying Club
RSP	Required surveillance performance
RSP	Responder beacon

RSR	En-route surveillance radar
RTE	Route
RTF	Radiotelephone
RTHL	Runway threshold light(s)
RTN	Return or returned or returning
RTODAH	Rejected take-off distance available, helicopter
RTT	Radioteletypewriter
RTZL	Runway touchdown zone light(s)
RUT	Standard regional route transmitting frequencies
RV	Rescue vessel
RVA	Radar vectoring area
RVR	Runway visual range
RWY	Runway
RVSM	Reduced vertical separation minimum (300m(1000ft)) between FL290 and FL410

S

S	South or southern latitude
SAF*	Singapore Armed Forces
SALS	Simple approach lighting system
SAR	Search and rescue
SARPS	Standards and recommended practices (ICAO)
SAT	Saturday
SATCC*	Singapore Air Traffic Control Centre
SATCOM	Satellite communication (used only when referring generally to both voice and data satellite communication or only data satellite communication)
SATVOICE	Satellite voice communication
SDBY	Stand by
SDF	Step down fix
SEC	Seconds
SELCAL	Selective calling system
SEP	September
SER	Service or servicing or served
SFC	Surface
SFL*	Sequenced flashing light
SGL	Signal
SIA*	Singapore Airlines Limited
SID	Standard instrument departure
SIG	Significant
SIGMET	Information concerning en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations
SIMUL	Simultaneous or simultaneously
SKED	Schedule or scheduled
SMC	Surface movement control
SMR	Surface movement radar
SOC	Start of climb
SPECI	Aerodrome special meteorological report (in meteorological code)
SPECIAL	Local special meteorological report (in abbreviated plain language)
SPL	Supplementary flight plan (message type designator)
SPOT	Spot wind
SQ	Squall
SR	Sunrise
SRA	Surveillance radar approach
SRE	Surveillance radar element of precision approach radar system
SRR	Search and rescue region
SRV	Secondary
SS	Sunset
SSR	Secondary surveillance radar
STA	Straight-in approach
STAR	Standard instrument arrival
STD	Standard
STN	Station
STOL	Short take-off and landing
STS	Status
STT*	Standard Taxi Time
STWL	Stopway light(s)
SUBJ	Subject to
SUN	Sunday
SUP	Supplement (AIP Supplement)
SUPPS	Regional supplementary procedures
SVCBL	Serviceable
SWY	Stopway

T

TA	Traffic advisory
TAA	Terminal arrival altitude
TACAN	UHF tactical air navigation aid

TAF	Aerodrome forecast (in meteorological code)
TAIL	Tail wind
TAR	Terminal area surveillance radar
TAS	True airspeed
TAX	Taxiing or taxi
TCAS RA	Traffic alert and collision avoidance system resolution advisory
TCH	Threshold crossing height
TDZ	Touchdown zone
TECR	Technical reason
TEL	Telephone
TEMPO	Temporary or temporarily
TFC	Traffic
TGL	Touch-and-go landing
TGS	Taxiing guidance system
THR	Threshold
THRU	Through
THU	Thursday
TIBA	Traffic information broadcast by aircraft
TIL	Until
TKOF	Take off
TLOF	Touchdown and lift-off area
TMA	Terminal control area
TOC	Top of climb
TODA	Take-off distance available
TODAH	Take-off distance available, helicopter
TOP	Cloud top
TORA	Take-off run available
TP	Turning point
TR	Track
TRA	Temporary reserved airspace
TRANS	Transmits or transmitter
TRG	Training
TRL	Transition level
TT	Teletypewriter
TUE	Tuesday
TURB	Turbulence
T-VASIS	T visual approach slope indicator system
TWR	Aerodrome control tower or aerodrome control
TWY	Taxiway
TXL	Taxilane
TYP	Type of aircraft
TYPH	Typhoon

U

UAC	Upper area control centre
UAR	Upper air route
UFN	Until further notice
UHF	Ultra high frequency (300 to 3 000 MHz)
UIC	Upper information centre
UIR	Upper flight information region
ULM	Ultra light motorized aircraft
UNL	Unlimited
UNREL	Unreliable
U/S	Unserviceable
UTA	Upper control area
UTC	Coordinated universal time

V

VA	Volcanic ash
VAAC	Volcanic ash advisory centre
VAC	Visual approach chart (followed by name/title)
VAR	Magnetic variation
VASIS	Visual approach slope indicator system
VCY	Vicinity
VER	Vertical
VFR	Visual flight rules
VHF	Very high frequency (30 to 300 MHz)
VIP	Very important person
VIS	Visibility
VLR	Very long range
VMC	Visual meteorological conditions
VNAV	Vertical navigation
VOLMET	Meteorological information for aircraft in flight
VOR	VHF omnidirectional radio range
VORTAC	VOR and TACAN combination
VOT	VOR airborne equipment test facility
VRB	Variable
VSA	By visual reference to the ground
VSP	Vertical speed
VTOL	Vertical take-off and landing
VVIP*	Very, very important person

W

W	West or western longitude or White
WAAS	Wide area augmentation system
WAC	World Aeronautical Chart - ICAO 1:1 000 000 (followed by name/title)
WBAR	Wing bar lights
WDI	Wind direction indicator
WED	Wednesday
WEF	With effect from or effective from
WGS-84	World Geodetic System - 1984
WI	Within
WID	Width or wide
WIE	With immediate effect or effective immediately
WIP	Work in progress
WPT	Way-point
WRNG	Warning
WS	Wind shear
WSPD	Wind speed
WT	Weight
WUT*	Wheels Up Time
WX	Weather
WXR	Weather radar

X

XBAR	Crossbar (of approach lighting system)
XNG	Crossing

Y

Y CZ	Yellow caution zone (runway lighting)
------	---------------------------------------

4

4D/15*	Four dimensional (latitude, longitude, altitude, time) position information at 15 minutes interval
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GEN 2.4 LOCATION INDICATORS

The location indicators marked with an asterisk (*) cannot be used in the address component of AFS messages.

1. ENCODE		2. DECODE	
Location	Indicator	Indicator	Location
AIR OPERATIONS CENTRE (RSAF)	WSAH	WIDD	BATAM/HANG NADIM (INDONESIA)
BATAM/HANG NADIM (INDONESIA)	WIDD	WIDN	TANJUNGPINANG / RAJA HAJI
JOHOR BAHRU	WMKJ		FISABILILLAH (INDONESIA)
PAYA LEBAR	WSAP	WIDT	TANJUNG BALAI KARIMUN/ RAJA HAJI
SATCC (RSAF)	WSAR		ABDULLAH (INDONESIA)
SEBRAWANG	WSAG	WMKJ	JOHOR BAHRU
SINGAPORE / SELETAR	WSSL	WSAG	SEBRAWANG
SINGAPORE / SINGAPORE CHANGI INTL	WSSS	WSAH	AIR OPERATIONS CENTRE (RSAF)
SINGAPORE ACC/FIC	WSJC	WSAP	PAYA LEBAR
TANJUNG BALAI KARIMUN/ RAJA HAJI	WIDT	WSAR	SATCC (RSAF)
ABDULLAH (INDONESIA)		WSAT	TENGAH
TANJUNGPINANG / RAJA HAJI	WIDN	WSJC	SINGAPORE ACC/FIC
FISABILILLAH (INDONESIA)		WSSL	SINGAPORE / SELETAR
TENGAH	WSAT	WSSS	SINGAPORE / SINGAPORE CHANGI INTL

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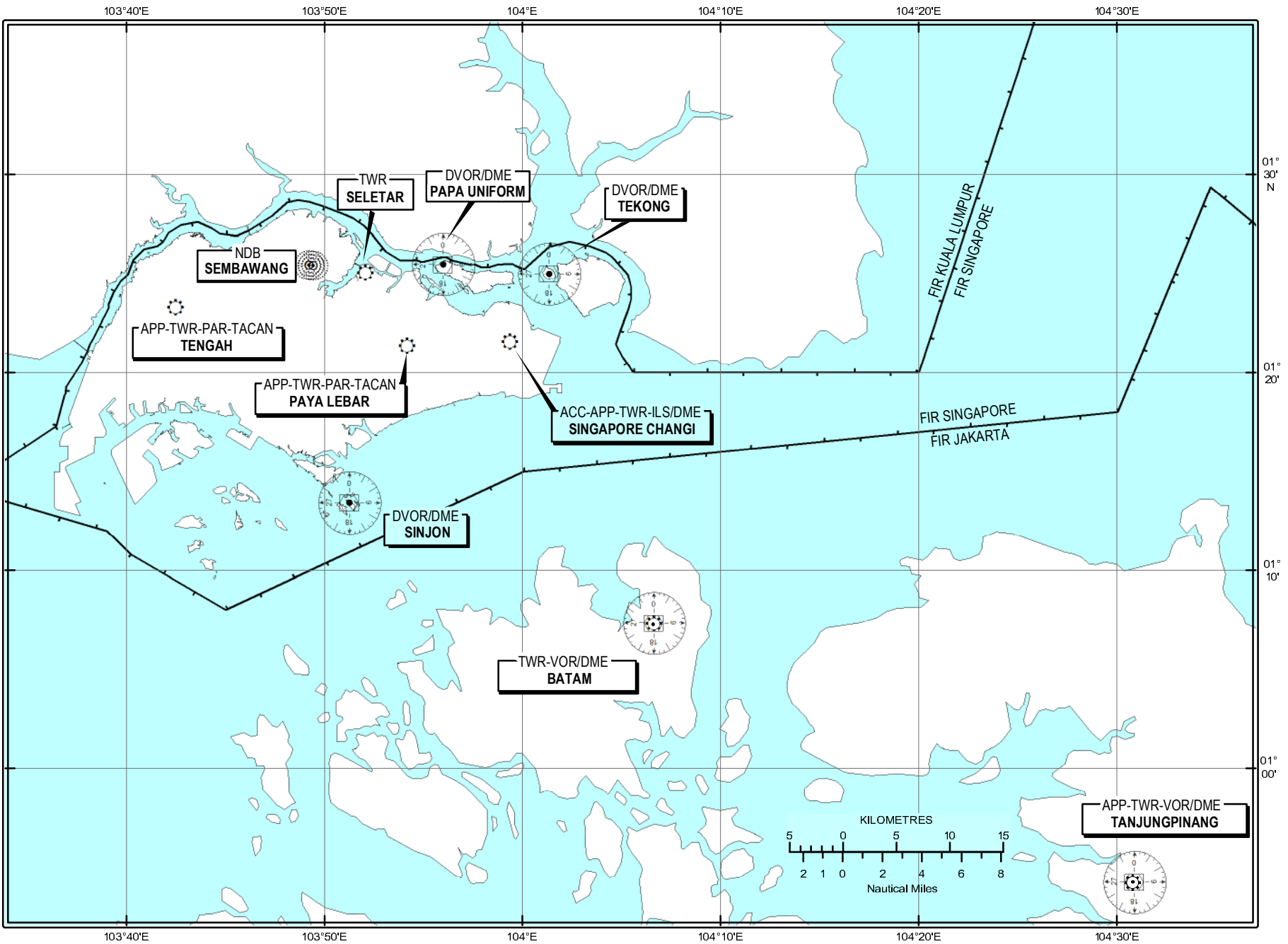
GEN 2.5 LIST OF RADIO NAVIGATION AIDS

ID	Station Name	Facility	Purpose	Station Name	Facility	ID	Purpose
AG	Sembawang	NDB	AE	Batam/Hang Nadim (Indonesian facility)	VOR/DME	BTM	A
BP	Batu Pahat (Malaysian facility)	NDB	E	Batu Pahat (Malaysian facility)	NDB	BP	E
BTM	Batam/Hang Nadim (Indonesian facility)	VOR/DME	A	Johor Bahru (Malaysian facility)	DVOR/DME	VJB	E
ICC	Singapore Changi	ILS/LLZ/DME	A	Mersing (Malaysian facility)	DVOR/DME	VMR	E
ICE	Singapore Changi	ILS/LLZ/DME	A	Papa Uniform	DVOR/DME	PU	AE
ICH	Singapore Changi	ILS/LLZ/DME	A	Sembawang	NDB	AG	AE
ICW	Singapore Changi	ILS/LLZ/DME	A	Singapore Changi	ILS/LLZ/DME	ICC	A
PU	Papa Uniform	DVOR/DME	AE	Singapore Changi	ILS/LLZ/DME	ICE	A
SJ	Sinjon	DVOR/DME	E	Singapore Changi	ILS/LLZ/DME	ICH	A
TPG	Tanjungpinang/ Raja Haji Fisabilillah (Indonesian facility)	VOR/DME	A	Singapore Changi	ILS/LLZ/DME	ICW	A
VJB	Johor Bahru (Malaysian facility)	DVOR/DME	E	Sinjon	DVOR/DME	SJ	E
VMR	Mersing (Malaysian facility)	DVOR/DME	E	Tanjungpinang/ Raja Haji Fisabilillah (Indonesian facility)	VOR/DME	TPG	A
VTK	Tekong	DVOR/DME	AE	Tekong	DVOR/DME	VTK	AE

Note : Purpose (A=Aerodrome, E=Enroute)

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SINGAPORE RADIO FACILITY INDEX CHART



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GEN 3 SERVICES

GEN 3.1 AERONAUTICAL INFORMATION SERVICES

3.1.1 RESPONSIBLE SERVICE

1.1 Aeronautical Information Services is a unit of the Air Traffic Services Division of the Civil Aviation Authority of Singapore which ensures the flow of information necessary for the safety, regularity and efficiency of international and national air navigation within the area of its responsibility as indicated under paragraph 2 below. It consists of the AIS Headquarters and International NOTAM Office (NOF). Changi and Seletar AIS Aerodrome units operate 24 hours at the same location.

1.2 *AIS Headquarters*

Post:	Tel: (65) 64227036
Aeronautical Information Services	Fax: (65) 64410221
Civil Aviation Authority of Singapore	Email: caas_singaporeais@caas.gov.sg
Singapore Changi Airport	
P.O. Box 1	
Singapore 918141	

1.3 *International NOTAM office (NOF) and Changi and Seletar AIS Aerodrome Units*

Post:	Tel: (65) 65956056 (Duty Supervisor)
Singapore Air Traffic Control Centre (SATCC)	Tel: (65) 65956053 (NOF)
60 Biggin Hill Road	AFS: WSSSYNYX (NOF)
Singapore 509950	Tel: (65) 65956052 (Changi FPL Officer)
	Fax: (65) 65431826 (Changi AIS)
	AFS: WSSSZPZX (Changi AIS)
	Tel: (65) 64812909 (Seletar FPL Officer)
	Fax: (65) 64833044 (Seletar AIS)
	AFS: WSSLZPZX (Seletar AIS)

The service is provided in accordance with the provisions contained in ICAO Annex 15 - Aeronautical Information Services and the guidance material in the Aeronautical Information Services Manual (Doc 8126 - AN/872).

3.1.2 AREA OF RESPONSIBILITY

3.1.2.1 Aeronautical Information Services is responsible for the collection and dissemination of information for the entire territory of Singapore and for the airspace over the high seas encompassed by the Singapore Flight Information Region.

3.1.2.2 For the following airspace within Jakarta FIR, AIS is jointly provided by Indonesia and Singapore:

The area bounded by 031727N 1052959E 012450N 1061648E 001030N 1045656E 000000N 1050340E 000000N 1044330E thence around the arc of a circle radius 90 NM centred on 011324N 1035124E to 013430N 1022353E 011300N 1033000E 011408N 1033142E 011200N 1033900E 011046N 1034015E 010800N 1034500E 011500N 1040000E 011800N 1043000E 012921N 1043441E 011947N 1044606E 021838N 1052205E 023641N 1051311E 024348N 1050854E 025010N 1051210E 031453N 1052619E 031727N 1052959E.

Vertical limit: SFC to FL370

← 3.1.3 AERONAUTICAL PUBLICATIONS

3.1 Aeronautical information is provided in the form of Aeronautical Information Products containing the following elements:

Aeronautical Information Publication (AIP) and related amendment service;
AIP Supplement (AIP SUP);
Notice to Airmen (NOTAM) and Pre-flight Information Bulletins (PIB);
Aeronautical Information Circulars (AIC); and
Aeronautical Charts

NOTAM and related monthly checklists are disseminated via the AFS and PIB via internet. All the other elements of the Aeronautical Information Products can be retrieved from AIM-SG URL at <https://aim-sg.caas.gov.sg>

3.2 *Aeronautical Information Publication (AIP)*

AIP Singapore is the basic aeronautical information document published for the Republic of Singapore and contains information of a lasting character essential to air navigation. It is available in English only. It is maintained up-to-date by a regular amendment service.

3.3 *Amendment service to the AIP (AIP AMDT)*

AIP AMDT is published in accordance with the established regular intervals (see GEN 0.1-2 paragraph 3.2). It incorporates permanent changes to the AIP on the indicated publication date.

A brief description of the amendments and changes made are provided in the AIP AMDT cover page.

Each AIP AMDT cover page also includes references to the serial numbers of those elements, if any, of the Integrated Aeronautical Information Package which have been incorporated into the AIP by the amendment.

Each AIP AMDT is allocated a serial number which is consecutive and based on the calendar year. The year, indicated by two digits, is a part of the serial number of the AIP AMDT.

3.4 *AIP Supplement (AIP SUP)*

Temporary changes of long duration (3 months or more) and information of short duration which contains extensive text and/or graphics, supplementing the permanent information contained in the AIP, are published as AIP SUP. Operationally significant changes to the AIP are published in accordance with the AIRAC system and its established effective dates, and are identified clearly by the acronym AIRAC.

Each AIP SUP (regular or AIRAC) is allocated a serial number which is consecutive and based on the calendar year.

An AIP SUP is kept as long as all or some of its contents remain valid. The period of validity of the information contained in the AIP SUP will normally be given in the AIP SUP itself. Alternatively, NOTAM may be used to indicate changes to the period of validity or cancellation of the AIP SUP.

The checklist of current AIP SUP is published in the monthly plain-language NOTAM List.

3.5 *NOTAM and Pre-flight Information Bulletins (PIB)*

A NOTAM contains information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel engaged in flight operations. Each NOTAM contains information in the order shown in the ICAO NOTAM format and is composed of abbreviated phraseology assigned to the ICAO NOTAM code complemented by ICAO abbreviations, indicators, identifiers, designators, callsigns, frequencies, figures and plain language. NOTAM originated and issued for Singapore FIR and the airspace within Jakarta FIR where AIS is jointly provided by Indonesia and Singapore are distributed in 'A' series.

NOTAM are published as and when necessary to disseminate information of direct operational significance which:

- a. is of an ephemeral nature;
- b. requires advance distribution; or
- c. is appropriate to the AIP but needs immediate dissemination.

Each NOTAM is assigned a 4-digit serial number preceded by the letter 'A' indicating the series, followed by a stroke and 2 digits indicating the year of issue. The serial numbers begin with 0001 every year. A checklist of current NOTAMs is issued every month via the AFS. Additionally, a monthly plain language list of valid NOTAM, including indications of the latest AIP Amendment, AIP Supplement, AIC issued and a checklist of current AIP Supplements is also retrievable online at <https://aim-sg.caas.gov.sg>

k. Visual Approach Chart - ICAO

This chart is produced for aerodromes used by civil aviation where:

- * only limited navigation facilities are available; or
- * radio communication facilities are not available; or
- * no adequate aeronautical charts of the aerodrome and its surroundings at 1:500 000 or greater scale are available; or
- * visual approach procedures have been established

The aeronautical data shown include information on aerodromes obstacles, designated airspace, visual approach information, radio navigation aids and communication facilities, as appropriate.

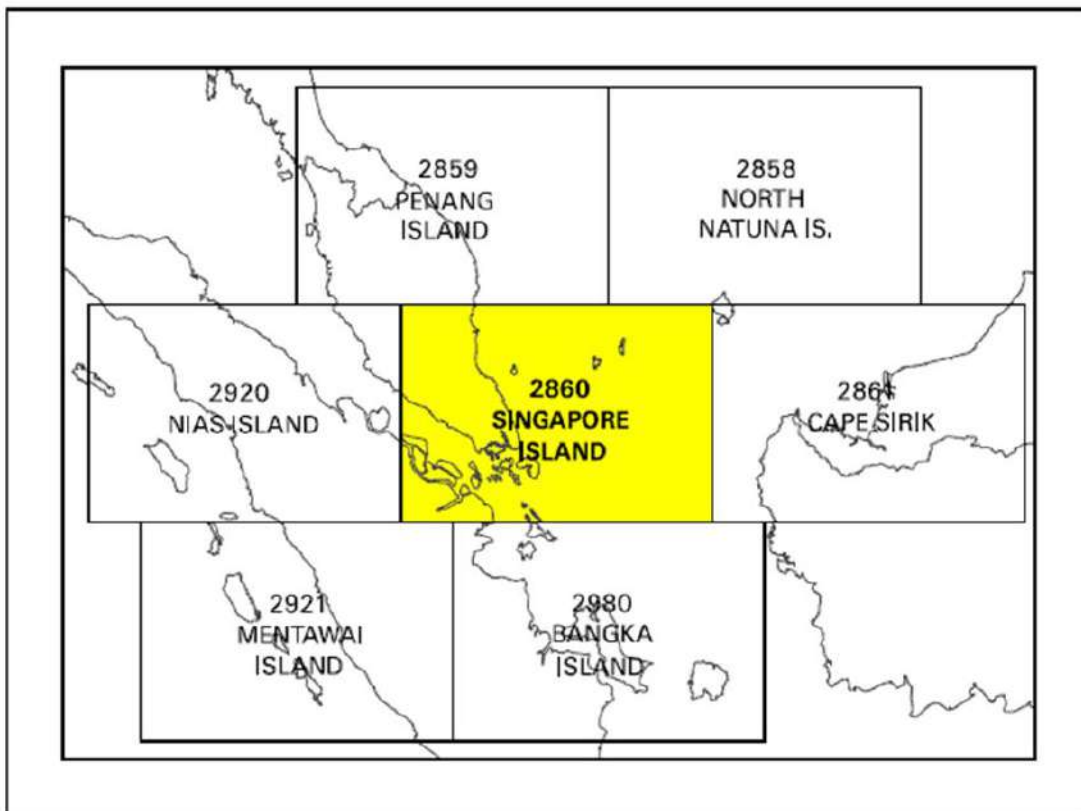
3.2.5 LIST OF AERONAUTICAL CHARTS AVAILABLE

GEN 3.2.5 LIST OF AERONAUTICAL CHARTS AVAILABLE					
Title of Chart Series	Scale	Name and/or number		Price (\$)	Date
← World Aeronautical Chart ICAO (WAC)	1:1 000 000	WAC 2860		In AIP	21 MAR 24
← Enroute Chart ICAO (ENRC)		ERC 6-1		In AIP	21 MAR 24
Instrument Approach Chart ICAO (IAC)		Singapore Changi			
←	1:400 000	RWY 02L - ICW ILS/DME	AD-2-WSSS-IAC-1	In AIP	21 MAR 24
←	1:400 000	RWY 02C - ICE ILS/DME	AD-2-WSSS-IAC-2	In AIP	21 MAR 24
←	1:400 000	RWY 02R - ICX ILS/DME	AD-2-WSSS-IAC-3	In AIP	21 MAR 24
←	1:400 000	RWY 20R - ICH ILS/DME	AD-2-WSSS-IAC-5	In AIP	21 MAR 24
←	1:400 000	RWY 20C - ICC ILS/DME	AD-2-WSSS-IAC-6	In AIP	21 MAR 24
←	1:400 000	RWY 20C - VTK DVOR/DME	AD-2-WSSS-IAC-7	In AIP	21 MAR 24
←	1:400 000	RWY 02L - RNP	AD-2-WSSS-IAC-9	In AIP	21 MAR 24
←	1:400 000	RWY 02C - RNP	AD-2-WSSS-IAC-10	In AIP	21 MAR 24
←	1:400 000	RWY 20R - RNP	AD-2-WSSS-IAC-11	In AIP	21 MAR 24
←	1:400 000	RWY 20C - RNP	AD-2-WSSS-IAC-12	In AIP	21 MAR 24
←	1:400 000	RWY 02R - RNP	AD-2-WSSS-IAC-13	In AIP	21 MAR 24
←	1:400 000	RWY 20L - RNP	AD-2-WSSS-IAC-14	In AIP	21 MAR 24
		Paya Lebar			
←	1:400 000	RWY 20 - PU DVOR/DME	AD-2-WSAP-IAC-1	In AIP	25 JAN 24
←	1:400 000	RWY 02 - PU DVOR/DME	AD-2-WSAP-IAC-2	In AIP	21 MAR 24
←	1:400 000	RWY 20 - IPS ILS/DME	AD-2-WSAP-IAC-3	In AIP	21 MAR 24
←	1:400 000	RWY 02 - IPN ILS/DME	AD-2-WSAP-IAC-4	In AIP	21 MAR 24
←	1:400 000	RWY 02 - RNP	AD-2-WSAP-IAC-5	In AIP	21 MAR 24
←	1:400 000	RWY 20 - RNP	AD-2-WSAP-IAC-6	In AIP	21 MAR 24
← Visual Approach Chart ICAO (VAC)	1:400 000	Singapore Changi		AD-2-WSSS-VAC-1	In AIP 21 MAR 24
		Seletar			
	1:100 000	RWY 03	AD-2-WSSL-VAC-1	In AIP	08 SEP 22
	1:100 000	RWY 21	AD-2-WSSL-VAC-2	In AIP	08 SEP 22
	1:100 000	RWY 03	AD-2-WSSL-VAC-3	In AIP	08 SEP 22
	1:100 000	RWY 21	AD-2-WSSL-VAC-4	In AIP	08 SEP 22
Visual Departure Chart		Seletar			
	1:100 000	RWY 03	AD-2-WSSL-VDC-1	In AIP	08 SEP 22
	1:100 000	RWY 21	AD-2-WSSL-VDC-2	In AIP	08 SEP 22
← Aerodrome Chart ICAO (AC)		Singapore Changi		AD-2-WSSS-ADC-2	In AIP 21 MAR 24
←		Seletar		AD-2-WSSL-ADC-1	In AIP 21 MAR 24
		Paya Lebar		AD-2-WSAP-ADC-1	In AIP 16 JUL 20
Aerodrome Obstacle Chart ICAO TYPE A (AOC)		Singapore Changi			
←	1:10 000	RWY 20R/02L	AD-2-WSSS-AOC-1	In AIP	08 SEP 22
	1:10 000	RWY 20C/02C	AD-2-WSSS-AOC-2	In AIP	21 MAR 24
	1:10 000	RWY 02R/20L	AD-2-WSSS-AOC-4	In AIP	08 SEP 22
		Seletar			
	1:10 000	RWY 03/21	AD-2-WSSL-AOC-1	In AIP	16 JUL 20
		Paya Lebar			
	1:20 000	RWY 20/02	AD-2-WSAP-AOC-1	In AIP	24 MAR 22
← Aerodrome Obstacle Chart ICAO TYPE B (AOC)	1:20 000	Singapore Changi		AD-2-WSSS-AOC-3	In AIP 21 MAR 24
		Seletar			
	1:20 000	RWY 03/21	AD-2-WSSL-AOC-2	In AIP	16 JUL 20

GEN 3.2.5 LIST OF AERONAUTICAL CHARTS AVAILABLE

<i>Title of Chart Series</i>	<i>Scale</i>	<i>Name and/or number</i>		<i>Price (\$)</i>	<i>Date</i>
Precision Approach Terrain Chart ICAO (PATC)	1:2 500	Singapore Changi			
	1:2 500	RWY 02L	AD-2-WSSSPATC-1	In AIP	10 OCT 19
	1:2 500	RWY 20C	AD-2-WSSSPATC-2	In AIP	21 MAR 24
	1:2 500	RWY 02R	AD-2-WSSSPATC-3	In AIP	31 DEC 20
	1:2 500	RWY 20L	AD-2-WSSSPATC-4	In AIP	31 DEC 20
	1:2 500	RWY 02C	AD-2-WSSSPATC-5	In AIP	25 JAN 24

3.2.6 INDEX TO THE WORLD AERONAUTICAL CHART (WAC) - ICAO 1:1 000 000



3.2.7 TOPOGRAPHICAL CHARTS

NIL

3.2.8 CORRECTIONS TO CHARTS NOT CONTAINED IN THE AIP

Identification of charts	Location on the chart where the correction has to be made	Precise details of the corrections to be made
NIL	NIL	NIL

GEN 3.4 COMMUNICATION SERVICES

3.4.1 RESPONSIBLE SERVICE

- 1.1 The Civil Aviation Authority of Singapore (CAAS) is responsible for the provision of telecommunication and navigation facility services in Singapore.
- 1.2 Enquiries, suggestions or complaints regarding any telecommunication and navigation facility services should be referred to the Director-General of Civil Aviation.

Post:	Tel: (65) 65421122
Director-General of Civil Aviation	Fax: (65) 65421231
Civil Aviation Authority of Singapore	AFS: WSSSYAYX
Singapore Changi Airport	
P. O. Box 1	
Singapore 918141	

- 1.3 The service is provided in accordance with the provisions contained in the following ICAO documents:

Annex 10 – Aeronautical Telecommunications
Doc 8400 – Procedures for Air Navigation Services - ICAO Abbreviations and Codes (PANS-ABC)
Doc 8585 – Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services
Doc 7030 – Regional Supplementary Procedures
Doc 7910 – Location Indicators
 Doc 9880 - Manual on Detailed Technical Specifications for the Aeronautical Telecommunications Network (ATN) using ISO / OSI standards and protocols

- 1.4 Differences to these provisions are detailed in subsection GEN 1.7.

3.4.2 AREA OF RESPONSIBILITY

- 2.1 Communication services are provided for the entire SINGAPORE FIR.
- 2.2 For the following airspace within Jakarta FIR, aeronautical telecommunication services (CNS) will be jointly provided by Indonesia and Singapore:

The area bounded by 031727N 1052959E 012450N 1061648E 001030N 1045656E 000000N 1050340E 000000N 1044330E thence around the arc of a circle radius 90 NM centred on 011324N 1035124E to 013430N 1022353E 011300N 1033000E 011408N 1033142E 011200N 1033900E 011046N 1034015E 010800N 1034500E 011500N 1040000E 011800N 1043000E 012921N 1043441E 011947N 1044606E 021838N 1052205E 023641N 1051311E 024348N 1050854E 025010N 1051210E 031453N 1052619E 031727N 1052959E.

Vertical limit: SFC to FL370

3.4.3 TYPES OF SERVICE

3.1 *Radio navigation services*

- 3.1.1 The following types of radio aids to navigation are available:

LF/MF non-directional beacon (NDB)
 Instrument landing system (ILS)
 Doppler VHF omni-directional radio range (DVOR)
 Distance measuring equipment (DME)
 Long range primary and secondary surveillance radar
 Primary and secondary approach radar
 Airport surface detection equipment (ASDE)

3.2 Voice/data link services

3.2.1 Voice service

The aeronautical stations maintain a continuous watch on their stated frequencies during the published hours of service unless otherwise notified.

An aircraft should normally communicate with the air-ground control radio station that exercises control in the area in which the aircraft is flying. Aircraft should maintain a continuous watch on the appropriate frequency of the control station and should not abandon watch, except in an emergency, without informing the control radio station.

3.2.2 Enroute Communications Organisation

- a. The radio frequencies for enroute communications are listed in subsection ENR 2.1
- b. The Singapore HF network provides an umbrella communication coverage for the FIR and may be contacted if communication cannot be maintained on the primary channel.
- c. Aircraft approaching or departing from an airport is required to communicate with that airport on the appropriate surface movement, tower or approach control frequency.
- d. ADS-C and / or CPDLC services are available to suitably equipped aircraft operating outside radar cover and not in ADS-B exclusive airspace within the Singapore FIR. The hours when ADS-C and CPDLC services are available and the logon requirements are listed in ENR 2.1. Full details of the services are published in ENR 1.1 paragraphs 8.1 to 8.7.

3.2.3 Data link Service

The messages to be transmitted over the Aeronautical Fixed Service (AFS) are accepted only if:

- a. the messages satisfy the requirements of ICAO Annex 10, Volume II, Chapter 3, paragraph 3.3;
- b. the messages are prepared in the form specified in ICAO Annex 10;
- c. the text of an individual message does not exceed 1800 characters.

3.2.4 General Aircraft Operating Agency Messages

General aircraft operating agency messages (with priority indicator "KK") are only accepted for transmission to countries which have agreed to accept Class B2 traffic. Details of telecommunication charges for Class B2 traffic to countries with which Singapore has agreement for handling of such traffic are given below:

List of States/Regions to which Class B2 traffic will be accepted (rate of charge will be S\$0.30 per word):

Australia, Brunei, Hong Kong, Indonesia (AFS stations), Kampuchea Democratic, Malaysia (Peninsular Malaysia, Sabah and Sarawak), Myanmar, Netherlands, New Zealand, Philippines (Manila), Singapore, Taiwan, Thailand and Vietnam.

3.3 Broadcasting service

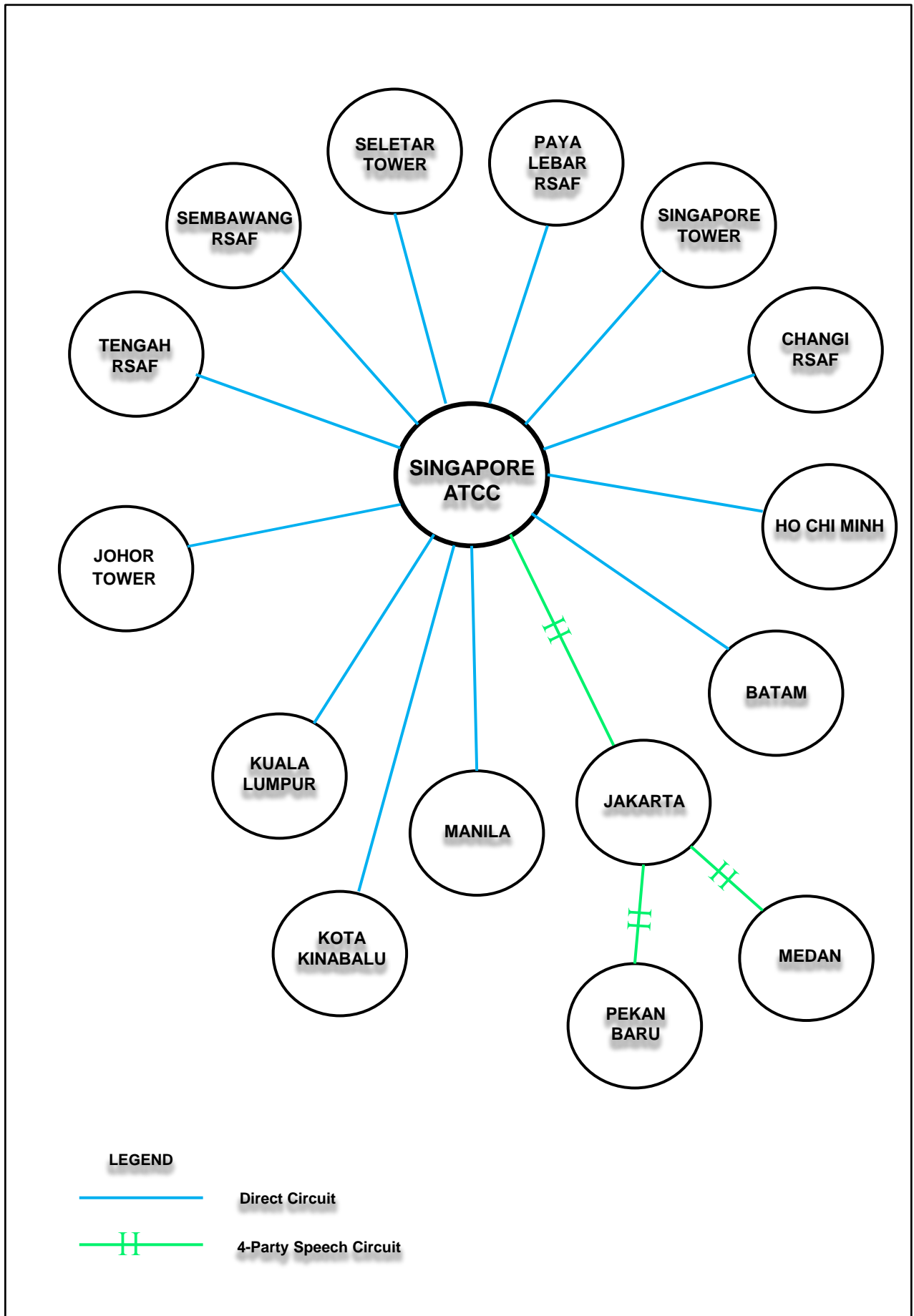
3.3.1 The following broadcasts are available for the use of aircraft in flight:

- a. HF RTF Volmet Broadcasts (page GEN 3.5-7 refers)
- b. VHF ATIS Broadcasts (page GEN 3.4-3 refers)

AERONAUTICAL FIXED SERVICES - INTERNATIONAL AND DOMESTIC CIRCUITS														
STATION			CORRESPONDENT				TYPE OF CHANNEL			RADIO FREQUENCIES		TYPE OF TRAFFIC	HOURS (UTC)	REMARKS
NAME	LOCATION INDICATOR	CALLSIGN FOR RADIO CIRCUITS	NAME	CALLSIGN FOR RADIO CIRCUITS	TYPE OF CHANNEL	TRANS KHZ	REC KHZ	TYPE OF TRAFFIC	HOURS (UTC)	REMARKS				
1	2	3	4	5	6	7	8	9	10	11				
SINGAPORE	WSSS		BANGKOK		LTTdx			AFS	H24					
	WSSS		BAHRAIN		LTTdx			AFS	H24					
	WSSS		BRUNEI		LTTdx			AFS	H24					
	WSSS		COLOMBO		LTTdx			AFS	H24					
	WSSS		HO CHI MINH		LTTdx			AFS	H24					
	WSSS		JAKARTA		LTTdx			AFS	H24					
	WSSS		KUALA LUMPUR		LTTdx			AFS	H24					
	WSSS		LONDON		LTTdx			AFS	H24					
	WSSS		MANILA		LTTdx			AFS	H24					
	WSSS		BRISBANE		LTTdx			AFS	H24					
	WSSS		FUKUOKA		LTTdx			AFS	H24					
	WSSS		MUMBAI		LTTdx			AFS	H24					
SINGAPORE ACC			JOHOR BAHRU KUALA LUMPUR		LTTdx			ATS	H24				Direct ATS Speech Circuit	
			KOTA KINABALU		LTTdx			ATS	H24				Direct ATS Speech Circuit	
			JAKARTA		LTTdx			ATS	H24				4-party Speech Circuit	
			PEKAN BARU		LTTdx			ATS	0001-1100				4-party Speech Circuit	
			MANILA		LTTdx			ATS	H24				Direct ATS Speech Circuit	
			MEDAN		LTTdx			ATS	2300-1400				4-party Speech Circuit	
			BATAM		LTTdx			ATS	0100-0800				Direct ATS Speech Circuit	
Note: For local circuits connecting different offices to a Com Centre, see diagrams GEN 3.4-7 and 3.4-9														

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AERONAUTICAL FIXED SERVICES - TELEPHONE



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GEN 3.5 METEOROLOGICAL SERVICES

3.5.1 RESPONSIBLE SERVICE

- ← 1.1 The meteorological services for international air navigation are provided by the Meteorological Service Singapore of the National Environment Agency.

Post:

THE DIRECTOR-GENERAL
Meteorological Service Singapore
Singapore Changi Airport,
P.O. Box 8
SINGAPORE 918141

Tel: (65) 65457190(HQ)
(65) 62446133 / (65) 65422837 (MET Office)

Fax: (65) 65457192 (HQ)
(65) 65425026 (MET Office)

AFS: WSSSYMYX

URL: www.weather.gov.sg

- 1.2 The service is provided in accordance with the provisions contained in the following ICAO documents:

Annex 3 – Meteorological Service for International Air Navigation
Doc 7030 – Regional Supplementary Procedures Part 3 - Meteorology

- 1.3 Differences to these provisions, if any, are detailed in subsection GEN 1.7.

3.5.2 AREA OF RESPONSIBILITY

- ← 2.1 Aeronautical meteorological services (MET) is provided for the Singapore FIR. For the following portions of Jakarta FIR, MET is jointly provided by Indonesia and Singapore:

The area bounded by 031727N 1052959E 012450N 1061648E 001030N 1045656E 000000N 1050340E 000000N 1044330E thence around the arc of a circle radius 90 NM centred on 011324N 1035124E to 013430N 1022353E 011300N 1033000E 011408N 1033142E 011200N 1033900E 011046N 1034015E 010800N 1034500E 011500N 1040000E 011800N 1043000E 012921N 1043441E 011947N 1044606E 021838N 1052205E 023641N 1051311E 024348N 1050854E 025010N 1051210E 031453N 1052619E 031727N 1052959E

Vertical limit: SFC to FL370

3.5.3 METEOROLOGICAL OBSERVATIONS AND REPORTS

←

Meteorological Observations and Reports					
<i>Name of Station/ Location Indicator</i>	<i>Type & Frequency of Observation/ Automatic Observing Equipment</i>	<i>Types of MET Reports & Supplementary Information included</i>	<i>Observation System & Sites (s)</i>	<i>Hours of Operation</i>	<i>Climatological Information</i>
1	2	3	4	5	6
SINGAPORE/ Singapore Changi WSSS	Half hourly plus special observations	MET REPORT Special Report METAR SPECI TREND WS	a. Ultrasonic wind sensors at ends and middle of RWY 02L/20R (Runway 1), RWY 02C/20C (Runway 2) and RWY 02R/20L (Runway 3). Surface wind report in METAR and SPECI is taken from the wind sensor at the southern end of RWY 02L (with the sensor at the northern end of RWY 02C/20C as backup). b. Windsocks at ends of all runways. c. Transmissometers at both ends and in the middle of all runways. d. Low level wind shear observations made continuously by system of 15 surface wind sensors, located in the airport and its vicinity. e. Integrated and combination of MET Doppler X, C and S band weather radars and two wind lidars for detecting wind shear up to 20km and monitoring storms up to 480km.	H24	Climatological Summaries available at Meteorological Service Singapore of the National Environment Agency.
SINGAPORE/ Seletar WSSL	Hourly plus special observations	MET REPORT Special Report METAR SPECI WS	a. Ultrasonic wind sensors at the ends of runway (surface wind report in METAR and SPECI is taken from measurements of the ultrasonic wind sensor at RWY 03). b. Windsocks at both ends of RWY 03 and 21. c. Transmissometers at both ends of RWY 03 and 21. d. Low level wind shear observations made continuously by system of 6 surface wind sensors, located in its vicinity. e. Integrated and combination of MET Doppler C and S band weather radars for detecting wind shear within 20km and monitoring storms up to 480km.	H24	NIL
SINGAPORE/ Paya Lebar WSAP	Hourly plus special observations	METAR SPECI	a. Cup anemometers and wind vanes located at both ends of the runway, and an ultrasonic wind sensor located at 400m next to mid-runway. Surface wind report in METAR and SPECI is taken from the ultrasonic wind sensor.	H24	NIL

3.5.4 TYPES OF SERVICES

- ← 4.1 The Meteorological Office and Meteorological Watch Office at Singapore Changi Airport operate H24 and provide the following services for international air navigation:
- a. Full meteorological documentation and briefing for current operational planning for all flights operating out of Singapore Changi Airport via the Aviation Weather Services Portal at URL <https://www.weather.gov.sg/aviation>;
 - b. Area meteorological watch over the Singapore FIR with the supply of meteorological information including SIGMET information to aircraft in flight through the Singapore ATS radio channels (see subsection AD 2.11);
 - ← c. For the portions of airspace within the Jakarta FIR where MET is jointly provided by Indonesia and Singapore (see GEN 3.5 para 3.5.2.1), high level SIGWX forecasts are provided jointly with the Centre for Aviation Meteorology of BMKG; SIGMET and special air reports (ARS) are provided jointly with Meteorological Watch Office Jakarta;
 - d. HF RTF VOLMET broadcasts of meteorological information (see page GEN 3.5-7), Aviation weather report with trend statement, strong low level vertical wind shear report and aerodrome warnings are also included in VHF ATIS broadcasts for Singapore Changi Airport (see page GEN 3.4-3);
 - e. Meteorological information for ATS.
- ← 4.2 Weather briefing by a forecaster is available H24 to qualified flight operations personnel at the Meteorological Office at Singapore Changi Airport or via telephone at (65)62446133 / (65)65422837. Weather information is available online via the Aviation Weather Services Portal at URL <https://www.weather.gov.sg/aviation> (see paragraph 9.2 for further details).
- 4.3 The Meteorological Office at Seletar Aerodrome operates H24 and provides meteorological documentation without briefing for international and general aviation flights operating out of Seletar Aerodrome.
- 4.4 Details of documentation supplied for each flight are determined by arrangement between the operator and the Meteorological Office. In general, the pilot-in-command is provided with documentation comprising one or more fixed-time prognostic streamline/istotach/spot temperature charts of standard isobaric surfaces appropriate to the cruising level (ICAO model IS), one of fixed-time prognostic significant weather chart code form and appropriate aerodrome forecasts in TAF code form.
- 4.5 Routine aerodrome forecasts received from other Meteorological Offices are normally included in meteorological documentation without modification. When a required aerodrome forecast is not received, a provisional forecast may be issued by the Meteorological Office providing the documentation.
- 4.6 After documentation has been issued and until take-off (i.e. the latest ETD notified to the Meteorological Office), the Meteorological Office at Singapore Changi Airport makes available amendments to the documentation. It is the responsibility of the operator's local representative or the pilot-in-command to obtain any pre-departure amendment(s) from the Meteorological Office at Singapore Changi Airport. The pilot-in-command may request pre-departure amendment(s) through the Singapore Changi Airport Control Tower.
- 4.7 Climatological Summaries for Singapore Changi (WSSS-48698) are available from the Meteorological Service Singapore.

4.8 OBSERVING SYSTEMS AND OPERATING PROCEDURES AT SINGAPORE CHANGI AIRPORT AND SELETAR AERODROME**4.8.1 SINGAPORE CHANGI AIRPORT****4.8.1.1 RWY 02L/20R (Runway 1)**

4.8.1.1.1 Surface wind is measured by three ultrasonic wind sensors located as follows:

	<u>DIST FROM END OF RWY</u>	<u>DIST FROM RWY CENTRELINE</u>
(i) One set at	406 metres north of RWY 02L	120 metres
(ii) One set at	middle of runway	121 metres
(iii) One set at	381 metres south of RWY 20R	121 metres

4.8.1.1.2 RVR observations are made by means of three sets of transmissometers, located as follows:

	<u>DIST FROM END OF RWY</u>	<u>DIST FROM RWY CENTRELINE</u>
1st set	446 metres north of RWY 02L	120 metres
2nd set	Middle of runway	121 metres
3rd set	421 metres south of RWY 20R	121 metres

4.8.1.1.3 RVR is reported in steps of 25 metres between 0 and 400 metres, 50 metres between 400 and 800 metres and 100 metres between 800 and 1,500 metres.

4.8.1.1.4 Surface wind report in METAR and SPECI is taken from the wind sensor at the southern end of RWY 02L (with the sensor at the northern end of RWY 02C/20C as backup).

4.8.1.2 RWY 02C/20C (Runway 2)

4.8.1.2.1 Surface wind is measured by three ultrasonic wind sensors, located as follows:

	<u>DIST FROM THRESHOLD</u>	<u>DIST FROM RWY CENTRELINE</u>
(i) One set at	414 metres north of RWY 02C	130 metres
(ii) One set at	Middle of runway	130 metres
(iii) One set at	413 metres south of RWY 20C	128 metres

4.8.1.2.2 RVR observations are made by means of three sets of transmissometers, located as follows:

	<u>DIST FROM THRESHOLD</u>	<u>DIST FROM RWY CENTRELINE</u>
1st set	449 metres north of RWY 02C	120 metres
2nd set	Middle of runway	120 metres
3rd set	427 metres south of RWY 20C	120 metres

4.8.1.2.3 RVR is reported in steps of 25 metres between 0 and 400 metres, 50 metres between 400 and 800 metres and 100 metres between 800 and 1,500 metres.

4.8.1.3 RWY 02R/20L (Runway 3)

4.8.1.3.1 Surface wind is measured by three ultrasonic wind sensors located as follows:

	<u>DIST FROM THRESHOLD</u>	<u>DIST FROM RWY CENTRELINE</u>
(i) One set at	428 metres north of RWY 02R	132 metres
(ii) One set at	Middle of runway	121 metres
(iii) One set at	435 metres south of RWY 20L	132 metres

4.8.1.3.2 RVR observations are made by means of three sets of transmissometers, located as follows:

	<u>DIST FROM THRESHOLD</u>	<u>DIST FROM RWY CENTRELINE</u>
← 1st set	421 metres north of RWY 02R	120 metres
← 2nd set	Middle of runway	121 metres
← 3rd set	425 metres south of RWY 20L	120 metres

4.8.1.3.3 RVR is reported in steps of 25 metres between 0 and 400 metres, 50 metres between 400 and 800 metres and 100 metres between 800 and 1500 metres.

4.8.1.4 Wind Shear Observations (Singapore Changi Airport)

4.8.1.4.1 Horizontal low level wind shear observations are measured continuously by a system consisting of 15 surface wind sensors, MET Doppler X, S and C band weather radars and two wind lidars located in Singapore Changi airport and its vicinity.

4.8.1.4.2 ATC will pass to all aircraft taking off or landing for the next 1/2 hour from the time of report whenever microburst or wind shear of intensity 15 knots or greater is observed/reported.

4.8.1.4.3 The phraseology used by ATC to warn pilots of the presence of wind shear of intensity between 15 and 30 knots is:

“..... (callsign) WIND SHEAR WARNING
STRONG LOW LEVEL WIND SHEAR OBSERVED IN THE VICINITY OF
CHANGI AIRPORT AT (time)”

- 4.8.1.4.4 The phraseology used by ATC to warn pilots of the presence of wind shear of intensity greater than 30 knots is:

“.....(callsign) WIND SHEAR WARNING
SEVERE LOW LEVEL WIND SHEAR OBSERVED IN THE VICINITY OF
CHANGI AIRPORT AT(time)”

- 4.8.1.4.5 The presence of wind shear will also be broadcast in the ATIS for the next half an hour.

4.8.2 SELETAR AERODROME

- 4.8.2.1 Surface wind is measured by ultrasonic wind sensors at ends of runway. Surface wind report in METAR and SPECI is taken from measurements of the ultrasonic wind sensor at RWY 03.

4.8.2.2 Wind Shear Observations (Seletar Aerodrome)

- 4.8.2.2.1 ATC will pass to all aircraft taking off or landing for the next 1/2 hour from the time of report whenever microburst or windshear of intensity 15 knots or greater is observed/reported.

- 4.8.2.2.2 The phraseology used by ATC to warn pilots of the presence of wind shear of intensity between 15 and 30 knots is:

“.....(callsign) WIND SHEAR WARNING
STRONG LOW LEVEL WIND SHEAR OBSERVED IN THE VICINITY OF
SELETAR AIRPORT AT(time)”

- 4.8.2.2.3 The phraseology used by ATC to warn pilots of the presence of wind shear of intensity greater than 30 knots is:

“.....(callsign) WIND SHEAR WARNING
SEVERE LOW LEVEL WIND SHEAR OBSERVED IN THE VICINITY OF
SELETAR AIRPORT AT(time)”

3.5.5 NOTIFICATION REQUIRED FROM OPERATORS

- 5.1 It is the responsibility of the operator or the pilot-in-command to notify the meteorological office of any flight for which meteorological documentation is required (ref. ICAO Annex 3, paragraph 2.3). As much prior notice as possible should be given, and at least one hour notice at Singapore Changi Airport and two hours at Seletar Aerodrome would be required for nonscheduled flights.

← 3.5.6 AIRCRAFT REPORTS

6.1 AIREP

- 6.1.1 Special aircraft observations shall be made and the reports transmitted as necessary to ATC.
- 6.1.2 Special aircraft observations of pre-eruption volcanic activity, volcanic eruption or volcanic ash cloud shall be recorded on the special Air-Report of Volcanic Activity form which can be downloaded from URL <https://aim-sg.caas.gov.sg>. A copy of the completed Volcanic Activity Report shall be delivered by the operator or a flight crew member, without delay, either personally or by telephone facsimile (TEL: 62446133 / 65422837 or FAX: 65429978 / 65425026) to the Meteorological Office, Singapore Changi Airport.

← 6.2 REPORTING OF LOW LEVEL WIND SHEAR

- 6.2.1 Pilots encountering wind shear shall report to ATC as soon as possible.
- 6.2.2 When reporting wind shear on radiotelephony, the information should be transmitted in this order:
- Aircraft callsign;
 - WIND SHEAR report;
 - Time (of wind shear occurrence);
 - Position (of wind shear);
 - Intensity (moderate, strong or severe);
 - Average height of wind shear layer.

6.2.3 On receipt of a wind shear report from a pilot, ATC will pass it to other aircraft in the vicinity. The following phraseology will be used:

“WIND SHEAR WARNING
ARRIVING (or DEPARTING) (type of aircraft)
REPORTED (moderate, strong, severe)
WIND SHEAR IN APPROACH (or DEPARTURE)
RUNWAY (number) AT (time)
HEIGHT OF WIND SHEAR LAYER (feet)”

6.2.4 The presence of wind shear as reported by a pilot will also be broadcast in the ATIS for the next half an hour unless subsequent reports indicate that wind shear no longer exists.

← **3.5.7 VOLMET SERVICE**

VOLMET SERVICE						
Name of station	CALLSIGN IDENT (EM)	Frequency	Broadcast period	HR of SER	Aerodromes included	Contents and format of REP and FCST
1	2	3	4	5	6	7
SINGAPORE	SINGAPORE RADIO (A3J)	6676KHz (1230-2230) 11387KHz (2230-1230)	H + 20 to H + 25 and H + 50 to H + 55	H24	SINGAPORE (1) SINGAPORE (2)(4) KUALA LUMPUR (3)(4) SUBANG AIRPORT (4) SOEKARNO-HATTA (3)(4) KUCHING (3)(4) BRUNEI (3)(4) KOTA KINABALU (3)(4) DEN PASAR (3) (4) PENANG (3)(4) SINGAPORE (5) KUALA LUMPUR (4)(8) SINGAPORE (1) SINGAPORE (4)(6) KUALA LUMPUR (4)(7) SUBANG AIRPORT (4) SOEKARNO-HATTA (4)(7) KUCHING (4)(7) BRUNEI (4)(7) KOTA KINABALU (4)(7) DEN PASAR (4)(7) PENANG (4)(7) SINGAPORE (5) SOEKARNO HATTA (4)(8)	SIGMET METAR METAR METAR METAR METAR METAR METAR METAR TAF TAF SIGMET METAR METAR METAR METAR METAR METAR METAR TAF TAF
Plain Language EN.						
(1) SIGMET message or 'NIL' is transmitted.						
(2) Latest routine report H+00 including trend statement; repeated at end of broadcast, time permitting.						
(3) H+00 (or the previous H+30 report when the H+00 report is not available) including trend statement when appended.						
(4) As available.						
(5) Valid for 12 hours.						
(6) Latest routine report H+30 including trend statement; repeated at end of broadcast, time permitting.						
(7) H+30 (or the H+00 report when the H+30 report is not available) including trend statement when appended.						
(8) Valid for 30 hours.						

VOLMET SERVICE						
Name of station	CALLSIGN IDENT (EM)	Frequency	Broadcast period	HR of SER	Aerodromes included	Contents and format of REP and FCST
1	2	3	4	5	6	7
SINGAPORE	SINGAPORE VOLMET	D-VOLMET	as required	H24	SINGAPORE KUALA LUMPUR SOEKARNO-HATTA SINGAPORE KUALA LUMPUR SUBANG AIRPORT SOEKARNO-HATTA KUCHING BRUNEI KOTA KINABALU DEN PASAR PENANG SINGAPORE KUALA IUMPUR SOEKARNO-HATTA	SIGMET SIGMET SIGMET METAR METAR METAR METAR METAR METAR METAR METAR METAR METAR TAF TAF TAF
Data Link VOLMET (D-VOLMET) service available H24. AP Ident WSSS. Messages comply with ARINC 623 standards.						

3.5.8 SIGMET SERVICE

← 8.1 General

- ← 8.1.1 For the safety of air traffic, the Meteorological Watch Office of Singapore maintains an area meteorological watch and warning service. This service consists partly of a continuous weather watch within the Singapore FIR and the portions of airspace within the Jakarta FIR where MET is jointly provided by Indonesia and Singapore (see GEN 3.5 para 3.5.2.1), and issuance of appropriate information (SIGMET) by Meteorological Watch Office of Singapore and partly of the issuing of warnings for Changi Airport.

SIGMET SERVICE						
Name of MWO/ location indicators	Hours of Operation	FIR or CTA served	Type of SIGMET / validity	Specific procedures	ATS unit served	Additional Information
1	2	3	4	5	6	7
SINGAPORE/WSSS	H24	Singapore FIR Jakarta FIR*	SIGMET / 4-6HR	Nil	Singapore ACC	Nil

* For the portions of airspace within the Jakarta FIR where MET is jointly provided by Indonesia and Singapore (see GEN 3.5 para 3.5.2.1), SIGMET is jointly provided by the Meteorological Watch Offices of Jakarta and Singapore. The Meteorological Watch Offices of Jakarta and Singapore have implemented agreed coordination procedures in accordance with the procedures in the ICAO Asia/Pacific Regional SIGMET Guide and Operational SIGMET Coordination to ensure that there is no conflict in the SIGMETs published by both Meteorological Watch Offices.

8.2 Area Meteorological Watch Service

- 8.2.1 The area meteorological watch service is performed by the Meteorological Service Singapore.
- 8.2.2 The Meteorological Service Singapore issues information in the form of SIGMET messages about the occurrence or expected occurrence of one or several of the following significant meteorological phenomena:
- thunderstorms *
 - severe turbulence
 - severe icing
 - severe mountain waves
 - heavy sand storm/dust storm
 - volcanic ash cloud
 - tropical cyclone

* Area of widespread cumulonimbus clouds or cumulonimbus along a line (squall line) with little or no space between individual clouds, or cumulonimbus embedded in cloud layers or obscured by haze.

8.2.3 The SIGMETs are issued in abbreviated plain language using ICAO abbreviations and are respectively numbered consecutively for each day commencing at 0001. Their period of validity is generally not more than 4 hours and less than 6 hours from the time of transmission.

← 8.2.4 SIGMETs issued by the Meteorological Service Singapore are transmitted to adjacent MWOs in accordance with regional air navigation agreements and used by ATS units in Singapore.

8.3 Warning Service

8.3.1 Aerodrome warnings for Changi Airport are issued by Meteorological Service Singapore if one or several of the following phenomena are expected to occur at the airport:

- squall
- thunderstorm
- hail
- tornado
- horizontal visibility and/or RVR of 800 metres or less
- mean surface wind speed of 25 knots or more
- wind gusts of 35 knots or more
- cloud of BKN or OVC amount with base 500 ft or less

8.3.2 The warnings are:

- for the protection of parked and moored aircraft,
- for the protection of equipment at the airport, and
- for the safety of arriving and departing aircraft.

8.3.3 The warnings are issued in English and are distributed in accordance with a distribution list which has to be agreed upon locally. In order to guarantee rapid dissemination of the warnings, the distribution list to be used shall, as far as possible, contain only one recipient for an interested group; this recipient will be responsible for the further dissemination of the warning within the group.

← 8.3.4 SIGMET is disseminated by directed transmissions to aircraft through general calls by the Singapore Area Control Centre for Singapore FIR, and the portions of airspace within the Jakarta FIR where MET is jointly provided by Indonesia and Singapore (see GEN 3.5 para 3.5.2.1).

3.5.9 OTHER AUTOMATED METEOROLOGICAL SERVICES

← 9.1 Besides VOLMET and ATIS broadcasts, airline operators can obtain access to various operational meteorological information through the Aviation Weather Services Portal and automated faxing service.

← 9.2 The Aviation Weather Services Portal is free to airlines and flight operators for flights departing from Singapore Changi or Seletar Airports. It is accessible via the "Login" link at URL <https://www.weather.gov.sg/>. A registered user account is required for the access. For registration, please email to MSS_Aviation_Enquiries@nea.gov.sg.

AVIATION WEATHER SERVICES PORTAL			
<i>Service Name</i>	<i>Information Available</i>	<i>Area, Route and Aerodrome Coverage</i>	<i>Telephone and Telefax numbers Remarks</i>
1	2	3	4
Aviation Weather Services Portal	METAR, SPECI, TAF, AD Warning, Wind Shear Warning, SIGMET, Tropical Cyclone Warnings/Advisories, Volcanic Ash, Radioactive Fallout and Haze Information Advisories	All METAR, SPECI, TAF, SIGMET, Tropical Cyclone Warnings/Advisories, Volcanic Ash, Radioactive Fallout Advisories received from designated major centres around the world. AD Warning and Wind Shear Warning for WSSS and WSSL. Haze Information/Advisories for Southeast Asia Region	
	Latest Himawari-8 composite and true colour satellite images every 20 minutes	Southeast Asia and full globe	
	Latest Himawari-8 IR and hourly cloud top height satellite images every 10-minutes	Asia Pacific	
	Latest images from other satellites such as EUMETSAT, NOAA and Feng-Yun weather satellites	Europe, US Polar, America and Asia Pacific	
	Low-to-Mid-Level Significant Weather charts	Low-Medium level (Surface-FL250) covering southern ASEAN region	
	WAFS (World Area Forecast System) SIGWX charts	Medium-High level covering Asia, Middle East, Africa, America and Europe	
	Prognostic Wind-Temperature charts	Standard levels covering Europe, America, Asia-Pacific regions and the southern ASEAN region.	
	Weather Radar images	Latest Singapore Changi Airport 70km, 240km and 480km range rain intensity radar plots.	
	WAFS Washington model gridded data	Full globe forecast of winds, temperature, turbulence potential, icing potential and horizontal extent of cumulonimbus clouds	
	Take-off conditions	Singapore Changi Airport	
	Climb and Descent winds forecast	Selected airports over Asia Pacific, Europe, Africa and North America	

Note: Details of meteorological briefing at aerodromes are given in the individual aerodrome sections, i.e. AD 2

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GEN 3.6 SEARCH AND RESCUE

3.6.1 RESPONSIBLE SERVICE(S)

- 1.1 The search and rescue service in Singapore is provided by the Civil Aviation Authority of Singapore, in collaboration with the Ministry of Defence, Meteorological Service and Maritime and Port Authority of Singapore, which have the responsibility for making the necessary facilities available. The postal and telegraphic addresses of the Civil Aviation Authority of Singapore are given on page [GEN 1.1-1](#).

Post:

RESCUE COORDINATION CENTRE (RCC),
60 Biggin Hill Road,
Singapore 509950.

Tel: (65) 65425024 - Singapore RCC
(65) 65412668 or (65) 65412672 - Singapore ACC

Fax: (65) 65422548

AFS: WSJCZQZX

- 1.2 The service is provided in accordance with the provisions contained in the following ICAO documents and local procedures:

Annex 12 – Search and Rescue

Annex 13 – Aircraft Accident and Incident Investigation

Doc 7030 – Regional Supplementary Procedures for Alerting and SAR services applicable in the SEA Region.

Doc 9731 – International Aeronautical and Maritime Search and Rescue Manuals Volume 1, 2 and 3 Singapore local procedures

3.6.2 AREA OF RESPONSIBILITY

- 2.1 The search and rescue service in Singapore is responsible for SAR operations within Singapore SRR.

- 2.2 For the following airspace within Jakarta FIR, search and rescue services (SAR) will be jointly provided by Indonesia and Singapore:

The area bounded by 031727N 1052959E 012450N 1061648E 001030N 1045656E 000000N 1050340E 000000N 1044330E thence around the arc of a circle radius 90 NM centred on 011324N 1035124E to 013430N 1022353E 011300N 1033000E 011408N 1033142E 011200N 1033900E 011046N 1034015E 010800N 1034500E 011500N 1040000E 011800N 1043000E 012921N 1043441E 011947N 1044606E 021838N 1052205E 023641N 1051311E 024348N 1050854E 025010N 1051210E 031453N 1052619E 031727N 1052959E.

Vertical limit: SFC to FL370

3.6.3 TYPES OF SERVICES

- 3.1 Details of the rescue coordination centre and related supporting rescue units are given in the table on page GEN 3.6-3 titled - Search and Rescue Units. In addition, various elements of the Singapore Police Force, Maritime and Port Authority of Singapore and the Merchant Marine are available for search and rescue missions, when required. The aeronautical, maritime and public telecommunication services are available to the search and rescue organisation.
- 3.2 All search aircraft are land planes and carry survival equipment, capable of being dropped, consisting of inflatable rubber dinghies equipped with general purpose first aid supplies, emergency rations and survival radio equipment. Aircraft are equipped to communicate on 121.5MHz, 123.1MHz, 243.0MHz, 282.8MHz, 2182KHz, 3023KHz and 5680KHz and are also equipped with VHF/UHF direction finder. Marine craft are equipped to communicate on 123.1MHz, 282.8MHz, 2182KHz, 3023KHz and 5680KHz and are equipped with radar.
- 3.3 The Singapore RCC provides distress alert detection of Emergency Locator Transmitters (ELTs), Emergency Position Indicator Radio Beacons (EPIRBs) and Personal Locator Beacons (PLBs) using the Cospas-Sarsat Satellite Aided Tracking System. This system is able to detect 406.0MHz beacons globally and the information is shared with the other users of the system. A database of the Singapore registered aviation beacons is kept at the RCC and the Maritime beacons are in the Maritime and Port Authority database.
- 3.4 Users of 406.0MHz beacons that are coupled with the 121.5MHz frequency will be able to use the 121.5MHz for homing purposes only by search units.

3.6.4 SAR AGREEMENTS

- 4.1 SAR agreements have been concluded between Civil Aviation Authority of Singapore and the SAR authorities or agencies of Indonesia, Malaysia, Philippines, Thailand and Vietnam. These agreements provide for mutual assistance in the conduct of SAR operations within each others' SAR Regions (SRR) and approval for entry of SAR aircraft, vessels and personnel of one State into the SRR of another State, with prior permission, for the purpose of conducting SAR operations or rendering SAR assistance and for direct communications between the SAR authorities or agencies on all common SAR matters.
- 4.2 Requests for the entry of aircraft, equipment and personnel from other States to engage in search for aircraft in distress or to rescue survivors of aircraft accidents should be transmitted to the Rescue Coordination Centre. Instructions as to the control which will be exercised on entry of such aircraft and/ or personnel will be given by the Rescue Coordination Centre in accordance with the standing plan for the conduct of search and rescue in the area.
- 4.3 Civil Aviation Authority of Singapore has also concluded an SAR agreement with the SAR Coordinator Pacific RCC, United States Air Force (USAF). The agreement provides for all possible assistance to assist RCC Singapore in its response to United States (US) military SAR incidents within the Singapore SRR. It will also provide US assistance to RCC Singapore in its prosecution of civil SAR incidents when requested.

3.6.5 CONDITIONS OF AVAILABILITY

- 5.1 The SAR service and facilities in Singapore are available without charge to neighbouring states on opportunity basis and upon request to the Rescue Coordination Centre Singapore or the Singapore Air Traffic Control Centre. All facilities are specialised in SAR techniques and functions.

3.6.6 PROCEDURES AND SIGNALS USED

6.1 *Procedures and signals used by aircraft*

- 6.1.1 Procedures for pilots-in-command observing an accident or intercepting a distress call and/or message are outlined in ICAO Annex 12, Chapter 5.

← 6.2 *Communications*

- 6.2.1 Transmission and reception of distress messages within the Singapore Search and Rescue Region are handled in accordance with ICAO Annex 10, Volume II, Chapter 5, para 5.3.
- 6.2.2 For communications during search and rescue operations, the codes and abbreviations published in *ICAO Abbreviations and Codes (Doc 8400)* are used.
- 6.2.3 Information concerning positions, callsigns, frequencies and hours of operation of Singapore aeronautical stations is published in sections AD 2 and ENR 2.
- 6.2.4 The frequency 121.5MHz is guarded continuously by the Control Tower, Singapore Changi Airport, the Singapore Air Traffic Control Centre and Control Tower, Seletar Aerodrome. The Coast Radio Station in Singapore guards the international distress frequencies.
- 6.2.5 Search and Rescue aircraft conducting Search and Rescue Operations will use the following callsigns:
- a. Fixed Wing 'Rescue (plus number 61 to 85)'
 - b. Rotary Wing 'Rescue (plus number 10 to 19)'
- 6.2.6 Rescue vessels / boats conducting Search and Rescue Operations will use the following callsigns:
- a. 'Rescue Vessel (plus number 21 to 31)'
 - b. 'Rescue Boat (plus number or callsign)'

6.3 *Search and Rescue Signals*

- ← 6.3.1 The search and rescue signals to be used are those prescribed in ICAO Annex 12, Chapter 5, paragraph 5.8.
- 6.3.2 Ground/Air Visual Signal Codes for use by Survivors

GROUND/AIR VISUAL SIGNAL CODES FOR USE BY SURVIVORS			
<i>Nr.</i>	<i>Message</i>	<i>Code symbol</i>	<i>Instructions for use</i>
1	Require assistance	V	a. Make signals not less than 8ft (2.5m).
2	Require medical assistance	X	b. Take care to lay out signals exactly as shown.
3	No or Negative	N	Provide as much colour contrast as possible
4	Yes or Affirmative	Y	
5	Proceeding in this direction	↑	
			c. between signals and background. Make every effort to attract attention by other
			d. means such as radio, flares, smoke, reflected light.

6.4 Search and Rescue Units

SEARCH AND RESCUE UNITS			
<i>Name</i>	<i>Location</i>	<i>Facilities</i>	<i>Remarks</i>
MINDEF	Singapore	LRG	One search and locate aircraft.
		VLR	One search and locate aircraft.
		Hel-M	One search and rescue aircraft.
		Hel-H	One search and rescue aircraft.
		RV	Two search and rescue ship.
CHANGI AIRPORT EMERG SERVICE	Singapore Changi Airport	RB	Additional maritime cover is provided by vessels of the Police Coast Guard and the Maritime and Port Authority of Singapore.
USAF PACIFIC RCC	Hickham Airforce Base	LRG	On opportunity basis. Singapore in coordination with USAF Pacific RCC.

6.5 Search and Rescue Frequencies

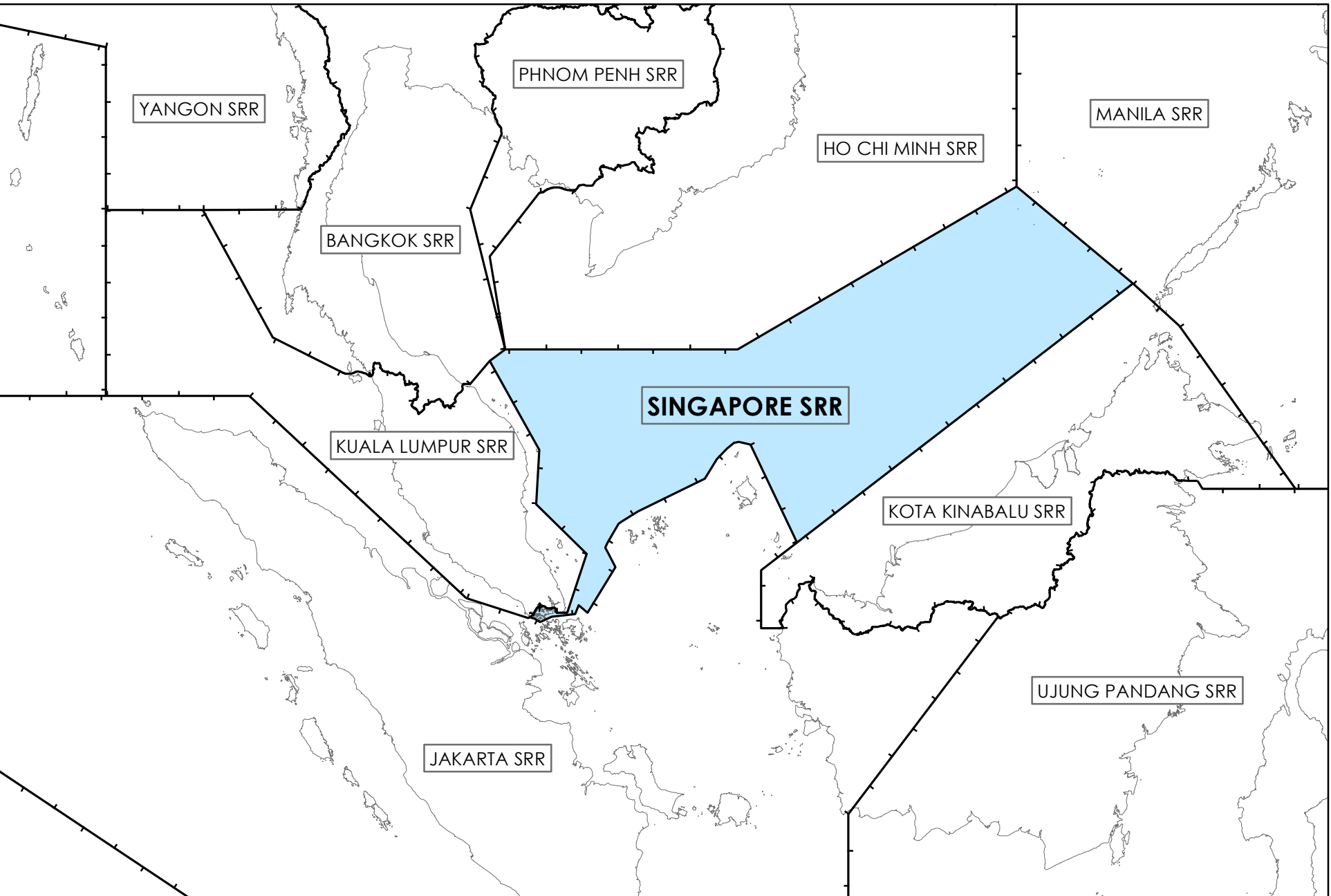
SEARCH AND RESCUE FREQUENCIES			
<i>Purpose</i>	<i>Frequency</i>	<i>Period</i>	<i>Watch Kept By</i>
International Distress Frequencies	121.5 MHz	24 hours watch	RSAF (SATCC) RCC Singapore
	243.0 MHz	24 hours watch	RSAF (SATCC)
	156.8 MHz (Channel 16)	24 hours watch	Maritime and Port Authority Ships at sea.
	156.525 MHz (DSC Channel 70)	24 hours watch	Maritime and Port Authority Ships at sea.
Scene of Search	2 182 KHz	As required	RCC Singapore
	282.8 MHz	As required	Search Aircraft RCC Singapore
	123.1 MHz	As required	RCC Singapore Merchant Shipping (if equipped)
	3 023 KHz	As required	RCC Singapore
	5 680 KHz	As required	RCC Singapore

Note:

←

Speech circuits exist between all ATS Units in Peninsular Malaysia and Singapore. Speech circuits also exist between Singapore ATS Unit and Kota Kinabalu ATS Unit in Sabah. Direct speech communications circuits exist between Singapore ATS Unit and Jakarta, Manila and Ho Chi Minh ATS Units and are available for relay of messages between Singapore RCC and the respective RCCs but may be subject to delays.

SINGAPORE SEARCH AND RESCUE REGION (SRR)



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*Note: The following sections in this chapter are intentionally left blank:
ENR 0.1, ENR 0.2, ENR 0.3, ENR 0.4, ENR 0.5.*

ENR 1 GENERAL RULES AND PROCEDURES

ENR 1.1 GENERAL RULES

1 INTRODUCTION

- 1.1 The air traffic rules and procedures applicable to air traffic within the Singapore FIR conform to Annexes 2 and 11 to the Convention on International Civil Aviation and to those portions on the Procedures for Air Navigation Services – Air Traffic Management applicable to aircraft and of the regional Supplementary Procedures applicable to the Asia Pacific Region except for the differences listed in GEN 1.7.
- 1.2 Additionally, aircraft in flight shall comply with the instrument flight rules (IFR) or the visual flight rules (VFR). An aircraft operating between the hours of sunset and sunrise, irrespective of weather conditions shall comply with IFR requirements or, if in a control zone during these hours, shall require special authorisation from ATC.
- 1.3 Aircraft operating in controlled airspace shall comply with any instruction, clearance or request issued by ATC, or shall immediately advise ATC if unable to comply. Aircraft operating on ATS routes are to maintain track centreline.

2 FLIGHTS ON AIRWAYS

2.1 SEPARATION

2.1.1 Areas of responsibility for the control of flights on airways and the units providing this service are shown in subsection [ENR 2.1](#).

2.1.2 Separation is based on:

- a. Estimated and actual times over position reporting points;
- b. Reports of visual sighting; and
- c. Radar identification.

Note: As position reports are most commonly used it is important for estimates to be revised and notified to the ACC if more than 2 minutes in error.

2.1.3 To preserve standard vertical separation from aircraft operating above and below controlled airspace in the Singapore/Johor Airspace Complex, aircraft shall not be flown within 500ft of the upper and lower limits. Similarly, an encroachment on the horizontal limits of these airspaces should be avoided because of the proximity of restricted and danger areas.

← 2.2 COMMUNICATIONS AND RADIO NAVIGATION REQUIREMENTS

2.2.1 All aircraft operating under IFR or VFR within controlled airspaces shall be equipped with appropriate communications and navigation equipment enabling them:

- a. To maintain two-way communication with the appropriate ATC unit. The minimum requirement is VHF RTF equipment suitable for communicating on ATC frequencies and HF RTF beyond the range of VHF.
- b. To maintain track within the lateral limits of the airway and to navigate in accordance with ATC instructions. The minimum requirement is one radio compass.

2.2.2 The pilot-in-command shall maintain a continuous listening watch on the appropriate air/ground frequency.

2.3 AIR TRAFFIC CONTROL CLEARANCE

2.3.1 An air traffic control clearance is an authorisation by ATC for an aircraft to proceed under specified traffic conditions within controlled airspaces. If for any reason an air traffic control clearance is not acceptable to the pilot-in-command, he may request an alternative clearance.

2.3.2 The pilot-in-command shall obtain an air traffic control clearance prior to operating in a controlled airspace.

2.3.3 An air traffic control clearance will contain the following items:

- a. Aircraft identification;
- b. Clearance limit and route instruction;
- c. Level assignment;
- d. Departure instruction when necessary;

- e. Approach instruction when necessary;
- f. Clearance expiry time when necessary; and
- g. Any special instructions and information.

2.3.4 **Request for Amended Clearance.** If the amended clearance is requested at a time a position report is made, the information contained in that report shall be given on the assumption that the aircraft is proceeding in accordance with the current clearance, and not with that which is being requested.

2.3.5 The contents of an air traffic control clearance or any revisions thereto shall apply only to those portions of the flight conducted within controlled airspaces.

2.3.6 An air traffic control clearance may be issued direct to an aircraft by an ACC or through an aerodrome control unit or an air/ground HF RTF communications unit.

2.3.7 Phrases used in air traffic clearances will have the following meanings:

- a. "Clearance expires at (time)".
If the aircraft is not airborne by the time stated, a fresh clearance shall be obtained.
- b. "Depart not before (time)".
An aircraft will not be cleared for departure until the time specified.
- c. "Unable to approve (flight planned level)".
When ATC is unable to approve the flight planned level, an alternative level will be offered whenever possible, to avoid or reduce delay.

2.3.8 A pilot-in-command operating under VFR in controlled airspaces shall not enter instrument meteorological conditions without first obtaining an ATC clearance in accordance with the procedure laid down for flights joining airways. Until such clearance is received, the aircraft must remain in VMC.

2.3.9 Where a flight plan specifies IFR for the first portion of a flight and VFR for the latter portion, the aircraft will normally be cleared to the point where IFR terminates. (Clearance is not necessary beyond that point unless within the Singapore-Johor Airspace Complex and CTR).

2.3.10 If an ATC clearance stipulates VFR climb or descent and it becomes evident to the pilot-in-command that VMC cannot be maintained, he shall hold in VMC and request an alternative clearance.

2.3.11 The pilot-in-command having acknowledged an air traffic control clearance shall not deviate from the provisions of the clearance unless an amended clearance has been obtained.

2.3.12 Subsection [ENR 1.6](#) provides guidance to pilot-in-command compelled to deviate from the provisions of an air traffic control clearance because of communications failure.

2.3.13 A flight shall normally be cleared to the aerodrome of first intended landing and the point of leaving controlled airspace or, in the case of a flight where prior co-ordination with an adjacent unit cannot be established, the FIR boundary. This is known as the clearance limit.

2.3.14 An aircraft which has been cleared to an intermediate point en-route to await further ATC clearance will whenever possible, be issued the required ATC clearance at least 5 minutes before the aircraft arrives at the clearance limit, unless the pilot is instructed to hold over the intermediate holding point until a specified time.

2.3.15 In the event of an aircraft arriving at the clearance limit without having received a further clearance, the pilot-in-command shall immediately request a further clearance and hold in accordance with the specified holding pattern where one is established or otherwise the standard holding pattern, maintaining the last assigned cruising level until further clearance is received. Where no direct ATC coordination facilities between Regional Area Control Centres exist, pilots on such routes must endeavour, when airborne, to contact the Area Control Centre of the next FIR which the aircraft is entering and obtain clearance to enter its Control Area before reaching the transfer point of the two ACCs.

2.3.16 When a flight operates successively in a Control Area and subsequently along the advisory route or area, the clearance issued for the flight or any revisions thereto will only apply to those portions of the flight conducted within controlled airspaces.

2.4 ROUTE AND LEVEL ASSIGNMENT

2.4.1 The pilot-in-command shall fly in strict accordance to the route specified by ATC. Deviation from the specified route may be permitted by ATC if traffic conditions permit.

2.4.2 Traffic permitting ATC will assign the flight planned level if in accordance with the table of Semi-Circular System of Cruising Levels. Cruising levels below the minimum specified in subsection [ENR 3.1](#) will not be assigned.

2.5 ESSENTIAL TRAFFIC INFORMATION

- 2.5.1 Essential traffic is that controlled traffic to which the provision of separation by ATC is applicable but, which in relation to a particular controlled traffic, does not have the required minimum separation.
- 2.5.2 Essential traffic information will be issued to controlled flights concerned whenever they constitute essential traffic to each other.

Note: This information will inevitably relate to controlled flights which are cleared subject to maintaining own separation and remaining in visual meteorological conditions.

- 2.5.3 Essential traffic information will include:
- Direction of flight of aircraft concerned;
 - Type of aircraft concerned;
 - Level(s) of aircraft concerned and estimated time of passing or if this is not available, the estimated time of arrival for the reporting point nearest to where the level will be crossed.

2.6 INSTRUCTIONS TO DEPARTING AIRCRAFT

- 2.6.1 ATC may specify any or all of the following items when issuing clearance to departing aircraft:
- Turn after take-off;
 - Track to make good before turning on desired route;
 - Initial level to maintain;
 - Time, point and/or rate at which level change shall be made.
- 2.6.2 ATC may instruct a departing aircraft to leave a reporting point at a specified time or to be at a specified level at a specified point or time. The pilot-in-command shall notify ATC if these instructions cannot be complied with.

2.7 ARRIVAL/APPROACH INSTRUCTIONS

- 2.7.1 ATC clearance or control instructions for approach to an aerodrome or holding point will be issued to an arriving aircraft on initial contact with the appropriate ATC unit.
- 2.7.2 The clearance will specify the clearance limit, route and level to be flown. An Expected Approach Time will be included if it is anticipated that the arriving aircraft will be required to hold.
- 2.7.3 Pilots are reminded to use the phraseology minimum fuel and MAYDAY MAYDAY MAYDAY fuel to notify ATC of their low fuel state or fuel emergency. For details, refer to CAAS Information Circular IC 5/ 2013 available at URL <https://www.caas.gov.sg> - Regulations - Safety - Documents and Notices - Information Circulars.

2.8 WEATHER INFORMATION

- 2.8.1 Weather information will be passed to inbound aircraft on request. However, pilots should tune on to ATIS frequency 128.6 MHz for the weather.
- 2.8.2 The term CAVOK will be used in place of visibility, weather and cloud when the following conditions apply simultaneously:
- Visibility 10km or more;
 - No precipitations or thunderstorms;
 - No cloud below 1 500m.
- 2.8.3 Deterioration and improvement weather reports and significant weather information, e.g. severe turbulence, thunderstorms, icing conditions etc. will be passed to all aircraft concerned.

2.9 AIRCRAFT JOINING OR CROSSING AIRWAYS

- 2.9.1 Pilots-in-command of aircraft joining or crossing an airway will:
- When flying under VFR outside the Singapore/Johor Airspace Complex and CTRs notify the appropriate authority; or
 - When flying under IFR, or when joining or crossing the Singapore/Johor Airspace Complex and CTRs request clearance from the appropriate authority not later than 10 minutes on VHF RTF or 20 minutes on HF RTF before joining or crossing.

2.9.2 An in-flight request or notification or intention to join an Airway shall include the following information, as appropriate:

- a. Aircraft identification;
- b. Aircraft type;
- c. Position;
- d. Level and flight conditions;
- e. Estimated time at point of joining;
- f. Desired level;
- g. Route and point of first intended landing;
- h. True airspeed;
- i. The words "Request joining clearance".

2.9.3 An in-flight request or notification of intention to cross an Airway shall include the following information:

- a. Aircraft identification;
- b. Aircraft type;
- c. True track;
- d. Place and estimated time of crossing;
- e. Desired crossing level;
- f. Ground Speed;
- g. The words "Request crossing clearance"

2.9.4 The selected crossing or joining point should, where possible, be associated with a radio facility to assist accurate navigation.

2.10 VFR Flights Crossing Airways

2.10.1 VFR flights intending to cross Airways outside the Singapore/Johor Airspace Complex shall only cross them at various levels plus 500ft at an angle of 90° to the direction of the Airway, or as close as possible to this angle. Condition for operation of VFR flights are given in page [ENR 1.2](#) para 2.

2.10.2 In an emergency, where neither a radar nor a procedural crossing can be obtained, an Airway may be crossed at various levels plus 500ft. The various levels referred to are flight levels of whole thousands in feet.

2.11 TEMPORARY DANGER AREAS ON AIRWAYS

2.11.1 Military operations, both air and ground, frequently take place within the Singapore FIR and airspace within the Jakarta FIR where ATS is provided by Singapore (see ENR 2.1). Danger Areas will be promulgated by NOTAM, giving the reference point, vertical extent, radius and duration of the operation.

2.11.2 Where danger areas infringe controlled airspace, the areas will not be available for use by civil aircraft at the levels affected.

2.12 SINGAPORE/JOHOR AIRSPACE COMPLEX - SPECIAL REQUIREMENTS

2.12.1 All flights, IFR and VFR, conducted within the Singapore/Johor Airspace Complex are subject to an Air Traffic Control Clearance and are regulated in accordance with IFR separation standards.

2.12.2 Singapore ACC performs both Area and Approach Control functions for all aircraft landing at Singapore Changi and Seletar Airports. Procedural traffic bound for RSAF Paya Lebar, Tengah or Sembawang are likewise controlled by Singapore ACC but such traffic will normally be released to the respective military aerodrome/approach unit according to traffic circumstances and at the most convenient point within the Singapore/Johor Airspace Complex. Due to the close proximity of these aerodromes, all FIR procedural traffic are processed in order of priority irrespective of destination and slight delays may be expected. The pilot-in-command will call the appropriate Tower at the time, level or place specified by Singapore ACC.

2.12.3 Control instructions for arriving and departing aircraft will be issued in accordance with paras 2.6 and 2.7.

← 2.13 IFR FLIGHTS OUTSIDE SINGAPORE/JOHOR AIRSPACE COMPLEX IN VMC

← 2.13.1 The pilot-in-command of an aircraft operating under IFR within 183km (100NM) from Singapore Changi Airport below FL150 may request a VFR clearance for any portion of the flight. In the absence of such a request, ATC will issue a full IFR clearance regardless of weather conditions.

← 2.13.2 Outside the Singapore/Johor Airspace Complex within 100NM from Singapore Changi Airport, when necessary to expedite traffic, ATC may request a pilot-in-command under IFR below FL150 to conduct portion of the flight under VFR. An alternative clearance will be issued if the pilot-in-command has any doubt as to his ability to maintain VFR.

3 AIR TRAFFIC ADVISORY SERVICE

Not Provided

4 FLIGHT INFORMATION SERVICE

4.1 INTRODUCTION

4.1.1 Flight Information Service is provided to all flights.

4.1.2 Units providing FIS and the areas they serve are shown in section ENR 2.

4.2 PROVISION OF FLIGHT INFORMATION SERVICE

4.2.1 Under this service the following information is provided to pilots by the FIC or at the request of the pilot:

- a. SIGMET Information concerning tropical revolving storm, active thunderstorm areas, severe line squall, heavy hail, severe turbulence, severe icing and marked mountain waves, is provided;
- b. Special Air-Reports are provided as available;
- c. Landing Forecast (Trend Type) for Singapore is provided to turbine operations when approximately one hour from landing;
- d. Aerodrome Forecasts are readily available on request for Singapore, Kuala Lumpur and Soekarno-Hatta; *Note: Aerodrome Forecasts for other aerodromes are also provided on request but are not readily available.*
- e. Amended Aerodrome Forecasts for local as well as foreign aerodromes are provided as available;
- f. Special Met Reports (aviation selected special weather reports) are provided for Singapore and Kuala Lumpur;
- g. Met Reports (aviation routine weather reports) (half-hourly) are readily available on request for Singapore, Kuala Lumpur and Soekarno Hatta; *Note: Met Reports for other aerodromes are also provided on request but are not readily available.*
- h. Upper-Air Information - Forecast of en-route upper winds and temperatures are available on request.

4.2.2 In addition, the FIC may arrange diversions of aircraft in consultation with the appropriate operating company representative.

Note: As traffic information may be based on data of doubtful accuracy and completeness and as it may be subject to communication delay, the FIC cannot assume any responsibility by issuing information or professing advice to aircraft in an endeavour to resolve an apparent hazardous traffic situation.

4.2.3 All aircraft on VFR flights and aircraft on IFR flights outside controlled airspace shall maintain watch on the frequency used by the unit providing flight information service and file with the station information as to their position.

Note: No information on position of surface vessels is provided by the Singapore ATC Centre.

8.3 APPLICATION OF CPDLC

- 8.3.1 Aircraft operating outside radar coverage and not in the ADS-B exclusive airspace within the Singapore FIR shall establish contact with ATC using CPDLC as a primary means of communication except for the following:
- prior instruction to contact ATC on VHF;
 - receive notice that CPDLC service is not available; and
 - during data link outage.
- 8.3.2 To ensure the correct synchronisation of messages, controller/pilot dialogues opened by CPDLC must be closed by CPDLC. Controller/pilot dialogues opened by voice must be closed by voice.
- 8.3.3 Due to inherent integrity checks and a coded reference to any preceding related message contained within CPDLC messages, a clearance issued by CPDLC requires only the appropriate CPDLC response, not a read-back as would be required if the clearance had been issued by voice.
- 8.3.4 The down link response "WILCO" indicates that the pilot accepts the full terms of the whole uplink message.
- 8.3.5 A down link response "AFFIRM" is not an acceptable acknowledgement or reply to a CLEARANCE issued by CPDLC.
- 8.3.6 To avoid ambiguity in message handling and response, a CPDLC downlink message should not contain more than one clearance request.
- 8.3.7 If multiple clearance requests are contained in a single downlink message and the controller cannot approve all requests, the uplink message element "UNABLE" will be sent as a response to the entire message. A separate message containing a response to those requests that can be complied with will be sent by the controller.
- 8.3.8 If any ambiguity exists as to the intent of a particular message, clarification must be sought by voice.
- 8.3.9 Standard pre-formatted message elements must be used whenever possible. Free text messages should be used only when an appropriate pre-formatted message element does not exist or to supplement the pre-formatted message element. The use of free text should be kept to a minimum.
- 8.3.10 When CPDLC connection is established, aircraft will be instructed to transfer from voice to CPDLC. The phraseology used is:
TRANSFER TO SINGAPORE CONTROL ON DATA LINK [position];
MONITOR [HF frequency primary/secondary]
- ← 8.3.11 Pilots should down link a CPDLC position report upon position over first compulsory reporting point when aircraft enters Singapore FIR.
- 8.3.12 CPDLC connections will be terminated at the FIR boundary position or when entering radar coverage. The CONTACT [unit name][frequency] message and the END SERVICE message will be sent as separate messages. The END SERVICE message will be sent as soon as possible after receipt of the WILCO response to the CONTACT message.

8.4 APPLICATION OF ADS

- 8.4.1 ADS Periodic contracts will be established automatically on receipt of a LOGON.
- 8.4.2 The Periodic reporting rate is 10 minutes for aircraft operating outside radar coverage and 20 minutes for aircraft operating within radar coverage.
- ← 8.4.3 For ADS logged-on aircraft, CPDLC position reports are required only when aircraft enters Singapore FIR upon the first compulsory reporting point.
- ← 8.4.4 ADS contracts will be terminated automatically at a system parameter time after the aircraft has left the Singapore FIR.

8.5 DATA LINK FAILURE

- 8.5.1 Pilots recognising a failure of a CPDLC connection must immediately establish communications on the appropriate voice frequency. When voice communications have been established, voice must continue to be used as the primary medium until a CPDLC connection has been re-established and the controller has authorised the return to data link.
- 8.5.2 In the event of an expected CPDLC shutdown, the controller will immediately advise all data link connected aircraft of the failure by voice. Instructions will continue to be issued by voice until the return of the data link system. The return of the system to an operational state will require a new AFN LOGON from the affected aircraft.

8.6 FLIGHT PLAN NOTIFICATION

8.6.1 Aircraft planning to utilise data link communications must annotate their ICAO flight plan as follows:

- a. Data link communication serviceability and capability must be notified by inserting one or more of the following letters in Item 10a (radio communication, navigation and approach aid equipment and capabilities):

J1	CPDLC ATN VDL Mode 2
J2	CPDLC FANS 1/A HFDL
J3	CPDLC FANS 1/A VDL Mode A
J4	CPDLC FANS 1/A VDL Mode 2
J5	CPDLC FANS 1/A SATCOM (INMARSAT)
J6	CPDLC FANS 1/A SATCOM (MTSAT)
J7	CPDLC FANS 1/A SATCOM (Iridium)
P1	CPDLC RCP 400
P2	CPDLC RCP 240
P3	SATVOICE RCP 400
P4-P9	Reserved for RCP

- b. Aircraft registration must be inserted in Item 18 as the ground system uses the information during the AFN LOGON.
- c. Serviceable ADS equipment carried must be annotated on the flight plan by adding one or more of the following descriptors to describe the serviceable surveillance equipment and/or capabilities on board:

B1	ADS-B with dedicated 1090MHz ADS-B “out” capability
B2	ADS-B with dedicated 1090MHz ADS-B “out” and “in” capability
U1	ADS-B “out” capability using UAT
U2	ADS-B “out” and “in” capability using UAT
V1	ADS-B “out” capability using VDL Mode 4
V2	ADS-B “out” and “in” capability using VDL Mode 4
D1	ADS-C with FANS 1/A capabilities
G1	ADS-C with ATN capabilities

- d. Additional surveillance equipment or capabilities are to be listed in Item 18 following the indicator SUR/ .

ENR 1.2 VISUAL FLIGHT RULES

1. Except when operating as a special VFR flight, VFR flights within Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) shall be conducted so that the aircraft is flown in conditions of visibility and distance from clouds equal to or greater than those specified in the table below:

Altitude band	Airspace class	Flight visibility	Distance from cloud
At and above 3 050m (10 000ft) AMSL	B, C, D, G	8Km	1 500m horizontally 300m (1 000ft) vertically
Below 3 050m (10 000ft) AMSL and above 900m (3 000ft) AMSL, or above 300m (1 000ft) above terrain, whichever is higher	B, C, D, G	5Km	1 500m horizontally 300m (1 000ft) vertically
At and below 900m (3 000ft) AMSL, or 300m (1 000ft) above terrain, whichever is the higher	B, C, D	5Km	1 500m horizontally 300m (1 000ft) vertically
	G	5Km	Clear of cloud and with the surface in sight

2. An aircraft operating in Class G airspace flying at speeds of 140kt or less may operate under VFR at or below 3 000ft outside controlled airspace with a flight visibility of at least 1.5km. An aircraft flying at speeds above 140kt IAS may operate under VFR with a flight visibility of at least 5km. In both cases, the aircraft must remain clear of cloud and in sight of ground or water.
3. Except when a clearance is obtained from air traffic control, VFR flights shall not take off or land at an aerodrome within a control zone, or enter the aerodrome traffic zone or traffic pattern:
- when the ceiling is less than 450m (1 500ft); or
 - when the ground visibility is less than 5km.
4. Unless authorized, VFR flights shall not be operated:
- above FL200;
 - at transonic and supersonic speeds.
5. Except when necessary for take-off or landing, or except by permission from the authority, a VFR flight shall not be flown:
- over the congested areas of cities, towns or settlements or over an open-air assembly of persons at a height less than 300m (1 000ft) above the highest obstacle within a radius of 600m from the aircraft;
 - elsewhere than as specified in 5. a, at a height less than 150m (500ft) above the ground or water.
6. Except where otherwise indicated in air traffic control clearances, VFR flights in level cruising flight when operated above 900m (3 000ft) from the ground or water, shall be conducted at a cruising level appropriate to the track as specified in the tables of cruising levels in section ENR 1.7 para 4.3.
7. VFR flights shall comply with air traffic control instructions
- when operated within Classes B, C and D airspace;
 - when forming part of aerodrome traffic at controlled aerodromes; or
 - when operated as special VFR flights.
8. A VFR flight operating within or into areas, or along Routes shall maintain continuous air-ground voice communication watch on the appropriate communication channel of, and report its position as necessary, to the air traffic services unit providing flight information service.
9. An aircraft operated in accordance with the visual flight rules which wishes to change to comply with the instrument flight rules shall:
- if a flight plan was submitted, communicate the necessary changes to be effected to its current flight plan; or
 - submit a flight plan to the appropriate air traffic services unit and obtain a clearance prior to proceeding IFR in controlled airspace.
10. Helicopters may be permitted to operate in less than 1.5km flight visibility, if manoeuvred at a speed that will give adequate opportunity to observe other traffic or any obstacles in time to avoid collision.
11. In the case of helicopters, navigation shall be accomplished by visual reference to landmarks at least every 110km (60NM)

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ENR 1.3 INSTRUMENT FLIGHT RULES

1 GENERAL

1.1 In instrument meteorological conditions pilots shall operate in accordance with the instrument flight rules except that within a control zone, a special VFR flight may be authorised.

2 APPLICABLE INSTRUMENT FLIGHT RULES

2.1 Flights shall be conducted in accordance with the Instrument Flight Rules (even when not operating in instrument meteorological conditions) when operated:

- a. More than 185km (100NM) seaward from the shoreline within controlled airspace; or
- b. During the hours between sunset and sunrise; or
- c. Above FL200.

3 DIRECT ROUTING OPERATIONS (DRO) – GENERAL PROCEDURES

3.1 APPLICABLE ROUTES AND FLIGHT PLANNING PROCEDURES

3.1.1 Direct routes are available on specified segments of ATS routes. Flights entering Singapore FIR operating at FL290 to FL460 (inclusive) should flight plan using the direct routes listed in paragraphs 3.1.2 and 3.1.3.

3.1.2 Arriving aircraft to Singapore Changi Airport (WSSS) should flight plan for DRO when operating on the following ATS routes:

Flight planning on ATS routes	Flight planning for DRO (24-hours)	Remarks	Reduction in distance flown (NM)
MELAS N892 MABAL to join MABAL STAR	MELAS DCT MABAL to join MABAL STAR	For Changi arrivals entering Singapore FIR via ATS route N892	2.3
ESPOB Q801 ESBUM Q802 ELALO to join ELALO STAR	ESPOB DCT ELALO to join ELALO STAR	For Changi arrivals entering Singapore FIR via ATS route L642	5.4

3.1.3 Departing aircraft from Singapore (WSSS and WSSL) should flight plan for DRO when operating on the following ATS routes:

Flight planning on ATS routes	Flight planning for DRO (24-hours)	Remarks	Reduction in distance flown (NM)
VMR L642 ENREP M753 IPRIX	VMR L642 EGOLO DCT IPRIX	For Singapore departures exiting Singapore FIR via ATS route M753	1.1

3.1.4 Aircraft operating to destinations other than Singapore Changi Airport (WSSS) should flight plan for DRO when operating on the following ATS routes:

Flight planning on ATS routes	Flight planning for DRO (24-hours)	Remarks	Reduction in distance flown (NM)
ESPOB L642 EGOLO	ESPOB DCT EGOLO	NIL	4.6
DUDIS L644 LIGVU	DUDIS DCT LIGVU	NIL	2.2
MELAS N892 MABAL	MELAS DCT MABAL	NIL	2.3
VMR L642 ENREP M753 IPRIX	VMR L642 EGOLO DCT IPRIX	Applicable to northbound flights	1.1
IPRIX M753 ENREP L642 VMR	IPRIX DCT EGOLO L642 VMR	Applicable to southbound flights	1.1

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ENR 1.4 ATS AIRSPACE CLASSIFICATION

1 INTRODUCTION

1.1 The airspace in the Singapore FIR has been classified in accordance with Appendix 4 of ICAO Annex 11.

2 AIRSPACE CLASSIFICATION

2.1 Within the Singapore FIR, the airspace is divided into 5 classes as shown in the table below:

AIRSPACE CLASSIFICATION IN THE SINGAPORE FIR		
<i>Airspace</i>	<i>Flight Levels</i>	<i>Classification</i>
Controlled Airspace	FL150 to FL460	A
	Surface to FL150	B
Controlled Airspace more than 100NM seaward from the shoreline	Lower Limit to FL460	A
Control Zones (CTRs)	CHANGI CTR	C
	PAYA LEBAR CTR	Surface to Upper Limit
	SELETAR CTR	C
ATZs	Surface to Upper Limit	D
Uncontrolled Airspace		G*

* Aircraft operating in Light Aircraft Training Areas A, B and C (refer to page ENR 5.2-1) are required to have continuous two-way communications with the appropriate ATS authority.

2.2 For the airspace within the Jakarta FIR where ATS is provided by Singapore (see ENR 2.1), Class A airspace is established above FL150 and Class B airspace is established for controlled airspace from surface to FL150.

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ENR 1.5 HOLDING, APPROACH AND DEPARTURE PROCEDURES

1.5.1 GENERAL

1.1 The arrival, holding, approach and departure procedures in use throughout the Singapore FIR and airspace within the Jakarta FIR where ATS is provided by Singapore (see ENR 2.1) are developed in accordance with the criteria contained in ICAO DOC 8168-OPS/611: Procedures for Air Navigation Services - Operations (PANS-OPS).

1.1.1 To ensure conformity with associated procedures, this section should be read in conjunction with section ENR 3.6.

1.1.2 An aircraft approaching an aerodrome under IFR for the purpose of making a landing shall conform to the holding and instrument approach procedures for the radio navigational aid employed as prescribed in the appropriate Instrument Approach Charts in WSSS AD 2.24.

1.1.3 Pilots will be expected to know the correct holding, approach and departure procedures.

Note: Due to military operations above, below and adjacent to controlled airspace within the Singapore/Johor Airspace Complex, pilots unable to remain within 500ft of the vertical limits, or within the lateral limits of the controlled airspace are required to advise ATC immediately.

1.2 STANDARD INSTRUMENT DEPARTURE (SID) AND STANDARD INSTRUMENT ARRIVAL (STAR)

Pilots departing from and landing at Singapore Changi Airport should refer to the procedure charts in WSSS AD 2.24.

1.5.2 ARRIVING FLIGHTS

2.1 INSTRUMENT APPROACH PROCEDURES

2.1.1 Pilots making instrument approaches to Singapore Changi Airport should refer to the procedures in WSSS AD 2.24.

2.2 CATEGORY I ILS APPROACHES

← 2.2.1 Category I ILS approaches are generally available on RWY 02L/20R, RWY 02C/20C and RWY 02R at Singapore Changi Airport. Pilots making Category I ILS approaches to Singapore Changi Airport should refer to the procedures in WSSS AD 2.24.

2.3 CATEGORY II ILS APPROACHES

(refer to WSSS AD 2-22 for details)

2.4 VISUAL APPROACH PROCEDURES

2.4.1 An IFR flight operating into Singapore Changi Airport may be cleared for a visual approach subject to the following conditions:

- a. the pilot has the aerodrome in sight and can conduct his approach with visual reference to terrain;
- b. the flight will not cause delay to other traffic;
- c. there is no conflicting tall vessel movement;
- d. the cloud ceiling at the aerodrome is 4,000ft or more for landing on RWY 20 and 3,000ft or more for landing on RWY 02; and
- e. the visibility at the aerodrome is 5km or more.

2.4.2 Notwithstanding paragraphs 2.4.1(d) and 2.4.1(e), if the pilot reports that he has the aerodrome in sight and can conduct his approach with visual reference to terrain, the flight may be cleared for a visual approach.

2.4.3 Pilots may expect radar vectoring for separation and sequencing with other traffic prior to being cleared for a visual approach.

2.5 VESSEL MOVEMENT AFFECTING INSTRUMENT APPROACHES ON RUNWAY 02 AND 20

2.5.1 There are possible tall vessel movements in waters around Singapore Changi Airport. As these mobile vessels vary in height and location, they are only indicated as "possible vessel" obstacles in the instrument approach charts.

2.5.2 Information on the heights of these tall vessels are relayed to ATC by the Maritime and Port Authority of Singapore. ATC will advise arriving aircraft of any restrictions on the types of instrument approaches and landing runway.

1.5.3 DEPARTING FLIGHTS

3.1 INTRODUCTION

- a. 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 aeroplane and to conduct the necessary examination of obstacles throughout the areas concerned in relation to the certificated performance of the individual aeroplane type. It is also the responsibility of the operator to ensure that contingency procedures comply fully with the aeroplane performance requirements of ICAO Annex 6.
- b. The specific routes to be followed are depicted in SID charts AD-2-WSSS-SID-1 to AD-2-WSSS-SID-64. Altitude restrictions at fixes and/or DME specify ATC/airspace requirements.
- c. Minimum climb gradient specifies obstacle clearance requirements.
- d. In the event that the minimum climb gradient cannot be achieved pilots shall inform ATC. ATC shall hold departures if pilots indicate that they are unable to meet the required climb gradient.

3.2 RUNWAY 02L

- a. When there are no reports of vessel movement along the northern shipping channel or where the reported vessel height is 55m AMSL and below, all aircraft departures on Runway 02L, regardless of on SID or vectors, shall be on a minimum climb gradient of 5% until reaching or passing 2500FT. Thereafter, the minimum climb gradient shall be 3.3%.
- b. When the reported vessel height is above 55m AMSL, ATC shall advise departing pilots of the vessel height. Pilots on receipt of this information shall apply the minimum climb gradient in accordance with Para 3.6. After the aircraft has reached or passed the minimum crossing altitude over vessel, the minimum climb gradient shall be 3.3%.
- c. The minimum climb gradient restriction stated above for Runway 02L is for the purpose of air traffic management. If the climb gradient restriction cannot be complied with, the pilot-in-command of an aircraft departure shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. Delays can be expected as coordination is required.

3.3 RUNWAY 02C

- a. When there are no reports of vessel movement along the northern shipping channel or where the reported vessel height is 115m AMSL and below, all aircraft departures on Runway 02C, regardless of on SID or vectors, shall be on a minimum climb gradient of 5% until reaching or passing 2500FT. Thereafter, the minimum climb gradient shall be 3.3%.
- b. Where the reported vessel height is above 115m AMSL, ATC shall advise departing pilots of the vessel height. Pilots on receipt of this information shall apply the minimum climb gradient in accordance with Para 3.6. After the aircraft has reached or passed the minimum crossing altitude over vessel, the minimum climb gradient shall be 3.3%.
- c. The minimum climb gradient restriction stated above for Runway 02C is for the purpose of air traffic management. If the climb gradient restriction cannot be complied with, the pilot-in-command of an aircraft departure shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. Delays can be expected as coordination is required.

3.4 RUNWAY 02R

- a. When there are no reports of vessel movement along the northern shipping channel or where the reported vessel height is 95m AMSL and below, all aircraft departures on Runway 02R, regardless of on SID or vectors, shall be on a minimum climb gradient of 5% until reaching or passing 2,500ft. Thereafter, the minimum climb gradient shall be 3.3%.
- b. Where the reported vessel height is above 95m AMSL, ATC shall advise departing pilots of the vessel height. Pilots on receipt of this information shall apply the minimum climb gradient in accordance with Para 3.6. After the aircraft has reached or passed the minimum crossing altitude over vessel, the minimum climb gradient shall be 3.3%.
- c. The minimum climb gradient restriction stated above for Runway 02R is for the purpose of air traffic management. If the climb gradient restriction cannot be complied with, the pilot-in-command of an aircraft departure shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. Delays can be expected as coordination is required.

3.5 RUNWAYS 20L, 20C AND 20R

3.5.1 All aircraft departures on Runway 20C, regardless of on SID or vectors, shall be on a minimum climb gradient of 7% until reaching or passing 2,500ft. Thereafter, the minimum climb gradient shall be 3.3%.

3.5.2 All aircraft departures on Runway 20R, regardless of on SID or vectors, shall be on a minimum climb gradient of 6% until reaching or passing 2,500ft. Thereafter, the minimum climb gradient shall be 3.3%.

3.5.3 All aircraft departures on Runway 20L, regardless of on SID or vectors, shall be on a minimum climb gradient of 9% until reaching or passing 2,500ft. Thereafter, the minimum climb gradient shall be 3.3%.

3.5.4 The minimum climb gradient restrictions stated above for Runway 20C/20R/20L are for the purpose of air traffic management. If the climb gradient restriction cannot be complied with, the pilot-in-command of an aircraft departure shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. Delays can be expected as coordination is required.

(Please also refer to charts AD-2-WSSS-SID-1 to AD-2-WSSS-SID-64: Standard Instrument Departures for Runway 20L, Runway 20C and Runway 20R).

← **3.6 DETERMINATION OF CLIMB GRADIENT BY OPERATORS**

← 3.6.1 Aircraft operators shall calculate their own climb gradients based on actual lift off point to ensure enough clearance with the vessels crossing the northern shipping channel. The calculation will have to ensure the following:

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

Note: The calculated climb gradient shall not be lower than the procedure climb gradient for departures.

3.6.2 For the above calculations, operators shall use the distance information for the various departure runways as follows:

DEP RWY	02L	02C	02R
Distance d	1 100m	2 590m	2 130m

Note: The distance for departure Runways 02L, 02C and 02R are measured from the DER to the shipping channel north of Changi.

1.5.4 OTHER RELEVANT INFORMATION AND PROCEDURES**4.1 HOLDING PROCEDURES**

Initial approach tracks and holding patterns associated with Singapore Airports are detailed in ENR 3.6 Area Charts. Holding patterns for other airfields are indicated on the applicable approach charts.

4.1.1 LOW LEVEL HOLDING AREAS

4.1.1.1 The holding areas for procedural traffic landing at Singapore Changi Airport or Seletar Airport depend on the runway in use at Singapore Changi Airport and are as follows:

-
- a. RWY 02L/02C/02R - SAMKO Holding Area (SHA).
 - b. RWY 20R/20C/20L - NYLON Holding Area (NHA).
 - c. Details of these holding areas and those mentioned in paragraphs 4.1.1.2 and 4.1.1.3 are given in ENR 3.6. They are also shown in ENR 3.6 Area Charts.

4.1.1.2 An intermediate holding area - HOSBA Holding Area (HHA) - is also established.

4.1.1.3 A bad weather holding area - SINJON Holding Area - is established for Seletar bound commercial traffic.

4.1.2 **HIGH LEVEL HOLDING AREAS**

4.1.2.1 High Level Holding Areas are also established at NHA, SHA and HHA. Details of these areas are given in ENR 3.6.

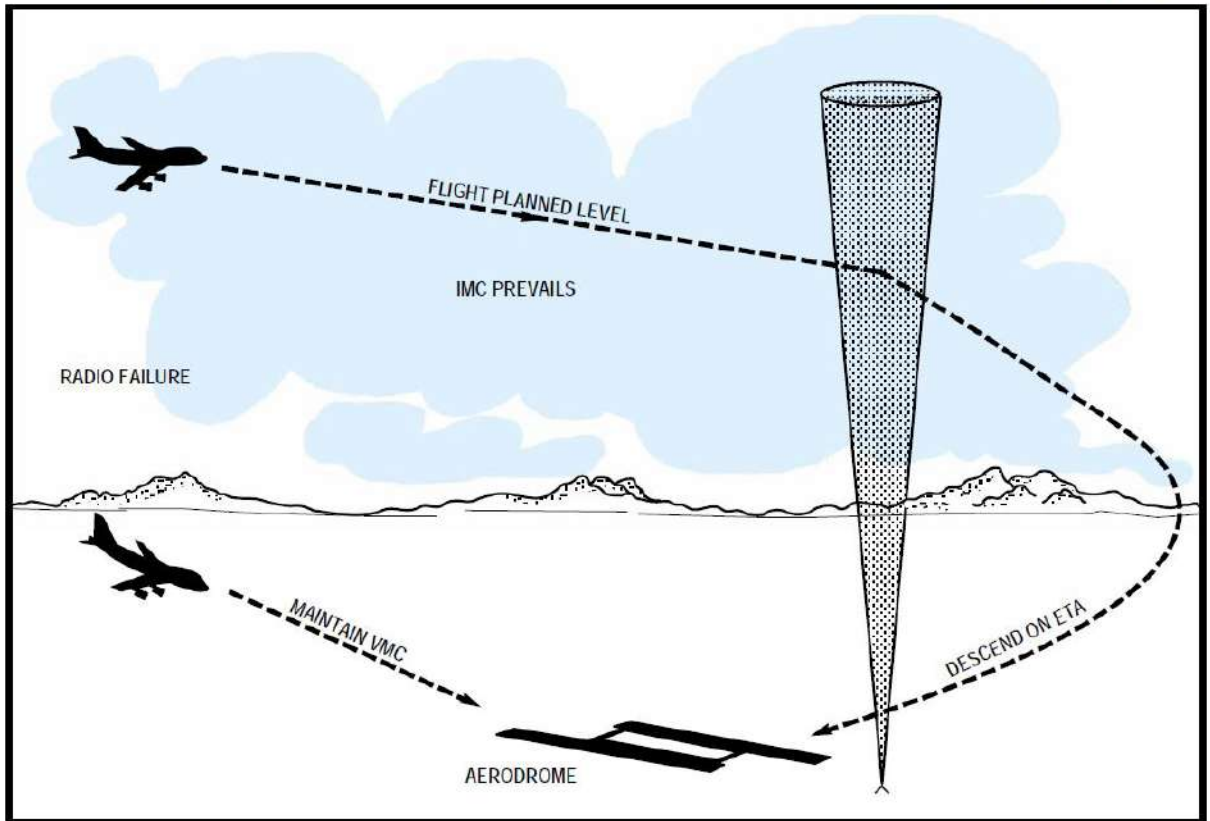
4.1.3 **HOLDING SPEEDS**

4.1.3.1 The maximum holding speeds for all holding areas are detailed in ENR 3.6.

4.1.3.2 During conditions of turbulence, pilots could request ATC clearance to hold at speeds up to 280kt for both high and low level holding areas.

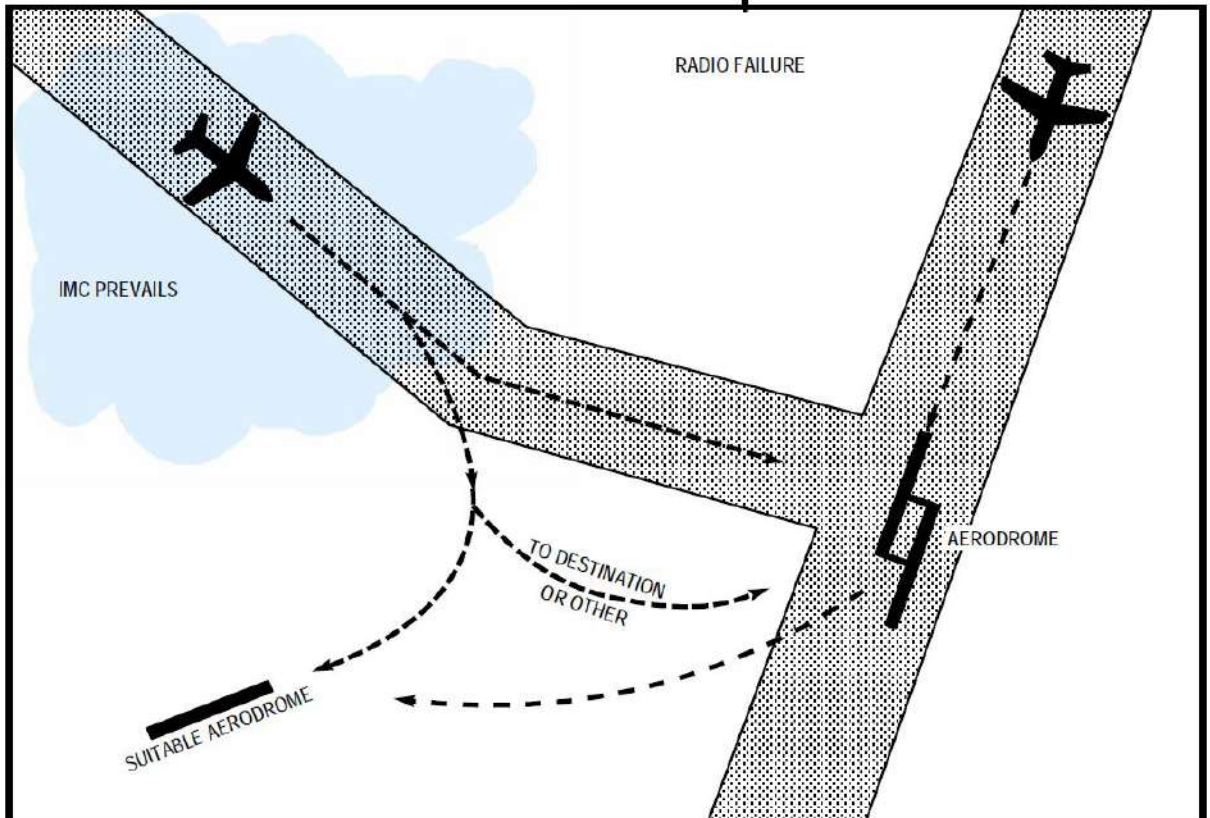
PILOT PROCEDURE FOR RADIO FAILURE

APPENDIX 'B'



IF IFR, DIVERT OFF AIRWAYS, ESTABLISH VMC AND LAND AT SUITABLE AERODROME OR, PROCEED IN STRICT ACCORDANCE WITH CLEARANCE OR FLIGHT PLAN TO DESTINATION.

IF VFR, MAINTAIN VMC TO DESTINATION OR OTHER SUITABLE AERODROME



1.6.2 SECONDARY SURVEILLANCE RADAR (SSR)

2.1 DESCRIPTION OF SSR OPERATING PROCEDURES

- 2.1.1 All aircraft operating in controlled airspace where Singapore is responsible for the provision of ATS are required to operate SSR transponders selecting Mode 3/A (4096 codes) and Mode C simultaneously.
- 2.1.2 Aircraft departing Singapore shall operate transponders in accordance with instructions given by ATC.
- 2.1.3 Pilots who have received specific instructions from ATC concerning the setting of the transponder shall maintain that setting except in circumstances detailed in paragraphs 2.2, 2.3 and 2.4 below.
- 2.1.4 Aircraft bound for Singapore shall operate on the SSR code last assigned to them by the adjacent FIR, or if no code has been previously assigned, advise the ATC unit concerned who will provide the required code.
- 2.1.5 Aircraft will be identified by ATC before providing ATS surveillance services using one of the following methods:
 - a. Verification of compliance to assigned discrete SSR transponder code;
 - b. Observation of compliance with an instruction to set a specific SSR transponder code;
 - c. Observation of compliance with an instruction to squawk IDENT.

2.2 EMERGENCY PROCEDURES

2.2.1 Pilot(s) of aircraft encountering a state of emergency shall set their transponder as follows:

NATURE OF EMERGENCY	TRANSPONDER CODE
Unlawful Interference	7500
Radio Failure	7600
General Emergency	7700

2.3 RADIO COMMUNICATION FAILURE

- 2.3.1 Aircraft experiencing total radio communication failure shall set transponder code as per paragraph 2.2.1 and adopt the procedures specified in paragraph 1.6
- 2.3.2 Aircraft experiencing partial radio communication failure shall set transponder code as per paragraph 2.2.1. The possible scenarios are:
 - a. Aircraft is unable to receive ATC transmissions, pilots shall adopt the appropriate procedures specified in paragraph 1.6 to 1.13.
 - b. Aircraft can receive ATC transmissions, ATC will continue to issue instructions and/or clearances to pilots. Such instructions and clearances will be repeated. Pilots may squawk ident to acknowledge.

2.4 SYSTEM OF SSR CODE ASSIGNMENT

2.4.1 Aircraft operating in the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) will be assigned the following codes except for those aircraft already assigned codes by adjacent FIRs:

INTERNATIONAL	DOMESTIC
0100 - 0177	0001 - 0077
2200 - 2277	4200 - 4277
	4300 - 4377
	4600 - 4677

2.5 VOICE AND CPDLC POSITION REPORTING REQUIREMENTS

2.5.1 There are no voice and CPDLC position reporting requirements for the SSR coverage area stipulated in paragraph 2.6.1.

2.6 AREA OF SSR COVERAGE

2.6.1 Maximum operating range of the SSR is 250 NM from Singapore Changi Airport.

1.6.3 AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST (ADS-B)

3.1 DESCRIPTION OF ADS-B OPERATING PROCEDURES IN ADS-B OUT EXCLUSIVE AIRSPACE

- 3.1.1 Aircraft that operates on ATS routes L642, L644, M753, M771, M904, N891, N892, Q801, Q802, Q803 and T611 within airspace bounded by 073605N 1090045E, 040713N 1063543E, 041717N 1061247E (MABLI), 044841N 1052247E (DOLOX), 045224N 1041442E (ENREP), 045000N 1034400E, thence north along the Singapore FIR boundary to 070000N 1080000E at or above FL290 must carry serviceable ADS-B transmitting equipment that has been certified as meeting:
- European Aviation Safety Agency - Certification Considerations for the Enhanced ATS in Non-Radar Areas using ADS-B Surveillance (ADS-B-NRA) Application via 1090MHz Extended Squitter (AMC 20-24), or
 - European Aviation Safety Agency (EASA) CS-ACNS (Subpart D - Surveillance - SUR), or
 - Federal Aviation Administration - Advisory Circular No: 20-165A (or later versions) Airworthiness Approval of Automatic Dependent Surveillance - Broadcast (ADS-B) Out Systems, or
 - An 'approved ADS-B Out equipment configuration' as specified in Part 91 (General Operating and Flight Rules) Manual of Standards 2020, issued by the Civil Aviation Safety Authority of Australia.
- 3.1.2 Aircraft that does not comply with the requirements stipulated in paragraph 3.1.1 will not be accorded priority in the delineated airspace and flight level assignments would be subjected to air traffic conditions.
- 3.1.3 If an aircraft carries ADS-B transmitting equipment but does not comply with the requirements stipulated in paragraph 3.1.1, the aircraft must not fly in the delineated airspace unless the equipment is deactivated or set to transmit only a value of zero for the Navigation Uncertainty Category (NUCp) or Navigation Integrity Category (NIC).
- 3.1.4 Aircraft will be identified by ATC before providing ATS surveillance services using one of the following methods:
- Direct recognition of the aircraft identification in an ADS-B label displayed to ATC on their air situation display system;
 - Observation of compliance with an instruction to TRANSMIT ADS-B IDENT.

3.2 EMERGENCY PROCEDURES

- 3.2.1 The pilot-in-command, upon awareness of an onboard ADS-B equipment failure, must inform ATC as soon as possible. ATC would then provide the necessary clearance to ensure separation with other flights operating in the delineated airspace as stipulated in paragraph 3.1.1.
- 3.2.2 Pilot(s) of aircraft encountering a state of emergency shall set their transponder as stipulated in paragraph 2.2.1.

3.3 RADIO COMMUNICATION FAILURE

- 3.3.1 Aircraft experiencing total radio communication failure shall set transponder code as per paragraph 2.2.1 and adopt the procedures specified in paragraph 1.6
- 3.3.2 Aircraft experiencing partial radio communication failure shall set transponder code as per paragraph 2.2.1. In the event whereby:
- Aircraft is unable to receive ATC transmissions, pilots shall adopt the appropriate procedures specified in paragraph 1.6 to 1.13.
 - Aircraft can receive ATC transmissions, ATC will continue to issue instructions and/or clearances to pilots. Such instructions and clearances will be repeated. Pilots may squawk ident to acknowledge.

3.4 FLIGHT PLANNING REQUIREMENTS

- 3.4.1 Aircraft operators complying with the requirements stipulated in paragraph 3.1.1 are to indicate the appropriate ADS-B designator in Field 10b of the ICAO flight plan:
- B1: ADS-B with dedicated 1090 MHz ADS-B "out" capability
 - B2: ADS-B with dedicated 1090 MHz ADS-B "out" and "in" capability
- 3.4.2 Aircraft operators are to include the aircraft address (24 bit Code) in hexadecimal format in Field 18 of the ICAO flight plan as per the following example: CODE/7C432B

- 3.4.3 Aircraft identification (ACID) not exceeding 7 characters must be accurately indicated in Field 7 of the ICAO flight plan and replicated exactly when set in the aircraft avionics (for transmission as Flight ID) as follows:
- a. The three-letter ICAO designator of the aircraft operator followed by the flight number (e.g. SIA123, MAS123, GIA123), when radiotelephony callsign consists of the associated ICAO telephony designator for the aircraft operator followed by the flight number (e.g. SINGAPORE123, MALAYSIAN123, INDONESIA123).
 - b. The aircraft registration (e.g. N555AB, 9VABC) when the radiotelephony callsign consists of the aircraft registration.

Important: ACID entered should not have any leading zeros unless it is part of the flight number as indicated in Item 7 of the ICAO flight plan. Hyphens, dashes or spaces are NOT to be used.

3.5 VOICE AND CPDLC POSITION REPORTING REQUIREMENTS

- ← 3.5.1 There are no voice and CPDLC position reporting requirements for the ADS-B coverage area.

← 1.6.4 OTHER RELEVANT INFORMATION AND PROCEDURES

NIL

ENR 1.7 ALTIMETER SETTING PROCEDURES

1 INTRODUCTION

- 1.1 A common transition altitude of 11,000ft (3,350 metres) has been established in the Singapore Flight Information Region and airspace where ATS is provided by Singapore (see ENR 2.1). This will ensure uniformity in the transition altitudes for aerodromes within the territories of Brunei, Malaysia and Singapore, except for an area of radius 10 nautical miles centred on Mount Kinabalu where the lowest safe altitude will be 15,000ft (4,570 metres) and the lowest usable flight level will be FL170.
- 1.2 The maximum variation in QNH values in the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) does not exceed 10hPa either side of the standard setting 1013.2hPa, representing a change of about 300ft on the altimeter from QNH to 1013.2hPa. To simplify ATC procedures, therefore, a transition level of FL130 has been established, thus providing a transition layer of 2,000ft and ensuring at all times the 1,000ft vertical separation between aircraft.
- 1.3 No aircraft should therefore flight plan to cruise at flight levels 115, 120 and 125 when operating in the Singapore Flight Information Region and airspace where ATS is provided by Singapore (see ENR 2.1).

1.4 AREA QNH

- 1.4.1 AREA QNH is the forecast value of the LOWEST mean sea level pressure within Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1), valid for a period of 6 hours. e.g. AREA QNH valid 0600-1200.
- 1.4.2 AREA QNH as defined above, is one of the types of MET data required for the determination of the lowest flight level which will ensure adequate terrain clearance at any location within Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) during the period of validity.
- 1.4.3 Amendments are issued by MET when the mean sea level pressure at any location in Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) is expected to fall below the current AREA QNH by more than 2hPa, and units responsible for airspace in which aircraft could be operating on AREA QNH shall broadcast the amended value on all air/ground frequencies in use.
- 1.4.4 Change from LOCAL QNH (set for departure) to AREA QNH will be made on leaving the Aerodrome Traffic Zone after take-off.
- 1.4.5 Cruising within the transition layer is not permitted unless specifically cleared by the ATC.

← 2 BASIC ALTIMETER SETTING PROCEDURES

← 2.1 ALTIMETER SETTING PROCEDURES

- 2.1.1 For flight at or below the transition altitude, the altimeter reference will be the AREA QNH. Flight will therefore be conducted in altitudes.
- 2.1.2 Change from LOCAL QNH (set for departure) to AREA QNH will be made on leaving the Singapore/Johor Airspace Complex or Aerodrome Traffic Zone after take-off.
- 2.1.3 Change from AREA QNH to LOCAL QNH will be made on entering Terminal Control Area or Aerodrome Traffic Zone or on commencement of final approach to land.
- 2.1.4 For flight at and above the transition level, the standard altimeter setting of 1013.2hPa will be used.
- 2.1.5 Change from AREA QNH to 1013.2hPa will be made on climb through the transition altitude.
- 2.1.6 Change from 1013.2hPa to AREA QNH will be made on descent through the transition level.
- ← 2.1.7 Cruising within the transition layer is not permitted unless specifically cleared by ATC.
- 2.1.8 Vertical displacement of aircraft when at or below the transition is expressed in terms of altitude whereas such displacement at or above the transition level is expressed in terms of flight level. While passing through the transition layer, vertical displacement is expressed in terms of altitude when descending and in terms of flight level when ascending.
- 2.1.9 Flight Level zero is located at the atmospheric pressure level of 1013.2hPa. Consecutive flight levels are separated by a pressure level corresponding to 500ft in the Standard Atmosphere.

Note:

Example of the relationship between flight levels and altimeter indications are given in the following table, the metric equivalents being approximate:

FLIGHT LEVEL	ALTIMETER INDICATION	
	Number	Feet
10	1 000	300
15	1 500	450
20	2 000	600
50	5 000	1 000
100	10 000	3 050
130	13 000	3 950
150	15 000	4 550
200	20 000	6 100
250	25 000	7 600
300	30 000	9 150
350	35 000	10 650
400	40 000	12 200
450	45 000	13 700
500	50 000	15 250

2.2 TAKE-OFF AND CLIMB

2.2.1 A QNH altimeter setting shall be made available to aircraft by Approach/Aerodrome Control in the routine take-off and climb instructions.

2.2.2 Vertical displacement of aircraft during climb shall be effected by reference to altitude until reaching the transition altitude above which vertical displacement shall be effected by reference to flight level.

2.2.3 A QFE altimeter setting will be made available on request but reports to ATC are to be made in altitudes.

2.3 VERTICAL SEPARATION - ENROUTE

← 2.3.1 Aircraft en-route in the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1), regardless whether IFR or VFR, shall be flown at flight levels or altitudes where appropriate.

2.3.2 It is the pilots' responsibility to select a flight level which will give adequate terrain clearance using forecast pressure information.

← 2.3.3 For the purpose of en-route vertical separation IFR and VFR flights within controlled airspace and flights in uncontrolled airspace of the Singapore FIR and airspace within the Jakarta FIR where ATS is provided by Singapore (see ENR 2.1), reference should be made to the following:

- a. Semi-circular system of cruising levels within all controlled airspace (IFR flights) (section ENR 1.7 para 4.2);
- b. VFR flights cruising levels up to FL150 within controlled airspace (section ENR 1.7 para 4.3);
- c. Quadrantal cruising levels in uncontrolled airspace of the Singapore FIR and airspace within the Jakarta FIR where ATS is provided by Singapore (see ENR 2.1) (section ENR 1.7 para 4.4).

2.4 APPROACH AND LANDING

2.4.1 A QNH altimeter setting shall be made available in the routine approach and landing instructions.

2.4.2 A QFE altimeter setting will be made available on request but reports to ATC are to be made in altitude.

2.4.3 Vertical displacement of aircraft during approach is effected by reference to flight level until reaching the transition level below which vertical displacement is controlled by reference to altitude.

2.5 MISSED APPROACH

2.5.1 The relevant portions of paragraphs 2.1, 2.2, 2.3 and 2.4 shall be applied in case of a missed approach.

3 PROCEDURES APPLICABLE TO OPERATORS AND PILOTS

3.1 FLIGHT PLANNING

3.1.1 The level(s) at which a flight is to be conducted shall be specified in a flight plan;

- a. In terms of flight level(s) if the flight is to be conducted at or above the transition level, and
- b. In terms of altitude(s) if the flight is to be conducted in the vicinity of an aerodrome and at or below the transition altitude.

Note: 1:

Short flights in the vicinity of an aerodrome may often be conducted only at altitude below the transition altitude.

Note: 2:

Flight levels are specified in a plan by number, and not in terms of feet as is the case with altitudes.

4 TABLES OF CRUISING LEVELS

4.1 SEMI-CIRCULAR SYSTEM OF CRUISING LEVELS WITHIN THE SINGAPORE FIR AND AIRSPACE WHERE ATS IS PROVIDED BY SINGAPORE (SEE ENR 2.1)

- ← 4.1.1 The pilot-in-command of an IFR flight at or above 3,000ft within controlled airspace and above FL250 in uncontrolled airspace shall select a level corresponding to the appropriate magnetic track as indicated in para 4.2. The Quadrantal Height Rule as contained in para 4.4 will continue to be used for all flights below FL200 in uncontrolled airspace of the Singapore FIR and airspace within the Jakarta FIR where ATS is provided by Singapore (see ENR 2.1).

- 4.1.2 FL250 in uncontrolled airspace will be held vacant to serve as a buffer.

4.2 IFR FLIGHTS - CRUISING LEVELS WITHIN THE SINGAPORE FIR AND AIRSPACE WHERE ATS IS PROVIDED BY SINGAPORE (SEE ENR 2.1)

T R A C K			
000° to 179°		180° to 359°	
Flight Level	Altitude (feet)	Flight Level	Altitude (feet)
30	3 000	40	4 000
50	5 000	60	6 000
70	7 000	80	8 000
90	9 000	100	10 000
110	11 000	140	14 000
130	13 000	160	16 000
150	15 000	180	18 000
170	17 000	200	20 000
190	19 000	220	22 000
210	21 000	240	24 000
230	23 000	260	26 000
250	25 000	280	28 000
270	27 000	310	31 000
290	29 000	350	35 000
330	33 000	390	39 000
370	37 000	430	43 000
410	41 000	470	47 000
450	45 000	510	51 000
490	49 000	etc.	etc.
etc.	etc.		

4.3 VFR FLIGHTS - CRUISING LEVELS WITHIN THE SINGAPORE FIR AND AIRSPACE WHERE ATS IS PROVIDED BY SINGAPORE (SEE ENR 2.1) IN CONTROLLED AIRSPACE

T R A C K			
000° to 179°		180° to 359°	
Flight Level	Altitude (feet)	Flight Level	Altitude (feet)
15	1 500	25	2 500
35	3 500	45	4 500
55	5 500	65	6 500
75	7 500	85	8 500

95	9 500	105	10 500
135	13 500	145	14 500

← **4.4** **QUADRANTAL CRUISING LEVELS FOR FLIGHTS BELOW FL200 OPERATING IN UNCONTROLLED AIRSPACE PART OF AIRSPACE WITHIN THE JAKARTA FIR WHERE ATS IS PROVIDED BY SINGAPORE (SEE ENR 2.1) BETWEEN PANGKALPINANG TMA AND PEKANBARU TMA**

← 4.4.1 The pilot-in-command of a VFR or IFR flight operating at or above 3,000ft and below FL200 between Pangkalpinang TMA and Pekanbaru TMA shall select a level corresponding to the appropriate magnetic track as indicated in the following Quadrantal Cruising Levels:

QUADRANTAL CRUISING LEVELS			
000° to 089°	090° to 179°	180° to 269°	270° to 359°
30	35	40	45
50	55	60	65
70	75	80	85
90	95	100	105
110	-	-	-
130	135	140	145
150	155	160	165
170	175	180	185
190	-	-	-

← 4.4.2 If compliance with VFR cannot be maintained at a quadrantal cruising level, the aircraft shall be flown at another quadrantal level where it is possible to comply with VFR.

4.4.3 The pilot-in-command shall ensure that the cruising level selected for an IFR flight is not below the lowest safe flight level applicable for the route to be flown.
Note: The provision of terrain clearance is not part of ATC service.

4.4.4 Except when taking-off or landing, or with the approval of the appropriate authority, aircraft shall be flown at least 1,000ft above the highest obstacle within 10km of the estimated position of the aircraft in flight.

4.5 TRANSIT PROCEDURES

4.5.1 The procedures to be followed by aircraft when transiting between areas where the Quadrantal System of cruising levels is in use and those where the Semi-Circular System is applicable, are indicated below.

4.5.2 Transition from the Quadrantal System to the Semi-Circular System

TRACK FLOWN	VFR FLIGHT	IFR FLIGHT
000-089	Climb to next ODD + 500ft level	Maintain ODD level
090-179	Maintain ODD + 500ft level	Descend to next ODD level
180-269	Climb to next EVEN + 500ft level	Maintain EVEN level
270-359	Maintain EVEN + 500ft level	Descend to next EVEN level

4.5.3 Transition from the Semi-Circular System to the Quadrantal System

TRACK FLOWN	VFR FLIGHT	IFR FLIGHT
000-089	Descend to next ODD level	Maintain ODD level
090-179	Maintain ODD + 500ft level	Climb to next ODD + 500ft level
180-269	Descend to next EVEN level	Maintain EVEN level
270-359	Maintain EVEN + 500ft level	Climb to next EVEN + 500ft level

Note: The terms “ODD + 500ft” level and “EVEN + 500ft” level have been used to designate those series of levels where, below FL290, flight levels ending with 75, 95, 115, etc. and 65, 85, 105 etc respectively are prescribed.

4.6 CHANGING LEVELS

4.6.1 ATC may clear aircraft to change level at a specific time, place or rate. The pilot-in-command must acknowledge receipt of ATC instruction to a change of level and shall effect a change of level immediately unless a later time

or place for the commencement is specified or is approved, as a result of a request by a pilot. The rate of change of level shall be the specific rate, or if no rate has been specified, a rate suitable for the type of aircraft.

Note: A pilot may request ATC approval for a different rate of change of level or a different time or place for commencing change of level.

4.6.2 When required, the pilot-in-command may be instructed to reach an assigned level by a specified time or position. The pilot-in-command shall advise ATC immediately if he is doubtful whether the assigned level can be reached as instructed.

4.6.3 A pilot-in-command shall report:

- a. At the time of leaving a level for a newly assigned level;
- b. When leaving or passing through such other levels as may be specified by ATC;
- c. On reaching an assigned level.

4.6.4 A pilot-in-command shall read back level clearances.

4.7 UNIDIRECTIONAL ATS ROUTES LEVEL ASSIGNMENTS - SINGAPORE/JAKARTA SECTOR

4.7.1 The following Level Assignments for aircraft operating in the Singapore/Jakarta sector on the unidirectional ATS Routes B470 and G579 will be adopted by Singapore and Jakarta ACCs.

4.7.2 Level Assignments

4.7.2.1 Jakarta ACC shall assign:

- a. All even flight levels plus 500ft above the minimum enroute level up to and including FL185.
- b. Above FL185, starting at FL220 all even flight levels up to and including FL280.
- c. Above FL280, all flight levels at 1,000ft intervals starting at FL290 and up to FL410 (inclusive), except for flights beyond Singapore where only even flight levels shall be assigned.

4.7.2.2 Singapore ACC shall assign:

- a. All odd flight levels plus 500ft above the minimum enroute level up to and including FL195.
- b. Above FL195, starting at FL210 all odd flight levels up to and including FL290.
- c. Above FL290, all flight levels at 1,000ft intervals starting at FL290 and up to FL410 (inclusive), except for flights beyond Jakarta where only odd flight levels shall be assigned.

4.8 POSITION REPORTS

4.8.1 In so far as range permits, the pilot-in-command shall report position to the responsible ATC unit on the appropriate VHF RTF frequency. When outside VHF RTF range, the pilot-in-command shall report position on HF RTF.

4.8.2 The pilot-in-command shall report position as soon as possible after the aircraft has passed each designated reporting point or "on request" reporting point (when so required by ATC).

4.8.3 Where no designated or "on request" position report is required, the pilot-in-command shall report position hourly in latitude and longitude and shall report "operations normal" every 30 minutes in between.

Note: Operating companies may request approval to make fixed rather than hourly reports.

4.8.4 When reporting their positions, pilots shall transmit the word "POSITION" either immediately before or after the callsign of their aircraft.

4.8.5 A position report shall comprise Section 1 or Sections 2 and 3, or the AIREP form of report:

Section 1 (Position Information)

1. aircraft identification
2. position
3. time
4. flight level or altitude
5. next position and time over
6. ensuing significant point

Section 2 (Operational Information)

7. estimated time of arrival
8. endurance

Section 3 (Meteorological Information)

- 9. air temperature
- 10. wind direction
- 11. wind speed
- 12. turbulence
- 13. aircraft icing
- 14. humidity (if available)

4.8.6 Section 2 - Operational Information of an AIREP is not required for turbine powered aircraft operations.

← 4.8.7 Designated and on request reporting points for the various established routes are listed in section ENR 3.

4.9 HOLDING

4.9.1 An aircraft required to hold en-route or over the destination holding point shall do so in accordance with the holding pattern specified for the radio aid in subsection ENR 3.6.

4.9.2 Where no specified holding pattern is established and en-route holding is required by ATC, the pilot-in-command shall hold in accordance with the standard holding pattern as follows:

- a. Follow the specified track inbound to the holding point;
- b. On passing the holding point, make a 180° rate one turn to the right;
- c. Maintain a parallel track outbound from the holding point for 1 min if at or below FL140 and 1½ min if above FL140;
- d. Make a 180° rate one turn to the right; and
- e. follow the specified track inbound.

Note:

- 1) *NOTWITHSTANDING PARA 4.9 ABOVE, ATC may instruct an aircraft to execute a left hand turn and specify the direction in which the aircraft is to be held in relation to the reporting or holding point en-route.*
- 2) *The pilot-in-command should adjust his holding pattern within the limits of the established holding area in order to leave the holding point as far as possible at the exact time specified.*

4.10 FLIGHT IN CONTROLLED AIRSPACES

4.10.1 Within controlled airspaces ATC separate IFR flights:

- a. Vertically: by assigning them different levels or altitude;
- b. Longitudinally: by instructing two aircrafts to maintain a minimum time interval between them; and
- c. Laterally: by providing different flight paths;
- d. By use of radar to ensure a minimum horizontal separation.

← 4.10.2 Standard separation in accordance with PANS-ATM DOC 4444 shall be provided to all flights operating in controlled airspace, except when:

- a. Positive identification by radar of an aircraft's position is available to the appropriate ATC unit;
- b. Within the Singapore/Johor Airspace Complex and Airways at/below FL150 during daylight hours, reports received from opposite direction aircraft indicate they have definitely passed each other;
- ← c. In the vicinity of an aerodrome:
 - i. two or more aircraft are continuously visible to an aerodrome controller who can take positive action to ensure separation; or
 - ii. all aircraft are continuously visible to one another and the pilots concerned indicate that they can maintain their own separation.

- ← 4.10.3 Within the Singapore/Johor Airspace Complex, standard separation is provided between all flights irrespective of whether they are operating on a VFR or IFR Flight Plan. All operations are required to obtain an Air Traffic Control Clearance.

Note: See ENR 3.6 Area Charts

- 4.10.4 All aircraft operating under IFR or VFR in controlled airspaces shall be equipped with appropriate two-way radio communication, suitable instruments and radio navigation apparatus appropriate to the route to be flown and the pilot shall hold an instrument rating.

4.11 TRANSFER OF COMMUNICATIONS

- ← 4.11.1 The transfer of air/ground communications contact to an adjoining Area Control Centre is normally made at the agreed transfer point.

4.12 ALERTING SERVICE

- 4.12.1 Alerting service is available for all notified aircraft movements in Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1).

- 4.12.2 The pilot-in-command of an aircraft landing at an unattended landing ground shall notify arrival to ATC by the most expeditious means available.

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ENR 1.8 REGIONAL SUPPLEMENTARY PROCEDURES

1 RVSM PROCEDURES IN THE SINGAPORE FIR AND AIRSPACE WHERE ATS IS PROVIDED BY SINGAPORE (SEE ENR 2.1)

1.1 IMPLEMENTATION OF REVISED FLOS (FLIGHT LEVEL ORIENTATION SCHEME) AND FLAS (FLIGHT LEVEL ALLOCATION SCHEME) IN THE WESTERN PACIFIC/SOUTH CHINA SEA AREA

1.1.1 In order to minimise flight level transition requirements for flights entering and leaving the Western Pacific / South China Sea area, the following flight level arrangements will be implemented simultaneously and permanently:

- a. a single alternate FLOS (i.e. 'east odd flight levels, west even flight levels') in compliance with the Table "RVSM-FEET" of Appendix 3 of ICAO Annex 2 and in accordance with the FLOS in surrounding areas;
- b. special high capacity arrangements for six unidirectional parallel routes (L642, M771, N892, L625, N884 and M767) that involve managed use of odd and even flight levels in the same direction of flight; and
- c. an associated FLAS agreed between affected ACCs to facilitate ATC 'No-PDC' operations.

1.1.2 To harmonise with RVSM operations within Jakarta FIR, RVSM operations within the Singapore FIR and airspace within the Jakarta FIR where ATS is provided by Singapore (see ENR 2.1) shall be conducted between FL290 and FL410 (inclusive) in the following areas:

ATS Routes	Flight Level Assignment
A464 (S) Southbound	FL290, FL310, FL330, FL350, FL370, FL390, FL410
A576 (S) Southbound	FL290, FL310, FL330, FL350, FL370, FL390, FL410
B470	FL290, FL300, FL310, FL320, FL330, FL340, FL350, FL360, FL370, FL380, FL390, FL400 and FL410 except for flights beyond Jakarta where only odd levels shall be assigned.
B469 (S) Southbound	FL290, FL310, FL330, FL350, FL370, FL390 and FL410
G580	FL290, FL330 and FL370
M635	FL290, FL310, FL330, FL350, FL370, FL390 and FL410
M646	FL290, FL330 and FL370
M774	FL290, FL310, FL330, FL350, FL370, FL390 and FL410
← N875 (S) Southbound	FL290, FL330, FL370 and FL410
← L644 (S) Southbound	FL290, FL330, FL370 and FL410
L762(W) Westbound	FL300, FL320, FL340, FL360, FL380 and FL400 For flights that go beyond Medan on ATS route a) No Pre-Departure Clearance (No-PDC) FL280 (in Non RVSM airspace) and No-PDC FL300 may be assigned b) Assignment of FL340 shall be subject to coordination
R469 (W) Westbound	FL300, FL320, FL340, FL360, FL380 and FL400
W22 (W) Westbound	FL300, FL320, FL340, FL360, FL380 and FL400
W24 (W) Westbound	FL300, FL320, FL340, FL360, FL380 and FL400
W26 (E) Eastbound	FL290, FL310, FL330, FL350, FL370, FL390 and FL410

1.1.3 Non-RVSM approved aircraft shall fly below RVSM airspace unless prior approval has been obtained from the ACC concerned for such aircraft to operate in RVSM airspace. In the assignment of cruising level in RVSM airspace, RVSM-approved aircraft shall be given priority over non-RVSM approved aircraft.

1.1.4 When an RVSM-approved aircraft reports that it is no longer RVSM-compliant before the transfer of control point, the transferring ACC shall immediately notify the receiving ACC of this fact and provide conventional vertical separation of 2,000ft between this aircraft and the other aircraft.

1.2 RVSM OPERATIONAL APPROVAL AND MONITORING

1.2.1 Operators must obtain airworthiness and operational approval from the State of Registry or State of the Operator, as appropriate, to conduct RVSM operations. The requirement for operators to qualify for RVSM operational approval can be found at:

<https://www.caas.gov.sg/legislation-regulations/guidelines-advisory/air-operations>

Each aircraft operating in RVSM airspace shall hold a valid RVSM approval. RVSM approval issued for one region will always be valid for RVSM operations in another region provided specific restrictions have not been imposed on the operator by the State of the Operator or State of Registry. The Monitoring Agency for Asia Region (MAAR) monitors operator compliance with State approvals requirements by performing periodic scrutiny checks using Traffic Sample Data and the RVSM approvals record (<https://www.aerothai.co.th/maar/approvals.php>)

- 1.2.2 Operators are required to participate in the RVSM aircraft monitoring program. This is an essential element of the RVSM implementation program in that it confirms that the aircraft altitude-keeping performance standard is being met. Monitoring accomplished for other regions can be used to fulfil the monitoring requirements for the Asia/Pacific Region. The information on height-keeping performance monitoring options can be found at:

<https://www.aerothai.co.th/maar/>

1.3 ACAS II AND TRANSPONDER EQUIPAGE

- 1.3.1 Aircraft operating in RVSM airspace shall be equipped with an airborne collision avoidance system (ACAS II) and to operate the ACAS system in accordance with the relevant provisions of ICAO Annex 10, Volume IV, Chapter 4.

1.4 IN-FLIGHT PROCEDURES WITHIN RVSM AIRSPACE

- 1.4.1 Before entering RVSM airspace, the pilot should review the status of required equipment. The following equipment should be operating normally:

- a. two primary altimetry systems;
- b. one automatic altitude-keeping device; and
- c. one altitude-alerting device.

- 1.4.2 The pilot must notify ATC whenever the aircraft:

- a. is no longer RVSM compliant due to equipment failure; or
- b. experiences loss of redundancy of altimetry systems; or
- c. encounters turbulence that affects the capability to maintain flight level.

See Appendix A for pilot and controller actions in contingency scenarios.

- 1.4.3 During cleared transition between levels, the aircraft should not overshoot or undershoot the assigned FL by more than 150ft (45m).

- 1.4.4 Except in an ADS or radar environment, pilots shall report reaching any altitude assigned within RVSM airspace.

1.5 SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES IN OCEANIC AIRSPACE

Introduction

- 1.5.1 Although all possible contingencies cannot be covered, the procedures in 1.5.4, 1.5.5 and 1.5.6 provide for the more frequent cases such as:

- a. the inability to comply with assigned clearance due to meteorological conditions (1.5.6 refers);
- b. en-route diversion across the prevailing traffic flow (for example, due to medical emergencies (1.5.4 and 1.5.5 refer)); and
- c. the loss of, or significant reduction in, the required navigation capability when operating in an airspace where the navigation performance accuracy is a prerequisite to the safe conduct of flight operations, or pressurization failure (1.5.4 and 1.5.5 refer).

- 1.5.2 The pilot shall take action as necessary to ensure the safety of the aircraft, and the pilot's judgement shall determine the sequence of actions to be taken, having regard to the prevailing circumstances. Air traffic control shall render all possible assistance.

General Procedures

Note.- Figure 1.5-1 provides an aid for understanding and applying the contingency procedures contained in Section 1.5

- 1.5.3 If an aircraft is unable to continue the flight in accordance with its ATC clearance, a revised clearance shall be obtained, whenever possible, prior to initiating any action.

- 1.5.4 If prior clearance cannot be obtained, the following contingency procedures should be employed until a revised clearance is received. In general terms, the aircraft should be flown at an offset level and on an offset track where other aircraft are less likely to be encountered. Specifically, the pilot shall:
- a. leave the cleared track or ATS route by initially turning at least 30 degrees to the right or to the left, in order to establish and maintain a parallel, same direction track or ATS route offset 5.0 NM. The direction of the turn should be based on one or more of the following factors:
 1. aircraft position relative to any organized track or ATS route system;
 2. the direction of flights and flight levels allocated on adjacent tracks;
 3. the direction to an alternate airport;
 4. any strategic lateral offset being flown; and
 5. terrain clearance.
 - b. maintain a watch for conflicting traffic both visually and by reference to ACAS (if equipped), leaving ACAS in RA mode at all times, unless aircraft operating limitations dictate otherwise;
 - c. turn on all aircraft exterior lights (commensurate with appropriate operating limitations);
 - d. keep the SSR transponder on at all times and, when able, squawk 7700, as appropriate and, if equipped with ADS-B or ADS-C, select the appropriate emergency functionality;
 - e. as soon as practicable, advise air traffic control of any deviation from their assigned clearance;
 - f. use means as appropriate (i.e. voice and/or CPDLC) to communicate during a contingency or emergency;
 - g. if voice communications are used, the radiotelephony distress signal (MAYDAY) or urgency signal (PAN PAN) preferably spoken three times, shall be used, as appropriate;
 - h. when emergency situations are communicated via CPDLC, the controller may respond via CPDLC. However, the controller may also attempt to make voice contact with the aircraft;
- Note.- Guidance on emergency procedures for controllers, radio operators, and flight crew in data link operations can be found in the Global Operational Data Link (GOLD) Manual (Doc 10037).*
- i. establish communications with and alert nearby aircraft by broadcasting on the frequencies in use and at suitable intervals on 121.5 MHz (or, as a backup, on the inter-pilot air-to-air frequency 123.45 MHz): aircraft identification, the nature of the distress condition, intention of the pilot, position (including the ATS route designator or the track code, as appropriate) and flight level.

Actions to be taken once offset from track

Note.- The pilot's judgement of the situation and the need to ensure the safety of the aircraft will determine the actions outlined to be taken. Factors for the pilot to consider when deviating from the cleared track or ATS route or level without an ATC clearance include, but are not limited to:

- a. *operation within a parallel track system;*
 - b. *the potential for user preferred routes (UPRs) parallel to the aircraft's track or ATS route;*
 - c. *the nature of the contingency (e.g. aircraft system malfunction); and*
 - d. *weather factors (e.g. convective weather at lower flight levels).*
- 1.5.5 If possible, maintain the assigned flight level until established on the 5.0 NM parallel, same direction track or ATS route offset. If unable, initially minimize the rate of descent to the extent that is operationally feasible.
- 1.5.6 Once established on a parallel, same direction track or ATS route offset by 5.0 NM, either:
- a. descend below FL 290, and establish a 500 ft vertical offset from those flight levels normally used, and proceed as required by the operational situation or if an ATC clearance has been obtained, in accordance with the clearance; or
 - b. establish a 500 ft vertical offset (or 1000 ft vertical offset if above FL 410) from those flight levels normally used, and proceed as required by the operational situation, or if an ATC clearance has been obtained, in accordance with the clearance.

Note.- Altimetry system errors (ASE) may result in less than 500 ft vertical spacing (less than 1000 ft above FL 410) when the above contingency procedure is applied.

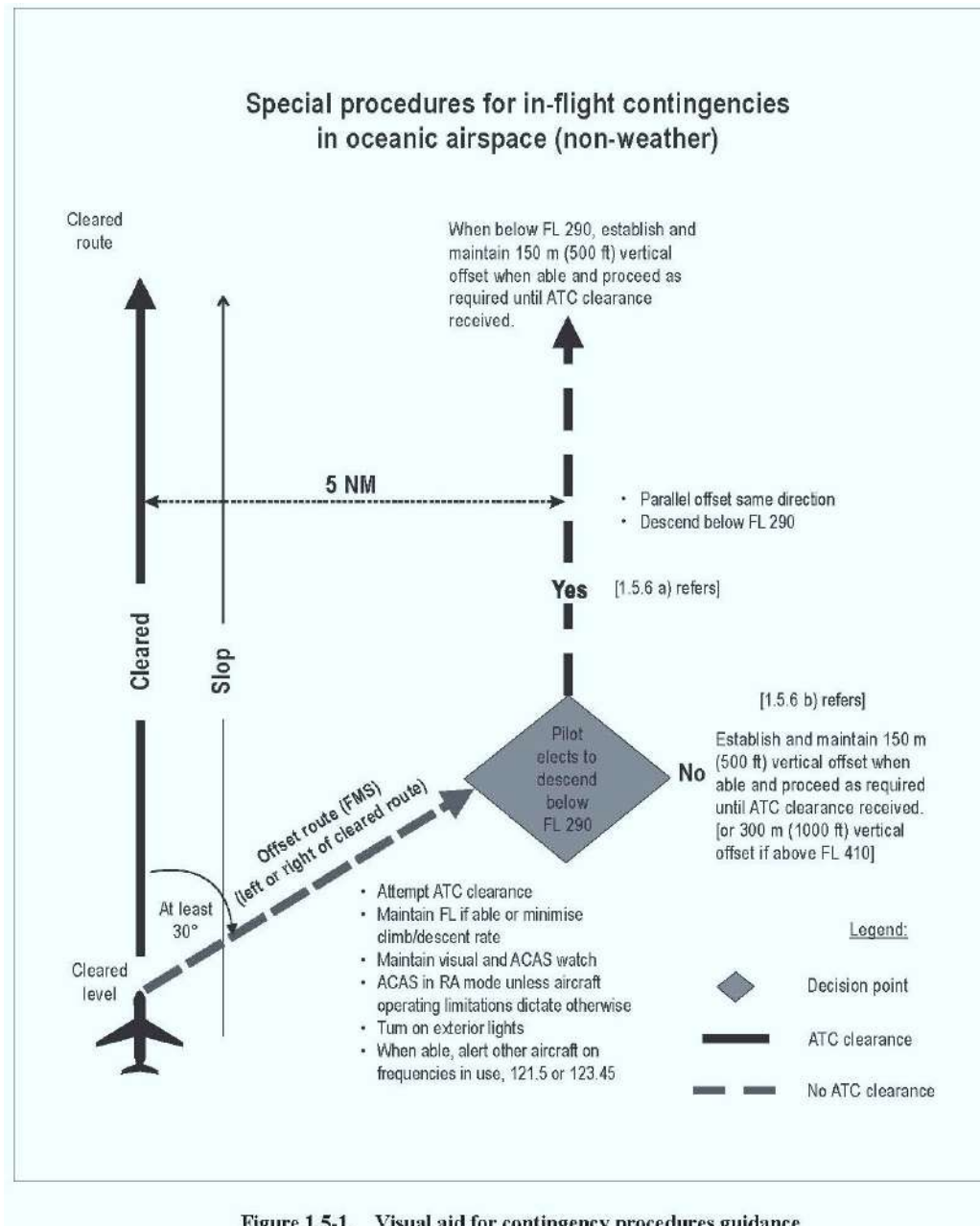


Figure 1.5-1. Visual aid for contingency procedures guidance

1.6 PROCEDURES TO MITIGATE WAKE TURBULENCE ENCOUNTERS AND DISTRACTING AIRCRAFT SYSTEM ALERTS IN THE OCEANIC AIRSPACE OF SINGAPORE FIR

1.6.1 The following special procedures are applicable to mitigate wake turbulence or distracting aircraft system alerts [e.g. ACAS, Ground Proximity Warning System (GPWS)] in Asia and Pacific airspace where RVSM is applied:

Note.- In the contingency circumstances below, ATC will not issue clearances for lateral offsets and will not normally respond to actions taken by the pilots.

1.6.2 An aircraft that encounters wake vortex turbulence or experiences distracting aircraft system alerts shall notify ATC and request a flight level, track or speed change to avoid the condition. However, in situations where such a change is not possible or practicable, the pilot may initiate the following temporary lateral offset procedure with the intention of returning to centreline as soon as practicable:

- a. the pilot should establish contact with other aircraft, if possible, on the appropriate VHF inter-pilot air-to-air frequency 123.45MHz; and
- b. one (or both) aircraft may initiate lateral offset(s) not to exceed 2NM from the assigned track, provided that:
 - i. as soon as practicable to do so, the offsetting aircraft notify ATC that temporary lateral offset action has been taken and specify the reason for doing so (ATC will not normally respond); and
 - ii. the offsetting aircraft notify ATC when re-established on assigned route(s) or track(s) (ATC will not normally respond).

1.7 FLIGHT PLANNING REQUIREMENTS

1.7.1 Unless special arrangement is made as detailed below, RVSM approval is required for aircraft to operate within designated RVSM airspace. The operator must determine that the appropriate State authority has approved the aircraft and will meet the RVSM requirements for the filed route of flight and any planned alternate routes. The letter "W" shall be inserted in item 10 (Equipment) of the ICAO standard flight plan to indicate that the aircraft is RVSM approved aircraft.

1.8 PROCEDURES FOR OPERATION OF NON-RVSM COMPLIANT AIRCRAFT IN RVSM AIRSPACE

1.8.1 It should be noted that RVSM approved aircraft will be given priority for level allocation over non-RVSM approved aircraft.

1.8.2 The vertical separation minimum between non-RVSM aircraft operating in the RVSM stratum and all other aircraft is 2,000ft.

1.8.3 Non-RVSM compliant aircraft operating in RVSM airspace should use the phraseology as contained in Appendix A.

1.8.4 Non-RVSM compliant aircraft may be cleared to climb to and operate above FL290 or descend to and operate below FL410 provided that they:

- a. do not climb or descend at less than the normal rate for the aircraft, and
- b. do not level off at an intermediate level while passing through the RVSM stratum.

1.8.5 Non-RVSM compliant aircraft may not flight plan between FL290 and FL410 inclusive within RVSM airspace. After special coordination as detailed in paragraph 1.8.6 below, the following non-RVSM aircraft may flight plan at RVSM flight levels in the RVSM stratum:

- a. is being initially delivered to the State of Registry or Operator (see paragraph 1.10 for additional details and information); or
- b. was formally RVSM approved but has experienced an equipment failure and is being flown to a maintenance facility for repair in order to meet RVSM requirements and/or obtain approval; or
- c. is transporting a spare engine mounted under the wing; or
- d. is being utilized for mercy or humanitarian purposes; or
- e. State aircraft (those aircraft used in military, custom and police services shall be deemed State aircraft).

1.8.6 The assignment of cruising level to non-RVSM compliant aircraft listed in paragraph 1.10.5 (a) to (e) shall be subject to an ATC clearance. Aircraft operators shall include "STS/CATEGORY (FERRY/ HUMANITARIAN/ MILITARY/ CUSTOMS/POLICE)/NON-RVSM COMPLIANT" in field 18 of the ICAO flight plan.

1.8.7 Contact details for approval request are as follows:

Watch Manager, Singapore Air Traffic Control Centre:
TEL: (65) 65412668
AFS: WSJCZRZX
FAX: (65) 65457526

1.8.8 This approval process is intended exclusively for the purposes indicated above and not as a means to circumvent the normal RVSM approval process.

1.9 DELIVERY FLIGHTS FOR AIRCRAFT THAT ARE RVSM COMPLIANT ON DELIVERY

1.9.1 An aircraft that is RVSM compliant on delivery may operate in RVSM airspace provided that the crew is trained on RVSM policies and procedures applicable in the airspace and the responsible State issues the operator a letter of authorisation approving the operation. State notification to the APARMO should be in the form of a letter, e-mail or facsimile documenting the one-time flight. The planned date of the flight, flight identification, registration number and aircraft type/series should be included.

1.10 PROCEDURES FOR SUSPENSION OF RVSM

1.10.1 Air traffic services will consider suspending RVSM procedures within affected areas of the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) when there are pilot reports of greater than moderate turbulence. Within areas where RVSM procedures are suspended, the vertical separation minimum between all aircraft will be 2,000ft.

1.11 GUIDANCE FOR PILOTS AND CONTROLLERS FOR ACTIONS IN THE EVENT OF AIRCRAFT SYSTEM MALFUNCTION OR TURBULENCE GREATER THAN MODERATE

1.11.1 See Appendix A for guidance in these circumstances.

1.12 PROCEDURES FOR AIR-GROUND COMMUNICATION FAILURE

1.12.1 The air-ground communication failure procedures specified in ENR 1.6 in conjunction with ICAO PANS-ATM DOC 4444 should be applied.

APPENDIX A

CONTINGENCY SCENARIOS

The following paragraphs summarize pilot actions to mitigate the potential for conflict with other aircraft in certain contingency situations. They should be reviewed in conjunction with the expanded contingency scenarios detailed below which contain additional technical and operational details.

* **Scenario 1** : The pilot is

- a. unsure of the vertical position of the aircraft due to the loss or degradation of all primary altimetry systems, or
- b. unsure of the capability to maintain cleared flight level (CFL) due to turbulence or loss of all automatic altitude control systems.

The pilot should:	ATC can be expected to:
Maintain CFL while evaluating the situation;	
Watch for conflicting traffic both visually and by reference to ACAS, if equipped;	
If considered necessary, alert nearby aircraft by a) Making maximum use of exterior lights; b) Broadcasting position, FL, and intentions on 121.5MHz (as a back-up, the VHF inter-pilot air-to-air frequency 123.45MHz may be used).	
Notify ATC of the situation and intended course of action. Possible courses of action include: a) Maintaining the CFL and route provided that ATC can provide lateral, longitudinal or conventional vertical separation. b) Requesting ATC clearance to climb above or descend below RVSM airspace if the aircraft cannot maintain CFL and ATC cannot establish adequate separation from other aircraft. c) Executing the contingency manoeuvre shown in paragraphs 1.5 and 1.6 to offset from the assigned track and FL, if ATC clearance cannot be obtained and the aircraft cannot maintain CFL.	Obtain the pilot's intentions and pass essential traffic information. If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum. If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible. If adequate separation cannot be established and it is not possible to comply with the pilot's request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation. Notify adjoining ATC facilities/sectors of the situation.

Scenario 2: There is a failure or loss of accuracy of one primary altimetry system (e.g. greater than 200ft difference between primary altimeters).

The pilot should:
Cross check standby altimeter, confirm the accuracy of a primary altimeter system and notify ATC of the loss of redundancy. If unable to confirm primary altimeter system accuracy, follow pilot actions listed in the preceding scenario.

EXPANDED EQUIPMENT FAILURE AND TURBULENCE ENCOUNTER SCENARIOS

Operators may consider this material for use in training programs.

* **Scenario 1:** All automatic altitude control systems failed (e.g. Automatic Altitude Hold).

The pilot should:	ATC can be expected to:
<p>Initially, Maintain CFL</p> <p>Evaluate the aircraft's capability to maintain altitude through manual control</p> <p>Subsequently, Watch for conflicting traffic both visually and by reference to ACAS, if equipped.</p>	
<p>If considered necessary, alert nearby aircraft by:</p> <p>a) Making maximum use of exterior lights;</p> <p>b) Broadcasting position, FL, and intentions on 121.5MHz (as a back-up, the VHF inter-pilot air-to-air frequency 123.45MHz may be used).</p>	
<p>Notify ATC of the failure and intended course of action. Possible courses of action include:</p> <p>a) Maintaining the CFL and route, provided that the aircraft can maintain level.</p> <p>b) Requesting ATC clearance to climb above or descend below RVSM airspace if the aircraft cannot maintain CFL and ATC cannot establish lateral, longitudinal or conventional vertical separation.</p> <p>c) Executing the contingency manoeuvre shown in paragraphs 1.5 and 1.6 to offset from the assigned track and FL, if ATC clearance cannot be obtained and the aircraft cannot maintain CFL.</p>	<p>If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum.</p> <p>If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible.</p> <p>If adequate separation cannot be established and it is not possible to comply with the pilot's request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation.</p> <p>Notify adjoining ATC facilities/sectors of the situation</p>

* **Scenario 2:** Loss of redundancy in primary altimetry systems

The pilot should:	ATC can be expected to:
<p>If the remaining altimetry system is functioning normally, couple that system to the automatic altitude control system, notify ATC of the loss of redundancy and maintain vigilance of altitude keeping.</p>	<p>Acknowledge the situation and continue to monitor progress.</p>

Scenario 3: All primary altimetry systems are considered unreliable or failed.

The pilot should:	ATC can be expected to:
Maintain CFL by reference to the standby altimeter (if the aircraft is so equipped).	
<p>Alert nearby aircraft by:</p> <p>a) Making maximum use of exterior lights;</p> <p>b) Broadcasting position, FL, and intentions on 121.5MHz (as a back-up, the VHF inter-pilot air-to-air frequency 123.45MHz may be used).</p> <p>Consider declaring an emergency. Notify ATC of the failure and intended course of action.</p> <p>Possible courses of action include:</p> <p>a) Maintaining CFL and route provided that ATC can provide lateral, longitudinal or conventional vertical separation.</p> <p>b) Requesting ATC clearance to climb above or descend below RVSM airspace if ATC cannot establish adequate separation from other aircraft.</p> <p>c) Executing the contingency manoeuvre shown in paragraphs 1.5 and 1.6 to offset from the assigned track and FL, if ATC clearance cannot be obtained.</p>	<p>Obtain pilot's intentions and pass essential traffic information.</p> <p>If the pilot intends to continue in RVSM airspace, assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum.</p> <p>If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible.</p> <p>If adequate separation cannot be established and it is not possible to comply with the pilot's request for clearance to exit RVSM airspace, advise the pilot of essential traffic information, notify other aircraft in the vicinity and continue to monitor the situation.</p> <p>Notify adjoining ATC facilities/sectors of the situation.</p>

Scenario 4: The primary altimeters diverge by more than 200ft (60m).

The pilot should:
Attempt to determine the defective system through established trouble-shooting procedures and/or comparing the primary altimeter display to the standby altimeter (as corrected by the correction cards, if required).
If the defective system can be determined, couple the functioning altimeter system to the altitude-keeping device.
If the defective system cannot be determined, follow the guidance in Scenario 3 for failure or unreliable altimeter indications of all primary altimeters.

Scenario 5: Turbulence (greater than moderate) which the pilot believes will impact the aircraft's capability to maintain flight level.

The pilot should:	ATC can be expected to:
Watch for conflicting traffic both visually and by reference to ACAS, if equipped.	
If considered necessary, alert nearby aircraft by: <ul style="list-style-type: none"> a) Making maximum use of exterior lights; b) Broadcasting position, FL, and intentions on 121.5MHz (as a back-up, the VHF inter-pilot air-to-air frequency 123.45MHz may be used). 	
Notify ATC of intended course of action as soon as possible. <u>Possible courses of action include:</u> <ul style="list-style-type: none"> a) Maintaining CFL and route, provided ATC can provide lateral, longitudinal or conventional vertical separation. b) Requesting flight level change, if necessary c) Executing the contingency manoeuvre shown in paragraphs 1.5 and 1.6 to offset from the assigned track and FL, if ATC clearance cannot be obtained and the aircraft cannot maintain CFL. 	Assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum. If unable to provide adequate separation, advise the pilot of essential traffic information and request pilot's intentions. Notify other aircraft in the vicinity and monitor the situation. Notify adjoining ATC facilities/sectors of the situation.

CONTROLLER / PILOT PHRASEOLOGY

Phrases	Purpose
(<i>callsign</i>) CONFIRM RVSM APPROVED	Used by the controller to ascertain the RVSM approval status of an aircraft.
NEGATIVE RVSM*	Used by the pilot to report non-RVSM approval status: a) On the initial call on any frequency within the RVSM airspace (controllers shall provide a readback with this same phrase); and b) In all requests for flight level changes pertaining to flight levels within the RVSM airspace; and c) In all readback of flight level clearances pertaining to flight levels within the RVSM airspace. Additionally, except for State aircraft, pilots shall include this RTF phrase to read back flight level clearances involving the vertical transit through FL290 or FL410.
AFFIRM RVSM*	Used by the pilot to report RVSM approval status.
NEGATIVE RVSM STATE AIRCRAFT*	Used by the pilot of a non-RVSM approved State aircraft to report non-RVSM approval status in response to the RTF phrase (<i>callsign</i>) CONFIRM RVSM APPROVED.
(<i>callsign</i>) UNABLE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN [or DESCEND TO, or CLIMB TO] FLIGHT LEVEL (<i>number</i>)	Used to deny ATC clearance into the RVSM airspace.
UNABLE RVSM DUE TURBULENCE*	Used by the pilot to report when severe turbulence affects the aircraft's capability to maintain the height- keeping requirements for RVSM.
UNABLE RVSM DUE EQUIPMENT*	Used by the pilot to report that the aircraft's equipment has degraded below the MASPS (Minimum Aircraft Systems Performance Specification) required for flight within the RVSM airspace.
READY TO RESUME RVSM*	Used by the pilot to report the ability to resume operations within the RVSM airspace after an equipment or weather-related contingency.
REPORT ABLE TO RESUME RVSM	Used by the controller to confirm that an aircraft has regained its RVSM approval status or to confirm that the pilot is ready to resume RVSM operations.

* indicates a pilot transmission

2 MACH NUMBER TECHNIQUE (MNT) AND AREA NAVIGATION (RNAV)

2.1 INTRODUCTION

2.1.1 RNAV is a method which permits aircraft navigation along any desired flight path within the coverage of the associated navigation aids, or within the limits of the capability of self-contained aids, or a combination of these methods. RNAV equipment is considered to be that equipment which operates by automatically determining aircraft position from one, or a combination of the following sensors with the means to establish and follow a desired path: VOR/DME, DME/DME, INS, LORAN C, GNSS.

← 2.1.2 Only aircraft equipped with RNAV systems would be able to operate on the RNAV routes in Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1). Aircraft that are not RNAV compliant will only be cleared to operate on non-RNAV routes.

2.1.3 The requirements for conduct of RNAV operations are stated in ICAO Doc 9613 (Manual on Required Navigation Performance) and at <https://www.caas.gov.sg/legislation-regulations/guidelines-advisory/air-operations>.

← 2.1.4 Minimum longitudinal separation of 10 minutes between RNAV equipped aircraft based on Mach Number Technique is applied on ATS routes A464, A576, B338, B469, B470, G334, G579, G580, L625, L642, L644, L649, L762, M630, M635, M646, M751, M753, M758, M761, M767, M768, M771, M772, M774, N502, N875, N884, N891, N892, P501, R469, T21, T22, T23, T24, T25, W22, W24 and W26 in accordance with DOC 7030/4. MNPS criteria is not required. If item 10 of the flight plan does not include any of the following equipment designators "G", "I" or "R", operators shall insert "NAV/NON-RNAV" in item 18 of the flight plan.

2.1.5 Operators of aircraft to which the Mach Number Technique and RNAV procedures will be applied must ensure that the equipment carried on their aircraft have been calibrated in accordance with the applicable airworthiness practices.

2.1.6 An 80NM RNAV distance-based longitudinal separation minima, with Mach Number Technique being applied, is permanently implemented on ATS routes within the oceanic portion of the Singapore FIR.

2.2 MACH NUMBER IN A FLIGHT PLAN

2.2.1 Aircraft are required to include their true Mach Number in item 15 of the ICAO flight plan as follows:

- a. True airspeed and level preceding the entry point.
- b. True Mach Number and level at entry point.

Example: Item 15 of a flight plan for a flight from Kuala Lumpur to Kota Kinabalu:
0460F330 M758 VPK/M072F330 M758

2.2.2 Westbound departure flights from Singapore Changi Airport proceeding beyond Indonesia, Malaysia and Thailand shall include Mach Number in item 18 of the flight plan.

2.3 ATC CLEARANCE

2.3.1 The ATC clearance shall include the filed Mach Number which is to be maintained, whether climbing, descending or on level flight.

Example: An ATC clearance for a flight from Kuala Lumpur to Kuching, issued by Lumpur ATC to aircraft:

MAS 518 CLEARED TO KUCHING VIA AIRWAY MIKE 761, MAINTAIN FL290, AT VPK MAINTAIN SPEED OF MACH POINT SEVEN TWO TILL AGOBA. SSR CODE A2215.

2.4 MAINTENANCE/CHANGE OF MACH NUMBER

2.4.1 Aircraft will be cleared to maintain their Mach numbers from the point of entry to the exit point. Pilots shall adhere strictly to the last assigned Mach number and notify ATC of any variation to the cleared (filed) Mach number. Application of longitudinal separation between aircraft when the Mach Number Technique is used is based on the assumption that the assigned Mach number will be maintained at all times. In the event that for operational reasons it is not feasible to do so, the pilot must inform ATC at the time initial clearance or when subsequent clearances are issued or requested.

2.4.2 The current true Mach number shall be included in routine position reports.

2.4.3 When reporting a change in Mach number, pilots should use the following phraseology:

Example
SINGAPORE RADAR, THIS IS MAS 524, SPEED NOW REDUCED (INCREASED) TO MACH POINT SEVEN ZERO

2.5 LONGITUDINAL SEPARATION ON ATS ROUTES M758 AND M761

2.5.1 Longitudinal Separation Minimum

The minimum longitudinal separation between RNAV equipped aircraft on ATS routes M758 and M761 is 10 minutes based on MNT.

2.5.2 Separation of aircraft when the following aircraft is faster

When the following aircraft is faster, for each 600NM in distance between the entry and exit points of the area where the Mach Number Technique is used, 1 minute is added for each 0.01 difference in Mach number between the two aircraft concerned to compensate for the fact that the second aircraft is overtaking the first aircraft according to the table in Appendix B.

2.5.3 Separation of aircraft when the preceding aircraft is faster

When the preceding aircraft is maintaining a greater Mach number than the following aircraft, the following separation shall be applied:

- a. 9 minutes if the preceding aircraft is Mach 0.02 faster than the following aircraft;
- b. 8 minutes if the preceding aircraft is Mach 0.03 faster than the following aircraft;
- c. 7 minutes if the preceding aircraft is Mach 0.04 faster than the following aircraft;
- d. 6 minutes if the preceding aircraft is Mach 0.05 faster than the following aircraft; and
- e. 5 minutes if the preceding aircraft is Mach 0.06 faster than the following aircraft.

← 2.6 LONGITUDINAL SEPARATION ON ATS ROUTES A464, A576, B338, B469, B470, G579, G580, L625, L642, L644, L649, L762, M630, M635, M646, M751, M753, M758, M761, M767, M768, M771, M772, M774, N502, N875, N884, N891, N892, P501, R469, T21, T22, T23, T24, T25, W22, W24 AND W26

2.6.1 Requirements

The Mach Number Technique is applied on approved ATS routes between RNAV equipped aircraft.

2.6.2 Separation of aircraft with the same Mach number

10 minutes longitudinal separation shall be applied between aircraft with the same Mach number.

2.6.3 Separation of aircraft when the following aircraft is faster

The same buffer as stated in paragraph 2.5.2 shall be applied.

2.6.4 Separation of aircraft when the preceding aircraft is faster

The separation minima specified in paragraph 2.5.3 shall apply.

2.6.5 15 minutes longitudinal separation minimum

15 minutes longitudinal separation minimum shall be applied on these ATS routes between aircraft which cannot comply with RNAV procedures mentioned in paragraph 2.6.1.

←

APPENDIX BTable

APPLICATION OF MACH NUMBER TECHNIQUE WHEN THE FOLLOWING
AIRCRAFT IS THE FASTER
(BASED ON 10 MINUTES LONGITUDINAL SEPARATION)

DIFFERENCE IN MACH	DISTANCE TO FLY AND SEPARATION (IN MINUTES) REQUIRED AT ENTRY POINT				
	001-600 (NM)	601-1200 (NM)	1201-1800 (NM)	1801-2400 (NM)	2401-3000 (NM)
0.01	11	12	13	14	15
0.02	12	14	16	18	20
0.03	13	16	19	22	25
0.04	14	18	22	26	30
0.05	15	20	25	30	35
0.06	16	22	28	34	40
0.07	17	24	31	38	45
0.08	18	26	34	42	50
0.09	19	28	37	46	55
0.10	20	30	40	50	60

3 PERFORMANCE-BASED NAVIGATION ON RNAV ROUTES WITHIN SINGAPORE FIR AND AIRSPACE WHERE ATS IS PROVIDED BY SINGAPORE (SEE ENR 2.1)

3.1 INTRODUCTION

← 3.1.1 ATC separation minima based on RNP 10 navigation specification will be applied accordingly for aircraft which are approved for RNP 10 operations on the following segments of RNAV routes which fall within the airspace where ATS is provided by Singapore (see ENR 2.1):

- ← L625 - BTN TOMAN and UXEDA and BTN GUTUP and AKMON
- ← L642 - BTN ESPOB and MERSING
- L649 - BTN DAKIX and LAXOR
- M635 - BTN VTK and SURGA
- M767 - BTN TEGID and UKLIS and BTN NIXEB and TOMAN
- M771 - BTN MERSING and DUDIS
- ← M774 - BTN OBDOS and JUNHA
- N884 - BTN MERSING and OLMUT and BTN RILRI and LAXOR
- N892 - BTN MELAS and MERSING
- ← L644 - BTN DUDIS and LIGVU
- M772 - BTN ASISU and LAXOR

3.1.2 Additionally, to facilitate reduction of separation between suitably equipped aircraft, ATC separation minima based on RNP 4 navigation specification will be applied accordingly for aircraft which are approved for RNP 4 operations on the following segments of RNAV routes which fall within the Singapore FIR:

- ← M767 - BTN TEGID and UKLIS
- N884 - BTN RILRI and LAXOR

Note: Conformance monitoring shall be ensured by establishing an ADS-C event contract specifying a lateral deviation change event with a maximum of 5NM threshold and a waypoint change event.

3.1.3 RCP240 and RSP180 performance specifications shall be required for the application of the Performance-Based Longitudinal Separation Minima and in accordance with ICAO Doc 4444 PANS-ATM paragraph 5.4.2.9.2.

3.1.4 Pilots shall inform ATC of any deterioration or failure of the navigation systems below the navigation requirements for RNP 10. ATC shall then provide alternative separation and / or alternative routing.

3.2 OPERATIONS BY AIRCRAFT NOT MEETING RNP 10

3.2.1 An aircraft that is unable to meet the minimum navigational requirements for RNP 10 must file flight plan at below FL280. Operations at or above FL290 for these aircraft will be subjected to ATC approval, in accordance with the provisions of paragraph 3.2.2.

3.2.2 ATC units receiving a request for a non-RNP 10 approved aircraft to operate on ATS routes specified in paragraph 3.1, at or above FL290, will co-ordinate with adjacent ATC units affected by the flight. In deciding whether or not to approve the flight, each ATC unit will take into consideration:

- a. traffic density;
- b. communications, including the non-availability of normal communication facilities;
- c. weather conditions en-route; and
- d. any other factors pertinent at the time.

3.3 SAFETY ASSESSMENT CRITERIA

3.3.1 The safety criteria associated with the introduction of the reduced lateral separation minima of 60NM will be in accordance with the requirements for RNP 10 navigation performance, i.e. aircraft navigation performance shall be such that the standard deviation of lateral track errors shall be less than 8.7km (4.7NM).

3.4 MONITORING OF AIRCRAFT NAVIGATION PERFORMANCE

3.4.1 Monitoring of aircraft navigation performance is a joint responsibility between operators, States of Registry or States of Operators (as applicable), regulatory authorities and the ATS providers. The detection and reporting of non-conformance with the navigation requirements against the following parameters will rely primarily on radar monitoring by ATC units:

Lateral Deviations

- i. a deviation of 15NM or more from track centreline based on radar observations;

Longitudinal Deviations

- i. where time separation is applied by ATC - when the reported separation based on ATC verified pilot estimates varies by 3 minutes or more from the expected separation at the reporting point; or
- ii. where a distance based standard is applied by ATC based on ADS, radar observation or RNAV distance reports - when the distance varies by 10NM or more from the expected distance.

3.4.2 ATC will advise the pilot-in-command when such deviations are observed and implement the required investigation procedures.

3.4.3 The ATC authority will investigate the causes of such deviations in conjunction with the aircraft operator and the State of Registry, or the State of the Operator, as applicable.

3.5 SEPARATION MINIMA

3.5.1 Lateral Separation Minima

- a. 60NM lateral separation minima will be applied between aircraft which are approved for RNP 10, operating at or above FL290, on RNAV routes L644 and M772.
- b. 50NM lateral separation minima will be applied between aircraft which are approved for RNP 10 operations on RNAV routes L625, L642, L649, M635, M767, M771, M774, N884 and N892.
- c. 23NM lateral separation minima will be applied between aircraft which are approved for RNP 4 operations on RNAV routes M767 and N884.
- d. When an aircraft not meeting the RNP 10 navigation requirements is approved to operate at or above FL290, on the ATS routes shown in paragraph 3.1, vertical separation shall be applied with aircraft operating on adjacent routes.

3.5.2 Longitudinal Separation

- a. 80NM RNAV or 10 minutes (or less) Mach Number Technique (MNT) separation minima may be applied between aircraft in situations where DCPC could not be maintained or when RCP240 / RSP180 performance requirement could not be complied.

Note: The maximum ADS-C periodic reporting interval of 12 minutes shall be used for RNP 4 approved aircraft.

- b. 50NM longitudinal separation may be applied between RNP10 approved aircraft on RNAV routes L642, L762, M635, M767, M771, M774 and N884 which either LOGON to CPDLC or are within VHF radio range.
- c. 30NM longitudinal separation may be applied between RNP 4 approved aircraft on RNAV routes M767 and N884 which are LOGON to CPDLC.

3.6 OPERATORS' PROCEDURES

3.6.1 The operator shall ensure in-flight procedures, crew manuals and training programmes are established in accordance with RNP 10 or RNP 4 navigation requirements.

3.7 CONTINGENCY PROCEDURES (including WEATHER DEVIATION)

3.7.1 Contingency procedures, including weather deviation, shall be in accordance with the provisions contained in ENR 1.8 paragraphs 1 and 6.

4 NO-PRE-DEPARTURE CO-ORDINATION (NO PDC) PROCEDURES

4.1 INTRODUCTION

← 4.1.1 No Pre-Departure Co-ordination (No PDC) procedures apply to flights departing from airports within Bangkok, Hanoi, Ho Chi Minh, Hong Kong, Jakarta, Kota Kinabalu, Kuala Lumpur, Manila, Phnom Penh, Sanya, Singapore, Taipei, Ujung Pandang and Vientiane FIRs operating on RNAV and ATS routes over the South China Sea.

4.1.2 No Pre-Departure Co-ordination (No PDC) levels and FPL route shall be omitted in content of ATC clearance for departures from Singapore Changi Airport on ATS routes A457, B466 and B469/M751 to destinations in Peninsular Malaysia and Thailand, as well as to Medan Polonia.

4.2 NO PDC FLIGHT LEVEL ALLOCATION

4.2.1 Flight Level Allocation Scheme (FLAS) for Western Pacific / South China Sea Area:

ATS Route	No-PDC Flight Levels (Other levels available with prior approval)	Remarks
G334	Eastbound - FL250, FL270 Westbound - FL260, FL280	
G580	Eastbound - FL270, FL290, FL330 Westbound - FL280, FL300, FL340	
L517	FL280, FL300, FL340	
L625	FL310, FL320, FL350, FL360, FL390, FL400	
L642	FL310, FL320, FL350, FL360, FL390, FL400	
L644	Southbound - FL330, FL410	
B469 / M751	FL280, FL300, FL320, FL340, FL360, FL380, FL400	For flights to/from airports within Bangkok FIR
M753	Northbound - FL260, FL300, FL380 Southbound - FL270, FL330	
M754	Northbound - FL300, FL340, FL380 Southbound - FL290, FL330, FL370, FL410	
M758	Eastbound - FL270, FL290, FL330 Westbound - FL280, FL300, FL340	
M761	Eastbound - FL270, FL290, FL330 Westbound - FL280, FL300, FL340	
M767	FL310, FL320, FL350, FL360, FL390, FL400	
M768	Eastbound - FL270, FL330, FL410 Westbound - FL300, FL380	
M771	FL310, FL320, FL350, FL360, FL390, FL400	
M772	Northbound - FL300, FL380	
N875	Eastbound - FL290, FL330, FL370 Westbound - FL300, FL340, FL380	
N884	FL310, FL320, FL350, FL360, FL390, FL400	
N891	Northbound - FL260, FL300, FL380 Southbound - FL330	
N892	FL310, FL320, FL350, FL360, FL390, FL400	

- 4.2.2 FLAS for Large Scale Weather Deviations (LSWD) in Western Pacific / South China Sea Area as applicable by Singapore ACC:

Flight Level Allocation (LSWD)	ATS Route and Direction of Flight					
	L642	M771	N892	L625	N884	M767
	SW	NE	SW	NE	NE	SW
410						
400	400		400			400
390		390		390	390	
380						
370						
360	360		360			360
350		350		350	350	
340						
330						
320	320		320			320
310		310		310	310	
300						
290						

- 4.2.3 Aircraft requesting FL280, FL300 and FL320 on ATS route L759, L515/M770, N571, N571/N877, P628 and P574 will be cleared to FL280. Succeeding aircraft on the same route will be cleared to FL280 with 10 minutes longitudinal separation provided there is no closing speed with the preceding aircraft. Additional longitudinal separation as appropriate shall be provided by ATC for the faster aircraft following a slower aircraft on the same route.
- 4.2.4 For aircraft on N571 or N571/ N877, the first aircraft from Singapore or Kuala Lumpur to be over GUNIP can expect its requested flight level.
- 4.2.5 For aircraft on M770, the first aircraft from Singapore or Kuala Lumpur to be over the Kuala Lumpur / Bangkok FIR boundary can expect its requested flight level.
- 4.2.6 For aircraft on L759, the first aircraft from Singapore or Kuala Lumpur to be over the Kuala Lumpur / Bangkok FIR boundary can expect its requested flight level.
- 4.2.7 For aircraft on P628, the first aircraft from Singapore or Kuala Lumpur to be over VPL can expect its requested flight level.
- 4.2.8 For aircraft going beyond Medan on ATS route L762, FL280 and FL300 may be assigned. Succeeding aircraft on the same route will be cleared to FL280 or FL300 with 10 minutes longitudinal separation provided there is no closing speed with the preceding aircraft. Additional longitudinal separation as appropriate shall be provided by ATC for the faster aircraft following a slower aircraft on the same route.

5 STRATEGIC LATERAL OFFSET PROCEDURES

5.1 INTRODUCTION

- 5.1.1 Studies and safety analyses conducted by the ICAO Separation and Airspace Safety Panel (SASP) have shown that the application of a strategic lateral offset by aircraft from route centre line would result in an overall increase in safety of operations in remote and oceanic airspace.

5.2 STRATEGIC LATERAL OFFSETS IN EN-ROUTE AIRSPACE

- 5.2.1 Offsets may only be applied outside surveillance cover in en-route airspace within the Singapore FIR.
- 5.2.2 Offsets may only be applied by aircraft with automatic offset tracking capability.
- 5.2.3 The following requirements may apply to the use of the offset:
- The decision to apply a strategic lateral offset is the responsibility of the flight crew;
 - The offset shall be established at a distance of one or two nautical miles to the right of the centre line relative to the direction of flight. Offsets are not to exceed two nautical miles right of centre line;
 - The strategic lateral offset procedure has been designed to include offsets to mitigate the effects of wake turbulence of preceding aircraft. If wake turbulence needs to be avoided, offsets to the right of the centreline relative to the direction of flight in tenths of a nautical mile up to a maximum of 3.7km (2nm) shall be used.

Pilots may contact other aircraft on the air to air frequency, 123.45MHz, as necessary, to coordinate the best wake turbulence offset option. As noted below, it is not necessary to notify air traffic control of approved offsets;

- d. In airspace where the use of lateral offsets has been authorized, ATC clearance is not required for this procedure and pilots are not required to inform ATC that an offset is being applied;
- e. Position reports are based on the current ATC clearance and not the exact coordinates of the offset position.

An example of a position report made by a pilot when passing reporting point TODAM while being offset from track is:

“Singapore Radio, Singapore 871, position TODAM 0930 Flight Level 380, estimate.....etc”.

6 WEATHER DEVIATION PROCEDURES IN THE SINGAPORE FIR AND AIRSPACE WHERE ATS IS PROVIDED BY SINGAPORE (SEE ENR 2.1)

6.1 GENERAL

Note.- The following procedures are intended for deviations around adverse meteorological conditions.

- 6.1.1 Modern ATC radar equipment are normally designed to suppress weather clutter and ATC may not always be aware of its presence.
- 6.1.2 ATC may pass observed weather information that appears likely to affect the pilot's flight and advise if a detour will result in the aircraft leaving controlled airspace. The pilot will be responsible for deciding whether to accept a detour into uncontrolled airspace.
- 6.1.3 If the pilot intends to detour a storm centre observed on his radar display, the pilot shall, obtain clearance from ATC for his proposed action. This is to ensure that separation which ATC may be providing to other aircraft is not prejudiced.
- 6.1.4 The following procedures are intended to enhance ICAO Regional Supplementary Procedures (DOC 7030). However, it must be recognised that all possible circumstances cannot be covered. The pilot's judgement shall ultimately determine the sequence of actions taken and ATC shall render all possible assistance.

6.2 OBTAINING ATC PRIORITY WHEN WEATHER DEVIATION IS REQUIRED

- 6.2.1 When weather deviation is required, the pilot should initiate communications with ATC via voice or CPDLC. A rapid response may be obtained by either:
 - a. stating “WEATHER DEVIATION REQUIRED” to indicate that priority is desired on the frequency and for ATC response; or
 - b. requesting a weather deviation using a CPDLC lateral downlink message.
- 6.2.2 When necessary, the pilot should initiate the communications using the urgency call “PAN PAN” (preferably spoken three times) or by using a CPDLC urgency downlink message to alert all listening parties of a special handling condition which requires ATC priority for issuance of a clearance or assistance.

6.3 ACTIONS TO BE TAKEN WHEN CONTROLLER-PILOT COMMUNICATIONS ARE ESTABLISHED

- 6.3.1 When two-way pilot-controller communications are in effect, the pilot should notify ATC and request clearance to deviate from track or ATS route, advising, when possible, the extent of the deviation requested. The flight crew will use whatever means are appropriate (i.e. voice and/or CPDLC) to communicate during a weather deviation.

Note.- Pilots are advised to contact ATC as soon as possible with requests for clearance in order to provide adequate time for the request to be assessed and acted upon.

- 6.3.2 After communicating with ATC, ATC will take one of the following actions:
 - a. if there is no conflicting traffic in the lateral dimension, ATC shall issue clearance to deviate from track;
 - b. if there is conflicting traffic in the lateral dimension, ATC shall separate aircraft by establishing vertical separation and issue a clearance to deviate from track;
 - c. if there is conflicting traffic in the lateral dimension, and ATC is unable to establish vertical separation, ATC shall advise the pilot and provide information on all other aircraft with which the aircraft could potentially conflict.

- 6.3.3 The pilot shall either:
- comply with the ATC clearance issued; or
 - if ATC is unable to issue a revised clearance, the pilot shall evaluate the circumstances of the situation and advise ATC of intentions before executing the procedures detailed in paragraph 6.4. ATC will issue essential traffic information to all affected aircraft.

6.4 ACTIONS TO BE TAKEN IF A REVISED ATC CLEARANCE CANNOT BE OBTAINED

- 6.4.1 If the aircraft is required to deviate from track or ATS route to avoid adverse meteorological conditions and a revised ATC clearance cannot be obtained, the pilot shall take the following actions:
- if possible, deviate away from an organized track or ATS route system;
 - establish communications with and alert nearby aircraft by broadcasting on 121.5MHz, at suitable intervals: (or, on 123.45MHz as a backup inter-pilot air-to-air frequency);
 - aircraft identification;
 - flight level;
 - position (including ATS route designator or the track code); and
 - intentions.
 - watch for conflicting traffic both visually and by reference to ACAS (such as TCAS, if equipped);
 - turn on all aircraft exterior lights (commensurate with appropriate operating limitations);
 - for deviations of less than 5.0 NM from the originally cleared track or ATS route, remain at a level assigned by ATC;
 - for deviations greater than, or equal to 5.0 NM from the originally cleared track or ATS route, when the aircraft is approximately 5.0 NM from track, initiate a level change in accordance with the following table:

Originally cleared track or ATS route centreline	Deviations greater than 5NM	Level change
EAST (000-179 magnetic)	LEFT RIGHT	DESCEND 300ft CLIMB 300ft
WEST (180-359 magnetic)	LEFT RIGHT	CLIMB 300ft DESCEND 300ft

- if the pilot receives clearance to deviate from cleared track or ATS route for a specified distance and, subsequently, requests, but cannot obtain a clearance to deviate beyond that distance, the pilot should apply an altitude offset in accordance with the table above before deviating beyond the cleared distance; and
- when returning to track or ATS route, be at its assigned flight level when the aircraft is within approximately 5.0 NM of the centreline.

Note.- If, as a result of actions taken under the provisions of 6.4.1, the pilot determines that there is another aircraft at or near the same flight level with which a conflict may occur, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.

- 6.4.2 If contact was not established prior to deviating, continue to attempt to contact ATC to obtain a clearance. If contact was established, continue to keep ATC advised of intentions and obtain essential traffic information.
- 6.4.3 The pilot shall inform ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to its cleared route.

7 AIR TRAFFIC MANAGEMENT CONTINGENCY PLAN

7.1 INTRODUCTION

- ← 7.1.1 The Air Traffic Management (ATM) Contingency Plan for Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) has been developed to fulfil the requirements of the ICAO Standards and Recommended Practices contained in Annex 11 and the Regional Supplementary Procedures (Doc 7030). In the event of partial or total disruption to the provision of Air Traffic Services (ATS) and / or the related support services in Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1), the ATM Contingency Plan referred to in this section shall be activated to ensure the continued safety of air navigation of aircraft operating through the affected airspace.

- 7.1.2 However, this contingency plan does not address arrangements for aircraft arriving and departing at Singapore airports. Aircraft departing or landing at Changi operating within 60NM from Singapore will be subjected to contingency procedures stated in ENR 1.8 paragraphs 1.5, 1.6, 1.7 and 1.8.

7.1.3 This ATM Contingency Plan provides:

- a. the contingency routes structure using existing published airways to enable transit through the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) and
- b. the associated Air Traffic Control (ATC) procedures to support the contingency plan.

7.1.4 As and where dictated by circumstances, aircraft planning to operate through Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) that have not yet departed may be temporarily suspended until a full assessment of the prevailing conditions has been determined and sufficient air traffic services restored.

7.1.5 Long-haul international aircraft and special operations (e.g. Search and Rescue (SAR), State aircraft, humanitarian flights, etc.) shall be afforded priority for levels at FL290 and above. Aircraft operators that operate domestic and regional flights should plan on the basis that FL290 and above may not be available.

7.1.6 Aircraft operators may elect to avoid the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) by using ATS routes outside of Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1).

7.2 REDUCED ATS AND PROVISION OF FLIGHT INFORMATION SERVICES (FIS)

7.2.1 During the period where the contingency arrangements are in place, ATS including ATC services may not be available, a NOTAM will be issued providing the relevant information. The contingency plan provides for limited flight information and alerting services to be provided by Singapore ACC.

7.2.2 FIS and flight monitoring will be provided by the designated ATS authorities for the adjacent FIRs on the contingency routes that enter their respective FIRs.

7.2.3 During the early stages of a contingency event, ATC may be overloaded and tactical action may be taken to re-clear aircraft on alternative routes not included in this Plan.

← 7.2.4 In the event that ATS cannot be provided in the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) a NOTAM shall be issued indicating the following:

- a. time and date on the commencement of the contingency measures;
- b. airspace available for aircraft operations and airspace to be avoided;
- c. details of the facilities and services available or not available and any limits on ATS provision, including an expected date of restoration of services if available;
- d. information on the provisions made for alternative services;
- e. applicable ATS routes, AIP-published contingency routes, or tactically defined contingency routes;
- f. any special procedures to be complied by neighbouring ATS units not covered by this Plan;
- g. any special procedures to be complied by pilots; and
- h. any other details that aircraft operators may find useful with respect to the disruption and actions taken.

7.2.5 In the event that the Singapore International NOTAM Office is unable to issue the NOTAM, the alternate International NOTAM Office will take action to issue the contingency NOTAM upon notification by CAAS.

7.3 AIRCRAFT SEPARATION AND SPACING

7.3.1 Aircraft separation criteria, where applicable, will be in accordance with the ICAO Procedures for Air Navigation Services - Air Traffic Management (PANS-ATM, Doc 4444) and the Regional Supplementary Procedures (Doc 7030).

7.3.2 The longitudinal separation / spacing will be 15 minutes. However, this may be reduced to 10 minutes in conjunction with application of the Mach number technique where authorized by CAAS and the agreed ATS coordination with the adjacent ATS authority.

7.3.3 The contingency route structure provides for lateral separation / spacing of 100NM. In cases where the lateral spacing of contingency routes is less than 100NM, a minimum vertical separation of 1000 feet will be applicable.

7.4 PRIORITY FOR FLIGHT LEVELS

7.4.1 Where possible, aircraft on long-haul international flights shall be afforded priority for cruising levels assigned in accordance with the flight level allocation scheme as specified in paragraph 7.10.

7.5 AIRSPACE CLASSIFICATIONS

7.5.1 Depending on the degree of disruption, airspace classifications may be changed to reflect the reduced level of services. Changes to airspace classification will be notified via NOTAM.

7.6 AIRCRAFT POSITION REPORTING

- 7.6.1 Beyond VHF coverage, Automatic Dependent Surveillance - Contract (ADS-C) shall replace any requirement for voice position reporting to ATC for suitably equipped aircraft and in this case Controller-Pilot Data Link Communications (CPDLC) or HF will be the secondary means of communication. When CPDLC has been authorised for use by the relevant ATC authority, this will become the primary means of communication while HF will act as the secondary means of communication. If means of communication (i.e. ADS-C, CPDLC, HF, VHF) are not available, aircraft operators shall comply with the communications procedures as stated in paragraph 7.9.
- 7.6.2 In the event that communication with the appropriate ATS authority could not be established, aircraft operators may apply Traffic Information Broadcast by Aircraft (TIBA) procedures in the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) as outline in paragraph 7.11 on 121.5MHz.

7.7 EXCLUSIONS

- 7.7.1 VFR flights shall not operate in the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) during contingency operations, except for State aircraft, Medevac flights, and any other aircraft as authorised by CAAS.

7.8 PILOT AND OPERATOR PROCEDURES

7.8.1 Filing of flight plans

- 7.8.1.1 Flight planning requirements detailed in AIP Singapore continue to apply during contingency operations, except where modified by the contingency ATS routes and flight level allocation scheme specified by ATC and / or in NOTAM.
- 7.8.1.2 Airspace users are expected to familiarize themselves with the Contingency Plan of the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) and the activation times. For aircraft intending to operate in areas during periods when the Contingency Plan is activated, the operators shall plan the flight to conform to the requirements of Contingency Plan.
- 7.8.1.3 The flight planning requirements during contingency periods will be in accordance to ICAO Annex 2 Chapter 3 and DOC 4444 Chapter 4 and Appendix 2. Additional information, will, however, be required, to indicate that the aircraft will operate in airspace where the Contingency Plan is active.

7.8.2 Overflight approval

- 7.8.2.1 Airspace users must obtain overflight approval from CAAS prior to operating aircraft through the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1). During the period of activation of this Contingency Plan, the adjacent ATS authority will provide normal ATC clearances for aircraft to enter Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1). The adjacent ATS authority is not responsible for coordination or provision of overflight clearances for Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1). The airspace users must ensure any required overflight approval has been obtained.

7.8.3 Pilot operating procedures

- 7.8.3.1 Pilots will continue to make or broadcast routine position reports in line with normal ATC procedures.
- 7.8.3.2 Pilots of aircraft operating in the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) during contingency operations shall comply with the following procedures:
- a. all aircraft proceeding along the ATS routes established in this Contingency Plan will comply with the instrument flight rules (IFR) and will be assigned a flight level in accordance with the flight level allocation scheme applicable to the route(s) being flown as specified in paragraph 7.10;
 - b. aircraft are to flight plan using the Contingency Routes specified in paragraph 7.10, according to their airport of origin and destination;
 - c. aircraft are to operate as close as possible to the centre line of the assigned contingency route;
 - d. a continuous communications watch shall be maintained on the specified contingency frequency as specified in paragraph 7.10;
 - e. aircraft position reports and other information as necessary shall be broadcast in accordance with TIBA procedures defined in paragraph 7.11;
 - f. aircraft navigation and anti-collision lights shall be displayed;
 - g. except in cases of emergency or for reasons of flight safety, pilots are to maintain the last assigned flight level, MACH number and SSR transponder code during their entire flight within Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1). If no transponder code has been assigned, aircraft shall squawk Code 2000.

- h. aircraft are to reach the flight level last assigned by the responsible ACC at least 10 minutes before entering the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) or as otherwise instructed by the ATC unit acting in accordance with the Operational Contingency Arrangement;
- i. pilots are to contact the next adjacent ACC as soon as possible, and in any event not less than ten (10) minutes before the estimated time of arrival over the relevant exit point from the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1);
- j. pilots are to strictly adhere to the ICAO Traffic Information Broadcasts by Aircraft (TIBA) procedures, reproduced in paragraph 7.11, on the specified VHF and HF frequencies listed in paragraph 7.10. When necessitated by emergency conditions or flight safety requirements, pilots are to transmit blind on these frequencies, their current circumstances and the commencement and completion of any climb and descent or deviation from the cleared contingency route;
- k. whenever emergencies and / or flight safety reasons make it impossible to maintain the flight level assigned for transit of Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1), pilots are to comply with the special procedures for in-flight contingencies set out in ENR 1.8 paragraph 1.5. If the deviation brings the aircraft out of Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1), pilots are to immediately inform the ACC unit responsible for that airspace. Pilots are to broadcast details of any level change including aircraft identification, aircraft position and route, vacated flight level, intended flight level; flight level passed and cruising flight level on 121.5MHz;
- l. pilots are to maintain own longitudinal separation of 15 minutes from preceding aircraft at the same cruising level. However, this may be reduced to 10 minutes in conjunction with application of the Mach number technique where authorized by CAAS and the agreed ATS coordination with the adjacent ATS authority; and
- m. not all operational circumstances can be addressed by this Contingency Plan and pilots are to maintain a high level of alertness when operating in the contingency airspace and take appropriate action to ensure safety of aircraft.

7.8.4 **Interception of civil aircraft**

- 7.8.4.1 Aircraft operators must be familiar with international intercept procedures contained in ICAO Annex 2 - Rules of the Air, paragraph 3.8 and Appendix 2, Sections 2 and 3.
- 7.8.4.2 Pilots are to comply with instructions given by the pilot of the intercepting aircraft. In such circumstances, the pilot of the aircraft being intercepted shall broadcast information on the situation.
- 7.8.4.3 If circumstances leading to the closure of the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) where no contingency routes are available, aircraft will be required to keep clear of Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1). As much warning as possible will be provided by the appropriate ATS authorities in the event of the complete closure of airspace.
- 7.8.4.4 Pilots shall continuously guard the VHF emergency frequency 121.5MHz and shall operate their transponder at all times during flight, regardless of whether the aircraft is within or outside airspace where secondary surveillance radar (SSR) is used for ATS purposes. Transponder should be set on the last discrete code assigned by ATC or select Code 2000 if no code was assigned.

7.9 **COMMUNICATION PROCEDURES**

7.9.1 **Degradation of Communication - Pilot Radio Procedures**

- 7.9.1.1 When operating within the contingency airspace, pilots should use normal radio communication procedures where ATS services are available. Where limited or no ATS is available, communications shall be conducted in accordance with the procedures in this Plan or as otherwise notified by NOTAM.
- 7.9.1.2 If communications are lost unexpectedly on the normal ATS frequencies, pilots shall try the next applicable frequency, e.g. if en-route contact is lost, pilots shall try the next appropriate frequency (the next normal handover frequency). Pilots should also consider attempting to contact ATC on the last frequency where two-way communication had been established. In the absence of communication with ATC, the pilot shall continue to make routine position reports on the assigned frequency, and also broadcast positions in accordance with the TIBA procedures in paragraph 7.11.

7.9.2 **Communication frequencies**

- 7.9.2.1 A list of frequencies to be used for the contingency routes and the ATS units providing FIS and air-ground communication monitoring for the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) is detailed in paragraph 7.10.

7.10 CONTINGENCY ROUTES**7.10.1 Between Singapore and Manila FIR**

7.10.1.1 The following table shows the Contingency Routes (CR) Structure, Flight Level Allocation Scheme (FLAS) and Transfer of Control and Communication (TOC) between Singapore and Manila FIR.

CR	ATS Route	Direction	FLAS	ACC	Transfer of Communication (TOC)	Remarks
CRS-3	N884 (075400N 1122000E - LAXOR)	East	FL310 FL350	Manila ACC	At 075400N 1122000E, contact Manila ACC: - ADS/CPDLC: Logon RPHI - HF: 5655 / 8942 - VHF : 118.9 (LAXOR)	Aircraft operators may choose to avoid the Singapore FIR by using alternate ATS routes in other FIRs.
CRM-3	N884 (LAXOR - CAB)	East	FL310 FL350 FL390	Kobe ACC	At CAB, contact Tokyo Radio: - HF: 8903 / 4666 - VHF: 123.9 (LEBIX)	Aircraft operators may choose to avoid the Manila FIR by using alternate ATS routes in other FIRs.
CRM-4	M767 (JOM - TEGID)	West	FL320 FL360 FL400	Singapore ACC	At JOM, contact Singapore ATC: - ADS/CPDLC: Logon WSJC - HF: 5655 / 8942	Aircraft operators may choose to avoid the Manila FIR by using alternate ATS routes in other FIRs.
N/A	M772	N/A	N/A	N/A	Not applicable. M772 will be suspended. No flight planning is allowed.	N/A

7.10.2 Between Singapore and Ho Chi Minh FIR

7.10.2.1 The following table shows the Contingency Routes (CR) Structure, Flight Level Allocation Scheme (FLAS) and Transfer of Control and Communication (TOC) between Singapore and Ho Chi Minh FIR.

CR	ATS Route	Direction	FLAS	ACC	Transfer of Communication (TOC)	Remarks
CRS-1	L642 (ESPOB - 060000N 1045600E)	West	FL360 FL400	Ho Chi Minh ACC	At 060000N 1045600E, contact Kuala Lumpur ATC: - VHF: 132.6 - HF: 5655 / 8942	International operators may choose to avoid the Singapore FIR by using alternate ATS routes in other FIRs.
CRS-2	M771 (060000N 1060900E - DUDIS)	East	FL350 FL390	Ho Chi Minh ACC	At 060000N 1060900E, contact Ho Chi Minh ATC: - ADS / CPDLC: Logon VVHM - VHF: 133.05 / 120.9 - HF: 5655 / 8942	International operators may choose to avoid the Singapore FIR by using alternate ATS routes in other FIRs.
CRS-3	N884 (060000N 1095600E - 075400N 1122000E)	East	FL310 FL350	Ho Chi Minh ACC	At 060000N 1095600E, contact Ho Chi Minh ATC: - ADS / CPDLC: Logon VVHM - VHF: 133.05 / 120.7 - HF: 5655 / 8942 At 075400N 1122000E, contact Manila ATC: - ADS / CPDLC: Logon RPHI - VHF: 118.9 (LAXOR) - HF: 5655 / 8942	International operators may choose to avoid the Singapore FIR by using alternate ATS routes in other FIRs.

CR	ATS Route	Direction	FLAS	ACC	Transfer of Communication (TOC)	Remarks
CRS-4	M768 (064600N 1121500E - AKMON)	East	FL330	Ho Chi Minh ACC	At 064600N 1121500E, contact Kota Kinabalu ATC: - ADS / CPDLC: Logon WBFC - VHF: 126.1	International operators may choose to avoid the Singapore FIR by using alternate ATS routes in other FIRs.
		West	FL380	Ho Chi Minh ACC	At 064600N 1121500E, contact Ho Chi Minh ATC: - ADS / CPDLC: Logon VVHM - VHF: 133.05 / 120.7	
CRH-1	N891 (XONAN - IGARI)	North	FL300	Hanoi ACC	At IGARI, contact Hanoi ACC: - VHF: 120.9	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.
		South	FL330	Hanoi ACC	At IGARI, contact Singapore ATC: - ADS / CPDLC: Logon WSJC - VHF: 134.35 - HF: 5655 / 8942	
CRH-2	M753 (OSOTA - IPRIX)	North	FL270	Hanoi ACC	At IPRIX, contact Hanoi ACC: - VHF: 120.9	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.
		South	FL260	Hanoi ACC	At IPRIX, contact Singapore ATC: - ADS / CPDLC: Logon WSJC - VHF: 134.35 - HF: 5655 / 8942	
CRH-3	R468 / M768 (SAPEN - TSH - AKMON)	East	FL270	Hanoi ACC	At AKMON, contact Singapore ATC: - ADS / CPDLC: Logon WSJC - HF: 5655 / 8942	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.
		West	FL380	Hanoi ACC	At AKMON, contact Hanoi ACC: - VHF: 133.05 - HF: 5655 / 8942	
CRH-4	L642 (EXOTO - ESPOB)	West	FL310 FL320 FL390 FL400	Hanoi ACC	At ESPOB, contact Singapore ATC: - ADS / CPDLC: Logon WSJC - VHF: 134.35 - HF: 5655 / 8942	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.
CRH-5	M771 (DUDIS - DONDA)	East	FL310 FL320 FL390 FL400	Hanoi ACC	At DUDIS, contact Hanoi ACC: - VHF: 133.05 / 120.7 - HF: 5655 / 8942	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.
CRH-6	N892 (MIGUG - MELAS)	West	FL310 FL320 FL390 FL400	Hanoi ACC	At MELAS, contact Singapore ATC: - ADS / CPDLC: Logon WSJC - VHF: 134.35 - HF: 5655 / 8942	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.
CRH-7	L625 (AKMON - ARES)	East	FL310 FL320 FL390 FL400	Hanoi ACC	At AKMON, contact Hanoi ACC: - VHF: 133.05 / 120.7 - HF: 5655 / 8942	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.

7.10.3 Between Singapore and Kota Kinabalu FIR

7.10.3.1 To be developed

7.10.4 Between Singapore and Kuala Lumpur FIR

7.10.4.1 To be developed

7.11 TRAFFIC INFORMATION BROADCASTS BY AIRCRAFT (TIBA)**7.11.1 Introduction and applicability of broadcasts**

7.11.1.1 Traffic information broadcasts by aircraft are intended to permit reports and relevant supplementary information of an advisory nature to be transmitted by pilots on a designated VHF radiotelephone (RTF) frequency for the information of pilots of other aircraft in the vicinity.

7.11.1.2 TIBAs shall be introduced only when necessary and as a temporary measure.

7.11.1.3 The broadcast procedures shall be applied in designated airspace where:

- a. there is a need to supplement collision hazard information provided by air traffic services outside controlled airspace; or
- b. there is a temporary disruption of normal air traffic services.

7.11.1.4 Such airspaces shall be identified by the States responsible for provision of air traffic services within these airspaces, if necessary with the assistance of the appropriate ICAO Regional Office(s), and duly promulgated in aeronautical information publications or NOTAM, together with the VHF RTF frequency, the message formats and the procedures to be used. Where, in the case of paragraph 7.11.1.3 a., more than one State is involved, the airspace should be designated on the basis of regional air navigation agreements and promulgated in Doc 7030.

7.11.1.5 When establishing a designated airspace, dates for the review of its applicability at intervals not exceeding 12 months should be agreed by the appropriate ATS authority(ies).

7.11.2 Details of broadcastsVHF RTF frequency to be used

7.11.2.1 The VHF RTF frequency to be used shall be determined and promulgated on a regional basis. However, in the case of temporary disruption occurring in controlled airspace, the States responsible may promulgate, as the VHF RTF frequency to be used within the limits of that airspace, a frequency used normally for the provision of air traffic control service within that airspace.

7.11.2.2 Where VHF is used for air-ground communications with ATS and an aircraft has only two serviceable VHF sets, one should be tuned to the appropriate ATS frequency and the other to the TIBA frequency.

Listening watch

7.11.2.3 A listening watch shall be maintained on the TIBA frequency 10 minutes before entering the designated airspace until leaving this airspace. For an aircraft taking off from an aerodrome located within the lateral limits of the designated airspace, listening watch should start as soon as appropriate after take-off and be maintained until leaving the airspace.

Time of broadcasts

7.11.2.4 A broadcast shall be made:

- a. 10 minutes before entering the designated airspace or, for a pilot taking off from an aerodrome located within the lateral limits of the designated airspace, as soon as appropriate after take-off;
- b. 10 minutes prior to crossing a reporting point;
- c. 10 minutes prior to crossing or joining an ATS route;
- d. at 20-minute intervals between distant reporting points;
- e. 2 to 5 minutes, where possible, before a change in flight level;
- f. at the time of a change in flight level; and
- g. at any other time considered necessary by the pilot.

Forms of broadcast

7.11.2.5 The broadcasts other than those indicating changes in flight level, i.e. the broadcasts referred to in paragraph 7.11.2.4 a., b., c., d. and g., should be in the following form:

ALL STATIONS (necessary to identify a traffic information broadcast)

(call sign)

FLIGHT LEVEL (number) (or CLIMBING* TO FLIGHT LEVEL (number))

(direction)

(ATS route) (or DIRECT FROM (position) TO (position))

POSITION (position**) AT (time)

ESTIMATING (next reporting point, or the point of crossing or joining a designated ATS route) AT (time)

(call sign)

FLIGHT LEVEL (number) (direction)

Fictitious example:

"ALL STATIONS WINDAR 671 FLIGHT LEVEL 350 NORTHWEST BOUND DIRECT FROM PUNTA SAGA TO PAMPA POSITION 5040 SOUTH 2010 EAST AT 2358 ESTIMATING CROSSING ROUTE LIMA THREE ONE AT 4930 SOUTH 1920 EAST AT 0012 WINDAR 671 FLIGHT LEVEL 350 NORTHWEST BOUND OUT"

7.11.2.6 Before a change in flight level, the broadcast (referred to in paragraph 7.11.2.4 e.) should be in the following form:

ALL STATIONS

(call sign)

(direction)

(ATS route) (or DIRECT FROM (position) TO (position))

LEAVING FLIGHT LEVEL (number) FOR FLIGHT LEVEL (number) AT (position and time)

7.11.2.7 Except as provided in paragraph 7.11.2.8, the broadcast at the time of a change in flight level (referred to in paragraph 7.11.2.4 f.) should be in the following form:

ALL STATIONS

(call sign)

(direction)

(ATS route) (or DIRECT FROM (position) TO (position))

LEAVING FLIGHT LEVEL (number) NOW FOR FLIGHT LEVEL (number)
followed by:

ALL STATIONS

(call sign)

MAINTAINING FLIGHT LEVEL (number)

7.11.2.8 Broadcasts reporting a temporary flight level change to avoid an imminent collision risk should be in the following form:

ALL STATIONS

(call sign)

LEAVING FLIGHT LEVEL (number) NOW FOR FLIGHT LEVEL (number)
followed as soon as practicable by:

ALL STATIONS

(call sign)

RETURNING TO FLIGHT LEVEL (number) NOW

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ENR 1.9 AIR TRAFFIC FLOW MANAGEMENT (ATFM)

1 AIR TRAFFIC FLOW MANAGEMENT (ATFM)

1.1 ATFM is a service to complement the safe, orderly and efficient delivery of Air Traffic Services (ATS) by regulating air traffic flow to match the prevailing capacity at a given airport or airspace. Through ATFM, airspace users (AUs) and ATS units (ATSUs) can be made aware of predicted delays so that timely adjustment to operations and flight schedules could be made accordingly. ATFM measure such as Ground Delay Programme (GDP), Minimum Departure Interval (MDI) and Miles- in-Trail (MIT) are some of the methods to achieve the objectives of ATFM as defined in ICAO's Manual on Collaborative ATFM (Doc 9971).

← 1.2 For Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1), ATFM services are provided by Civil Aviation Authority of Singapore (CAAS) from the Singapore ATFM Unit (ATFMU) operating on a 24-hour basis. The services comprise the planning and implementation of ATFM measures to balance demand and capacity. The review of the effectiveness of ATFM measures are carried out through the conduct of post operation analysis. The implementation of ATFM measures will be coordinated with AUs and ATSUs through Collaborative Decision Making (CDM) processes and agreed operating procedures.

2 ATFM OPERATIONS FOR FLIGHTS ARRIVING AT SINGAPORE CHANGI AIRPORT

2.1 Where necessary, ATFM measures will be applied for flights scheduled to arrive at Singapore Changi Airport (WSSS).

2.2 Flights departing from the following airports may be subjected to ATFM measures:

← States/Administrations	Airport
← Cambodia	VDPP, VDSA, VDSV
China	ZGGG, ZGSZ, ZJHK, ZJSY
Hong Kong	VHHH, VMMC
Indonesia	WIII, WADD, WARR
Malaysia	WBGG, WBGR, WBKK, WMKC, WMKI, WMKJ, WMKK, WMKP, WMSA, WMKL
Myanmar	VYMD, VYNT, VYYY
Philippines	RPLL, RPLC, RPVM, RPSP
Republic of Korea	RKSI, RKSS, RKPK, RKPC, RKTN, RKNW
Thailand	VTBS, VTSP, VTBD, VTBU, VTCC, VTCT, VTSB, VTSG, VTSM, VTSS, VTUD
Vietnam	VVTS, VVNB, VVDN, VVCI, VVCR, VVPQ, VVVD, VVVH, VVPB, VVCT, VVDL

2.3 When ATFM measures are applied, the Singapore ATFMU will assign Calculated Take-Off Times (CTOTs) to flights departing from the airports listed in paragraph 2.2 planning to arrive into Singapore Changi Airport.

2.4 AUs and ATSUs are advised to refer to the Air Traffic Flow Management (ATFM) Portal to access CTOTs and/or other pertinent ATFM information via the Civil Aviation Authority Singapore (CAAS) Webpage, link provided: <http://www.caas.gov.sg/e-services/air-traffic-flow-management>

2.5 Compliance to CTOT during the ATFM operation is important, it contributes to the realisation of the ATFM plan. It would assist in the reduction of the need for tactical airborne delay, promoting a safer and more efficient operating environment for AOs and AUs.

2.6 All AUs planning to arrive into WSSS shall:

- i. file and submit FPLs at least 3 hours before the Estimated Off Block Time (EOBT);
- ii. transmit the appropriate ATS messages (CHG / DLA) when the EOBT changes by more than 15 minutes; and
- iii. transmit CNL message if the flight is cancelled after the submission of FPL.

2.7 FPLs and ATS messages shall be addressed to WSJCZQZX.

3 ATFM OPERATIONS FOR FLIGHTS PLANNING TO OPERATE WITHIN THE SINGAPORE FIR AND AIRSPACE WHERE ATS IS PROVIDED BY SINGAPORE (SEE ENR 2.1)

3.1 The Singapore ATFMU may implement ATFM measures to facilitate ATC of flow restrictions originated by downstream ATSUs, with the aim to provide a higher level of predictability for AUs and affected upstream ATSUs when operating in the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1). For example, flow restriction on a given ATS route in a form of Minutes-in- trail MINIT at downstream segments

would be converted into CTOT, and/or Calculated Time Over (CTO) at a given waypoint within the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1).

- 3.2 Procedures for flight plan submission for such ATFM facilitation would be coordinated tactically by the Singapore ATFMU with AUs and affected upstream ATSUs. The transmit of the appropriate ATS messages would take reference from para 2.6 in the above.

Note: In general, Singapore ATFMU would request for FPL to be filed and submitted within 1 hour from the notification of the activation of ATFM measure.

- 3.3 FPLs and ATS messages should be addressed to WSJCZQZX.

4 SINGAPORE ATFMU CONTACT INFORMATION AND WEB CONFERENCE

- 4.1 When ATFM measure are implemented, Singapore ATFMU will open a CDM channel for AUs and affected ATSUs through an active web conferencing facilities and ATFM helpdesk thereafter to facilitate operational queries from AUs relating to the ATFM measure.

- 4.2 The contact details of the Singapore ATFMU are as follows:

Email: CAAS_ATFMU@caas.gov.sg

Phone: (+65) 62414143, (+65) 62414142

Fax: (+65) 62414034

5 BAY OF BENGAL COOPERATIVE ATFM (BOBCAT)

5.1 INTRODUCTION

- 5.1.1 The States of the ICAO Asia/Pacific Region within the Bay of Bengal, South Asia and Pakistan airspace have implemented an automated Air Traffic Flow Management (ATFM) service under the auspices of the ICAO Bay of Bengal ATS Coordination Group - ATFM Task Force.

5.2 PROVISION OF ATFM SERVICES

- 5.2.1 ATFM services are provided by Aeronautical Radio of Thailand LTD (AEROTHAI) from the Bangkok Air Traffic Flow Management Unit (ATFMU) at Bangkok ACC. ATFM services will be limited to calculation, promulgation and management of mandatory Calculated Take-Off Time (CTOT) and Kabul FIR flight level, ATS route and Calculated Time-Over (CTO) entry waypoint for each affected flight.

- 5.2.2 Singapore ATC retains responsibility for the tactical management of flights that are subject to ATFM. In discharging tactical responsibilities, Singapore ATC will manage non-ATFM compliant flights using delayed pushback and start clearances, non-preferred routes and/or flight levels.

- 5.2.3 The ATFMU utilises the automated web based Bay of Bengal Cooperative ATFM System (BOBCAT) system in meeting its ATFM responsibilities. These responsibilities will be managed in coordination with aircraft operators and Singapore ATC in the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1).

- 5.2.4 The Bangkok ATFMU operates on a 24-hour basis and is responsible for westbound flights entering the Kabul FIR at specified times, flight levels and ATS routes in accordance with paragraph 5.3. The objectives of these ATFM services are to:

- a. reduce ground and en-route delays;
- b. maximise capacity and optimize the flow of air traffic through Kabul FIR;
- c. provide an informed choice of routing and flight level selection;
- d. alleviate unplanned in-flight re-routing and technical stops; and
- e. assist regional Air Navigation Service Providers (ANSPs) in planning for and managing future workload in the light of forecast increased traffic flows through Kabul FIR.

ENR 1.10 FLIGHT PLANNING

1 PROCEDURES FOR SUBMISSION OF A FLIGHT PLAN

1.1 REQUIREMENT FOR SUBMISSION OF A FLIGHT PLAN

1.1.1 The pilot-in-command or airline operator shall submit an ICAO flight plan to ATC via the AFS or the AIM-SG system (accessible by registration at <https://aim-sg.caas.gov.sg>) for the following flights:

- a. Flights on airways, associated holding areas and all other controlled airspaces whether IFR or VFR;
- b. Any flight or portion thereof to be provided with air traffic control service;
- c. Any flight within or into designated areas, or along designated routes to facilitate co-ordination with appropriate military units or with air traffic service units in adjacent States in order to avoid the possible need for interception for the purpose of identification;
- d. Any flight across international borders.

← 1.1.2 The pilot-in-command or the airline operator shall submit details of a functional check/training flight, planned to be conducted in the Seletar aerodrome circuit or in Light Aircraft Training Areas A, B and C, by electronic mail using the "Seletar Functional Check/Training Form" retrievable from webpage: <https://aim-sg.caas.gov.sg>

1.1.3 For a flight that will be operating within Singapore only (except for flights mentioned in paragraph 1.1.2, the pilot-in-command or the operator shall submit the ICAO flight plan using the automated AIM-SG system and to include Military ATC addressee WSARYWYX. If for any reason a flight plan is not approved, the pilot-in-command shall contact RSAF Air Operations Control (AOC) at 67683702 for clarification.

← 1.2 REQUIREMENT FOR SUBMISSION OF A FLIGHT PLAN FOR FUNCTIONAL CHECK FLIGHTS

← 1.2.1 Functional check flights shall be conducted on ATS route G580 between OBGET and NIMIX to minimise disruption to civil scheduled flight movements and to facilitate the test flight operations.

← 1.2.2 A flight plan shall be submitted for a functional check flight at least one hour before departure. The pilot-in-command or the operator shall include in Item 18 of the flight plan 'RMK/TEST FLT APPROVED BY ATC'.

← 1.2.3 The pilot-in-command of the functional check flight shall adhere to ATC instructions at all times. Functional check flight manoeuvres are subject to ATC clearance, real-time coordination and traffic.

← 1.2.4 Procedures for application to conduct functional check flights are provided on GEN 1.2 section 6.

← 1.3 LEAD TIME FOR FILING FLIGHT PLANS AND FLIGHT PLAN ASSOCIATED MESSAGES

1.3.1 Flight plan shall be filed 120 hours, or five days, at the earliest but no later than 60 minutes prior to departure (estimated off-block time).

1.3.2 In the event of a delay of 30 minutes in excess of the estimated off-block time, the flight plan should be amended or a new flight plan submitted and the old flight plan cancelled, whichever is applicable. To indicate a delay to a flight, a DLA or a CHG message may be used depending on the circumstances.

1.3.3 The old flight plan shall be cancelled and a new flight plan shall be submitted when changes are made to any one of the following fields:
7/Aircraft Identification, 15/Route and/or 16/Destination Aerodrome.

1.3.4 A flight plan submitted in flight on HF RTF shall be submitted at least 20 minutes (or if on VHF RTF at least 10 minutes) prior to the intended point of entry into a control zone, control area, advisory area or advisory route.

1.3.5 A pilot-in-command may change from an IFR flight plan to a VFR flight plan by reporting "CANCELLING MY IFR FLIGHT" when weather conditions indicate that the remainder of the flight can be conducted under VFR. [However, within Singapore, all flights whether IFR or VFR shall be regulated in accordance with instrument flight rules.] (see note 2 below).

1.3.6 ATC will acknowledge:

"IFR flight cancelled at.....(time)" or

if information is available which indicates the likelihood of IMC prevailing along the route, will notify these conditions as follows:

"Instrument MET conditions reported (or forecast) in the vicinity of....."

Note:

- 1) The fact that pilot flying in VMC does not by itself constitute cancellation of an IFR flight plan.
- 2) Within the Singapore/Johor Airspace Complex and Control Zones all flights are regulated in accordance with IFR separation standards.

1.4 PERSONS ON BOARD (POB)

1.4.1 The pilot-in-command or his representative is required to state the total number of persons on board (POB - i.e. passengers and crew) in the flight plan.

1.5 DATA LINK COMMUNICATION AND SURVEILLANCE

1.5.1 Aircraft using data link communications (see ENR 1.1 section 8) must insert one or more of the following letters in Item 10a of their flight plan to indicate serviceable COM aid equipment and capabilities available:

- J1 CPDLC ATN VDL Mode 2
- J2 CPDLC FANS 1/A HF DL
- J3 CPDLC FANS 1/A VDL Mode A
- J4 CPDLC FANS 1/A VDL Mode 2
- J5 CPDLC FANS 1/A SATCOM (INMARSAT)
- J6 CPDLC FANS 1/A SATCOM (MTSAT)
- J7 CPDLC FANS 1/A SATCOM (Iridium)
- P1 CPDLC RCP 400
- P2 CPDLC RCP 240
- P3 SATVOICE RCP 400
- P4-P9 Reserved for RCP

1.5.2 Aircraft using data link surveillance (see ENR 1.1 section 8) must insert one or more of the following letters in Item 10b of their flight plan to indicate serviceable SUR equipment and capabilities available:

- D1 ADS-C with FANS 1/A capabilities
- G1 ADS-C with ATN capabilities

1.5.3 Additional surveillance equipment or capabilities are to be listed in Item 18 following the indicator SUR/ .

1.6 RNAV APPROVED AIRCRAFT

1.6.1 Aircraft flying on RNAV routes (see ENR 3.2) must be RNAV equipped and should annotate their flight plan as follows:

	Item 10	Item 15	Item 18
RNAV equipment is carried	<p>G (GNSS)</p> <p>I (Inertial Navigation)</p> <p>R (PBN approved) Guidance material in the application of performance based navigation to a specific route segment, route or area is contained in the Performance Based Navigation Manual (Doc 9613).</p>	True Mach NR and FL at entry and exit points	<p>The types of external GNSS augmentation, if any, are specified following the indicator NAV/ and separated by a space.</p> <p>The performance based navigation levels that can be met shall be specified following the indicator PBN/.</p>

1.6.2 Operators of aircraft approved for RNP 10 operations shall include the following information in their flight plan:

Item 10 - "R" where R = PBN approved
Item 18 - PBN/A1 where A1 = RNAV 10 (RNP 10)

1.6.3 Operators of aircraft approved for RNP 4 operations shall include the following information in their flight plan:

Item 10 - "R" where R = PBN approved
Item 18 - PBN/L1 where L1 = RNP 4

1.6.4 Operators of aircraft approved for RNP 1 (P-RNAV) operations shall include the following information in their flight plan:

Item 10 - "R" where R = PBN approved
Item 18 - PBN/O1 where O1 = Basic RNP1 all permitted sensors, or
PBN/O2 where O2 = Basic RNP1 GNSS, or
PBN/O3 where O3 = Basic RNP1 DME/DME, or
PBN/O4 where O4 = Basic RNP1 DME/DME/IRU

1.7 **RVSM AND NON-RVSM APPROVED AIRCRAFT**

1.7.1 Operators of RVSM approved or non-RVSM approved aircraft operating in RVSM airspace (see ENR 1.8 sub-section 1.9 and 1.10) shall annotate their flight plan as follows:

	Item 10	Item 18
RVSM approved aircraft	W	
Non-RVSM approved aircraft		STS/NONRVSM

1.8 **OTHER DOCUMENTARY AND / OR PERMIT REQUIREMENTS**

1.8.1 In addition to the flight planning requirements, all pilots-in-command and aircraft operators should consult the respective AIPs for other documentary and / or permit requirements for flights intending to enter, depart, and / or overfly the sovereign airspaces of States along the planned flight routes.

← 1.8.2 In particular, for Indonesian sovereign airspace within portions of airspace in which Singapore provides Air Traffic Services (ATS) (see ENR 2.1), aircraft operators should also consult AIP Indonesia GEN 1.2 Entry, Transit and Departure of Aircraft at <https://aimindonesia.dephub.go.id> for Indonesia's requirements for flights intending to enter, depart, and/or overfly its sovereign airspace. Please note that this AIP's reference to these requirements is without prejudice to Singapore's legal position on such requirements.

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ENR 1.11 ADDRESSING OF FLIGHT PLAN MESSAGES

- 1 Flight movement messages relating to traffic into or via the Singapore FIR and airspace within the Jakarta FIR where ATS is provided by Singapore (see ENR 2.1) shall be addressed as stated below in order to warrant correct relay and delivery.

Category of Flight (IFR, VFR or both)	Route (Into or via FIR and/or TMA)	Message Address
1	2	3
All flights	Transiting into or via:	
	Singapore FIR (WSJC) and airspace within the Jakarta FIR (WIIF) where ATS is provided by Singapore (see ENR 2.1)	WSJCZQZX
	Inbound to:	
	Singapore Changi Airport (WSSS) Seletar Airport (WSSL) Paya Lebar Airport (WSAP) Tengah Airport (WSAT)	WSJCZQZX
	Outbound from:	
	Singapore Changi Airport (WSSS)	WSSSZPZX
	Seletar Airport (WSSL)	WSSLZPZX
	Paya Lebar Airport (WSAP)	WSAPZPZX
Tengah Airport (WSAT)	WSATZPZX	

Note:

Flight movement messages comprise flight plan messages, amendment messages relating thereto and flight plan cancellation messages (ICAO DOC 4444 - PANS-ATM, Chapter 11, paragraph 11.2.1.1.3 refers).

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ENR 1.14 AIR TRAFFIC INCIDENTS

1 DEFINITION OF AIR TRAFFIC INCIDENTS

- 1.1 An incident is an occurrence other than an accident associated with the operation of an aircraft which affect or could affect the safety of operation.
- 1.2 An incident may be caused by any of the following:
- a. Ground Organisation:
 - i. abnormal function or operation of radio communication or navigational aids, faulty organisation or procedure;
 - ii. personal negligence, incompetence, error or misapplication of procedures or instructions.
 - b. Aircrew - negligence, incompetence, error of judgement, misapplication of procedures or failure to comply with procedures or instructions.
 - c. Aircraft - defects in the aircraft or its equipment.
 - d. Severe meteorological conditions.

2 USE OF AIR TRAFFIC INCIDENT REPORTING FORMS

- 2.1 Pilots shall file all incident reports on the "Air Traffic Incident Report Form" (see pages ENR 1.14-3 to ENR 1.14-6) in order to speed up the process of investigation of the various categories of incidents.

3 AIR TRAFFIC INCIDENT REPORTING PROCEDURES

- 3.1 A pilot should proceed as follows regarding an incident in which he is or has been involved:
- a. during flight, use the appropriate air/ground frequency for reporting an incident of major significance, particularly if it involves other aircraft, so as to permit the facts to be ascertained immediately;
 - b. as promptly as possible after landing submit a completed "Air Traffic Incident Report Form":
 - i. for confirming a report of an incident made initially as in 3.1 a) above, or for making the initial report on such an incident if it had not been possible to report it by radio;
 - ii. for reporting an incident which did not require immediate notification at the time of occurrence.
- 3.2 An initial report made by radio should contain the following information:
- | | | |
|---|---|---|
| A | - | Type of incident, e.g. near collision. |
| F | - | Radio call sign of aircraft making report. |
| J | - | Position, heading or route, true airspeed. |
| K | - | FL, altitude or height, and aircraft altitude. |
| L | - | IMC or VMC. |
| M | - | Time of incident, in UTC. |
| N | - | Description of other aircraft, if relevant. |
| O | - | Brief details of incident, including when appropriate, sighting distance and miss distance. |

- 3.3 The confirmatory report on an incident of major significance initially reported by radio or the initial report on any other incident should be submitted to the Aeronautical Information Services located at Passenger Terminal 1, East, 4th Storey, Room 041-52 on the "Air Traffic Incident Report Form." A copy of the incident report form should also be forwarded to the Co-ordination/Investigation Authority as shown in page ENR 1.14-2 para 5 and the operating company or agency concerned.

← 4 INVESTIGATION

- 4.1 All Incident Reports filed will be thoroughly investigated and the complainant will be notified of the results of the investigation as soon as possible.

5 CO-ORDINATION/INVESTIGATION AUTHORITY

- 5.1 Co-ordination/Investigation Authority responsible for the Co-ordination/Investigation of Near Collision/Infringements, ATC Complaints, Fault Reporting and Post-Flight Information Service:

Co-ordination/Investigation Authority	Area Of Responsibility
← Director-General of Civil Aviation Civil Aviation Authority of Singapore Singapore Changi Airport P O Box 1 Singapore 918141	Within Singapore FIR and airspace where ATS is provided by Singapore. (Refer to pages ENR 2.1-1 to ENR 2.1-5)

6 OTHER REPORTS UNDER ICAO INITIATIVE FOR DATA COLLECTION AND ANALYSIS PURPOSES

6.1 Wake Vortex

← 6.1.1 Pilots experiencing any wake vortex encounters within the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) should report such encounters by filling out the Wake Vortex Encounter Reporting Form and submitting the form to CAAS. The contact address, facsimile and e- mail address can be found on the form.

6.1.2 Alternatively, pilots can submit the report online direct to ICAO at:

<http://www.icao.int/fsix/wakevortexformpilot.html>

7 INDEX OF REPORTING FORMS APPENDED TO THIS SECTION

S/N	Form	Page
1	Air Traffic Incident Report Form	ENR 1.14-3 to ENR 1.14-6
2	Wake Vortex Encounter Reporting Form for Pilots	ENR 1.14-7 to ENR 1.14-8

ENR 2 AIR TRAFFIC SERVICES AIRSPACE**ENR 2.1 FIR, UIR, TMA**

<i>Name</i> <i>Lateral limits</i> <i>Upper limit/Lower limit</i> <i>Class of airspace</i>	<i>Unit</i> <i>providing</i> <i>service</i>	<i>Call sign</i> <i>Languages</i> <i>Area and conditions</i> <i>of use</i> <i>Hr of ser</i>	<i>Frequency</i> <i>/Purpose</i>	<i>Remarks</i>
1	2	3	4	5
SINGAPORE FIR				

<i>Name</i> <i>Lateral limits</i> <i>Upper limit/Lower limit</i> <i>Class of airspace</i>	<i>Unit</i> <i>providing</i> <i>service</i>	<i>Call sign</i> <i>Languages</i> <i>Area and conditions</i> <i>of use</i> <i>Hr of ser</i>	<i>Frequency</i> <i>/Purpose</i>	<i>Remarks</i>
1	2	3	4	5
<p>082500N 1163000E 025050N 1091629E 045700N 1081619E 050012N 1080132E 045904N 1075525E 045203N 1074625E 043820N 1073315E 041312N 1071743E 033045N 1055130E 031727N 1052959E 031453N 1052619E 025010N 1051210E 024348N 1050854E 023641N 1051311E 021838N 1052205E 011947N 1044606E 012921N 1043441E 011800N 1043000E 011500N 1040000E 010800N 1034500E 011046N 1034015E 011200N 1033900E 011408N 1033142E 011700N 1033600E thence east along the national boundary of Singapore/Malaysia, thence along 012000N to 012000N 1042000E 023600N 1044500E 034000N 1034000E 045000N 1034400E 064500N 1024000E 070000N 1030000E 070000N 1080000E 103000N 1140000E 082500N 1163000E</p> <p>UNL SFC</p>	<p>SINGAPORE ACC</p>	<p>SINGAPORE RADAR</p> <p>English</p> <p>H24</p>	<p>255.4MHz</p> <p><u>Primary</u> 123.7 MHz 133.25MHz 134.4MHz 133.8MHz 134.2MHz 134.35 MHz 134.7 MHz</p> <p><u>Secondary</u> 127.3 MHz 135.8MHz 128.1MHz 133.35MHz 134.9 MHz 134.15 MHz</p> <p><u>SEA 1</u> 6556kHz 11297kHz</p> <p><u>SEA 2</u> 5655kHz 8942kHz 11396kHz</p> <p><u>SEA 3</u> 6556kHz</p>	<p>The responsibility for providing air traffic services to flights within the following portions of the Singapore FIR is vested in the Kuala Lumpur ACC:</p> <p>The airspace between a line from 023600N 1044500E to 022715N 1051750E 023641N 1051311E 024348N 1050854E 025010N 1051210E 031453N 1052619E 031727N 1052959E 033045N 1055130E 041312N 1071743E 043820N 1073315E 045203N 1074625E 045904N 1075525E 050012N 1080132E 045700N 1081619E 025050N 1091629E, in the south, and a line along 060000N in the north, and from surface level to FL150 west of longitude 105E and from surface level to FL200 east of longitude 105E.</p> <p>SEA 1, SEA 2, SEA 3: SSB Suppressed Carriers.</p> <p>Suitably equipped aircraft operating outside radar cover and not in ADS-B exclusive airspace within the Singapore FIR should log on to Singapore's AFN LOGON address at least 10 minutes prior to entering the above-mentioned airspace in Singapore FIR. Area Navigation (RNAV) routes suitable for ADS-C and / or CPDLC logon are described in ENR 3.2.</p>
		<p>SINGAPORE CONTROL</p> <p>SOUTH CHINA SEA</p> <p>English</p> <p>H24</p>	<p><u>AFN</u> <u>LOGON</u></p> <p>WSJC</p>	

Name Lateral limits Upper limit/Lower limit Class of airspace	Unit providing service	Call sign Languages Area and conditions of use Hr of ser	Frequency /Purpose	Remarks
1	2	3	4	5
<p>AREAS WITHIN JAKARTA FIR WHERE PROVISION OF ATS IS DELEGATED TO SINGAPORE</p> <p>The area bounded by 031727N 1052959E 012450N 1061648E 001030N 1045656E 000000N 1050340E 000000N 1044330E thence around the arc of a circle radius 90 NM centred on 011324N 1035124E to 013430N 1022353E 011300N 1033000E 011408N 1033142E 011200N 1033900E 011046N 1034015E 010800N 1034500E 011500N 1040000E 011800N 1043000E 012921N 1043441E 011947N 1044606E 021838N 1052205E 023641N 1051311E 024348N 1050854E 025010N 1051210E 031453N 1052619E 031727N 1052959E</p> <p>Excluding the Tanjungpinang Terminal Control Area and Control Zone</p> <p>FL370 SFC</p>	SINGAPORE ACC	SINGAPORE RADAR English H24	255.4MHz <u>Primary</u> 133.25MHz 134.4MHz 134.2MHz <u>Secondary</u> 135.8MHz 128.1MHz 134.9 MHz	

Name Lateral limits Upper limit/Lower limit Class of airspace	Unit providing service	Call sign Languages Area and conditions of use Hr of ser	Frequency /Purpose	Remarks
1	2	3	4	5
AREAS WITHIN THE KUALA LUMPUR FIR FOR WHICH SINGAPORE ACC IS RESPONSIBLE FOR PROVIDING ATS				
SECTOR 1: That airspace contained within coordinates 011300N 1033000E 012203N 1030209E thence along an arc radius 50 DME SJ to 014529N 1031305E 014225N 1031728E, thence along the Johor TMA western boundary to 013022N 1033437E 012600N 1034055E, thence along the Peninsular Malaysia and Singapore international boundary to 011700N 1033600E 011300N 1033000E. The airspace herein is designated as follows: a. AREA B (SJ DVOR/DME - 35 DME SJ) - 3 000ft to FL245 b. AREA D (35 DME SJ - 45 DME SJ) - 5 500ft to FL245 c. AREA F (45 DME SJ - 50 DME SJ) - 9 500ft to FL245	SINGAPORE ACC	SINGAPORE RADAR English H24	Primary 133.25MHz Secondary 135.8MHz	Controlling Authority: Johor APP for airspaces below Sectors 1 and 2, Airway W401 and south of VMR DVOR. <i>Note:</i> In the event an aircraft in the areas is forced to make an emergency descent which will penetrate Malaysian airspace, the pilot shall advise Singapore ATC immediately.
SECTOR 2: That airspace contained within coordinates 013206N 1035031E 022205N 1034724E 025234N 1033340E 025432N 1034341E 033822N 1034139E 023600N 1044500E 012000N 1042000E 012000N 1040528E thence along the Peninsular Malaysia and Singapore international boundary to 012600N 1034055E to 013022N 1033437E 013130N 1034236E to 013206N 1035031E. The airspace herein is designated as follows: a. AREA A (PU DVOR/DME - 30 DME PU excluding the northern portion of Changi CTR) - 2 000FT to FL245 b. AREA C (30 DME PU - 61 DME PU) - 5 500FT to FL300 c. AREA E (61 DME PU - 90 DME PU) - FL120 to FL360 d. AREA H (from 025432N 1034341E thence along the 90 DME PU arc to the FIR boundary (024712N 1043337E) thence to 033822N 1034139E, 025432N 1034341E) - FL145 to FL360	SINGAPORE ACC	SINGAPORE RADAR English H24	Primary 123.7 MHz 133.8 MHz Secondary 127.3 MHz	
ATS ROUTES W401 and G579 a. W401 [Airspace between OMKOM and PU radial 324 from 2,000ft to FL245 and PU radial 324 to PIMOK (excluding WMP228) from 3,000ft to FL245]. b. G579 from 2000ft to FL460.	SINGAPORE ACC	SINGAPORE RADAR English H24		

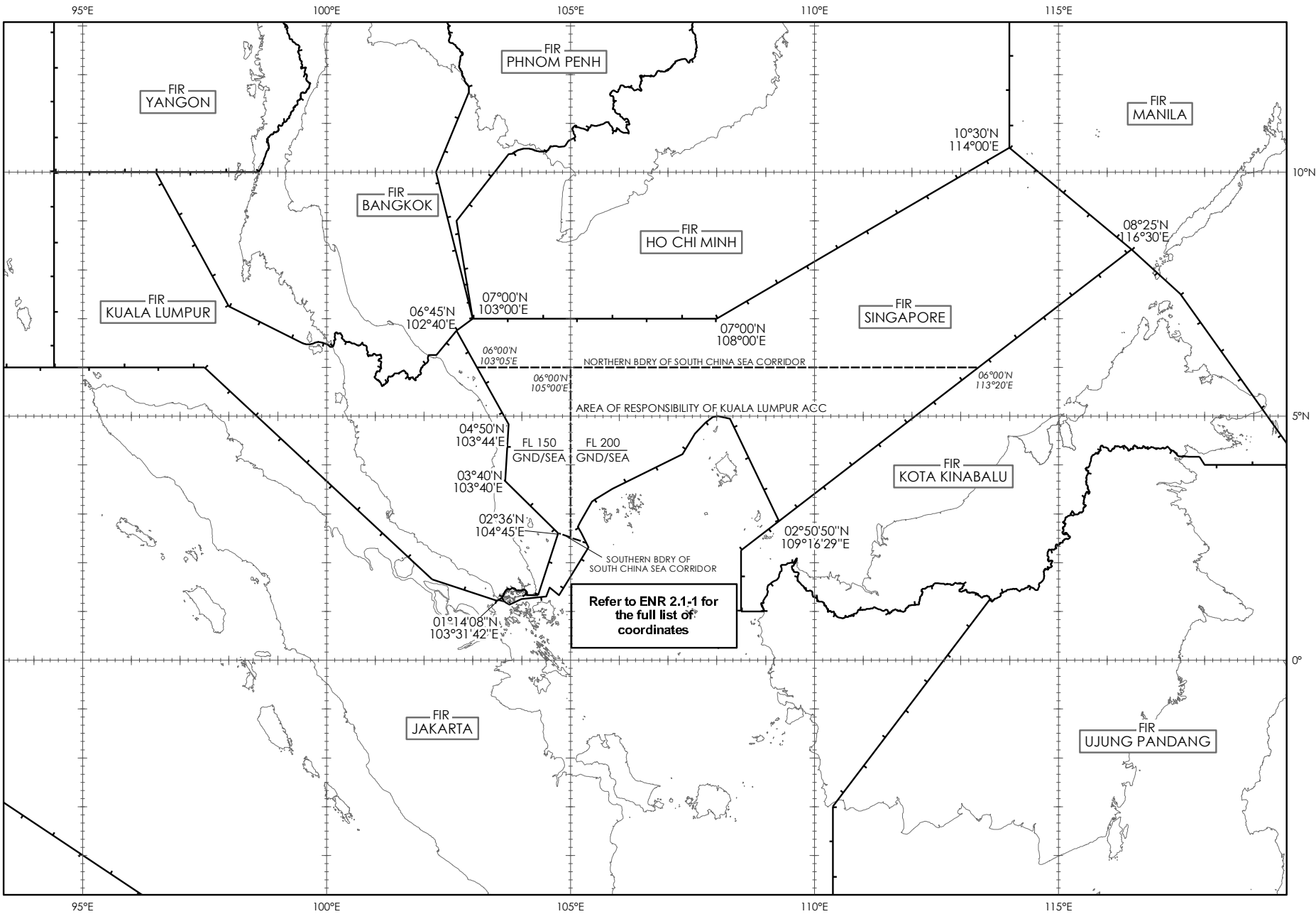
<i>Name Lateral limits Upper limit/Lower limit Class of airspace</i>	<i>Unit providing service</i>	<i>Call sign Languages Area and conditions of use Hr of ser</i>	<i>Frequency /Purpose</i>	<i>Remarks</i>
1	2	3	4	5
SINGAPORE /JOHOR AIRSPACE COMPLEX All controlled airspace within 022600N 1025605E 022600N 1043400E 004300N 1043400E 004300N 1025605E. *FL250 2 000ft ALT	SINGAPORE ACC	SINGAPORE RADAR English H24	Primary 123.7 MHz 133.8 MHz Secondary 127.3 MHz	*Upper limit FL450 from HOSBA [34 DME SJ R-079 (24 DME VTK R-103)] Lower limit varies from 2 000ft to 3 500ft ALT.
ALL AIRWAYS WITHIN THE SINGAPORE FIR, KUALA LUMPUR FIR AND ITS TRANSFER AREAS AND KOTA KINABALU FIR (see subsection ENR 3.1)	SINGAPORE ACC	SINGAPORE RADAR English H24	Primary 133.25MHz 123.7 MHz 133.8 MHz Secondary 135.8MHz 127.3 MHz	Airspaces within the Kuala Lumpur FIR under the control of Singapore ACC are depicted in diagrams in AIP pages: ENR 2.1-11 for AWY A464 ENR 2.1-13 for AWY B469
TANJUNGPINANG TMA				

<i>Name</i> <i>Lateral limits</i> <i>Upper limit/Lower limit</i> <i>Class of airspace</i>	<i>Unit</i> <i>providing</i> <i>service</i>	<i>Call sign</i> <i>Languages</i> <i>Area and conditions</i> <i>of use</i> <i>Hr of ser</i>	<i>Frequency</i> <i>/Purpose</i>	<i>Remarks</i>
1	2	3	4	5
<p>002448N 1043700E follow the circle radius 30NM from 0055.0N 10432.0E anti-clockwise until 010342N 1050018E 005612N 1053200E thence along the circle with radius 60NM from 0055.0N 10432.0E clockwise until 000224N 1050206E 002448N 1043700E</p> <p>10 000ft 3000 FT</p> <p>TANJUNGPINANG NORTH CONTROL ZONE (CTR)</p> <p>011533N 1040852E 011638N 1041620E 011305N 1042029E 010942N 1043500E thence along the circle radius 27 NM from BTM VOR/DME clockwise until 004236N 1041654E 005315N 1040335E 010018N 1035530E 011553N 1040852E</p> <p>3 000ft GND/MSL</p> <p>TANJUNGPINANG SOUTH CONTROL ZONE (CTR)</p> <p>004236N 1041654E follow the circle radius 27 NM from BTM VOR/DME anti-clockwise until 010942N 1043500E 010342N 1050018E thence along the circle radius 30 NM from 0055.0N 10432.0E clockwise until 002448N 1043700E 004236N 1041654E</p> <p>6 000ft GND/MSL</p>	<p>TANJUNGPINANG APPROACH CONTROL OFFICE (APP)</p>	<p>TANJUNGPINANG APPROACH</p> <p>English</p> <p>H24</p>	<p>130.2MHz</p>	

<i>Name</i> <i>Lateral limits</i> <i>Upper limit/Lower limit</i> <i>Class of airspace</i>	<i>Unit</i> <i>providing</i> <i>service</i>	<i>Call sign</i> <i>Languages</i> <i>Area and conditions</i> <i>of use</i> <i>Hr of ser</i>	<i>Frequency</i> <i>/Purpose</i>	<i>Remarks</i>
1	2	3	4	5
				<p>Tanjungpinang Approach Control Office (APP) shall be responsible for the provision of Air Traffic Control Service to controlled flights within Tanjungpinang TMA/CTR.</p> <p><u>Position Reporting Procedures</u> Aircraft operating within or about to enter Tanjungpinang CTR shall report position:</p> <ol style="list-style-type: none"> a. Over Tanjungpinang TMA boundary. b. Over any other point or time as instructed by ATC. <p><u>VFR Flights</u></p> <ol style="list-style-type: none"> 1. Flight Information and alerting service shall only be provided to VFR flight operating within Tanjungpinang CTR/TMA on request. VFR flight requesting this service shall report intended action and comply with the position or as required by ATC. 2. No aircraft shall operate under VFR within Tanjungpinang TMA/CTR until prior authorization has been obtained from Tanjungpinang Approach. <p><u>Altimeter Setting Procedures</u> The ICAO Standard Altimeter Setting Procedures shall be used by aircraft operating within Tanjungpinang CTR:</p> <p>Transition Level: FL130 Transition Altitude: 11</p>

<i>Name</i> <i>Lateral limits</i> <i>Upper limit/Lower limit</i> <i>Class of airspace</i>	<i>Unit</i> <i>providing</i> <i>service</i>	<i>Call sign</i> <i>Languages</i> <i>Area and conditions</i> <i>of use</i> <i>Hr of ser</i>	<i>Frequency</i> <i>/Purpose</i>	<i>Remarks</i>
1	2	3	4	5
				000ft

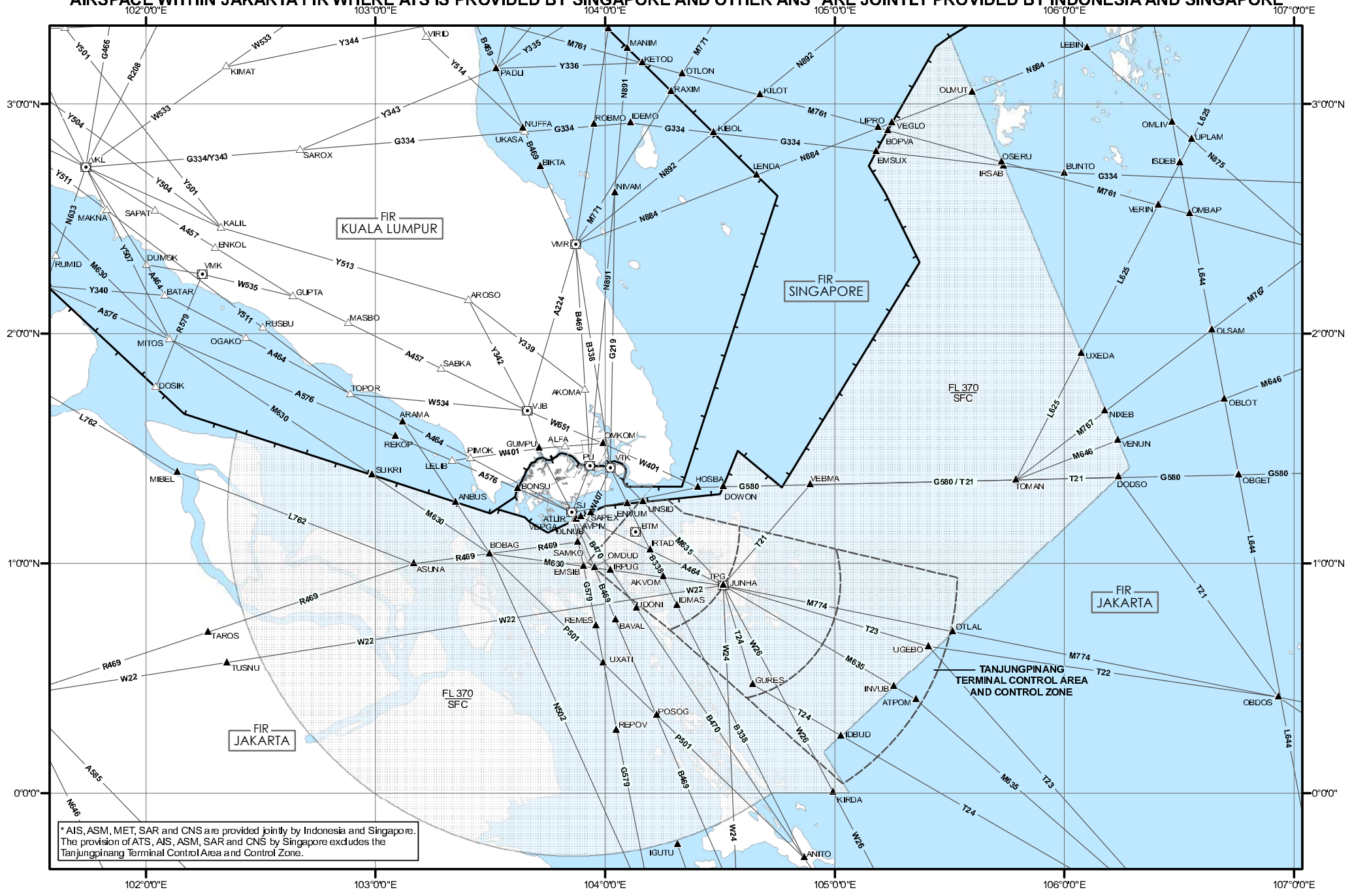
SINGAPORE AND ADJACENT FLIGHT INFORMATION REGIONS



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AIRSPACE WITHIN JAKARTA FIR WHERE ATS IS PROVIDED BY SINGAPORE AND OTHER ANS* ARE JOINTLY PROVIDED BY INDONESIA AND SINGAPORE



* AIS, ASM, MET, SAR and CNS are provided jointly by Indonesia and Singapore. The provision of ATS, AIS, ASM, SAR and CNS by Singapore excludes the Tanjungpinang Terminal Control Area and Control Zone.

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ENR 3 ATS ROUTES

ENR 3.1 CONVENTIONAL NAVIGATION ROUTES

Route Designator {RNP Type}	[Route Usage Notes]								
Significant Point Name	Significant Point Coordinates								Remarks
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7	8	9	10
A224	Route availability: (1) H24								
▲ JOHOR BAHRU DVOR/DME (VJB)	013950N 1033939E								
	196° 016°	45.3NM		FL 460 5500 FT ALT	6000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A –ABV FL150 Class B –BLW FL150]
▲ MERSING DVOR/DME (VMR) (58 DME PU)	022318N 1035218E								

Route Designator {RNP Type}		[Route Usage Notes]								
Significant Point Name	Significant Point Coordinates							Remarks		
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks	
1	2	3	4	5	6	7	8	9	10	
A457	Route availability: (1) H24									
▲ JOHOR BAHRU DVOR/DME (VJB)	013950N 1033939E									
	296° 116°	25.0NM		FL 460 4500 FT ALT	5000 FT	20	Even ⁽¹⁾		[Class A –ABV FL150 Class B –BLW FL150]	
Δ SABKA	015051N 1031713E									
	296° 116°	27.1NM		FL 460 4500 FT ALT	5000 FT	20	Even ⁽¹⁾		[Class A –ABV FL150 Class B –BLW FL150]	
Δ MASBO	020248N 1025251E									
<p><u>Route Remarks:</u> <u>Flight Planning:</u> Northbound flights landing at WMKK and WMSA are to flight plan via A457. Flights departing from Singapore FIR to destinations north of WMKK and WMSA, refer to Y339. Flights overflying Singapore FIR to destinations north of WMKK and WMSA, refer to Y342. Tolerances of airway infringe WMD222 ASAHAN (activated by NOTAM) – Military activities</p>										

Route Designator {RNP Type}		[Route Usage Notes]							
Significant Point Name		Significant Point Coordinates						Remarks	
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels		Controlling unit Frequency {Airspace class} Remarks
							↓	↑	
1	2	3	4	5	6	7	8	9	10
A464		Route availability: (1) H24							
← ▲ ARAMA (Delegated airspace BDRY)	013654N 1030712E								
	117° -	14.9NM		FL 460 3500 FT ALT	5500 FT	10	Odd ⁽¹⁾		[Class A – ABV FL150] [Class B – BLW FL150]
← Δ 35DME SJ	012954N 1032024E								
	118° -	5.0NM		FL 460 3000 FT ALT	5500 FT	10	Odd ⁽¹⁾		[Class A – ABV FL150] [Class B – BLW FL150]
← Δ LELIB	012729N 1032450E								
	117° -	14.6NM		FL 460 3000 FT ALT	5500 FT	10	Odd ⁽¹⁾		[Class A – ABV FL150] [Class B – BLW FL150]
← ▲ MASNI (WSJC/WMFC FIR BDRY)	012037N 1033746E								
	118° -	15.3NM		FL 460 3000 FT ALT	5500 FT	10	Odd ⁽¹⁾		[Class A – ABV FL150] [Class B – BLW FL150]
← ▲ SINJON DVOR/DME (SJ)	011321N 1035115E								
	116° 294°	2.8NM		FL 460 2000 FT ALT	6000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150]
← ▲ AVPIV (WSJC/WIIF FIR BDRY) (Delegated airspace BDRY)	011207N 1035349E								
	115° 295°	20.0NM		FL 600 2000 FT ALT	5500 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150]
← ▲ IRTAD	010326N 1041147E								
	115° 295°	21.2NM		FL 600 2000 FT ALT	5500 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150]
← ▲ TANJUNGPINANG VOR/DME (TPG)	005413N 1043052E								
<p>← Route Remarks: Singapore ACC FREQ: P133.25 MHz S135.8 MHz</p> <p>Flight Planning Instructions: Arrivals into Changi on A464 to flight plan via A464 – ARAMA – TEBUN. After TEBUN, to join the TEBUN STAR. When traffic permits, ATC will offer LELIB 3B for WSSS RWY 20.</p> <p>Arrivals into Batam and Tanjungpinang on A464 to flight plan via A464 – ARAMA – GUNAN. After GUNAN to join the GUNAN STAR (refer to Indonesia AIP WIDD AD 2.24 or WIDN AD 2.24 respectively).</p> <p>Point/Segment Remarks: Flights above FL370 between AVPIV and TPG VOR/DME, see AIP Indonesia ENR 2.1.</p>									

Route Designator {RNP Type}	[Route Usage Notes]									
Significant Point Name	Significant Point Coordinates							Remarks		
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks	
1	2	3	4	5	6	7	8	9	10	
A576	Route availability: (1) H24									
▲ REKOP (50 DME SJ) (delegated airspace BDRY)	013306N 1030521E									
	112° 292°	16.1NM		FL 460 6500 FT ALT	7000 FT		Odd ⁽¹⁾	Even ⁽¹⁾	[Class A –ABV FL150 Class B –BLW FL150] ⁽²⁾	
Δ PIMOK	012648N 1032008E									
	113° 293°	18.6NM		FL 460 6500 FT ALT	7000 FT		Odd ⁽¹⁾		[Class A –ABV FL150 Class B –BLW FL150] ⁽²⁾	
▲ BONSU (FIR BDRY)	011928N 1033710E									
	113° 293°	15.4NM		FL 460 6500 FT ALT	7000 FT		Odd ⁽¹⁾		[Class A –ABV FL150 Class B –BLW FL150] ⁽²⁾	
▲ SINJON DVOR/DME (SJ)	011321N 1035115E									
<p><u>Route Remarks:</u> 15 min longitudinal separation.</p> <p>RMK: AVBL for southbound FLT only BTN PIMOK and SJ DVOR/DME.</p> <p>Southbound FLT landing at WSSS are to flight plan via ATS Route A464.</p> <p>Singapore ACC FREQ: P133.25MHz S135.8MHz (westbound) P134.4MHz S128.1MHz (southbound)</p> <p><u>Point/Segment Remarks:</u> (2) 5NM either side of a rhumb line joining MDN and SJ, funnelling out at 7.5° to a width of 15NM either side of track.</p>										

Route Designator {RNP Type}		[Route Usage Notes]								
Significant Point Name	Significant Point Coordinates							Remarks		
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks	
1	2	3	4	5	6	7	8	9	10	
B338		Route availability: (1) H24								
← ▲ MERSING DVOR/DME (VMR)	022318N 1035218E									
	171° 351°	38.1NM		FL 460 3500 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150] ⁽³⁾	
← Δ 20DME PU	014530N 1035812E									
	171° 351°	20.7NM		FL 460 3500 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150] ⁽³⁾	
← ▲ TEKONG DVOR/DME (VTK)	012455N 1040120E									
	154° 334°	10.3NM		FL 460 3500 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150] ^{(2) (3) (4)}	
▲ ENVUM (WSJC/WIIF FIR BDRY) (Delegated airspace BDRY)	011535N 1040552E									
	154° 334°	13.5NM		FL 600 3500 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150] ⁽⁴⁾	
▲ IRTAD	010326N 1041147E									
	154° 334°	7.9NM		FL 600 3500 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150] ⁽⁴⁾	
▲ AKVOM	005620N 1041514E									
	154° 334°	8.1NM		FL 600 3500 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150] ⁽⁴⁾	
▲ IDMAS	004900N 1041848E									
	153° 333°	73.6NM		FL 600 3500 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150] ⁽⁴⁾	
← ▲ ANITO	001700S 1045200E									
← <u>Point/Segment Remarks:</u>										
(2) Kuala Lumpur/Singapore FIR boundary approximately 1.2NM north of VTK.										
(3) Segment from MERSING to VTK use: P133.8MHz S127.3MHz										
(4) Segment from VTK to ANITO use: P134.4MHz S128.1MHz										
(5) Flights above FL370 between ENVUM and ANITO, see AIP Indonesia ENR 2.1.										

Route Designator {RNP Type}	[Route Usage Notes]								
	Significant Point Name	Significant Point Coordinates							Remarks
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7	8	9	10
B469	Route availability: (1) H24								
← ▲ PEKAN DVOR/DME (VPK)	032259N 1032524E								
	155° 335°	14.9NM		FL 460 7500 FT ALT	8000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150] (2)
← Δ PADLI	030918N 1033133E								
	155° 335°	17.1NM		FL 460 7500 FT ALT	8000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150] (2)
← ▲ 90DME PU (Delegated airspace BDRY)	025341N 1033836E								
	155° 335°	11.0NM		FL 460 7500 FT ALT	8000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150] (2)
← ▲ BIKTA	024337N 1034308E								
	155° 335°	22.2NM		FL 460 7500 FT ALT	8000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150] (2)
← ▲ MERSING DVOR/DME (VMR)	022318N 1035218E								
	176° 356°	27.9NM		FL 460 3000 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150] (2)
← Δ 30DME PU	015520N 1035405E								
	176° 356°	9.9NM		FL 460 2000 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150] (2)
← Δ AKOMA	014522N 1035443E								
	176° 356°	10.0NM		FL 460 2000 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] Class B - BLW FL150 (2) (3)
← Δ 10DME PU	013523N 1035522E								
	176° 356°	10.0NM		FL 460 GND	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150] (3)
← ▲ PAPA UNIFORM DVOR/DME (PU)	012524N 1035600E								
	201° 021°	12.9NM		FL 460 3000 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150] (3)
← ▲ SINJON DVOR/DME (SJ)	011321N 1035115E								
	156° 336°	2.2NM		FL 460 2000 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150] (3)
← ▲ ATLIR (WSJC/WIIF FIR BDRY) (Delegated airspace BDRY)	011120N 1035208E								
	158° 338°	13.5NM		FL 600 2000 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150] (3)
← ▲ OMDUD	005847N 1035714E								
Route Remarks:									
Flight Planning Instructions:									
Flights overflying Singapore FIR to destinations in Jakarta FIR and beyond to flight plan via B470 ANITO.									
Point/Segment Remarks:									
(2) Segment from VPK to AKOMA use: P133.8MHz S127.3MHz									
(3) Segment from AKOMA to ENPUX use: P134.4MHz S128.1MHz									
(4) Flights above FL370 between ATLIR and ENPUX, see AIP Indonesia ENR 2.1.									

Route Designator {RNP Type}	[Route Usage Notes]								
Significant Point Name	Significant Point Coordinates							Remarks	
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7	8	9	10
	158° 338°	14.5NM		FL 600 2000 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150] ⁽³⁾
▲ BAVAL	004518N 1040242E								
	156° 336°	27.0NM		FL 600 2000 FT ALT	5000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150] ⁽³⁾
▲ POSOG	002024N 1041323E								
	156° 336°	53.5NM		FL 6000 2000 FT ALT	4000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150] ⁽³⁾
← ▲ ENPUX	002859S 1043434E								
<p>← <u>Route Remarks:</u></p> <p><u>Flight Planning Instructions:</u> Flights overflying Singapore FIR to destinations in Jakarta FIR and beyond to flight plan via B470 ANITO.</p> <p><u>Point/Segment Remarks:</u></p> <p>(2) Segment from VPK to AKOMA use: P133.8MHz S127.3MHz</p> <p>(3) Segment from AKOMA to ENPUX use: P134.4MHz S128.1MHz</p> <p>(4) Flights above FL370 between ATLIR and ENPUX, see AIP Indonesia ENR 2.1.</p>									

Route Designator {RNP Type}	[Route Usage Notes]								
Significant Point Name	Significant Point Coordinates								Remarks
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7	8	9	10
B470	Route availability: (1) H24								
▲ SINJON DVOR/DME (SJ)	011321N 1035115E								
	145° -	2.2NM		FL 460 2000 FT ALT	3000 FT	10	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150]
▲ VEPGA (WSJC/WIIF FIR BDRY) (Delegated airspace BDRY)	011131N 1035232E								
	146° -	16.0NM		FL 600 2000 FT ALT	3000 FT	10	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150]
▲ IRPUG	005813N 1040127E								
	146° -	11.9NM		FL 600 2000 FT ALT	3000 FT	10	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150]
▲ UDONI	004818N 1040806E								
	146° -	78.5NM		FL 600 2000 FT ALT	5000 FT	10	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150]
▲ ANITO	001700S 1045200E								
<p><u>Route Remarks:</u> Unidirectional route (southbound) for flights from Singapore FIR to Jakarta FIR and beyond. For flights to these destination aerodromes: WICC, WIHH, WIII, WAHH, WAHS - FL300, FL320, FL340, FL360, FL380 and FL400 are available.</p> <p>Singapore ACC FREQ: P134.4MHz S128.1MHz</p> <p><u>Point/Segment Remarks:</u> Flights above FL370 from VEPGA to ANITO, see AIP Indonesia ENR 2.1.</p>									

Route Designator {RNP Type}	[Route Usage Notes]									
Significant Point Name	Significant Point Coordinates								Remarks	
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks	
1	2	3	4	5	6	7	8	9	10	
G219	Route availability: (1) H24									
▲ NIVAM	023650N 1040228E									
	180° 000°	41.7NM		FL 460 10500 FT ALT	11000 FT		Even ⁽¹⁾	Odd ⁽¹⁾	[Class A – ABV FL150 Class B – BLW FL150] (2)	
Δ 30VTK (30 DME VTK)	015454N 1040159E									
	181° 001°	29.8NM		FL 460 3000 FT ALT	4000 FT		Even ⁽¹⁾	Odd ⁽¹⁾	[Class A – ABV FL150 Class B – BLW FL150] (2)	
▲ TEKONG DVOR/DME (VTK)	012455N 1040120E									(3)
<p><u>Route Remarks:</u> Singapore ACC FREQ: P123.7 MHz, S127.3 MHz</p> <p><u>Point/Segment Remarks:</u> (2) Lateral Limits: The eastern and western airway sectors are enclosed by a line joining 023705N 1041200E 015610N 1041200E 015100N 1041442E 012454N 1041442E 012454N 1035620E 023705N 1035729E 023705N 1041200E.</p> <p>(3) Singapore/Kuala Lumpur FIR boundary approximately 1.2NM north of VTK.</p>										

Route Designator {RNP Type}		[Route Usage Notes]								Remarks	
Significant Point Name		Significant Point Coordinates									
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks		
1	2	3	4	5	6	7	8	9	10		
G334		Route availability: (1) H24									
Δ IDEMO	025431N 1040603E										
	095° 275°	22.4NM		FL 285 FL 240	FL 250	20	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A]		
▲ KIBOL (WMFC/WSJC FIR BDRY)	025224N 1042818E										
	097° 277°	42.5NM		FL 285 FL 240	FL 250	20	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A]		
▲ EMSUX (WSJC/WIIF FIR BDRY) (Delegated airspace BDRY)	024647N 1051026E										
	095° 275°	33.7NM		FL 285 FL 240	FL 250	20	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150]		
▲ IRSAB (Delegated airspace BDRY)	024349N 1054359E										
<p><u>Route Remarks:</u> 10 min longitudinal separation between RNAV-equipped aircraft applying Mach Number Technique. 15 min longitudinal separation between other aircraft.</p> <p>Singapore ACC FREQ: P134.7MHz S134.15MHz</p> <p><u>Flight Planning Instructions:</u> Non-PBN and Non-RVSM equipped aircraft on ATS route G334:</p> <ol style="list-style-type: none"> To destinations other than WMKK to flight plan via G334-KIBOL-VPK. Alternative route to G334 for non-PBN equipped aircraft to destinations within WMFC may flight plan via G580-HOSBA-VJB-A457. For departure from WMFC to flight plan via VPK-KIBOL-G334. Alternative route to G334 for non-PBN equipped aircraft for departure from WMFC may flight plan via A464-TOPOR-W534-VJB-HOSBA-G580. 											

Route Designator {RNP Type}	[Route Usage Notes]								
Significant Point Name	Significant Point Coordinates								Remarks
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7	8	9	10
G579	Route availability: (1) H24								
▲ JOHOR BAHRU DVOR/DME (VJB)	013950N 1033939E								
	162° 342°	10.3NM		FL 460 6500 FT ALT	7000 FT	3	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150]
▲ GUMPU	013000N 1034243E								
	152° 332°	4.1NM		FL 460 2000 FT ALT	7000 FT	3	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150] ⁽²⁾
LAPOL	012622N 1034435E								
	153° 333°	6.1NM		FL 460 2000 FT ALT	11000 FT	3	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150]
LEGOL	012053N 1034723E								
	152° 332°	8.4NM		FL 460 2000 FT ALT	3000 FT	3	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150]
▲ SINJON DVOR/DME (SJ)	011321N 1035115E								
	- 346°	2.2NM		FL 460 2000 FT ALT	4000 FT	10		Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150]
▲ OLNUB (WSJC/WIIF FIR BDRY) (Delegated airspace BDRY)	011110N 1035147E								
	- 348°	12.2NM		FL 600 2000 FT ALT	4000 FT	10		Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150]
▲ EMSIB	005911N 1035419E								
	- 348°	15.8NM		FL 600 2000 FT ALT	5000 FT	10		Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150]
▲ REMES	004342N 1035735E								
	- 349°	10.0NM		FL 600 2000 FT ALT	5000 FT	10		Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150]
▲ UXATI	003348N 1035933E								
	- 349°	17.7NM		FL 600 2000 FT ALT	5000 FT	10		Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150]
▲ REPOV	001623N 1040300E								
	- 348°	51.1NM		FL 600 2000 FT ALT	5000 FT	10		Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150]
▲ PARDI	003400S 1041300E								
<p><u>Route Remarks:</u> Unidirectional route (Northbound) for flights from Jakarta FIR to Singapore FIR and beyond. FL310, FL330, FL350, FL370, FL390, FL410 can be assigned as flight levels for inbounds to Singapore.</p> <p>Singapore ACC FREQ: P134.4MHz S128.1MHz</p> <p><u>Point/Segment Remarks:</u> (2) Kuala Lumpur/Singapore FIR boundary is approximately 2NM south of GUMPU. (3) Flights above FL370 from PARDI to OLNUB, see AIP Indonesia ENR 2.1.</p>									

Route Designator {RNP Type}		[Route Usage Notes]							
Significant Point Name	Significant Point Coordinates							Remarks	
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7	8	9	10
G580		Route availability: (1) H24							
▲ SINJON DVOR/DME (SJ)	011321N 1035115E								
	079° 259°	33.7NM		FL 460 2000 FT ALT	3000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150]
▲ HOSBA	011948N 1042418E								
	088° 268°	6.5NM		FL 460 6500 FT ALT	7000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150]
▲ DOWON (WSJC/WIIF FIR BDRY)	011957N 1043048E								
	088° 268°	76.6NM		FL 600 6500 FT ALT	7000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150]
▲ TOMAN	012147N 1054717E								
	088° 268°	26.8NM		FL 600 6500 FT ALT	7000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150]
▲ DODSO (Delegated airspace BDRY)	012225N 1061402E								
<u>Route Remarks:</u> Singapore ACC FREQ: P134.2MHz S133.35MHz <u>Point/Segment Remarks:</u> Flights above FL370 between DOWON and DODSO, see AIP Indonesia ENR 2.1.									

<i>Route Designator {RNP Type}</i>	<i>[Route Usage Notes]</i>								
<i>Significant Point Name</i>	<i>Significant Point Coordinates</i>								<i>Remarks</i>
<i>{RNP Type}</i>	<i>Track MAG</i> ↓ ↑	<i>Dist NM</i>	<i>(COP)</i>	<i>Upper limit Lower limit</i>	<i>MNM FLT ALT</i>	<i>Lateral limits NM</i>	<i>Direction of cruising levels</i> ↓ ↑		<i>Controlling unit Frequency {Airspace class} Remarks</i>
1	2	3	4	5	6	7	8	9	10
R208	<i>Route availability:</i> (1) H24								
▲ IGARI	065612N 1033506E								
	197° 017°	73.9NM		FL 460 FL 240	FL 250	20	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A]
▲ IKUKO (FIR BDRY)	054512N 1031324E								
<i>Route Remarks:</i> Portion of R208 within the Singapore FIR to be released to Lumpur ACC daily subject to coordination BTN Singapore ACC and Lumpur ACC. 15 min longitudinal separation. Singapore ACC FREQ: P127.3MHz, S123.7MHz Lumpur ACC FREQ: P132.6MHz									

Route Designator {RNP Type}		[Route Usage Notes]							
Significant Point Name	Significant Point Coordinates							Remarks	
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7	8	9	10
R469	Route availability: (1) H24								
← ▲ TAROS	004200N 1021612E								
←	072° 252°	56.6NM		FL 600 9500 FT ALT	10000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150]
← ▲ ASUNA	005948N 1030954E								
←	082° 262°	20.2NM		FL 600 5500 FT ALT	6000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150]
← ▲ BOBAG	010230N 1032954E								
←	082° 262°	23.2NM		FL 600 5500 FT ALT	6000 FT	10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150]
← ▲ SAMKO	010530N 1035255E								
←	<u>Route Remarks:</u> Singapore ACC FREQ: P133.25MHz S135.8MHz <u>Point/Segment Remarks:</u> Flights above FL370 between TAROS and SAMKO, see AIP Indonesia ENR 2.1.								

<i>Route Designator {RNP Type}</i>	<i>[Route Usage Notes]</i>								
<i>Significant Point Name</i>	<i>Significant Point Coordinates</i>								<i>Remarks</i>
<i>{RNP Type}</i>	<i>Track MAG</i> ↓ ↑	<i>Dist NM</i>	<i>(COP)</i>	<i>Upper limit Lower limit</i>	<i>MNM FLT ALT</i>	<i>Lateral limits NM</i>	<i>Direction of cruising levels</i> ↓ ↑		<i>Controlling unit Frequency {Airspace class} Remarks</i>
1	2	3	4	5	6	7	8	9	10
W22	<i>Route availability:</i> (1) H24								
▲ TUSNU	003403N 1022109E								
	081° 261°	131.5NM		FL 600 6000 FT ALT		10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150] [Class B – BLW FL150]
▲ TANJUNGPINANG VOR/DME (TPG)	005413N 1043052E								
<i>Route Remarks:</i> Singapore ACC FREQ: P133.25MHz S135.8MHz									
<i>Point/Segment Remarks:</i> Flights above FL370 between TUSNU and TPG VOR/DME, see AIP Indonesia ENR 2.1.									

Route Designator {RNP Type}		[Route Usage Notes]								
Significant Point Name	Significant Point Coordinates							Remarks		
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks	
1	2	3	4	5	6	7	8	9	10	
W24	Route availability: (1) H24									
▲ ENPUX	002859S 1043434E									
	357° 177°	82.9NM		FL 600 6000 FT ALT		10	Even ⁽¹⁾	Odd ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150]	
▲ TANJUNGPINANG VOR/DME (TPG)	005413N 1043052E									
<p><u>Route Remarks:</u> Singapore ACC FREQ: P134.4MHz S128.1MHz</p> <p><u>Point/Segment Remarks:</u> Flights above FL370 between ENPUX and TPG VOR/DME, see AIP Indonesia ENR 2.1.</p>										

<i>Route Designator {RNP Type}</i>	<i>[Route Usage Notes]</i>								
<i>Significant Point Name</i>	<i>Significant Point Coordinates</i>								<i>Remarks</i>
<i>{RNP Type}</i>	<i>Track MAG</i> ↓ ↑	<i>Dist NM</i>	<i>(COP)</i>	<i>Upper limit Lower limit</i>	<i>MNM FLT ALT</i>	<i>Lateral limits NM</i>	<i>Direction of cruising levels</i>		<i>Controlling unit Frequency {Airspace class} Remarks</i>
1	2	3	4	5	6	7	8	9	10
W26	<i>Route availability:</i> (1) H24								
▲ TANJUNGPINANG VOR/DME (TPG)	005413N 1043052E								
	152° 332°	61.0NM		FL 600 6000 FT ALT		10	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150]
▲ KIRDA	000009N 1045934E								
<i>Route Remarks:</i> Singapore ACC FREQ: P134.4MHz S128.1MHz									
<i>Point/Segment Remarks:</i> Flights above FL370 between TPG VOR/DME and KIRDA, see AIP Indonesia ENR 2.1.									

Route Designator {RNP Type}		[Route Usage Notes]								
Significant Point Name	Significant Point Coordinates							Remarks		
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks	
1	2	3	4	5	6	7	8	9	10	
W401		Route availability: (1) H24								
▲ HOSBA (R079/34 DME SJ) (R103/24 DME VTK)	011948N 1042418E									
	294° 114°	27.6NM		FL 245 2000 FT ALT	7000 FT	5	Even ⁽¹⁾	Odd ⁽¹⁾	[Class A - ABV FL150 Class B - BLW FL150]	
▲ OMKOM	013112N 1035910E									
	266° 086°	9.5NM		FL 245 2000 FT ALT	3000 FT	3	Even ⁽¹⁾	Odd ⁽¹⁾	[Class A - ABV FL150 Class B - BLW FL150]	
△ ALFA	013033N 1034942E									
	265° 085°	7.0NM		FL 245 3000 FT ALT	6000 FT	3	Even ⁽¹⁾	Odd ⁽¹⁾	[Class A - ABV FL150 Class B - BLW FL150]	
▲ GUMPU	013000N 1034243E									
	262° 082°	18.1NM		FL 245 3000 FT ALT	6000 FT	3	Even ⁽¹⁾	Odd ⁽¹⁾	[Class A - ABV FL150 Class B - BLW FL150]	
△ LELIB	012729N 1032450E									
	262° 082°	4.8NM		FL 245 3000 FT ALT	6000 FT	3	Even ⁽¹⁾	Odd ⁽¹⁾	[Class A - ABV FL150 Class B - BLW FL150]	
△ PIMOK	012648N 1032008E									
Route Remarks: Controlling Authority: Singapore ACC Airspace below airway controlled by Johor Approach.										

Route Designator {RNP Type}		[Route Usage Notes]								
Significant Point Name	Significant Point Coordinates							Remarks		
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks	
1	2	3	4	5	6	7	8	9	10	
W407		Route availability: (1) H24								
▲ TEKONG DVOR/DME (VTK)	012455N 1040120E									
	203° 023°	12.7NM		FL 250 3000 FT ALT	4000 FT	3	Even ⁽¹⁾	Odd ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150]	
▲ SAPEX (WSJC/WIIF FIR BDRY) (Delegated airspace BDRY)	011316N 1035617E									
	203° 023°	8.4NM		FL 250 3000 FT ALT	4000 FT	3	Even ⁽¹⁾	Odd ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150] [Class C]	
▲ SAMKO	010530N 1035255E									
Route Remarks: Singapore APP FREQ: P124.6MHz S132.15MHz										

Route Designator {RNP Type}		[Route Usage Notes]								
Significant Point Name	Significant Point Coordinates							Remarks		
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks	
1	2	3	4	5	6	7	8	9	10	
W534	Route availability: (1) H24									
Δ TOPOR	014412N 1025330E									
	275° 095°	46.5NM		FL 460 4500 FT ALT	5000 FT	8	Odd ⁽¹⁾		[Class A – ABV FL150 Class B – BLW FL150]	
▲ JOHOR BAHRU DVOR/DME (VJB)	013950N 1033939E									

Route Designator {RNP Type}		[Route Usage Notes]							
Significant Point Name	Significant Point Coordinates								Remarks
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit Lower limit	MNM FLT ALT	Lateral limits NM	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7	8	9	10
W651	Route availability: (1) H24								
▲ JOHOR BAHRU DVOR/DME (VJB)	013950N 1033939E								
	114° 294°	21.3NM		FL 200 2500 FT ALT	3000 FT	3	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A – ABV FL150 Class B – BLW FL150]
▲ OMKOM	013112N 1035910E								

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Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates		Upper limit Lower limit		Direction of cruising levels	Remarks
{RNP Type}	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
L625		Route availability: (1) H24				
▲ AKMON	081254N 1101306E					
(10)	- 035°	236.1NM	FL 460 FL 135			[Class A] (2)
▲ GUTUP (WSJC/WIIF FIR BDRY)	045911N 1075603E					
(10)	- 035°	104.4NM	FL 600 FL 135			[Class A] [Class B] (2) (3)
▲ LUSMO	033341N 1065534E					
(10)	- 027°	48.2NM	FL 600 FL 135			[Class A] [Class B] (3)
▲ UPLAM	025043N 1063319E					
(10)	- 027°	6.8NM	FL 600 FL 135			[Class A] [Class B] (3)
▲ ISDEB	024440N 1063011E					
(10)	- 027°	12.5NM	FL 600 FL 135			[Class A] [Class B] (3)
▲ VERIN	023332N 1062425E					
(10)	- 027°	43.4NM	FL 600 FL 245			[Class A] (3)
▲ UXEDA (Delegated airspace BDRY)	015449N 1060423E					
(10)	- 027°	37.1NM	FL 600 FL 245			[Class A] (4)
▲ TOMAN	012147N 1054717E					
<p>Route Remarks: Uni-directional for north-east bound flights from TOMAN to AKMON. No PDC Flight Levels FL310, FL320, FL350, FL360, FL390, FL400 applicable. Other levels available with prior approval.</p> <p>Point/Segment Remarks:</p> <p>(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover between GUTUP and AKMON within the Singapore FIR.</p> <p>(3) Segment from UXEDA to GUTUP to contact Jakarta ACC.</p> <p>(4) Segment from TOMAN to UXEDA use: P134.2 MHz S133.35 MHz</p> <p>(5) Flights above FL370 from TOMAN to UXEDA, see AIP Indonesia ENR 2.1.</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name {RNP Type}	Significant Point Coordinates		Upper limit Lower limit	Direction of cruising levels		Remarks Controlling unit Frequency {Airspace class} Remarks
1	Track MAG ↓ ↑	Dist NM 3	4	↓	↑	7
L629		Route availability: (1) H24				
▲ DOLOX	044841N 1052247E					
		43.1NM	FL 460 FL 240		Odd ⁽¹⁾	[Class A] ⁽²⁾
▲ NOPAT	042313N 1044756E					
		52.2NM	FL 460 FL 240		Odd ⁽¹⁾	[Class A] ⁽²⁾
▲ VEPLI	035223N 1040542E					
		27.2NM	FL 460 FL 240		Odd ⁽¹⁾	[Class A] ⁽²⁾
▲ BUVAL (WSJC/MMFC FIR BDRY)	033622N 1034341E					
		22.6NM	FL 460 FL 240		Odd ⁽¹⁾	[Class A] ⁽²⁾
▲ PEKAN DVOR/DME (VPK)	032259N 1032524E					
<p><i>Route Remarks:</i> Lateral Limits: 10NM either side of line joining VPK DVOR/DME to BUVAL and 25NM either side of line joining BUVAL to DOLOX.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.3 MHz</p> <p><i>Point/Segment Remarks:</i> (2) NIL</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates			Direction of cruising levels		Remarks
{RNP Type}	Track MAG	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
L644		Route availability: (1) H24				
← ▲ DUDIS (WSJC/VVHM FIR BDRY)	070000N 1064836E					
← (10)	192° -	165.8NM	FL 460 FL 240	Odd ⁽¹⁾		[Class A] (2) (3)
← ▲ MABLI	041717N 1061247E					
(10)	169° -	33.4NM	FL 460 FL 240	Odd ⁽¹⁾		[Class A] (4)
← ▲ LIGVU (WSJC/WIIF FIR BDRY)	034417N 1061859E					
<p>← <u>Route Remarks:</u> <u>Flight Planning Instructions for Direct Routing Operations (DRO):</u> All aircraft operating at FL290 to FL460 (inclusive) and entering Singapore FIR via DUDIS should flight plan using the direct route DUDIS DCT LIGVU.</p> <p>← <u>Point/Segment Remarks:</u> (2) ADS-C service is available to suitably equipped aircraft operating outside radar cover (between DUDIS and MABLI) and not in the exclusive ADS-B airspace within Singapore FIR. (3) Segment from DUDIS to MABLI use: P134.35 MHz S133.6 MHz (4) Segment from MABLI to LIGVU use: P134.7 MHz S134.15 MHz</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name {RNP Type}	Significant Point Coordinates		Upper limit Lower limit	Direction of cruising levels		Remarks
	Track MAG ↓ ↑	Dist NM		↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
L649		Route availability: (1) H24				
▲ LAXOR (WSJC/RPHI FIR BDRY)	094937N 1144829E					
(10)		98.0NM	FL 460 FL 240		Even ⁽¹⁾	[Class A]
▲ URKET (WSJC/WBFC FIR BDRY)	081130N 1145000E					⁽²⁾
(10)		62.0NM	FL 460 FL 240		Even ⁽¹⁾	[Class A]
▲ DAKIX (WBFC/WSJC FIR BDRY)	070854N 1145054E					⁽³⁾
<p><u>Route Remarks:</u> Lateral Limits: 25NM either side of line joining DAKIX to LAXOR.</p> <p>Available only for flights departing from Brunei (WBSB), Labuan (WBKL) and Miri (WBGR) to Hong Kong (VHHH) only.</p> <p>No-PDC Flight Levels FL300 and FL380 applicable.</p> <p>ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover within the Singapore FIR.</p> <p><u>Point/Segment Remarks:</u> (2) NIL (3) BRU 359° 136NM</p>						

<i>Route Designator {RNP Type}</i>		<i>[Route Usage Notes]</i>				
<i>Significant Point Name</i>		<i>Significant Point Coordinates</i>			<i>Remarks</i>	
<i>{RNP Type}</i>	<i>Track MAG</i> ↓ ↑	<i>Dist NM</i>	<i>Upper limit</i> <i>Lower limit</i>	<i>Direction of cruising levels</i> ↓ ↑		<i>Controlling unit Frequency {Airspace class} Remarks</i>
1	2	3	4	5	6	7
L762		<i>Route availability:</i> (1) H24				
← ▲ ASUNA	005948N 1030954E					
(10)	291° 111°	66.2NM	FL 460 9500 FT ALT	Even ⁽¹⁾	Odd ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150]
← ▲ MIBEL	012351N 1020816E					
<p>← <i>Route Remarks:</i> Singapore ACC FREQ: P133.25MHz S135.8MHz</p> <p>← <i>Flight Planning Instructions:</i> Westbound - Aircraft originating only from airports within Singapore, Batam, Tanjungpinang and Johor to Medan and destinations beyond Jakarta FIR. Eastbound - Aircraft to destinations within Singapore, Batam, Tanjungpinang and Johor only.</p> <p>← <i>Point/Segment Remarks:</i> Flights above FL370 between ASUNA and MIBEL, see AIP Indonesia ENR 2.1.</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name {RNP Type}	Significant Point Coordinates		Upper limit Lower limit	Direction of cruising levels		Remarks Controlling unit Frequency {Airspace class} Remarks
1	Track MAG ↓ ↑	Dist NM 3	4	↓	↑	7
M522	Route availability: (1) H24					
▲ VINIK (WSJC/RPHI FIR BDRY)	083830N 1161348E					(2)
		27.5NM	FL 460 FL 135	Even ⁽¹⁾	Odd ⁽¹⁾	[Class A - ABV FL150 Class B - BLW FL150]
▲ NODIN (WSJC/WBFC FIR BDRY)	081100N 1161142E					(2)
<p><u>Route Remarks:</u> Portion of M522 within the Singapore FIR has been delegated to Kota Kinabalu ACC for provision of ATS</p> <p>Kinabalu ACC FREQ: 126.1 MHz</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates		Direction of cruising levels		Remarks	
{RNP Type}	Track MAG	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M630		Route availability: (1) H24				
▲ SUKRI (WMFC/WIIF FIR BDRY) (Delegated airspace BDRY)	012306N 1025904E					
(5)	123° -	37.1NM	FL 600 5500 FT ALT	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150]
▲ BOBAG	010230N 1032954E					
(5)	098° -	24.7NM	FL 600 5500 FT ALT	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150]
▲ EMSIB	005911N 1035419E					
(5)	098° -	2.9NM	FL 600 5500 FT ALT	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150]
▲ OMDUD	005847N 1035714E					
(5)	098° -	4.3NM	FL 600 5500 FT ALT	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150]
▲ IRPUG	005813N 1040127E					
(5)	098° -	13.9NM	FL 600 5500 FT ALT	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150]
▲ AKVOM	005620N 1041514E					
(5)	097° -	15.8NM	FL 600 5500 FT ALT	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150]
▲ JUNHA	005413N 1043052E					
<p><u>Route Remarks:</u> Flight departing from aerodromes in Peninsular Malaysia with planned cruising level of FL270 or above are required to cross SUKRI at FL270 or above.</p> <p>Singapore ACC FREQ: P133.25 MHz S135.8 MHz</p> <p><u>Point/Segment Remarks:</u> Flights above FL370 from SUKRI to JUNHA, see AIP Indonesia ENR 2.1.</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name {RNP Type}	Significant Point Coordinates		Direction of cruising levels		Remarks	
	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M635		Route availability: (1) H24				
▲ TEKONG DVOR/DME (VTK)	012455N 1040120E					
(10)	136° 316°	12.4NM	FL 460 5500 FT ALT	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] [Class B] ⁽²⁾
▲ UNSID (WSJC/WIIF FIR BDRY) (Delegated airspace BDRY)	011600N 1040955E					
(10)	136° 316°	30.2NM	FL 600 5500 FT ALT	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] [Class B]
▲ JUNHA	005413N 1043052E					
(10)	120° 300°	51.8NM	FL 600 5500 FT ALT	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] [Class B]
▲ INVUB (Delegated airspace BDRY)	002749N 1051530E					
(10)	120° 300°	6.7NM	FL 600 FL 5500 ALT	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] [Class B]
▲ ATPOM	002425N 1052114E					
(10)	131° 311°	93.0NM	FL 600 5500 FT ALT	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] [Class B]
▲ SURGA	003657S 1063119E					
<p><u>Route Remarks:</u> Singapore ACC FREQ: P134.4 MHz S128.1 MHz</p> <p><u>Flight Planning Instructions:</u> Flights overflying Singapore to destinations north of Kuala Lumpur and Subang are to flight plan via M635 JUNHA IRTAD A464 SJ G579 VJB Y342 AROSO Y513.</p> <p>Flights overflying Singapore to land at Kuala Lumpur and Subang are to flight plan via M635 JUNHA IRTAD A464 SJ G579 VJB A457.</p> <p>All departures from Singapore aerodromes joining ATS route M635 to flight plan via JUNHA T24.</p> <p><u>Point/Segment Remarks:</u> (2) Kuala Lumpur / Singapore FIR boundary approximately 1.2NM north of VTK. (3) Flights above FL370 between UNSID and SURGA, see AIP Indonesia ENR 2.1.</p>						

<i>Route Designator {RNP Type}</i>		<i>[Route Usage Notes]</i>				
<i>Significant Point Name</i>	<i>Significant Point Coordinates</i>			<i>Direction of cruising levels</i>		<i>Remarks</i>
<i>{RNP Type}</i>	<i>Track MAG</i> ↓ ↑	<i>Dist NM</i>	<i>Upper limit</i> <i>Lower limit</i>	↓	↑	<i>Controlling unit Frequency {Airspace class} Remarks</i>
1	2	3	4	5	6	7
M646		<i>Route availability:</i> (1) H24				
← ▲ VENUN (Delegated airspace BDRY)	013206N 1061351E					
(10)	249° 069°	28.5NM	FL 600 FL 245	Even ⁽¹⁾	Odd ⁽¹⁾	[Class A]
← ▲ TOMAN	012147N 1054717E					
← <i>Route Remarks:</i> Singapore ACC FREQ: P134.2 MHz S133.35 MHz						
← <i>Point/Segment Remarks:</i> Flights above FL370 between VENUN and TOMAN, see AIP Indonesia ENR 2.1.						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name {RNP Type}	Significant Point Coordinates		Direction of cruising levels		Remarks	
	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M753	Route availability: (1) H24					
▲ IPRIX (VVHM/WSJC FIR BDRY)	070000N 1040754E					
		127.2NM	FL 460 FL 155	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (2)
▲ ENREP	045224N 1041442E					
<p><u>Route Remarks:</u> Singapore ACC FREQ: P134.35 MHz S134.9 MHz</p> <p>ADS-C service is available to suitably equipped aircraft operating outside radar cover and not in the exclusive ADS-B airspace within the Singapore FIR.</p> <p><u>Flight planning for Direct Routing Operations (DRO):</u> Departing aircraft from Singapore operating at FL290 to FL460 (inclusive) and exiting Singapore FIR via IPRIX should flight plan using the direct route EGOLO DCT IPRIX.</p> <p>All other aircraft operating at FL290 to FL460 (inclusive) and entering or exiting Singapore FIR via L642 ENREP M753 IPRIX should flight plan using the direct route EGOLO DCT IPRIX or its reciprocal track.</p> <p><u>Lateral Limits:</u> 25NM either side of line joining ENREP to IPRIX.</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates					Remarks
{RNP Type}	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M754	Route availability: (1) H24					
▲ VINIK (WSJC/RPHI FIR BDRY)	083830N 1161348E					
		37.9NM	FL 460 FL 135	Even ⁽¹⁾	Odd ⁽¹⁾	[Class A-ABV FL150 Class B-BLW FL150] ⁽²⁾
▲ SUMLA (WSJC/MMFC FIR BDRY)	080242N 1160054E					
<p><u>Route Remarks:</u> Lateral Limits: 10NM either side of line joining SUMLA to VINIK.</p> <p>Portion of M754 within the Singapore FIR has been delegated to Kinabalu ACC for provision of ATS.</p> <p>Kinabalu ACC FREQ: 126.1 MHz</p> <p><u>Point/Segment Remarks:</u> (2) BRU 019° 238.9NM</p>						

Route Designator {RNP Type}		[Route Usage Notes]					Remarks
Significant Point Name		Significant Point Coordinates		Upper limit Lower limit	Direction of cruising levels		
{RNP Type}	Track MAG ↓ ↑	Dist NM			↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7	
M758		Route availability: (1) H24					
▲ PEKAN DVOR/DME (VPK)	032259N 1032524E						
	087° 267°	30.4NM	FL 460 FL 240	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (3)	
▲ IDSEL (WMFC/WSJC FIR BDRY)	032432N 1035544E						
	087° 267°	11.1NM	FL 460 FL 240	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (4)	
▲ URIGO	032505N 1040647E						
	087° 267°	24.8NM	FL 460 FL 240	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (4)	
▲ VISAT	032620N 1043134E						
	087° 267°	41.1NM	FL 460 FL 240	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (4)	
▲ MABAL	032826N 1051236E						
	087° 267°	35.7NM	FL 460 FL 240	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (4)	
▲ ELGOR	033014N 1054818E						
	087° 267°	2.6NM	FL 460 FL 240	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (4)	
△ UPVUN (WSJC/WIIF FIR BDRY)	033022N 1055053E						
	087° 267°	30.5NM	FL 600 FL 245	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (4) (5)	
▲ OPULA	033155N 1062118E						
	087° 267°	34.3NM	FL 600 FL 245	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (5)	
▲ LUSMO	033341N 1065534E						
	075° 255°	110.7NM	FL 600 FL 245	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (5)	
▲ GULGU (WSJC/WIIF FIR BDRY)	040141N 1084242E						
	075° 255°	53.9NM	FL 460 FL 240	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (2)	
▲ TERIX	041521N 1093456E						
	075° 255°	140.5NM	FL 460 FL 240	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (2)	
▲ OLKIT (WSJC/WBFC FIR BDRY)	045010N 1115118E						
Point/Segment Remarks: (2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover between GULGU and OLKIT within the Singapore FIR. (3) Segment from VPK to IDSEL use: P123.7 MHz S127.3 MHz (4) Segment from IDSEL to UPVUN use: P134.7 MHz S134.15 MHz (5) Segment from UPVUN to GULGU to contact Jakarta ACC.							

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates					Remarks
{RNP Type}	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	Direction of cruising levels ↓ ↑		Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M761		Route availability: (1) H24				
▲ PEKAN DVOR/DME (VPK)	032259N 1032524E					
	105° 285°	46.0NM	FL 460 FL 240	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (2)
▲ KETOD (WMFC/WSJC FIR BDRY)	031042N 1040942E					
	105° 285°	10.8NM	FL 460 FL 240	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (3)
▲ OTLON	030752N 1042006E					
	105° 285°	21.0NM	FL 460 FL 240	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (3)
▲ KILOT	030217N 1044023E					
	105° 285°	32.3NM	FL 460 FL 240	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (3)
▲ LIPRO	025342N 1051128E					
	105° 285°	2.4NM	FL 460 FL 240	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (3)
▲ BOPVA (WSJC/WIIF FIR BDRY) (Delegated airspace BDRY)	025303N 1051349E					
	105° 285°	30.9NM	FL 600 FL 245	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (3)
▲ OSERU (Delegated airspace BDRY)	024450N 1054334E					
<p><u>Point/Segment Remarks:</u></p> <p>(2) Segment from VPK to KETOD use: P123.7 MHz S127.3 MHz</p> <p>(3) Segment from KETOD to OSERU use: P134.7 MHz S134.15 MHz</p> <p>(4) Flights above FL370 between BOPVA and OSERU, see AIP Indonesia ENR 2.1.</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name {RNP Type}	Significant Point Coordinates		Upper limit Lower limit	Direction of cruising levels		Remarks
	Track MAG ↓ ↑	Dist NM		↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M763		Route availability: (1) H24				
▲ ENREP	045224N 1041442E					(2)
		70.3NM	FL 460 FL 240	Even ⁽¹⁾	Odd ⁽¹⁾	[Class A]
▲ TAXUL (WMFC/WSJC FIR BDRY)	035035N 1034037E					(2)
		31.4NM	FL 460 FL 240	Even ⁽¹⁾	Odd ⁽¹⁾	[Class A]
▲ PEKAN DVOR/DME (VPK)	032259N 1032524E					
<p><u>Route Remarks:</u> Lateral Limits: 10NM either side of line joining VPK DVOR/DME to TAXUL and 25NM either side of line joining TAXUL to ENREP.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.3 MHz</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates		Direction of cruising levels			Remarks
{RNP Type}	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M765	Route availability: (1) H24					
▲ IGARI	065612N 1033506E					
		53.3NM	FL 460 FL 135	Even ⁽¹⁾	Odd ⁽¹⁾	[Class B] ⁽²⁾
▲ VENLI (WMFC/WSJC FIR BDRY)	062848N 1024900E					
<p><u>Route Remarks:</u> Lateral Limits: 10NM either side of line joining VKB DVOR/DME to IGARI. Portion of M765 within the Singapore FIR has been delegated to Lumpur ACC for provision of ATS. Lumpur ACC FREQ: 132.6MHz</p> <p><u>Point/Segment Remarks:</u> (2) VKB 058° 88.8NM</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name		Significant Point Coordinates			Remarks	
{RNP Type}		Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	Direction of cruising levels ↓ ↑	
1		2	3	4	5	6
7						
M767		Route availability: (1) H24				
←	▲ TEGID (RPHI/WSJC FIR BDRY)	085656N 1155143E				
←	(10)	233° -	242.5NM	FL 460 FL 205		[Class A] (2) (3)
←	▲ TODAM	063138N 1123536E				
←	(10)	233° -	225.5NM	FL 460 FL 205		[Class A] (2) (3)
←	▲ TERIX	041521N 1093456E				
	(10)	233° -	54.0NM	FL 460 FL 205		[Class A] (2) (3)
	▲ UKLIS (WSJC/WIIF FIR BDRY)	034234N 1085149E				
	(10)	233° -	132.8NM	FL 600 FL 205		[Class A] (2) (3) (4)
	▲ BOBOB	022206N 1070558E				
	(10)	233° -	69.6NM	FL 600 FL 205		[Class A] (4)
	▲ NIXEB (Delegated airspace BDRY)	013943N 1061040E				
	(10)	232° -	29.4NM	FL 600 FL 205		[Class A – ABV FL150] (4)
←	▲ TOMAN	012147N 1054717E				
←	Route Remarks: Uni-directional for south-west bound flights from TEGID to TOMAN. No PDC Flight Levels FL310, FL320, FL350, FL360, FL390, FL400 applicable. Other levels available with prior approval.					
	Point/Segment Remarks:					
	(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between TEGID and UKLIS) within the Singapore FIR.					
	(3) Segment from UKLIS to NIXEB to contact Jakarta ACC.					
	(4) Segment from NIXEB to TOMAN use: P134.2 MHz S133.35 MHz					
	(5) Flights above FL370 from NIXEB to TOMAN, see AIP Indonesia ENR 2.1.					

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates			Direction of cruising levels		Remarks
{RNP Type}	Track MAG	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M772		Route availability: (1) H24				
▲ LAXOR (WSJC/RPHI FIR BDRY)	094937N 1144829E					(2)
(10)	020° -	147.5NM	FL 460 FL 240		Even ⁽¹⁾	[Class A]
▲ BIDAG	073101N 1135544E					(2)
(10)	020° -	97.9NM	FL 460 FL 240		Even ⁽¹⁾	[Class A]
▲ ASISU (WBFC/WSJC FIR BDRY)	055906N 1132046E					(3)
<p><u>Route Remarks:</u> Lateral Limits: 25NM either side of line joining ASISU to LAXOR.</p> <p>Available only for flights departing from : - WIII and WIHH to VHHH and airports in People's Republic of China. - WBGB, WBSB, WBG, WBKL, WBGR and WBSG to VHHH only.</p> <p>ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover within the Singapore FIR.</p> <p><u>Point/Segment Remarks:</u> (2) NIL (3) BRU 305° 113.3NM</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name {RNP Type}	Significant Point Coordinates		Direction of cruising levels		Remarks	
	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M774		Route availability: (1) H24				
▲ JUNHA	005413N 1043052E					
(10)	101° 281°	61.3NM	FL 600 5500 FT ALT	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A - ABV FL150] [Class B - BLW FL150]
▲ OTLAL (Delegated airspace BDRY)	004209N 1053052E					
(10)	101° 281°	86.8NM	FL 600 5500 FT ALT	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] [Class B]
▲ OBDOS	002503N 1065551E					
<p><u>Route Remarks:</u> Singapore ACC FREQ: P134.4 MHz S128.1 MHz</p> <p><u>Flight Planning:</u> Flights overflying Singapore to destinations north of Kuala Lumpur and Subang to flight plan via M774 JUNHA IRTAD A464 SJ G579 VJB Y342 AROSO Y513. Flights overflying Singapore to land at Kuala Lumpur and Subang to flight plan via M774 JUNHA IRTAD A464 SJ G579 VJB A457. All departures from Singapore aerodromes joining ATS route M774 to flight plan via HOSBA G580 DODSO T21.</p> <p><u>Point/Segment Remarks:</u> Flights above FL370 between JUNHA and OBDOS, see AIP Indonesia ENR 2.1.</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates		Direction of cruising levels		Remarks	
{RNP Type}	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M904	Route availability: (1) H24					
▲ TIDAR (WSJC/VTBB FIR BDRY)	065230N 1025000E					
(10)	144° 324°	19.8NM	FL 460 6500 FT ALT	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A (FL290 and ABV)] (2)
▲ ODOÑO	063614N 1030129E					
(10)	144° 324°	33.1NM	FL 460 FL 145	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A (FL290 and ABV)] (2)
▲ UPRON	060903N 1032040E					
(10)	144° 324°	93.4NM	FL 460 FL 245	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A (FL290 and ABV)] (2)
▲ ENREP	045224N 1041442E					
<p><i>Route Remarks:</i> Singapore ACC FREQ: P134.35 MHz S134.9 MHz</p> <p>ADS-C service is available to suitably equipped aircraft operating outside radar cover and not in the exclusive ADS-B airspace within the Singapore FIR.</p> <p><i>Point/Segment Remarks:</i> (2) NIL</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name {RNP Type}	Significant Point Coordinates		Direction of cruising levels		Remarks	
	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
N502		Route availability: (1) H24				
▲ BOBAG	010230N 1032954E					
(5)	336° -	105.3NM	FL 600 FL 275		Even ⁽¹⁾	[Class A]
▲ PARDI	003400S 1041300E					
<p><u>Route Remarks:</u> Singapore ACC FREQ: P134.4 MHz S128.1 MHz</p> <p><u>Point/Segment Remarks:</u> Flights above FL370 from PARDI to BOBAG, see AIP Indonesia ENR 2.1.</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates					Remarks
{RNP Type}	Track MAG	Dist NM	Upper limit Lower limit	Direction of cruising levels		Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
N875		Route availability: (1) H24				
← ▲ ENREP	045224N 1041442E					
←	131° 311°	44.1NM	FL 460 FL 245	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (2)
← ▲ NOPAT	042313N 1044756E					
←	131° 311°	16.3NM	FL 460 FL 245	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (2)
← ▲ DAMOG	041225N 1050014E					
←	131° 311°	20.6NM	FL 460 FL 245	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (2)
← ▲ SUSAR	035848N 1051547E					
←	131° 311°	21.8NM	FL 460 FL 245	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (3)
← ▲ MUMSO	034420N 1053213E					
←	131° 311°	21.3NM	FL 460 FL 245	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (3)
← ▲ ELGOR	033014N 1054818E					
←	131° 311°	1.3NM	FL 460 FL 245	Odd ⁽¹⁾	Even ⁽¹⁾	[Class A] (3)
← ▲ AKDAT (WSJC/WIIF FIR BDRY)	032923N 1054917E					
Point/Segment Remarks: (2) Segment from ENREP to SUSAR use: P123.7 MHz S127.3 MHz (3) Segment from SUSAR to AKDAT use: P134.7 MHz S134.15 MHz						

Route Designator {RNP Type}		[Route Usage Notes]					Remarks
Significant Point Name {RNP Type}		Significant Point Coordinates		Upper limit Lower limit	Direction of cruising levels		Controlling unit Frequency {Airspace class} Remarks
		Track MAG ↓ ↑	Dist NM		↓	↑	
1		2	3	4	5	6	7
N884		Route availability: (1) H24					
▲ LAXOR (WSJC/RPHI FIR BDRY)		094937N 1144829E					
(10)		051° -	246.6NM	FL 460 6500 FT ALT			[Class A] (2)
▲ LAGOT		071632N 1113243E					
(10)		051° -	242.9NM	FL 460 6500 FT ALT			[Class A] (2)
▲ RILRI (WSJC/WIIF FIR BDRY)		044343N 1082239E					
(10)		051° -	111.5NM	FL 600 6500 FT ALT		Odd ⁽¹⁾	[Class A] [Class B] [Class C] (5)
▲ LUSMO		033341N 1065534E					
(10)		069° -	53.0NM	FL 600 6500 FT ALT		Odd ⁽¹⁾	[Class A] [Class B] (5)
▲ LEBIN		031438N 1060604E					
(10)		069° -	32.2NM	FL 600 6500 FT ALT		Odd ⁽¹⁾	[Class A] [Class B] (5)
▲ OLMUT (Delegated airspace BDRY)		030306N 1053558E					
(10)		069° -	22.5NM	FL 600 6500 FT ALT			[Class A - ABV FL150] [Class B - BLW FL150] (3)
▲ VEGLO (WSJC/WIIF FIR BDRY)		025502N 1051457E					
(10)		069° -	3.7NM	FL 460 6500 FT ALT			[Class A] (3)
▲ LIPRO		025342N 1051128E					
(10)		069° -	34.2NM	FL 460 6500 FT ALT			[Class A] (3)
▲ LENDA (WSJC/WMFC FIR BDRY)		024124N 1043932E					
(10)		069° -	50.6NM	FL 460 6500 FT ALT			[Class A] (4)
▲ MERSING DVOR/DME (VMR)		022318N 1035218E					
<p>Route Remarks: Uni-directional for east bound flights from VMR to LAXOR. No PDC Flight Levels FL310, FL320, FL350, FL360, FL390, FL400 applicable. Other levels available with prior approval.</p> <p>Flight planning: Not available for flight planning between VMR and OLMUT. Flight Plan via TOMAN L625.</p> <p>Point/Segment Remarks:</p> <p>(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between RILRI and LAXOR) within the Singapore FIR.</p> <p>(3) Segment from OLMUT to LENDA use: P134.7 MHz S134.15 MHz</p> <p>(4) Segment from LENDA to VMR use: P133.8 MHz S127.3 MHz</p> <p>(5) Segment from OLMUT to RILRI to contact Jakarta ACC.</p> <p>(6) Flights above FL370 from VEGLO to OLMUT, see AIP Indonesia ENR 2.1.</p>							

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates		Direction of cruising levels		Remarks	
{RNP Type}	Track MAG	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
P501		Route availability: (1) H24				
← ▲ ARAMA (Delegated airspace BDRY)	013654N 1030712E					
← (10)	146° -	25.0NM	FL 460 9500 FT ALT	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150] ⁽²⁾
← ▲ ANBUS (WMFC/WIIF FIR BDRY) (Delegated airspace BDRY)	011554N 1032100E					
← (10)	146° -	16.0NM	FL 600 9500 FT ALT	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150] ⁽²⁾
← ▲ BOBAG	010230N 1032954E					
(10)	134° -	41.2NM	FL 600 FL 275	Odd ⁽¹⁾		[Class A] ⁽³⁾
← ▲ UXATI	003348N 1035933E					
(10)	134° -	19.2NM	FL 600 FL 275	Odd ⁽¹⁾		[Class A] ⁽³⁾
← ▲ POSOG	002024N 1041323E					
(10)	134° -	53.7NM	FL 600 FL 275	Odd ⁽¹⁾		[Class A] ⁽³⁾
← ▲ ANITO	001700S 1045200E					
← Point/Segment Remarks:						
(2) Segment from ARAMA to BOBAG use: P133.25 MHz S135.8 MHz						
(3) Segment from BOBAG to ANITO use: P134.4 MHz S128.1 MHz						
(4) Flights above FL370 from ANBUS to ANITO, see AIP Indonesia ENR 2.1.						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name {RNP Type}	Significant Point Coordinates		Upper limit Lower limit	Direction of cruising levels		Remarks
	Track MAG ↓ ↑	Dist NM		↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
Q801	Route availability: (1) H24					
▲ ESPOB (VHMM/WSJC FIR BDRY)	070000N 1053318E					
		143.0NM	FL 460 FL 200			[Class A]
▲ ESBUM	045210N 1042830E					
<p><u>Route Remarks:</u> Lateral Limits: 15NM either side of line joining ESPOB TO ESBUM.</p> <p>Flight planning for Direct Routing Operations (DRO): Arriving aircraft into Singapore Changi Airport operating at FL290 to FL460 (inclusive) and entering Singapore FIR via ESPOB should flight plan using the direct route ESPOB DCT ELALO.</p> <p>Uni-directional for southbound flights from ESPOB to ESBUM. No PDC Flight Levels FL310, F320, F350, FL360, FL390, FL400 applicable. Other levels available with prior approval.</p> <p>Singapore ACC FREQ: P134.35 MHz S134.9 MHz</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates		Direction of cruising levels		Remarks	
{RNP Type}	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
T21	Route availability: (1) H24					
▲ JUNHA	005413N 1043052E					
(2)	041° -	34.6NM	FL 600 3000 FT ALT	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150]
▲ VEBMA	012030N 1045332E					
(2)	088° -	53.8NM	FL 600 3000 FT ALT	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150]
▲ TOMAN	012147N 1054717E					
(2)	088° -	26.8NM	FL 600 5500 FT ALT	Odd ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150]
▲ DODSO (Delegated airspace BDRY)	012225N 1061402E					
<p><u>Route Remarks:</u> Singapore ACC FREQ: P134.2 MHz S133.35 MHz</p> <p><u>Flight Planning Instructions:</u> All departures from Singapore aerodromes, Batam and Tanjungpinang joining ATS route L504 or M774 to flight plan via DODSO T21.</p> <p><u>Point/Segment Remarks:</u> Flights above FL370 from JUNHA to DODSO, see AIP Indonesia ENR 2.1.</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates		Direction of cruising levels		Remarks	
{RNP Type}	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
T22	Route availability: (1) H24					
▲ OBDOS	002503N 1065551E					
(2)	278° -	92.4NM	FL 600 3000 FT ALT	Even ⁽¹⁾		[Class A] [Class B]
▲ UGEB0	003813N 1052432E					
<p><u>Route Remarks:</u> Singapore ACC FREQ: P134.2 MHz S133.35 MHz</p> <p><u>Flight Planning Instructions:</u> Arrivals into Changi, Batam and Tanjungpinang on L504 or M774 to flight plan via OBDOS – UGEB0. After UGEB0, to join the UGEB0 STAR. Arrivals into WSSL and WSAP on L504 or M774 to flight plan via OBDOS – T22 – UGEB0 – T23 – JUNHA. After JUNHA to route either to OMKOM or SJ.</p> <p><u>Point/Segment Remarks:</u> Flights above FL370 from OBDOS to UGEB0, see AIP Indonesia ENR 2.1.</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates		Direction of cruising levels		Remarks	
{RNP Type}	Track MAG	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
T23		Route availability: (1) H24				
▲ SURGA	003657S 1063119E					
(2)	318° -	100.4NM	FL 600 3000 FT ALT	Even ⁽¹⁾		[Class A] [Class B]
▲ UGEBO	003813N 1052432E					
(2)	286° -	56.1NM	FL 600 5500 FT ALT	Even ⁽¹⁾		[Class A - ABV FL150] [Class B - BLW FL150]
▲ JUNHA	005413N 1043052E					
<p><u>Route Remarks:</u> Singapore ACC FREQ: P134.2 MHz S133.35 MHz</p> <p><u>Flight Planning Instructions:</u> Arrivals into Changi, Batam and Tanjungpinang on M635 to flight plan via SURGA – UGEBO. After UGEBO, to join the UGEBO STAR. Arrivals into WSSL and WSAP on M635 to flight plan via SURGA – T23 – JUNHA. After JUNHA to route either to OMKOM or SJ.</p> <p><u>Point/Segment Remarks:</u> Flights above FL370 from SURGA to JUNHA, see AIP Indonesia ENR 2.1.</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name {RNP Type}	Significant Point Coordinates		Upper limit Lower limit	Direction of cruising levels		Remarks
1	Track MAG ↓ ↑	Dist NM	2	3	4	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
T24	Route availability: (1) H24					
▲ JUNHA	005413N 1043052E					
(2)	163° -	27.0NM	FL 600 3000 FT ALT	Odd ⁽¹⁾		[Class A – ABV FL150] [Class B – BLW FL150]
▲ GURES	002814N 1043835E					
(2)	120° -	26.7NM	FL 600 3000 FT ALT	Odd ⁽¹⁾		[Class A – ABV FL150] [Class B – BLW FL150]
▲ IDBUD (Delegated airspace BDRY)	001454N 1050139E					
(2)	120° -	103.6NM	FL 600 5500 FT ALT	Odd ⁽¹⁾		[Class A] [Class B]
▲ SURGA	003657S 1063119E					
<p><u>Route Remarks:</u> Singapore ACC FREQ: P134.4 MHz S128.1 MHz</p> <p><u>Flight Planning Instructions:</u> All departures from Singapore aerodromes, Batam and Tanjungpinang joining ATS route M635 to flight plan via IDBUD T24.</p> <p><u>Point/Segment Remarks:</u> Flights above FL370 from JUNHA to SURGA, see AIP Indonesia ENR 2.1.</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates		Direction of cruising levels		Remarks	
{RNP Type}	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
T25		Route availability: (1) H24				
▲ AVLUB	003112S 1042501E					
(2)	341° -	18.6NM	FL 600 FL 290	Even ⁽¹⁾		[Class A] [Class B] [Class C]
▲ IGUTU	001331S 1041857E					
Route Remarks: See Indonesia AIP ENR 2.1.						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name {RNP Type}	Significant Point Coordinates		Upper limit Lower limit	Direction of cruising levels		Remarks
	Track MAG ↓ ↑	Dist NM		↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
T611		Route availability: (1) H24				
▲ IPRIX (VVHM/WSJC FIR BDRY)	070000N 1040754E					
		128.0NM	FL 460 FL 200		Even ⁽¹⁾	[Class A]
▲ IPDOL	045111N 1035920E					
		86.0NM	FL 460 FL 200		Even ⁽¹⁾	[Class A]
▲ IDSEL (WMFC/WSJC FIR BDRY)	032432N 1035544E					
<p><u>Route Remarks:</u> Lateral Limits: 15NM either side of line joining IDSEL to IPRIX.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.3 MHz</p>						

<i>Route Designator {RNP Type}</i>		<i>[Route Usage Notes]</i>				
<i>Significant Point Name</i>	<i>Significant Point Coordinates</i>					<i>Remarks</i>
<i>{RNP Type}</i>	<i>Track MAG</i> ↓ ↑	<i>Dist NM</i>	<i>Upper limit</i> <i>Lower limit</i>	<i>Direction of cruising levels</i> ↓ ↑		<i>Controlling unit Frequency {Airspace class} Remarks</i>
1	2	3	4	5	6	7
T612	<i>Route availability:</i> (1) H24					
▲ DOLOX	044841N 1052247E					
		121.0NM	FL 460 FL 200			[Class A]
▲ IDSEL (WMFC/WSJC FIR BDRY)	032432N 1035544E					
<p><i>Route Remarks:</i> Lateral Limits: 15NM either side of line joining IDSEL to DOLOX.</p> <p>Uni-directional for north-east bound flights from IDSEL to DOLOX. No PDC Flight Levels FL310, FL320, FL350, FL360, FL390, FL400 applicable. Other levels available with prior approval.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.30 MHz</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name {RNP Type}	Significant Point Coordinates		Direction of cruising levels		Remarks	
	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
Y332	Route availability: (1) H24					
▲ TAXUL (WSJC/WMFC FIR BDRY)	035035N 1034037E					(2)
	192° -	42.1NM	FL 460 FL 245	Even ⁽¹⁾		
▲ PADLI	030918N 1033133E					(2)
<p><u>Route Remarks:</u> Lateral Limits: 10NM either side of line joining TAXUL to PADLI.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.3 MHz</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates		Direction of cruising levels			Remarks
{RNP Type}	Track MAG	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
Y334	Route availability: (1) H24					
▲ DOVOL (WSJC/WMFC FIR BDRY)	033047N 1034923E					(2)
	219° -	27.8NM	FL 460 FL 245	Even ⁽¹⁾		
▲ PADLI	030918N 1033133E					(2)
<p><u>Route Remarks:</u> Lateral Limits: 10NM either side of line joining DOVOL to PADLI.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.3 MHz</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name {RNP Type}	Significant Point Coordinates		Direction of cruising levels		Remarks	
	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
Y335	Route availability: (1) H24					
▲ IDSEL (WMFC/WSJC FIR BDRY)	032432N 1035544E					
(2)	057° 237°	28.5NM	FL 460 FL 245	Even ⁽¹⁾	Odd ⁽¹⁾	⁽²⁾
▲ PADLI	030918N 1033133E					
<p><u>Route Remarks:</u> Lateral Limits: 10NM on either side of line joining IDSEL to PADLI.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.3 MHz</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates		Direction of cruising levels			Remarks
{RNP Type}	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
Y336	Route availability: (1) H24					
▲ KETOD (WMFC/WSJC FIR BDRY)	031042N 1040942E					
(2)	087° 267°	38.2NM	FL 460 FL 245	Even ⁽¹⁾	Odd ⁽¹⁾	
▲ PADLI	030918N 1033133E					
<p><i>Route Remarks:</i> Lateral Limits: 10NM on either side of line joining KETOD to PADLI.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.3 MHz</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name		Significant Point Coordinates			Remarks	
{RNP Type}		Track MAG	Dist NM	Upper limit Lower limit	Direction of cruising levels	
1		2	3	4	5	6
		↓ ↑			↓	↑
						7
Y339		Route availability: (1) H24				
Δ	AKOMA (20 DME PU)	014522N 1035443E				
(2)			38.3NM	FL 460 5500 FT ALT	Even ⁽¹⁾	[Class A-ABV FL150 Class B-BLW FL150]
Δ	AROSO	020846N 1032421E				
<p><u>Route Remarks:</u> Lateral Limits: 11.5NM either side of line joining AKOMA to AROSO.</p> <p><u>Flight Planning</u> Flights departing from or overflying Singapore FIR to destinations north of WMKK and WMSA are to flight plan via Y339.</p> <p>Flights landing at WMKK and WMSAs, or flights operating at FL220 and below, refer to A457.</p> <p>Singapore ACC FREQ: P133.25 MHz S135.8 MHz</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates			Direction of cruising levels		Remarks
{RNP Type}	Track MAG	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
Y342		Route availability: (1) H24				
▲ JOHOR BAHRU DVOR/DME (VJB)	013950N 1033939E					
(5)		32.6NM	FL 460 4500 FT	Even ⁽¹⁾		[Class A-ABV FL150 Class B-BLW FL150]
Δ AROSO	020846N 1032421E					
<p><u>Route Remarks:</u> Lateral Limits: 10NM either side of line joining VJB to AROSO.</p> <p><u>Flight Planning</u> Flights overflying Singapore FIR to destinations north of WMKK and WMSA are to flight plan via Y342. Flights landing at WMKK and WMSA, refer to A457.</p>						

Route Designator {RNP Type}		[Route Usage Notes]				
Significant Point Name	Significant Point Coordinates		Upper limit Lower limit		Direction of cruising levels	Remarks
{RNP Type}	Track MAG ↓ ↑	Dist NM	Upper limit Lower limit	↓	↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
Y514	Route availability: (1) H24					
▲ VIRID	031728.05N 1031318.04E					
(2)		34.57	FL 460 11000 FT ALT	Odd ⁽¹⁾		[Class A] ⁽²⁾
▲ NUFFA	025341.40N 1033829.80E					
<p><u>Route Remarks:</u> Singapore ACC FREQ: P123.7MHz S127.3MHz</p> <p><u>Flight Planning</u> Arrivals into Changi to flight plan via Y514 - NUFFA - PIBAP - PASPU. After PASPU, expect radar vectors. All other flights to flight plan via Y514 - NUFFA - BIKTA -B469</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p>						

ENR 3.4 HELICOPTER ROUTES

1 HELICOPTER OPERATIONS OVER SINGAPORE ISLAND

1.1 INTRODUCTION

1.1.1 The rapid building development in many parts of Singapore has made it necessary for helicopter operations to be more stringently regulated in order to enhance safety. All helicopter operators are required to adhere strictly to the following procedures.

1.2 RESTRICTED AREA -SINGLE-ENGINE HELICOPTER OPERATIONS RESTRICTED

1.2.1 Single-engine helicopters are restricted from operating over and within the city area enclosed in the triangle bounded by the following locations:

- a. South of Rochor River/Kallang River (011817N 1035205E);
- b. Shenton Way/Keppel Road (011623N 1035045E); and
- c. Scotts Road/Orchard Road (011818N 1034954E).

Part of this triangle lies within the existing Restricted Area WSR38 (see charts [ENR 3.4-5](#) and [ENR 3.4-7](#)).

← 1.3 ROUTINGS

1.3.1 All helicopters must fly over water or use routes approved by the CAAS. There are two over-water and one over-land helicopter routes.

1.3.2 These helicopter routes are to be flown in VMC and in daylight hours. They could either be flown separately or in combination (see chart [ENR 3.4-5](#)).

1.4 OVER-WATER ROUTES

1.4.1 One of the two over-water routes is to the north of Singapore Island for helicopter flights into and out of Seletar Aerodrome. The other route is along the southern shore of Singapore. They are as described below.

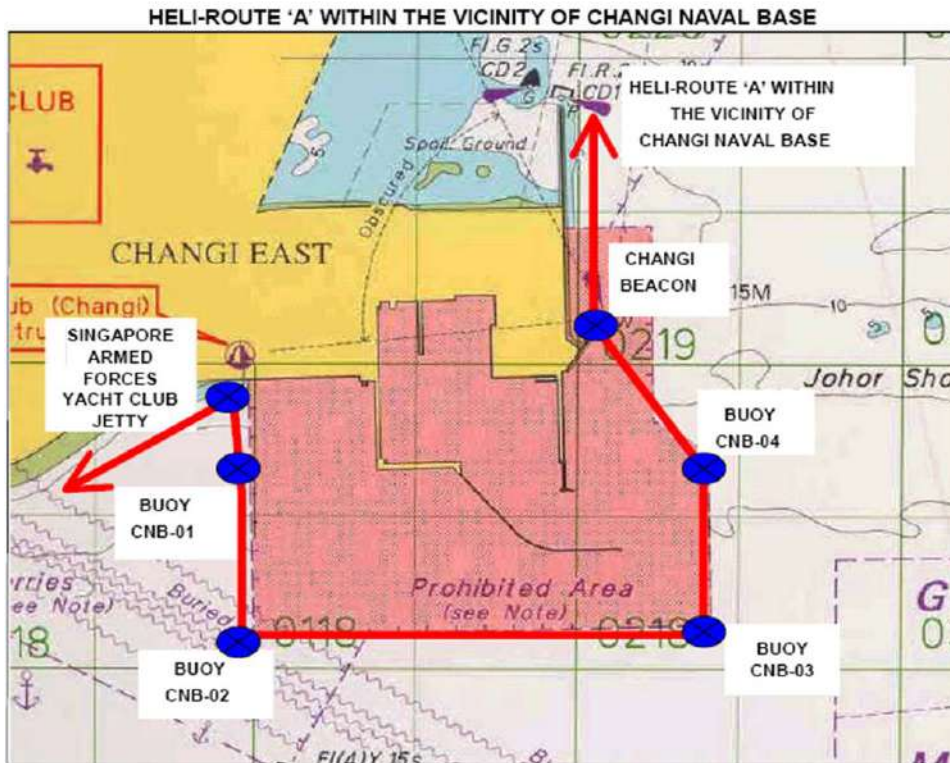
1.4.1.1 Heli-Route Alpha

This route covers the area from Johor Causeway eastbound over water along Selat Johor, following the coastline of Singapore Island via the northern contour of Pulau Ubin and along the eastern coastline, down to Bedok Jetty (011819N 1035632E) and vice versa. Within the vicinity of Changi Naval Base (CNB), transiting helicopters are to keep laterally clear by tracking along the following markers located about 1km from the Naval Base (see table below and diagram on page [ENR 3.4-2](#)).

	Markers Description	Coordinates	Remarks
a)	CHANGI BEACON	011909N 1040206E	White lights, 3 flashes every 15 sec
b)	BUOY CNB-04	011844N 1040224E	Yellow buoy, 3m above waterline Yellow lights, 1 flash every 2 sec
c)	BUOY CNB-03	011809N 1040224E	Yellow buoy, 3m above waterline Yellow lights, 1 flash every 2 sec
d)	BUOY CNB-02	011806N 1040100E	Yellow buoy, 3m above waterline Yellow lights, 1 flash every 2 sec
e)	BUOY CNB-01	011829N 1040059E	Yellow buoy, 3m above waterline Yellow lights, 1 flash every 2 sec
f)	Singapore Armed Forces Yacht Club Jetty	011851N 1040058E	Yellow lights, 3 lamp posts along jetty

Note: Pilots are to adhere strictly to the above transit routes.

Height: Minimum 200ft AMSL or as specified by the appropriate air traffic control authority.



1.4.1.2 **Heli-Route Bravo**

Originates from Bedok Jetty (011819N 1035632E), following the coastline of Singapore Island via the southern tip and contour of Sentosa towards Tuas and vice versa.

Height : Minimum 200ft AMSL or as specified by the appropriate air traffic control authority.

1.5 OVER-LAND ROUTE

1.5.1 The over-land transit route established to facilitate helicopter movements across the Singapore Island is as follows:

1.5.1.1 **Heli-Route Charlie**

Originates from Johor Causeway, southbound to Murnane Reservoir (012104N1034710E) along the eastern side of Bukit Timah Expressway. From Murnane Reservoir, southbound to PIE. Overfly PIE westbound to Anak Bukit Flyover (011956N1034552E). From Anak Bukit Flyover southbound to Pandan River (011920N1034507E). Fly over the Pandan River to Pandan Reservoir (011819N1034438E) and vice versa. To avoid overflying built-up areas and the Unmanned Aircraft Flying Area (UAFA) established at Pandan Reservoir (please refer to ENR 5), en-route by routing over open areas / nature reserve areas or as specified by the appropriate air traffic control authority. Height: Pilots to maintain minimum 1,500ft AMSL or as specified by the appropriate air traffic control authority. For southbound, commence descend after passing Pandan River (011920N1034507E). For northbound, to ascend to an altitude of 1,500ft AMSL prior to passing Pandan River (011920N1034507E).

1.6 CONDITIONS GOVERNING THE USE OF HELI-ROUTE CHARLIE

1.6.1 The over-land route is established based on evidence of ground features and is therefore subject to CAAS's review. Approval to use the route is given with the following conditions:

- a. The operator is fully satisfied that the route can be flown within the flight capability of the helicopter and that there are adequate suitable emergency landing sites along the route when in use. It remains the responsibility of the operator to ensure that his pilots are familiar with the route and the conditions governing them.
- b. The route is to be flown in VMC and in daylight hours.
- c. Prior ATC clearance from the appropriate controlling authority must be obtained.

← **1.7 FLIGHTS OPERATING OUTSIDE THE ESTABLISHED ROUTINGS**

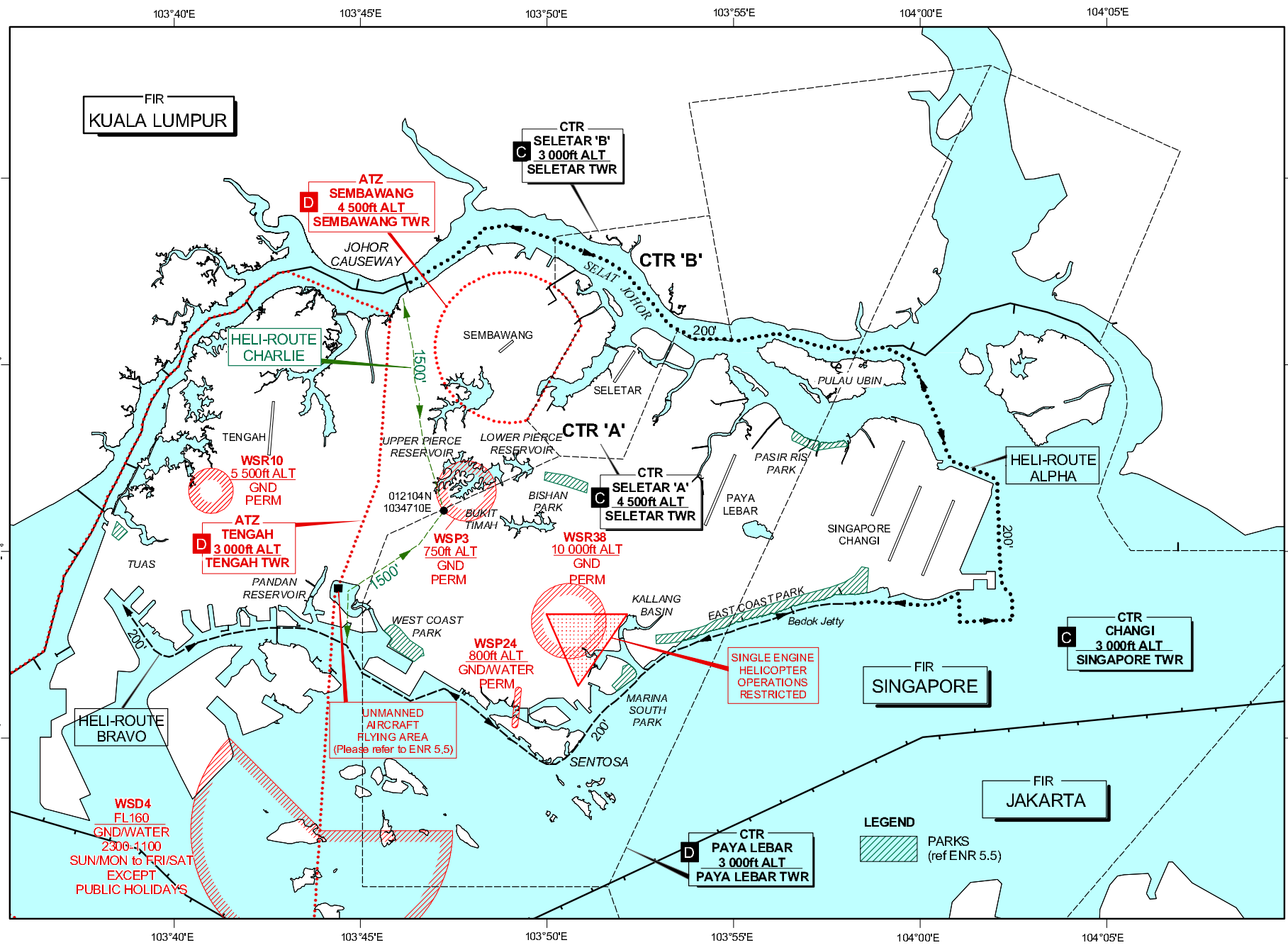
1.7.1 With the exception of an emergency situation, at all times, a helicopter shall not be operated within the Changi Control Zone or overland and outside of Heli-Route Charlie, unless prior permission has been obtained from the Director-General, CAAS.

HELICOPTER ROUTES IN VMC

© 2024 Civil Aviation Authority Singapore

CHANGES : Redignment of Jakarta-Singapore FIR

AIP AMDT 02/2024



103°40'E

103°45'E

103°50'E

103°55'E

104°00'E

104°05'E

01° 30'

01° 25'

01° 20'

01° 15' N

103°40'E

103°45'E

103°50'E

103°55'E

104°00'E

104°05'E

FIR
KUALA LUMPUR

CTR
SELETAR 'B'
3 000ft ALT
SELETAR TWR

ATZ
SEMBAWANG
4 500ft ALT
SEMBAWANG TWR

CTR 'B'

HELI-ROUTE
CHARLIE

WSR10
5 500ft ALT
GND PERM

ATZ
TENGGAH
3 000ft ALT
TENGGAH TWR

UPPER PIERCE
RESERVOIR

1012104N
1034710E

BUKIT
TIMAH

WSR3
750ft ALT
GND PERM

LOWER PIERCE
RESERVOIR

BISHAN
PARK

CTR
SELETAR 'A'
4 500ft ALT
SELETAR TWR

WSR38
10 000ft ALT
GND PERM

PASIR RIS
PARK

PAYA
LEBAR

SINGAPORE
CHANGI

HELI-ROUTE
ALPHA

CTR
CHANGI
3 000ft ALT
SINGAPORE TWR

FIR
SINGAPORE

HELI-ROUTE
BRAVO

WSR4
FL160
GND/WATER
2300-1100
SUN/MON to FRI/SAT
EXCEPT
PUBLIC HOLIDAYS

UNMANNED AIRCRAFT
FLYING AREA
(Please refer to ENR 5.5)

WSR24
800ft ALT
GND/WATER
PERM

KALLANG
BASIN

EAST COAST PARK

Bedok Jetty

MARINA
SOUTH
PARK

SENTOSA

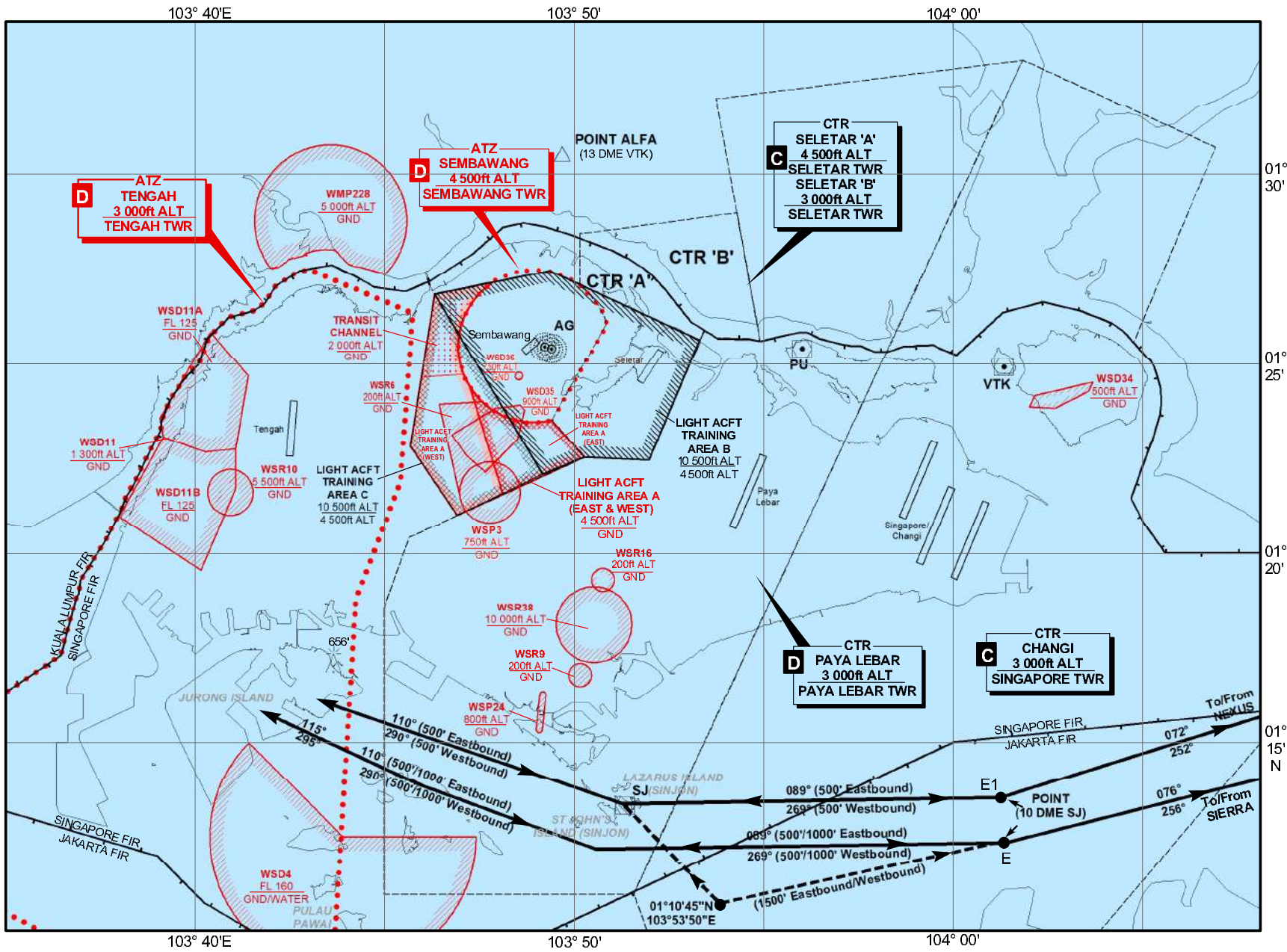
CTR
PAYA LEBAR
3 000ft ALT
PAYA LEBAR TWR

LEGEND
PARKS
(ref ENR 5.5)

FIR
JAKARTA

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VMC CROSSING BY MILITARY AIRCRAFT



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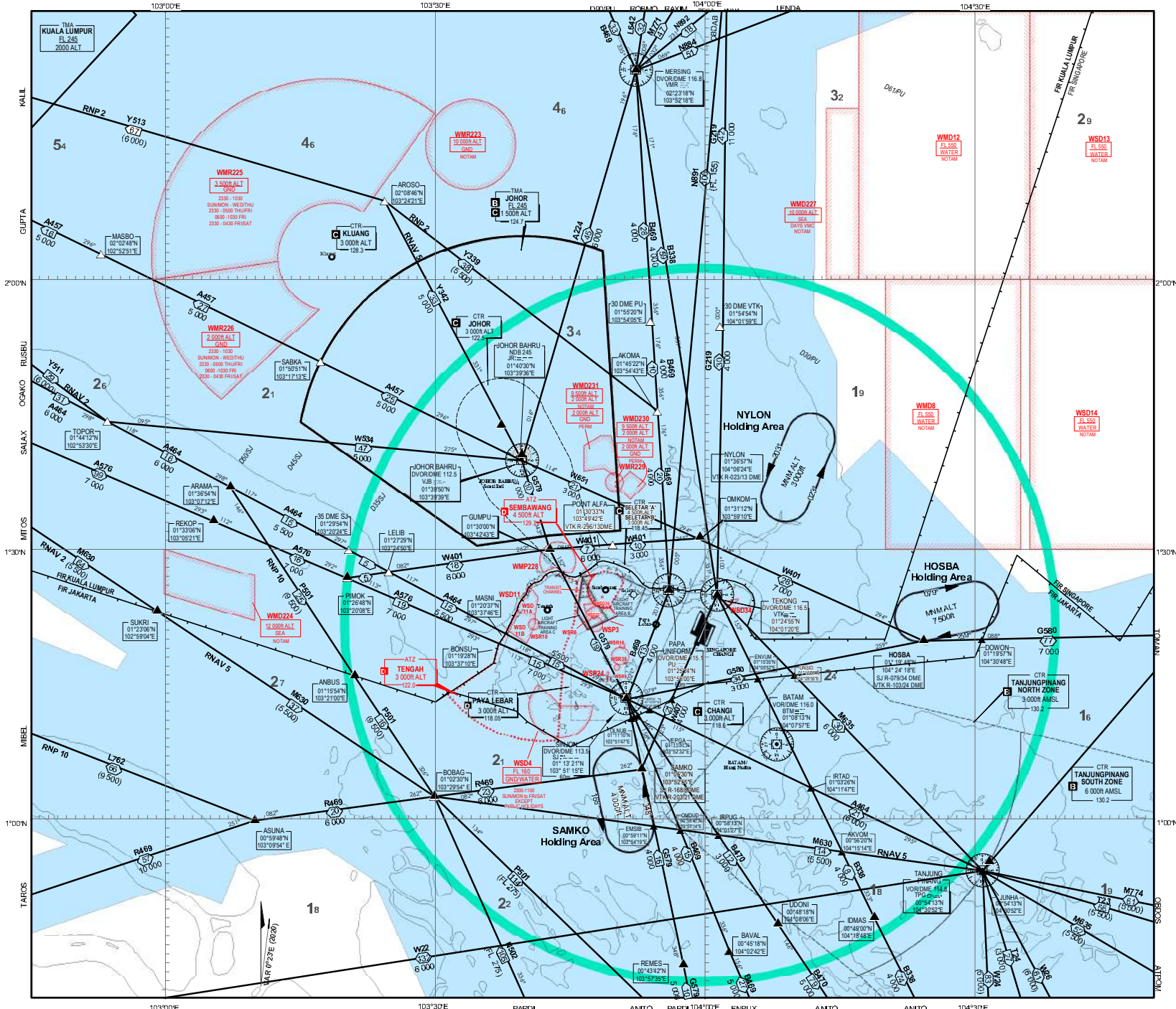
ENR 3.6 ENROUTE HOLDING

<i>HLDG ID/FIX/WPT Coordinates</i>	<i>INBD TR (*Mag)</i>	<i>Direction of Procedure Turn</i>	<i>MAX IAS</i>	<i>MNM-MAX HLDG Level</i>	<i>Time (min)</i>	<i>Controlling Unit and Frequency</i>
1	2	3	4	5	6	7
BOBAG - Low Level 38.6 DME VTK R-234.7 24.0 DME SJ R-243.2 010230N 1032954E	082	Right	220kt*	FL 140 6000 FT ALT	1	Singapore APP 124.6 MHz (PRI) 132.15 MHz (SRY)
BOBAG - High Level 38.6 DME VTK R-234.7 24.0 DME SJ R-243.2 010230N 1032954E	082	Right	250kt*	FL 180 FL 150	1	Singapore ACC 133.25 MHz (PRI) 135.8 MHz (SRY)
ELALO 041240N 1043329E	174	Left	300kt	FL 350 FL 280	1.5	Singapore ACC 123.7 MHz (PRI) 127.3 MHz (SRY)
HOSBA (HHA) - Low Level 34 DME SJ R-079 24 DME VTK R-103 011948N 1042418E	259	Right	230kt*	FL 140 7000 FT ALT	1	Singapore APP 120.3 MHz (PRI) 132.15 MHz (SRY)
HOSBA (HHA) - High Level 34 DME SJ R-079 24 DME VTK R-103 011948N 1042418E	259	Right	265kt*	FL 250 FL 150	1.5	Singapore ACC 134.4 MHz (PRI) 128.1 MHz (SRY) 255.4 MHz
KARTO 93.5 DME VTK R-098.3 102.6 DME SJ R-091.1 011124N 1053343E	268	Left	← ←250kt*	FL 310 FL 170	1.5	Singapore ACC 134.2 MHz (PRI) 133.35 MHz (SRY)
KEXAS 49.2 DME VTK R-107.2 011019N 1044818E	268	Left	220kt*	FL 160 11000 FT ALT	1	Singapore APP 124.05 MHz (PRI) 132.15 MHz (SRY)
KILOT 030217N 1044023E	227	Left	← ←250kt	FL 270 FL 220	1.5	Singapore ACC 134.7 MHz (PRI) 134.15 MHz (SRY)
LAMA 7 DME PU R-024 013150N 1035850E	204	Right	← ←230kt*	FL 140 2500 FT ALT	1	Singapore APP 126.025 MHz (PRI) 132.15 MHz (SRY)
MABAL 142.1 DME VTK R-030.1 157.2 DME SJ R-031.2 032826N 1051236E	231	Left	← ←300kt*	FL 350 FL 280	1.5	Singapore ACC 123.7 MHz (PRI) 127.3 MHz (SRY)
NYLON (NHA) - Low Level 13 DME VTK R-023 013657N 1040624E	203	Left	←220kt*	FL 140 3000 FT ALT	1	Singapore APP 124.05 MHz (PRI) 132.15 MHz (SRY)
NYLON (NHA) - High Level 13 DME VTK R-023 013657N 1040624E	203	Left	← ←265kt*	FL 250 FL 150	1.5	Singapore ACC 124.6 MHz (PRI) 132.15 MHz (SRY)
REMES 30 DME SJ R-168 004342N 1035735E	348	Left	←220kt	FL 140 6000 FT ALT	1	Singapore APP 124.6 MHz (PRI) 132.15 MHz (SRY)
REPOV 68.2 DME VTK R-178.6 57.9 DME SJ R-168.3 001623N 1040300E	348	Left	250kt*	FL 250 FL 150	1.5	Singapore ACC 134.4 MHz (PRI) 128.1 MHz (SRY)
SAMKO (SHA) - Low Level 8 DME SJ R-168 21 DME VTKR-203.5 010530N 1035255E	348	Left	←220kt*	FL 140 4000 FT ALT	1	Singapore APP 120.3 MHz (PRI) 124.6 MHz (SRY)

<i>HLDG ID/FIX/WPT Coordinates</i>	<i>INBD TR (°Mag)</i>	<i>Direction of Procedure Turn</i>	<i>MAX IAS</i>	<i>MNM-MAX HLDG Level</i>	<i>Time (min)</i>	<i>Controlling Unit and Frequency</i>
1	2	3	4	5	6	7
SAMKO (SHA) - High Level 8 DME SJ R-168 21 DME VTK R-203.5 010530N 1035255E	348	Left	265kt*	FL 250 FL 150	1.5	Singapore ACC 133.25 MHz (PRI) 135.8 MHz (SRY)
SINJON SJ DVOR/DME 011321N1035115E	348	Right	←230kt*	FL 140 4500 FT ALT	1	Singapore APP 120.3 MHz (PRI) 124.6 MHz (SRY)
TUSPI 003301N 1040959E	350	Right	220kt	10000 FT ALT 4000 FT ALT	1	Singapore APP 124.6 MHz (PRI) 132.15 MHz (SRY)
UGEBO 003813N 1052432E	310	Left	250kt*	FL 310 FL 170	1.5	Singapore ACC 134.2 MHz (PRI) 133.35 MHz (SRY)
VAMPO 44.5 DME VTK R233.9 005833N 1032525E	149	Right	220kt*	FL 180 6000 FT ALT	1	Singapore APP 124.6 MHz (PRI) 132.15 MHz (SRY)

* Maximum speed of 280kt in conditions of turbulence subject to ATC clearance.

AREA CHART - ICAO



LEGEND	
Terminal Control Area (TMA)	<ul style="list-style-type: none"> Name of TMA: JOHOR Airspace Classification: FL 145 Upper Limit: 5 000 Lower Limit: 124.7 Radio frequency(s): 124.7
Control Zone (CTR)	<ul style="list-style-type: none"> Name of CTR: CHANGI Airspace Classification: 3 000 Upper Limit: 3 000 Lower Limit: 118.6 Radio frequency(s): 118.6
Aerodrome Traffic Zone (ATZ)	<ul style="list-style-type: none"> Name of ATZ: TENGAH Airspace Classification: 3 000 Upper Limit: 3 000 Lower Limit: 122.0 Radio frequency(s): 122.0
ATS Routes	<ul style="list-style-type: none"> Route designation: B489 Distance in nautical miles: 1 000 Minimum flight altitude (MFL) / flight level: 4 000 Lower limit: (4 000) FL 160
Reporting Point	<ul style="list-style-type: none"> Com junction: ▲
DME distance from SJ Navaid	D35/SJ
Radio Navigation Aid	<ul style="list-style-type: none"> Name: CHANGI Identifier and frequency: D35/SJ 118.6 Geographical Coordinates: 01°13.2'N 103°51.7'E Elevation of DME in feet: 118.6
Collocated VOR and DME Radio Navigation Aids	<ul style="list-style-type: none"> Compass rose oriented on the chart by Magnetic North
Restricted Airspace (P - Prohibited, R - Restricted, D - Danger)	<ul style="list-style-type: none"> Identification of area: WSD13 Nationality letter: W Vertical limit: 122.0 Activation by NOTAM: NOTAM
Area Minimum Altitude (AMA)	<ul style="list-style-type: none"> Each quadrilateral contains an area minimum altitude (AMA) which represents the lowest altitude which may be used under instrument meteorological conditions (IMC). The AMA provides a minimum clearance of 1 000 feet (300m) above all terrain and obstacles in the quadrilateral. It is represented in the usage and hundreds of feet above mean sea level. Example: 3 400 feet 34

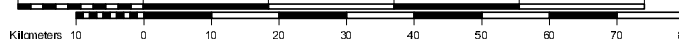
Speed Control Procedures	
<p>Speed control procedures are in force unless notified otherwise by ATC or ATIS.</p> <p>All arriving turbo-propeller and turbo-jet aircraft are to fly as fast as practicable at or above 250 knots when within 40nm from Singapore Changi Airport or when at or below 10,000ft except all arriving aircraft into Singapore Changi Airport shall comply with the speed restrictions as detailed on the transitions and RNAV STARs. Further speed reductions will be regulated by ATC as necessary.</p>	
<p>Pilots who may not be able to comply with the speed limits specified above for reasons of flight safety and/or weather should inform ATC and state the speed(s) achievable.</p>	

AIRSPACE CLASSIFICATION IN THE SINGAPORE FIR		
Airspace	Levels	Classification
Controlled airspace	FL150 to FL460	A
	Surface to FL150	B
Controlled airspace more than 100 nm seaward from the shoreline	Lower limit to FL460	A
		B
Control Zone (CTR)	Changi CTR	C
	Paya Lebar CTR	D
ATZs	Selangor CTR	C
		D
Uncontrolled airspace		G*

* Aircraft operating in the Light Aircraft Training Areas A, B and C (please refer to p.10 of ENR 3-2-1) are required to have continuous two-way communications with the appropriate ATIS authority.

SINGAPORE DATA DEF	
APP	DEF 128025
APP	DEF 1203
TWR	APP 119.3
TWR	APP 12405
TWR	118.6
TWR	118.25

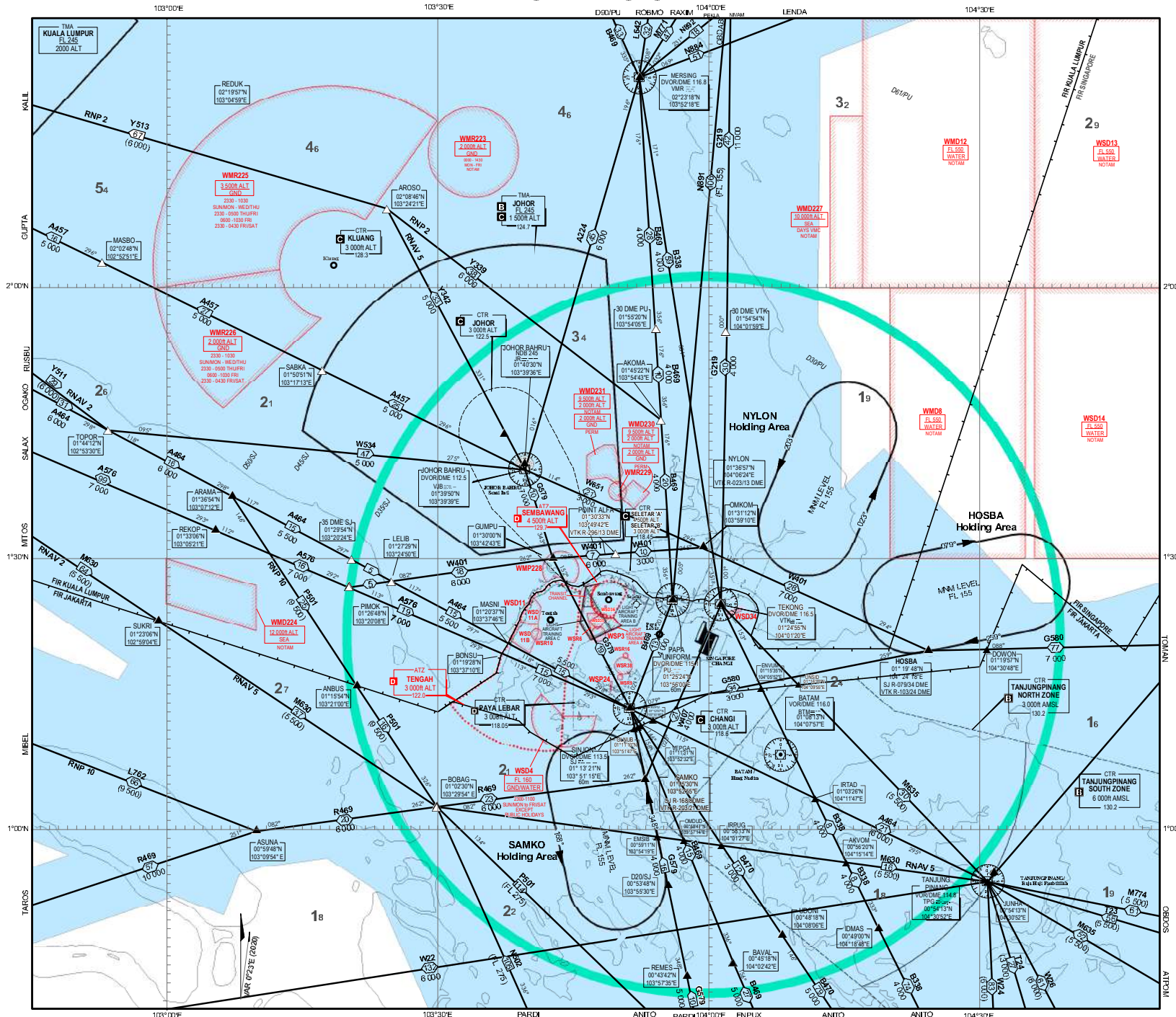
Note:
FOR DEPARTURE AND ARRIVAL ROUTES REFER TO AD-2-WSS3-SD-1 TO AD-2-WSS3-SD-64 AND AD-2-WSS3-STAR-1 TO AD-2-WSS3-STAR-19



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AREA CHART - ICAO

HIGH LEVEL HOLDING AREAS



LEGEND											
Terminal Control Area (TMA)	<table border="1"> <tr> <td>Name of TMA</td> <td>TMA</td> </tr> <tr> <td>Airspace Classification</td> <td>JOHOR</td> </tr> <tr> <td>Upper Limit</td> <td>FL150</td> </tr> <tr> <td>Lower Limit</td> <td>5 000</td> </tr> <tr> <td>Radio frequency (MHz)</td> <td>124.7</td> </tr> </table>	Name of TMA	TMA	Airspace Classification	JOHOR	Upper Limit	FL150	Lower Limit	5 000	Radio frequency (MHz)	124.7
Name of TMA	TMA										
Airspace Classification	JOHOR										
Upper Limit	FL150										
Lower Limit	5 000										
Radio frequency (MHz)	124.7										
Control Zone (CTR)	<table border="1"> <tr> <td>Name of CTR</td> <td>CHANGI</td> </tr> <tr> <td>Airspace Classification</td> <td>Class C</td> </tr> <tr> <td>Upper Limit</td> <td>3 000</td> </tr> <tr> <td>Lower Limit</td> <td>118.6m</td> </tr> <tr> <td>Radio frequency (MHz)</td> <td>124.7</td> </tr> </table>	Name of CTR	CHANGI	Airspace Classification	Class C	Upper Limit	3 000	Lower Limit	118.6m	Radio frequency (MHz)	124.7
Name of CTR	CHANGI										
Airspace Classification	Class C										
Upper Limit	3 000										
Lower Limit	118.6m										
Radio frequency (MHz)	124.7										
Aerodrome Traffic Zone (ATZ)	<table border="1"> <tr> <td>Name of ATZ</td> <td>TENGAH</td> </tr> <tr> <td>Airspace Classification</td> <td>Class E</td> </tr> <tr> <td>Upper Limit</td> <td>3 000ft</td> </tr> <tr> <td>Lower Limit</td> <td>122.0</td> </tr> <tr> <td>Radio frequency (MHz)</td> <td>122.0</td> </tr> </table>	Name of ATZ	TENGAH	Airspace Classification	Class E	Upper Limit	3 000ft	Lower Limit	122.0	Radio frequency (MHz)	122.0
Name of ATZ	TENGAH										
Airspace Classification	Class E										
Upper Limit	3 000ft										
Lower Limit	122.0										
Radio frequency (MHz)	122.0										
ATS Routes	<table border="1"> <tr> <td>Route designator</td> <td>B469</td> </tr> <tr> <td>Distance in nautical miles</td> <td>4 000</td> </tr> <tr> <td>Minimum flight altitude (FT/MSL level)</td> <td>4 000 (FL 160)</td> </tr> <tr> <td>Lower limit (FT/MSL level)</td> <td>(4 000) (FL 160)</td> </tr> </table>	Route designator	B469	Distance in nautical miles	4 000	Minimum flight altitude (FT/MSL level)	4 000 (FL 160)	Lower limit (FT/MSL level)	(4 000) (FL 160)		
Route designator	B469										
Distance in nautical miles	4 000										
Minimum flight altitude (FT/MSL level)	4 000 (FL 160)										
Lower limit (FT/MSL level)	(4 000) (FL 160)										
Reporting Point	<table border="1"> <tr> <td>Compulsory</td> <td>▲</td> </tr> <tr> <td>On request</td> <td>△</td> </tr> </table>	Compulsory	▲	On request	△						
Compulsory	▲										
On request	△										
DME distance from SJ Navaid	D35/SJ										
Radio Navigation Aid	<table border="1"> <tr> <td>Name</td> <td>CHANGI</td> </tr> <tr> <td>Identifier and frequency</td> <td>CHANGI 118.1</td> </tr> <tr> <td>Geographical Coordinates</td> <td>01°13.2'N</td> </tr> <tr> <td>Elevation of DME site</td> <td>60m AGL</td> </tr> </table>	Name	CHANGI	Identifier and frequency	CHANGI 118.1	Geographical Coordinates	01°13.2'N	Elevation of DME site	60m AGL		
Name	CHANGI										
Identifier and frequency	CHANGI 118.1										
Geographical Coordinates	01°13.2'N										
Elevation of DME site	60m AGL										
Collocated VOR and DME Radio Navigation Aids	<table border="1"> <tr> <td>Compass rose orientated on the chart to Magnetic North</td> <td>☉</td> </tr> </table>	Compass rose orientated on the chart to Magnetic North	☉								
Compass rose orientated on the chart to Magnetic North	☉										
Restricted Airspace (P - Prohibited, R - Restricted, D - Danger)	<table border="1"> <tr> <td>Identification of area</td> <td>WSD13</td> </tr> <tr> <td>Nationality letter</td> <td>W</td> </tr> <tr> <td>Vertical limit</td> <td>118.6m</td> </tr> <tr> <td>Activation by NOTAM</td> <td>NOTAM</td> </tr> </table>	Identification of area	WSD13	Nationality letter	W	Vertical limit	118.6m	Activation by NOTAM	NOTAM		
Identification of area	WSD13										
Nationality letter	W										
Vertical limit	118.6m										
Activation by NOTAM	NOTAM										
Area Minimum Altitude (AMA)	<p>Each quadrilateral contains an area minimum altitude (AMA) which represents the lowest altitude which may be used under instrument meteorological conditions (IMC). The AMA provides a minimum clearance of 1 000 feet (300m) above all terrain and obstacles in the quadrilateral. It is represented in the US and hundreds of feet above mean sea level.</p> <p>Example: 3 400 feet 34</p>										

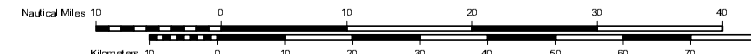
Speed Control Procedures	
Speed control procedures are in force unless notified otherwise by ATC or ATIS.	
All arriving turbo-propeller and turbo-jet aircraft are to fly at not faster than indicated air speed 250 knots when within 40nm from Singapore Changi Airport crown or or below 10 000ft except at arriving aircraft into Singapore Changi Airport shall comply with the speed restrictions depicted on the transitions and RNAV STARs. Further speed reductions will be regulated by ATC as necessary.	
Pilot who may not be able to comply with the speed limits specified above for reasons of flight safety and/or weather should inform ATC and state the speed they accept.	

AIRSPACE CLASSIFICATION IN THE SINGAPORE FIR		
Airspace	Levels	Classification
Controlled airspace	FL150 to FL450	A
Controlled airspace	Surface to FL150	B
Controlled airspace more than 100 nm seaward from the shoreline	Lower limit to FL450	A
Control Zone (CTR)	Changi CTR	C
	Paya Lebar CTR	D
	Seletar CTR	C
ATZs	Surface to upper limit	D
Uncontrolled airspace		GP

* Aircraft operating in the Light Aircraft Training Areas A, B and C (please refer to page ENR 5-2-1) are required to have continuous two-way communications with the appropriate ATIS authority.

SINGAPORE	DATIS	DEF	128.6
		AFR	128.025
		DEF	120.3
		AFR	119.3
		APP	124.05
		TWR	118.6
			118.25

Note:
FOR DEPARTURE AND ARRIVAL ROUTES
REFER TO AD-2-WSSSS-SD-1 TO AD-2-WSSSS-SD-64 AND
AD-2-WSSSS-STAR-1 TO AD-2-WSSSS-STAR-19



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ENR 4 RADIO NAVIGATION AIDS/SYSTEMS

ENR 4.1 RADIO NAVIGATION AIDS - ENROUTE

	Name of station (VOR/VAR)	Id	Frequency (CH)	Hours of operation	Co-ordinates	ELEV DME antenna	Remarks
	1	2	3	4	5	6	7
←	JOHOR BAHRU DVOR/DME	VJB	112.5 MHz (CH 72X)	H24	013950N 1033939E	43.07 M	Operating Authority: Department of Civil Aviation Malaysia
	JOHOR BAHRU NDB	JR	245 kHz	H24	014030N 1033936E	-	Operating Authority: Department of Civil Aviation Malaysia EM: A0/A2 (NDB)
	MERSING DVOR/DME	VMR	116.8 MHz (CH 115X)	H24	022318N 1035218E	-	Operating Authority: Department of Civil Aviation Malaysia. 50w
←	PAPA UNIFORM DVOR/DME	PU	115.1 MHz (CH 98X)	H24	012524N 1035600E	Antenna HGT: 190 FT AMSL	BRG 020° DIST 9km from THR RWY 02 (WSAP). MAINT Period: Third WED of EV month BTN 0200-0600 Coverage 200NM. EM: F1
	PAYA LEBAR TACAN	PLA	(CH 110X)	BTN 2300-1100 SUN/MON to THU/FRI; BTN 2300-0500 FRI/SAT; PPR from RSAF HQ via Paya Lebar OPS at other times.	012224N 1035451E	-	BRG 015° DIST 1.5km from WSAP ARP. MAINT Period: Second THU of EV month BTN 0001-1100
	SEMBAWANG NDB	AG	325 kHz	H24	012526.4N 1034913.0E	-	BRG 198° DIST 0.54km from WSAG ARP. MAINT Period: Second FRI of EV month BTN 0200-0400. Coverage 30NM. EM: A3
←	SINJON DVOR/DME	SJ	113.5 MHz (CH 82X)	H24	011321N 1035115E	Antenna HGT: 150 FT AMSL	BRG 201° DIST 14.5km from THR RWY 02 (WSAP). MAINT Period: Third THU of EV month BTN 0200-0600. Coverage 200NM. EM: F1
←	TANJUNGPINANG VOR/DME	TPG	114.8 MHz (CH 95X)	from 00:00 to 14:00	005413N 1043052E	-	Operating Authority: AirNav Indonesia, Indonesia. Coverage 40NM.
←	TEKONG DVOR/DME	VTK	116.5 MHz (CH 112X)	H24	012455N 1040120E	Antenna HGT: 150 FT AMSL	BRG 023° DIST 6.4km from THR RWY 20C (WSSS). MAINT Period: Third FRI of EV month BTN 0200-0600. Coverage 200NM. EM:F1
	TENGAH TACAN	TNG	(CH 86X)	BTN 2300-1100 SUN/MON to THU/FRI; BTN 2300-0500 FRI/SAT; PPR from RSAF HQ via Tengah OPS at other times.	012336N 1034242E	-	BRG 043° DIST 0.55km from WSAT ARP. MAINT Period: Second SAT of EV month BTN 0001-0900.

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ENR 4.4 NAME-CODE DESIGNATIONS FOR SIGNIFICANT POINTS

Name-code designator	Co-ordinates	ATS route or other route	Terminal Area
1	2	3	4
← ABVIP	010008N 1035032E		STAR-WSSS
← ABVON	012028N 1035827E		IAC-WSSS
← ADNIK	011651N 1035655E		IAC-WSSS
ADPON	010108N 1035808E		SID-WSSS
← AGROT	010108N 1035808E		STAR-WSSS
AGVAR	014719N 1034145E		SID-WSSS
AKDAT	032923N 1054917E	N875	
← AKIPO	011356N 1035542E		IAC-WSSS
AKMET	015355N 1034339E		SID-WSSS
AKMON	081254N 1101306E	L625, M768	
AKOMA	014522N 1035443E	B469, Y339	SID-WSSS, IAC-WSSS
AKVOM	005620N 1041514E	B338, M630	
ANBUS	011554N 1032100E	P501	
ANITO	001700S 1045200E	B338, B470, P501	SID-WSSS
← ANUMA	011053N 1035424E		IAC-WSSS
← APIPA	010618N 1035228E		IAC-WSSS
ARAMA	013654N 1030712E	A464, P501	STAR-WSSS
AROSO	020846N 1032421E	Y339, Y342	SID-WSSS
← ASISU	055906N 1132046E	M768, M772	
ASITI	004906N 1035042E		SID-WSSS
ASOMI	010142N 1040207E		SID-WSSS
ASUNA	005948N 1030954E	R469, L762	STAR-WSSS
ATLEX	010302N 1033331E		SID-WSSS
ATLIR	011120N 1035208E	B469	
← ATPOM	002425N 1052114E	M635	
ATRUM	013256N 1040057E		SID-WSSS
AVLUB	003112S 1042501E	T25	
AVPIV	011207N 1035349E	A464	
← BAVAL	004518N 1040242E	B469	
← BETBA	013302N 1035331E		STAR-WSSS
BIBVI	024336N 1040618E		STAR-WSSS
BIDAG	073101N 1135544E	M772	
← BIDUS	013554N 1035755E		IAC-WSSS, STAR-WSSS
BIKTA	024337N 1034308E	B469	
BIMOS	011512N 1035815E		IAC-WSSS

Name-code designator	Co-ordinates	ATS route or other route	Terminal Area
1	2	3	4
BIPOP	013122N 1041018E		IAC-WSSS, STAR-WSSS
BISOV	004229N 1025214E		SID-WSSS
BISUT	011218N 1035701E		IAC-WSSS
BITAM	010813N 1040757E		STAR-WSSS
BOBAG	010230N 1032954E	R469 , M630 , N502 , P501	HLDG ID, SID-WSSS, STAR-WSSS
← BOBOB	022206N 1070558E	M767	
← BONSU	011928N 1033710E	A576	
BOPVA	025303N 1051349E	M761	
← BUNTO	024200N 1060000E		
BUVAL	033622N 1034341E	L629	
DAKIX	070854N 1145054E	L649	
DAMOG	041225N 1050014E	M771 , N875	
DODSO	012225N 1061402E	G580 , T21	SID-WSSS
← DOLOX	044841N 1052247E	L629 , M771 , T612	
← DOVAN	011938N 1041249E		STAR-WSSS
DOVOL	033047N 1034923E	L635 , Y334	
DOWON	011957N 1043048E	G580	
DUBOT	010846N 1040103E		SID-WSSS
DUBSA	034901N 1044540E	L635 , M771	
DUDIS	070000N 1064836E	L644 , M771	
DUMUP	005430N 1035516E		STAR-WSSS
EGOLO	031934N 1040047E	L642	
← EGORA	013621N 1040607E		IAC-WSSS
ELALO	041240N 1043329E	Q802 , Q803	HLDG ID, STAR-WSSS
← ELALU	013440N 1040524E		IAC-WSSS
← ELBEB	012845N 1040254E		IAC-WSSS
← ELBEX	013149N 1040314E		IAC-WSSS
← ELGAP	012820N 1040146E		IAC-WSSS
ELGOR	033014N 1054818E	M758 , N875	
← ELMIN	012550N 1040141E		IAC-WSSS
EMRIX	012606N 1041040E		SID-WSSS
EMSIB	005911N 1035419E	G579 , M630	
EMSUX	024647N 1051026E	G334	
← EMTAP	011656N 1035657E		IAC-WSSS
← ENLES	010932N 1035350E		IAC-WSSS
ENPUX	002859S 1043434E	B469 , W24	
ENREP	045224N 1041442E	L642 , M753 , M763 , M904 , N875 , N891	

	<i>Name-code designator</i>	<i>Co-ordinates</i>	<i>ATS route or other route</i>	<i>Terminal Area</i>
	1	2	3	4
←	ENSUN	012603N 1040048E		IAC-WSSS
	ENVUM	011535N 1040552E	B338	
	ERVIV	010445N 1041013E		SID-WSSS
←	ERVOT	011120N 1035436E		IAC-WSSS
←	ESBIT	012212N 1040009E		IAC-WSSS
	ESBUM	045210N 1042830E	Q801, Q802	
←	ESLUX	011844N 1035840E		IAC-WSSS
←	ESPOB	070000N 1053318E	L642, Q801	
←	EXOMO	010425N 1040933E		IAC-WSSS
	GIXEM	004920N 1042539E		SID-WSSS
	GOTGA	012013N 1044200E		SID-WSSS
	GULGU	040141N 1084242E	M758	
	GULIB	041714N 1110633E	L517	
←	GUMPU	013000N 1034243E	G579, W401	STAR-WSSS
	GUNUD	011042N 1050618E		STAR-WSSS
	GURES	002814N 1043835E	T24	SID-WSSS
	GUTUP	045911N 1075603E	L625	
	HOSBA	011948N 1042418E	G580, W401	HLDG ID, SID-WSSS
	IBASU	005751N 1033410E		STAR-WSSS
	IBIVA	011351N 1035637E		SID-WSSS
	IBIXU	011621N 1035740E		SID-WSSS
	IDBUD	001454N 1050139E	T24	SID-WSSS
←	IDEMO	025431N 1040603E	G334	
	IDKIV	005652N 1041333E		SID-WSSS
←	IDMAS	004900N 1041848E	B338	
	IDSEL	032432N 1035544E	M758, T611, T612, Y335	
←	IDUNA	012306N 1035934E		IAC-WSSS
←	IDURO	012640N 1040104E		IAC-WSSS
←	IDVAS	012935N 1040218E		IAC-WSSS
	IGARI	065612N 1033506E	R208, M765, N891	
	IGNON	010847N 1041257E		STAR-WSSS
	IGOSI	005645N 1040644E		SID-WSSS
←	IGULA	013232N 1040333E		IAC-WSSS
	IGUTU	001331S 1041857E	T25	
	IKIRO	000849N 1044420E		SID-WSSS
←	IKUKO	054512N 1031324E	R208	
	IKUMI	055338N 1035509E	N891	

Name-code designator	Co-ordinates	ATS route or other route	Terminal Area
1	2	3	4
INVUB	002749N 1051530E	M635	
IPDOL	045111N 1035920E	Q803, T611	
IPNAK	013712N 1040531E		IAC-WSSS
IPRIX	070000N 1040754E	M753, Q802, T611	
IRPUG	005813N 1040127E	B470, M630	
IRSAB	024349N 1054359E	G334	
IRTAD	010326N 1041147E	A464, B338	
ISDEB	024440N 1063011E	L625	
ISGIL	004246N 1031257E		SID-WSSS
ISNOM	010629N 1035826E		SID-WSSS
JUNHA	005413N 1043052E	M630, M635, M774, T21, T23, T24	
KAKSA	011703N 1035758E		IAC-WSSS
KANLA	034556N 1043606E		STAR-WSSS
KARTO	011124N 1053343E		HLDG ID, STAR-WSSS,
KASPO	011507N 1035709E		IAC-WSSS
KETOD	031042N 1040942E	M761, Y336	
KEXAS	011019N 1044818E		HLDG ID, STAR-WSSS
KEXOL	043930N 1040942E	Q803	
KIBOL	025224N 1042818E	G334, N892	
KILOT	030217N 1044023E	M761, N892	STAR-WSSS
KIMER	011106N 1035527E		IAC-WSSS
KIRDA	000009N 1045934E	W26	SID-WSSS
LAGOT	071632N 1113243E	M768, N884	
LAGUS	011915N 1035854E		IAC-WSSS
LAPOL	012622N 1034435E	G579	
LASIN	011538N 1035722E		IAC-WSSS
LAVAX	010950N 1042714E		STAR-WSSS
LAXOR	094937N 1144829E	L649, M772, N884	
LEBIN	031438N 1060604E	N884	
LEDOX	011642N 1035651E		SID-WSSS
LEGOL	012053N 1034723E	G579	
LELIB	012729N 1032450E	A464, W401	SID-WSSS, STAR-WSSS
LELON	011244N 1035609E		IAC-WSSS
LEND A	024124N 1043932E	N884	
LEPNA	010648N 1035339E		IAC-WSSS
LETGO	011411N 1035548E		SID-WSSS
LIDVA	010506N 1035255E		IAC-WSSS

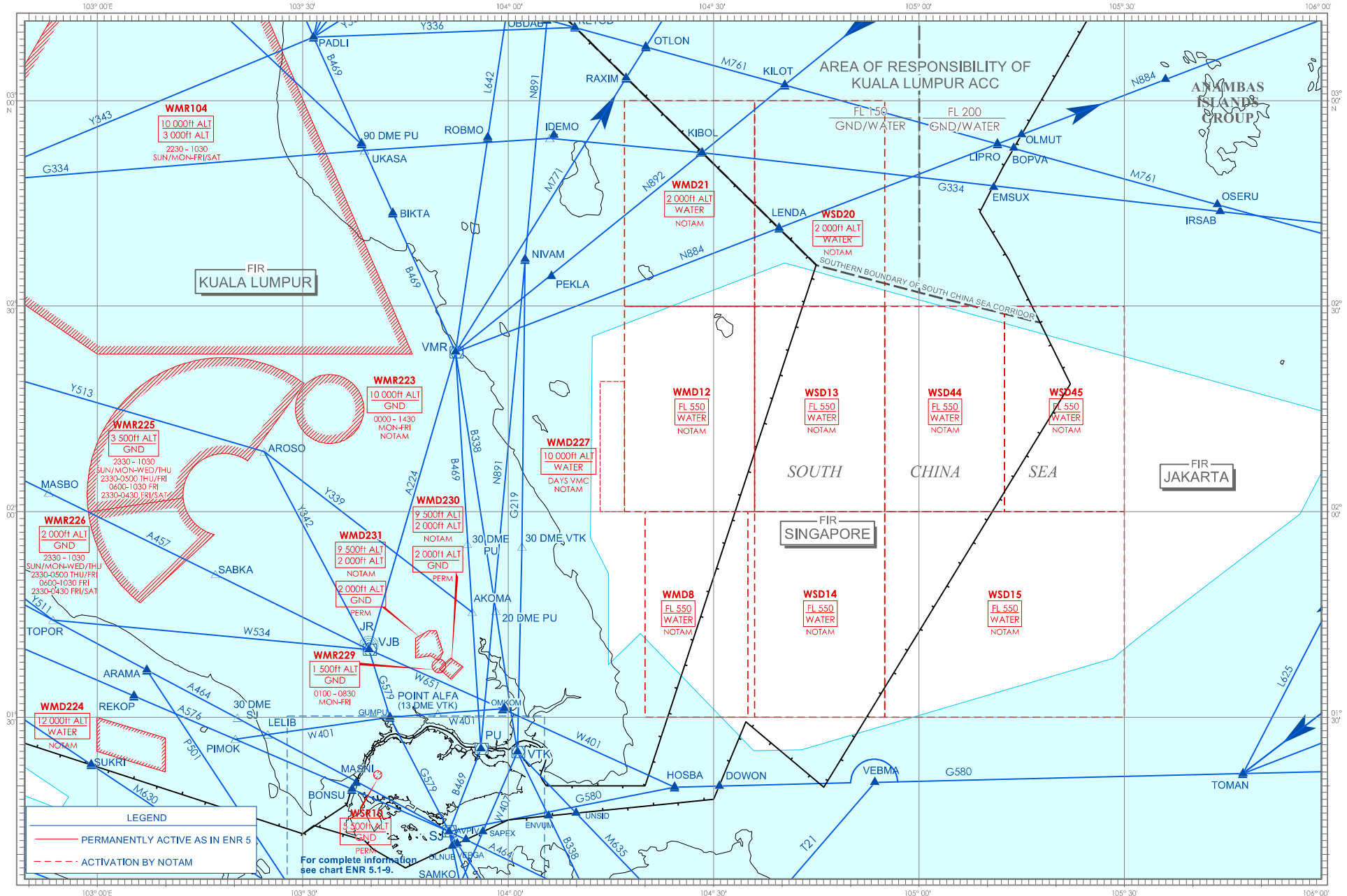
<i>Name-code designator</i>	<i>Co-ordinates</i>	<i>ATS route or other route</i>	<i>Terminal Area</i>
1	2	3	4
LIGVU	034417N 1061859E	L644	
LIPRO	025342N 1051128E	M761, N884	
LUSMO	033341N 1065534E	L625, M758, N884	
LUXOL	011803N 1035823E		IAC-WSSS
MABAL	032826N 1051236E	M758, N892	HLDG ID, STAR-WSSS
MABLI	041717N 1061247E	L635, L644, N892	
MANIM	031430N 1040554E	N891	
MASBO	020248N 1025251E	A457	SID-WSSS
MASNI	012037N 1033746E	A464	
MELAS	070518N 1080912E	N892	
MIBEL	012351N 1020816E	L762	SID-WSSS
MOLVO	012955N 1040227E		SID-WSSS
MOXIB	012933N 1040315E		SID-WSSS
MUMDU	010521N 1042714E		SID-WSSS
MUMSO	034420N 1053213E	N875, N892	
NIVAM	023650N 1040228E	G219	
NIXEB	013943N 1061040E	M767	
NODIN	081100N 1161142E	M522	
NOPAT	042313N 1044756E	L629, N875	
NUFFA	025341.40N 1033829.80E	Y514	
NYLON	013657N 1040624E		HLDG ID, IAC-WSSS, SID-WSSS, STAR-WSSS
OBDAE	031153N 1040538E	N891	
OBDOS	002503N 1065551E	L504, M774, T22	
OBGET	012307N 1064531E		
ODONO	063614N 1030129E	M904	
OLKIT	045010N 1115118E	M758	
OLMUT	030306N 1053558E	N884	
OLNUB	011110N 1035147E	G579	
OMDUD	005847N 1035714E	B469, M630	
OMKOM	013112N 1035910E	W401, W651	
OMLIV	025512N 1062812E		
OSERU	024450N 1054334E	M761	
OTLAL	004209N 1053052E	M774	
OTLON	030752N 1042006E	M761, M771	
PADLI	030918N 1033133E	B469, Y332, Y334, Y335, Y336	
PALGA	011059N 1034759E		STAR-WSSS
PAMSI	010459N 1034845E		STAR-WSSS

Name-code designator	Co-ordinates	ATS route or other route	Terminal Area
1	2	3	4
PARDI	003400S 1041300E	G579 , N502	
PASPU	015915N 1040618E		STAR-WSSS,
PEKLA	023437N 1040618E	N892	
PIBAP	023023N 1040618E		STAR-WSSS
PIMOK	012648N 1032008E	A576 , W401	,
POSOG	002024N 1041323E	B469 , P501	
← POSUB	012725N 1040748E		STAR-WSSS
POVEB	011344N 1040130E		SID-WSSS
RAXIM	030318N 1041713E	M771	
REKOP	013306N 1030521E	A576	
← REMES	004342N 1035735E	G579	HLDG ID, STAR-WSSS
← REPOV	001623N 1040300E	G579	HLDG ID, STAR-WSSS
RILRI	044343N 1082239E	N884	
ROBMO	025440N 1035700E	L642	
← SABKA	015051N 1031713E	A457	SID-WSSS
SALRU	011701N 1040802E		SID-WSSS
← SAMKO	010530N 1035255E	R469 , W407	HLDG ID, STAR-WSSS, SID-WSSS
← SANAT	010749N 1035930E		STAR-WSSS
SAPEX	011316N 1035617E	W407	
SEBVO	011259N 1044028E		SID-WSSS
SUKRI	012306N 1025904E	M630	
SUMLA	080242N 1160054E	M754	
SURGA	003657S 1063119E	M635 , T23 , T24	
SUSAR	035848N 1051547E	L635 , N875	
← TAROS	004200N 1021612E	R469	SID-WSSS
TAXUL	035035N 1034037E	M763 , Y332	
TEBUN	011455N 1031557E		STAR-WSSS
TEGID	085656N 1155143E	M767	
TERIX	041521N 1093456E	L517 , M758 , M767	
TIDAR	065230N 1025000E	M904	
TODAM	063138N 1123536E	M767 , M768	
← TOMAN	012147N 1054717E	G580 , L625 , M646 , M767 , T21	SID-WSSS, STAR-WSSS
← TOPOR	014412N 1025330E	W534	
TUSNU	003403N 1022109E	W22	
TUSPI	003301N 1040959E		HLDG ID
← UDONI	004818N 1040806E	B470	
UGEBO	003813N 1052432E	T22 , T23	HLDG ID, STAR-WSSS

<i>Name-code designator</i>	<i>Co-ordinates</i>	<i>ATS route or other route</i>	<i>Terminal Area</i>
1	2	3	4
UGPEK	033647N 1040752E	L635, N891	
UKIBO	011758N 1035924E		SID-WSSS
UKLIS	034234N 1085149E	M767	
UNSID	011600N 1040955E	M635	
UPLAM	025043N 1063319E	L625	
UPRON	060903N 1032040E	M904, Q803	
UPTEL	005925N 1040730E		SID-WSSS
UPVUN	033022N 1055053E	M758	
URIGO	032505N 1040647E	M758, N891	
UXATI	003348N 1035933E	G579, P501	
UXEDA	015449N 1060423E	L625	
VABRI	013115N 1040358E		IAC-WSSS
VAMPO	005833N 1032525E		HLDG ID, STAR-WSSS
VANBU	010643N 1042740E		SID-WSSS
VASTI	004320N 1043406E		SID-WSSS
VEBMA	012030N 1045332E	T21	SID-WSSS
VEGLO	025502N 1051457E	N884	
VENLI	062848N 1024900E	M765	
VENUN	013206N 1061351E	M646	
VEPGA	011131N 1035232E	B470	
VEPLI	035223N 1040542E	L629, L642	
VERIN	023332N 1062425E	L625	
VEXEL	005904N 1034254E		STAR-WSSS
VIBOG	004310N 1034302E		SID-WSSS
VIGUD	011328N 1035730E		SID-WSSS
VILEV	012729N 1040222E		IAC-WSSS
VIMAL	010942N 1042353E		STAR-WSSS
VINIK	083830N 1161348E	M522, M754	
VIRET	003940N 1043511E		SID-WSSS
VIRID	031728.05N 1031318.04E	Y514	
VISAT	032620N 1043134E	M758, M771	
VOVOS	011123N 1032651E		SID-WSSS

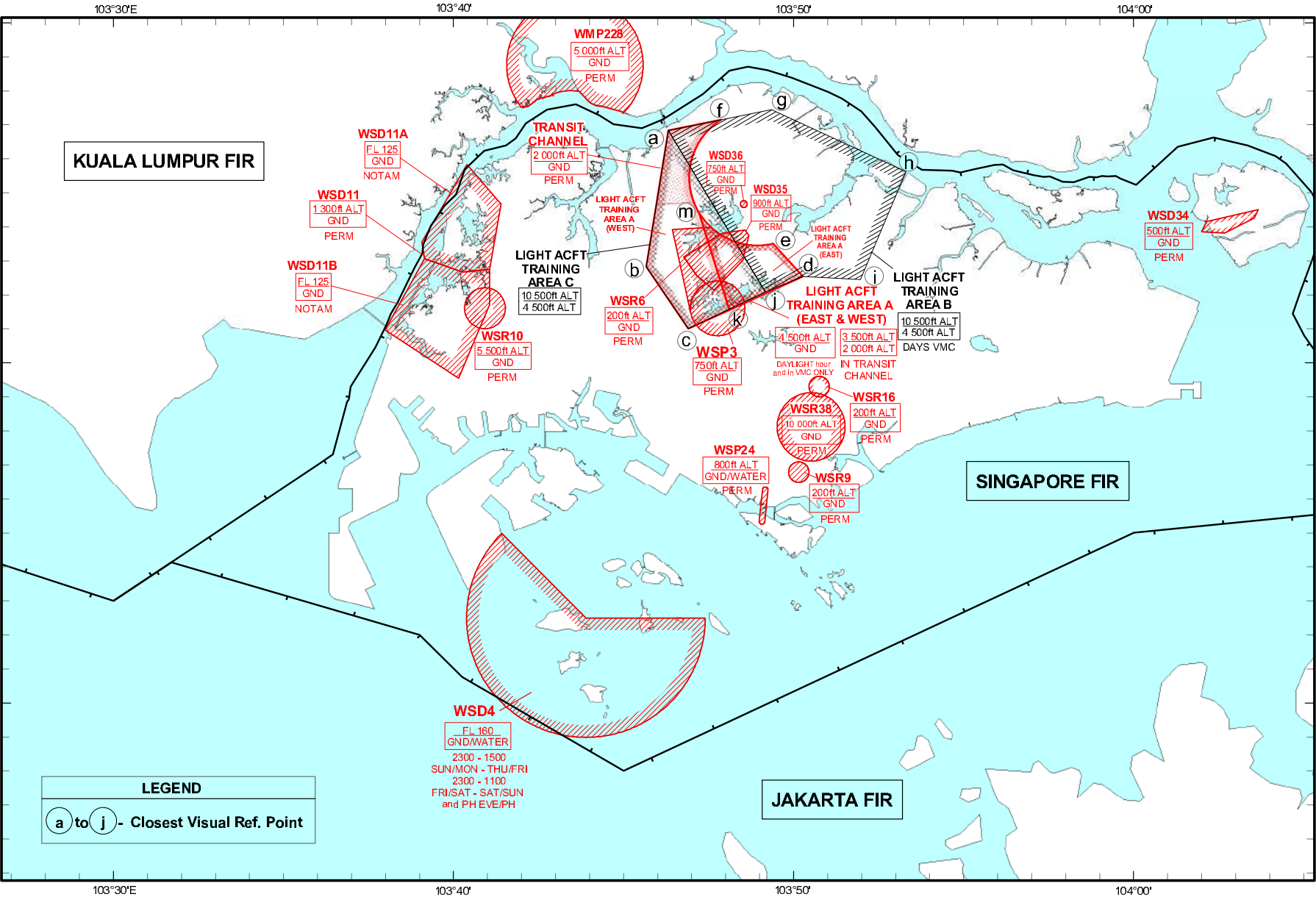
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PROHIBITED, RESTRICTED AND DANGER AREAS - CHART 1



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PROHIBITED, RESTRICTED AND DANGER AREAS - CHART 2



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ENR 5.2 MILITARY EXERCISE AND TRAINING AREAS

1. LIGHT AIRCRAFT TRAINING AREAS

1.1 The airspaces designated as Light Aircraft Training Areas are for Local Flying and Training purposes. Flights are to be conducted during DAYLIGHT hours and in VMC ONLY. The Training Areas are uncontrolled airspaces. It will be the responsibility of pilots to maintain adequate separation with other aircraft including those operating in the Seletar and Sembawang aerodrome circuits. All aircraft are to operate strictly within the designated areas and not to stray out of the areas or intrude into adjacent controlled airspaces.

← 1.2 Aerobatics and functional check flights are prohibited in Light Aircraft Training Areas A, B and C.

1.3 The provision of FIS is the responsibility of Paya Lebar Approach. However, due to the nature of training operations carried out, position and altitude of aircraft will not be made available. The only information that can be provided to pilots will be the number of REPORTED aircraft within the areas concerned.

1.4 On receipt of the relevant information, it shall be the responsibility of the pilot to decide whether his intended flight can be carried out safely in view of the prevailing air traffic.

1.5 To enable Paya Lebar Approach to maintain an accurate record of aircraft operating in the areas and to disseminate up-to-date information, all pilots must report entering and leaving the Training Areas to Paya Lebar Approach.

1.6 Pilots of all aircraft operating within the areas are required to keep a listening watch on the appropriate Paya Lebar Approach VHF/RT control frequency 127.7 MHz.

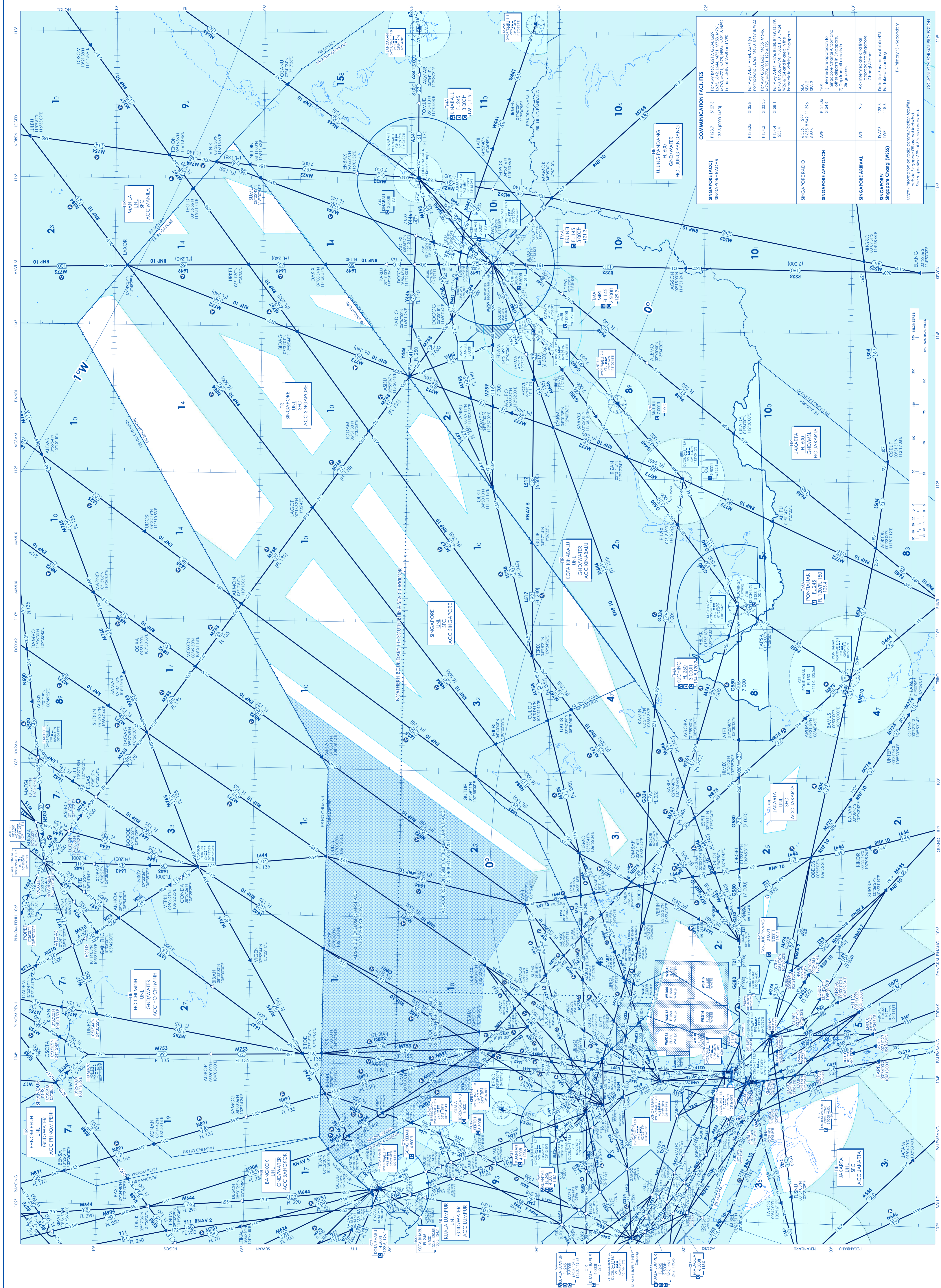
1.7 All flights in the Training Areas are to be conducted on Singapore QNH. This value can be obtained from Paya Lebar Approach.

1.8 In the interest of flight safety, aircraft operating in Light Aircraft Training Area A are advised to make a broadcast on the controlling frequency specifying their callsign and position when climbing or descending through 2,000ft.

Name and Lateral limits	Upper Limit	Remarks Time of Act
	Lower Limit	
1	2	3
LIGHT AIRCRAFT TRAINING AREA A		
(Training and Local Flying) All the airspace contained within the boundaries bounded by the following:	4 500ft ALT GND	# Above Transit Channel (see chart ENR 3.5-3)
012650N 1034619E @ (Woodlands Customs Checkpoint) (a)	3 500ft ALT 2 000ft ALT#	@ Closest Visual Reference Point (see chart ENR 5.1-9)
012249N 1034540E @ (cross-road junction of Upper Bukit Timah Road and Bukit Panjang Road/Choa Chu Kang Road) (b)	Maximum Usable ALT: 4 000ft	Daylight hour and in VMC only
012100N 1034654E @ (Bukit Timah) (c)		
012232N 1035016E @ (Mayflower Garden) (d)		
012327N 1034922E @ (Sembawang ATZ bdry) and along the bdry of Sembawang ATZ (e)		
012714N 1034752E @ (Admiralty Road West/Attap Valley Road) (f)		
012650N 1034619E @ (Woodlands Customs Checkpoint) (a)		

Name and Lateral limits	<i>Upper Limit</i> <i>Lower Limit</i>	Remarks Time of Act
1	2	3
LIGHT AIRCRAFT TRAINING AREA A (EAST)		
012423N 1034714E (m) thence along the boundary of Sembawang ATZ to 012327N 1034922E (e) 012232N 1035016E (d) 012133N 1034807E (k) 012423N 1034714E (m)	4 500ft ALT GND 3 500ft ALT 2 000ft ALT# Maximum Usable ALT: 4 000ft	To enable aircraft on ILS for landing into WSSL to carry out missed approach safely and efficiently, Light Aircraft Training Area A would be temporarily segregated into Area A (East) and Area A (West). When instructed, all aircraft operating in Light Aircraft Training Area A are to vacate the Area A (East) and operate only in Area A (West) or operate in the other Light Aircraft Training Areas B or C. Whenever there is an aircraft on ILS for landing into WSSL, Light Aircraft Training Area A (East) will temporarily be designated as Class D airspace to facilitate the nominal path for the missed approach aircraft.
LIGHT AIRCRAFT TRAINING AREA A (WEST)		
012650N 1034619E (a) 012714N 1034752E (f) thence along the boundary of Sembawang ATZ to 012423N 1034714E (m) 012133N 1034807E (k) 012100N 1034654E (c) 012249N 1034540E (b) 012650N 1034619E (a)	4 500ft ALT GND 3 500ft ALT 2 000ft ALT# Maximum Usable ALT: 4 000ft	
LIGHT AIRCRAFT TRAINING AREA B		
(High Flying Training Ops) The area includes the airspace above Seletar CTR A, Sembawang ATZ, parts of Paya Lebar CTR and Light Aircraft Training Area A and is contained within the following: 012650N 1034619E @ (Woodlands Customs Checkpoint) (a) 012205N 1034910E @ (Eastern Edge of Pierce Reservoir) (j) 012232N 1035016E @ (Mayflower Garden) (d) 012227N 1035158E @ (Seletar Hill Estate) (i) 012537N 1035319E @ (East of Seletar Airfield) (h) 012727N 1034921E @ (Canberra/Admiralty Rd) (g) 012650N 1034619E @ (Woodlands Customs Checkpoint) (a)	10 500ft ALT 4 500ft ALT Maximum Usable ALT: 10 000ft Minimum Usable ALT: 5 000ft	

ENROUTE CHART - ICAO



LEGEND

Aerodromes

Flight Information Region (FIR)

Terminal Control Area (TMA)

Control Zone (CTR)

ATS route

ATS route reporting point by-pass

Reporting Point (REP)

ATS/MET reporting point (MFP)

Restricted Airspace

Communication facilities

Obstacles

Identification for radio navigation aids (NAV/AID)

Area Minimum Altitude (AMA)

COE of mid-point between VOR are not shown

Always in which Mach Number technique and RNAV are applied

Inbound and Outbound flight separated from reporting aircraft

WILCO/WAC/IC/ERRY REPORTING POINTS

RVSM SEPARATION AVAILABLE SINGAPORE FIR BIN FL 290 AND FL 410 (Inclusive)

AIRSPACE CLASSIFICATION IN THE SINGAPORE FIR

Class	Classification
A	Class A
B	Class B
C	Class C
D	Class D
E	Class E
F	Class F
G	Class G

CAUTION

Consult respective NOTAMS and AIPs of States concerned for the latest information and the Civil Aviation Authority of Singapore does not accept responsibility for any errors or omissions in the information shown outside of Singapore FIR

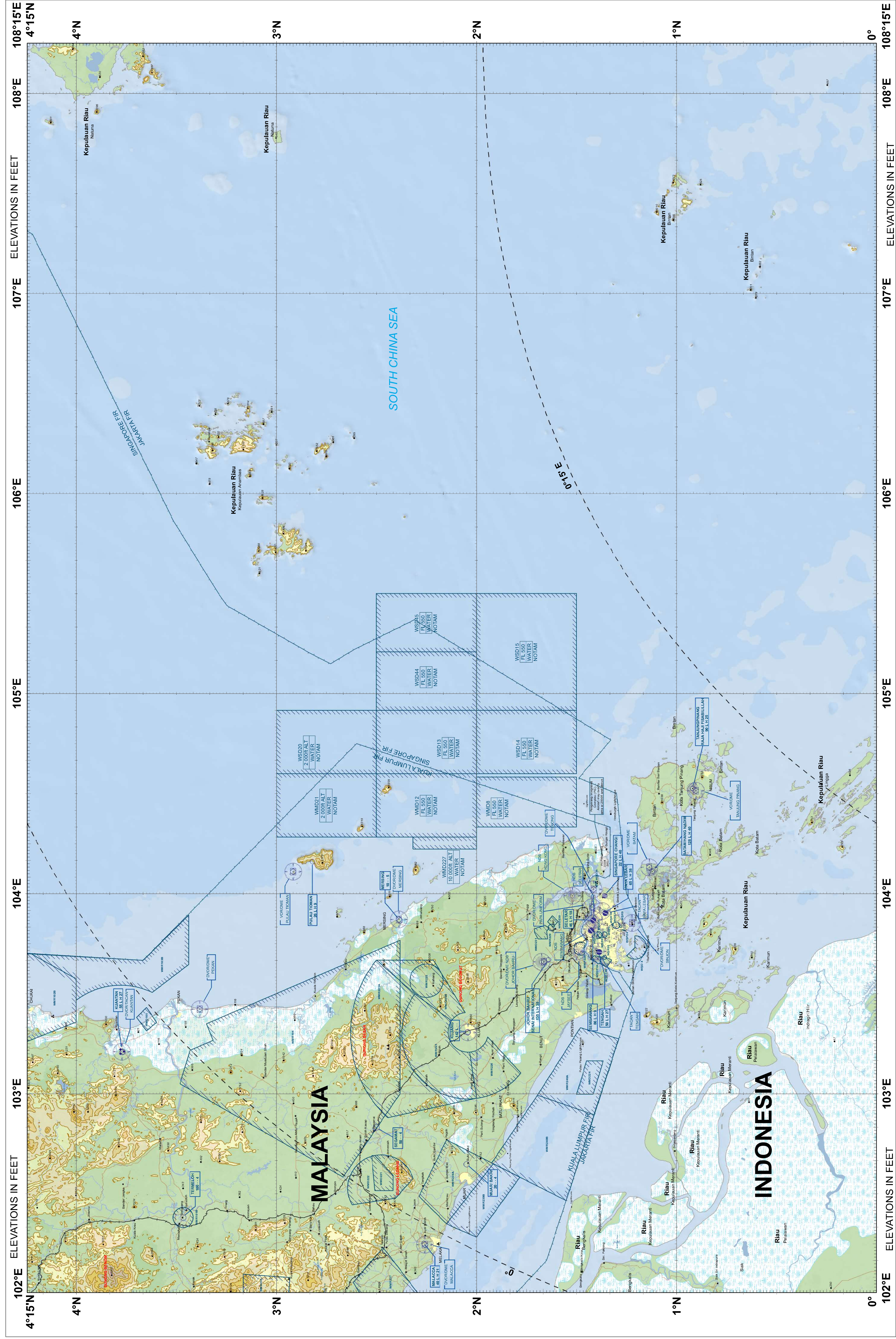
MAGNETIC INFORMATION FOR THE YEAR 2020

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WORLD AERONAUTICAL CHART ICAO 1:1,000,000

(2860) SINGAPORE ISLAND

WAC-2860
21 MAR 2024



HYPSONETRIC TINTS

Elevations Feet - Metres
6000-1829
5000-1524
4000-1219
3000-915
2000-610
1000-305
500-152
SEA LEVEL

CONVERSION TABLE

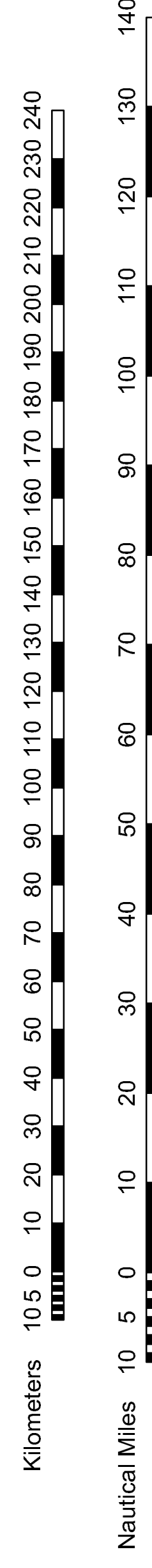
Feet	Metres
20000	6000
18000	5500
16000	5000
14000	4500
12000	4000
10000	3500
8000	3000
6000	2500
4000	1500
2000	1000
1000	500
500	250
100	50
50	25
10	5
5	2.5
1	0.5

PROJECTION
Lambert Conformal Conic Projection
Spheroid - World Geodetic System 1984
(WGS-84)

CAUTION
Consult respective NOTAMs and AIPs of States concerned for the latest aeronautical information
AND
the Civil Aviation Authority of Singapore does not accept responsibility for any errors or omissions in the information shown outside of Singapore territory.

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CHANGES: Realignment of Jakarta-Singapore FIR



Contours basic interval 1000 feet. Intermediate contours shown at 500 feet.

NOTE
Due to congestion in the Singapore area, only selected Navigation Aids and Restricted Airspace are shown.

MAGNETIC INFORMATION FOR THE YEAR 2020

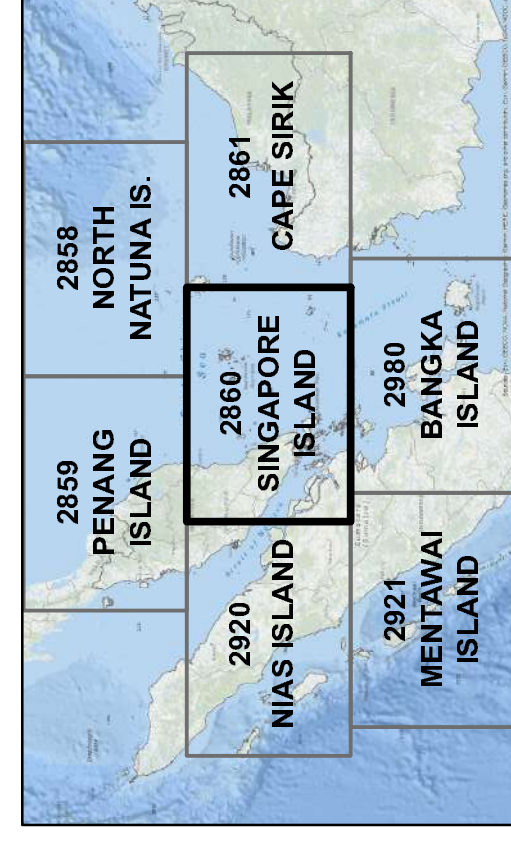
Aeronautical Information: March 2022

Primary Road	City or large town	Major	Aerodromes	Obstacle	Vertical Obstructions	Air Traffic Services	Visual Aids	Miscellaneous
Secondary Road	Town	Civil Land	Major Aerodrome	Lighted Obstacle	Obstacle	Flight Information Region	Aeronautical Ground Light	Isogonic line
Expressway	Small river, large river	Military Land	Civil Land	Lighted Group Obstacles	Lighted Group Obstacles	Prohibited, Restricted or Danger Area	Marine light	Group Flashing
Railway	Lake, dam	Aerodrome with no facilities	Military Land	Elevation of top above mean sea level (AMSL)	Elevation of top above ground level (AGL)	Radio Navigation Aids	Group Flashing	Gunong, Gunung
Spot elevation accurate, approximate	Swamp	Major aerodromes portrayed have a hard surface runway length of 3000 feet or more.	Aerodrome with no facilities	Height of top above ground level (AGL)	Height of top above ground level (AGL)	NDB	Marine lights are white unless colours are stated.	Kampong, Kg
Highest known elevation approximate	Cliff		Major aerodromes portrayed have a hard surface runway length of 3000 feet or more.	All reported vertical obstructions cannot be portrayed due to chart scale. Obstructions shown are at least 200 feet AGL. In and around major populated places the pattern is further reduced to enhance clarity.	All reported vertical obstructions cannot be portrayed due to chart scale. Obstructions shown are at least 200 feet AGL. In and around major populated places the pattern is further reduced to enhance clarity.	VOR / DME		Pulau
Contours	Ruins	Fort	Major aerodromes portrayed have a hard surface runway length of 3000 feet or more.			VOR / TAC		Selat
						TACAN		Sungai, S
								Tanjung, Tanjung, Tg
								Tasik
								lake
								point, cape
								river, stream
								bay

AERONAUTICAL INFORMATION

Primary Road	City or large town	Major	Aerodromes	Obstacle	Vertical Obstructions	Air Traffic Services	Visual Aids	Miscellaneous
Secondary Road	Town	Civil Land	Major Aerodrome	Lighted Obstacle	Obstacle	Flight Information Region	Aeronautical Ground Light	Isogonic line
Expressway	Small river, large river	Military Land	Civil Land	Lighted Group Obstacles	Lighted Group Obstacles	Prohibited, Restricted or Danger Area	Marine light	Group Flashing
Railway	Lake, dam	Aerodrome with no facilities	Military Land	Elevation of top above mean sea level (AMSL)	Elevation of top above ground level (AGL)	Radio Navigation Aids	Group Flashing	Gunong, Gunung
Spot elevation accurate, approximate	Swamp	Major aerodromes portrayed have a hard surface runway length of 3000 feet or more.	Aerodrome with no facilities	Height of top above ground level (AGL)	Height of top above ground level (AGL)	NDB	Marine lights are white unless colours are stated.	Kampong, Kg
Highest known elevation approximate	Cliff		Major aerodromes portrayed have a hard surface runway length of 3000 feet or more.	All reported vertical obstructions cannot be portrayed due to chart scale. Obstructions shown are at least 200 feet AGL. In and around major populated places the pattern is further reduced to enhance clarity.	All reported vertical obstructions cannot be portrayed due to chart scale. Obstructions shown are at least 200 feet AGL. In and around major populated places the pattern is further reduced to enhance clarity.	VOR / DME		Pulau
Contours	Ruins	Fort	Major aerodromes portrayed have a hard surface runway length of 3000 feet or more.			VOR / TAC		Selat
						TACAN		Sungai, S
								Tanjung, Tanjung, Tg
								Tasik
								lake
								point, cape
								river, stream
								bay

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(2860) SINGAPORE ISLAND

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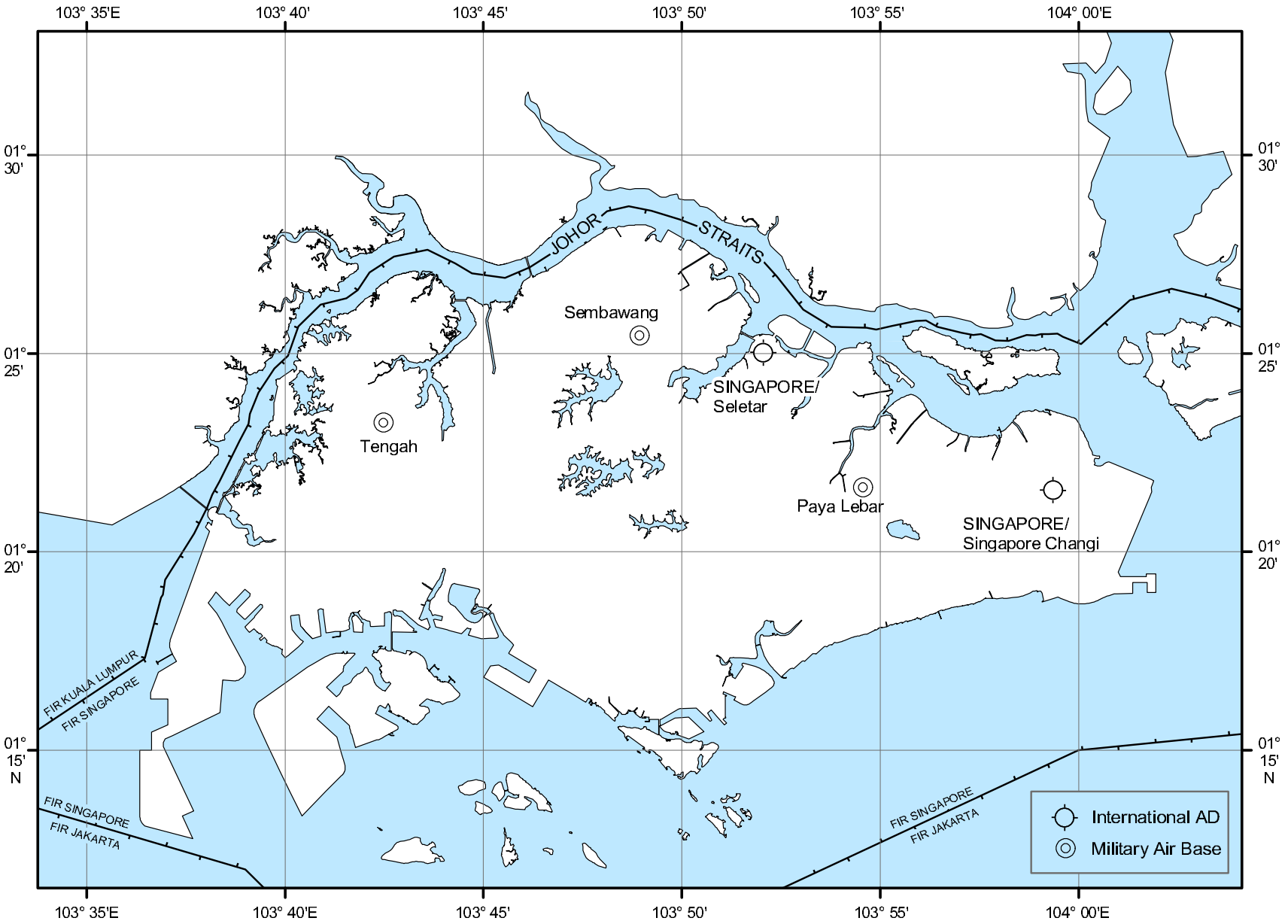
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WIDT AD 2.2	[NIL] AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA	NIL
WIDT AD 2.3	[NIL] OPERATIONAL HOURS	NIL
WIDT AD 2.4	[NIL] HANDLING SERVICES AND FACILITIES	NIL
WIDT AD 2.5	[NIL] PASSENGER FACILITIES	NIL
WIDT AD 2.6	[NIL] RESCUE AND FIRE FIGHTING SERVICES	NIL
WIDT AD 2.7	[NIL] SEASONAL AVAILABILITY – CLEARING	NIL
WIDT AD 2.8	[NIL] APRONS, TAXIWAYS AND CHECK LOCATIONS DATA	NIL
WIDT AD 2.9	[NIL] SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS	NIL
WIDT AD 2.10	[NIL] AERODROME OBSTACLES	NIL
WIDT AD 2.11	[NIL] METEOROLOGICAL INFORMATION PROVIDED	NIL

WIDT AD 2.12	[NIL] RUNWAY PHYSICAL CHARACTERISTICS	NIL
WIDT AD 2.13	[NIL] DECLARED DISTANCES	NIL
WIDT AD 2.14	[NIL] APPROACH AND RUNWAY LIGHTING	NIL
WIDT AD 2.15	[NIL] OTHER LIGHTING, SECONDARY POWER SUPPLY	NIL
WIDT AD 2.16	[NIL] HELICOPTER LANDING AREA	NIL
WIDT AD 2.17	ATS AIRSPACE	AD 2.WIDT-1
WIDT AD 2.18	ATS COMMUNICATION FACILITIES	AD 2.WIDT-1
WIDT AD 2.19	[NIL] RADIO NAVIGATION AND LANDING AIDS	NIL
WIDT AD 2.20	[NIL] LOCAL TRAFFIC REGULATIONS	NIL
WIDT AD 2.21	[NIL] NOISE ABATEMENT PROCEDURES	NIL
WIDT AD 2.22	[NIL] FLIGHT PROCEDURES	NIL
WIDT AD 2.23	[NIL] ADDITIONAL INFORMATION	NIL
WIDT AD 2.24	CHARTS RELATED TO AN AERODROME	AD 2.WIDT-1

*Note: The following sections in this chapter are intentionally left blank:
AD 0.1, AD 0.2, AD 0.3, AD 0.4, AD 0.5.*

AERODROME INDEX - CHART



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WSSS AD 2.18 ATS COMMUNICATION FACILITIES

Service Designation	Call sign	Frequency (P-Pri, S-Sec)	Hours of operation	Remarks
APP	Singapore Departure	P120.3 MHz S132.15 MHz	H24	DEP from all airports in Singapore.
	Singapore Arrival	P119.3 MHz S119.4 MHz S119.55 MHz		TAR - Intermediate and final approach to Singapore Changi AP.
	Singapore Approach	P124.05 MHz S124.6 MHz S126.3 MHz	2100-1700	TAR - flow control service provided for ARR/DEP ACFT. Intermediate approach to Singapore Changi AP and other airports in Singapore.
TWR	Singapore Tower	118.6 MHz	H24	for TKOF/LDG. for ACFT operating on RWY 02L/20R for vehicular movements on RWY 02L/20R
		118.25 MHz		for ACFT operating on RWY 02C/20C for vehicular movements on RWY 02C/20C for ground movement of ACFT (including ACFT on tow) north and south of RWY 02C/20C
		131.4 MHz		for ACFT operating on RWY 02R/20L for vehicular movements on RWY 02R/20L
	Singapore Ground	124.3 MHz	1600-0000 0000-1600	for push-back / taxiing of all ACFT for ground movement of ACFT (including ACFT on tow) west of Terminal 3
		121.725 MHz	0000-1700 2100-0000	for push-back / taxiing of all ACFT for ground movement of ACFT (including ACFT on tow) east of Terminal 2
		121.85 MHz	0000-1800 2300-0000	for push-back / taxiing of all ACFT for ground movement of ACFT (including ACFT on tow) north of Terminal 1
		121.00 MHz	H24	for ground emergency
		122.55 MHz		for push-back / taxiing of all ACFT for ground movement of ACFT (including ACFT on tow) east of Terminal 4
		125.65 MHz		for push-back / taxiing of all ACFT for ground movement of ACFT (including ACFT on tow) west of Terminal 4
		127.275 MHz	for taxiing of all ACFT for ground movement of ACFT (including ACFT on tow) west of RWY 02R/20L and east of TWY C	
	Singapore Delivery	121.65 MHz	H24	for Pre-flight check/ATC clearance
		119.6 MHz	0030-0230 1200-1300	for issuance of ATC clearance

Service Designation	Call sign	Frequency (P-Pri, S-Sec)	Hours of operation	Remarks
TWR	Changi Tower / Changi Apron	121.9 MHz	H24	<p>Requests for engine runs on aprons and taxiways, excluding runways, would be regulated by Changi Apron. All towing request to contact Changi Apron followed by instruction to contact respective Singapore Ground frequency for towing clearance.</p> <p>Request for vehicular movements on taxiways, excluding runways, would be regulated by Changi Tower.</p> <p>For ACFT on tow and vehicular movements on the runway when the runway is closed for maintenance.</p> <p>All personnel operating the radio station on board an ACFT that is on the ground in Changi Airport should possess the Aircraft Radio Operator Approval (AROA) or other equivalent certification.</p>
	Changi East Tower	119.675 MHz	H24	<p>Request for vehicular movements on taxiways, excluding runway, west of RWY 02R/20L and east of TWY C will be regulated by Changi East Tower.</p> <p>For ACFT on tow and vehicular movements on RWY 02R/20L when the runway is closed for maintenance.</p> <p>All personnel operating the radio station on board an ACFT that is on the ground in Changi Airport should possess the Aircraft Radio Operator Approval (AROA) or other equivalent certification.</p>
	Changi East Ground	120.95 MHz	Not for use, unless with prior coordination	For start-up / taxiing of all aircraft
D-ATIS	Changi Airport Departure Information	128.6 MHz	H24	<p>(broadcasting with half hourly updated MET INFO)</p> <p>Data Link Service available.</p>
	Changi Airport Arrival Information	128.025 MHz	H24	<p>AP IDENT WSSS</p> <p>Messages comply with ARINC 623 Standards.</p> <p>Updating of data: H+00 to H+10 and H+30 to H+40</p>
ATIS	Changi East Information (02R/ 20L)	139.95 MHz	Not for use, unless with prior coordination	NIL

WSSS AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of aid and Variation	IDENT	Frequency	OPR Hour	Position of Transmitting Antenna Coordinates	DME Transmitting Antenna Elevation / Remarks
1	2	3	4	5	6 & 7
SINJON DVOR/DME	SJ	113.5 MHz CH82X	H24	011321.34N 1035115.22E	201° MAG 14.5km from THR RWY 02 (Paya Lebar). Antenna HGT: 194ft AMSL. Coverage 200NM. EM: F1. Maintenance period: Third Thursday of every month between 0200-0600
TEKONG DVOR/DME	VTK	116.5 MHz CH112X	H24	012455.36N 1040120.17E	023° MAG 6.4km from THR RWY 20C (Singapore Changi). Antenna HGT: 150ft AMSL. Coverage 200NM. EM: F1 Maintenance Period: Third Friday of every month between 0200-0600
RWY 20C ILS LLZ	ICC	109.7MHz	H24	011932.40N 1035901.32E	Located 368m (1207ft) from THR RWY 02C, along RWY centreline. Course width 2.80° . EM: A0/A2.
RWY 20C ILS GP	-	333.2MHz	H24	012131.73N 1035955.71E	Located 338m (1109ft) from THR RWY 20C on left side of RWY, 120m (394ft) from RWY centreline. GP angle 3° . HGT of ILS Reference Datum: 16.2m (53ft). EM: A0/A2.
RWY 20C ILS DME	ICC	CH34X	H24	012131.73N 1035955.71E	DME co-located with GP. EM: P9.
RWY 20C ILS MM	-	75MHz	H24	012212.24N 1040008.87E	Located 964m (3162ft) from THR RWY 20C along extended centreline of RWY. No back beam.
RWY 02C ILS LLZ	ICE	108.3MHz	H24	012154.47N 1040001.18E	Located 368m (1207ft) from THR RWY 20C, along RWY centreline. Course width 2.80° . EM: A0/A2.
RWY 02C ILS GP	-	334.1MHz	H24	011952.18N 1035913.68E	Located 338m (1109ft) from THR RWY 02C on right side of RWY, 120m (394ft) from RWY centreline. GP angle 3° . HGT of ILS Reference Datum: 16.5m (54ft). EM: A0/A2.
RWY 02C ILS DME	ICE	CH20X	H24	011952.18N 1035913.68E	DME co-located with GP. EM: P9.
RWY 02C ILS MM	-	75MHz	H24	011914.72N 1035853.19E	Located 966m (3169ft) from THR RWY 02C along extended centreline of RWY. No back beam.
RWY 20R ILS LLZ	ICH	108.9MHz	H24	012045.23N 1035834.17E	Located 368m (1207ft) from THR RWY 02L, along centreline of the RWY. Course width 3.38° . EM: A0/A2.
RWY 20R ILS GP	-	329.3MHz	H24	012225.59N 1035912.29E	Located 330m (1083ft) from displaced THR RWY 20R on right side of the RWY, 120m (394ft) from RWY centreline. GP angle 3° . HGT of ILS Reference Datum: 17m (56ft). EM: A0/A2.
RWY 20R ILS DME	ICH	CH26X	H24	012225.59N 1035912.29E	DME co-located with GP. RWY 20R ILS DME not available beyond 15 degrees west of RWY 20R centreline below 2500ft. EM: P9.
RWY 20R ILS MM	-	75MHz	H24	012307.51N 1035934.24E	Located 1122m (3681ft) from displaced THR RWY 20R, along centreline of the RWY.

Type of aid and Variation	IDENT	Frequency	OPR Hour	Position of Transmitting Antenna Coordinates	DME Transmitting Antenna Elevation / Remarks
1	2	3	4	5	6 & 7
RWY 02L ILS LLZ	ICW	110.9MHz	H24	012307.03N 1035934.03E	Located 1105m (3625ft) from displaced THR RWY 20R, along centreline of RWY. Course width 2.81°. EM:A0/A2.
RWY 02L ILS GP	-	330.8MHz	H24	012108.35N 1035838.86E	Located 343m (1125ft) from THR RWY 02L on left side of RWY, 143m (469ft) from RWY centreline. GP angle 3°. HGT of ILS Reference Datum: 17m (56ft). EM:A0/A2.
RWY 02L ILS DME	ICW	CH46X	H24	012108.35N 1035838.86E	DME co-located with GP. EM:P9.
RWY 02L ILS MM	-	75MHz	H24	012027.54N 1035826.68E	Located 957m (3140ft) from THR RWY 02L along extended centreline of RWY. No back beam.
RWY 20L ILS LLZ	ICZ	108.55MHz	H24	011909.54N 1035954.79E	Located 367m (1204ft) from THR RWY 02R, along RWY centreline. Course width 2.80°. EM: A0/A2.
RWY 20L ILS GP	-	329.75MHz	H24	012108.89N 1040049.38E	Located 335m (1099ft) from THR RWY 20L on left side of the RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS REF datum: 16.8m (55ft). EM: A0/A2.
RWY 20L ILS DME	ICZ	CH22Y	H24	012108.89N 1040049.38E	DME co-located with GP. EM: P9.
RWY 20L ILS MM	-	75MHz	H24	012149.37N 1040102.55E	Located 968m (3176ft) from THR RWY 20L, along extended centreline of the RWY.
RWY 02R ILS LLZ	ICX	110.5MHz	H24	012131.46N 1040054.70E	Located 367m (1204ft) from THR RWY 20L, along RWY centreline. Course width 2.80°. EM: A0/A2.
RWY 02R ILS GP	-	329.6MHz	H24	011929.11N 1040007.26E	Located 335m (1099ft) from THR RWY 02R on right side of the RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS REF datum: 16.2m (53ft). EM: A0/A2.
RWY 02R ILS DME	ICX	CH42X	H24	011929.11N 1040007.26E	DME co-located with GP EM: P9
RWY 02R ILS MM	-	75MHz	H24	011851.60N 1035947.22E	Located 974m (3196ft) from THR RWY 02R, along extended centreline of the RWY.

WSSS AD 2.20 LOCAL TRAFFIC REGULATIONS

1 DESIGNATION OF PAYA LEBAR AIRPORT AS AN ALTERNATE AERODROME FOR SINGAPORE CHANGI AIRPORT

Please refer to section WSAP AD 2.20 for details.

2 WRONG APPROACHES AND LANDINGS OF AIRCRAFT BOUND FOR SINGAPORE CHANGI AND PAYA LEBAR AIRPORTS

2.1 INTRODUCTION

2.1.1 The attention of all pilots is drawn to the existence of Paya Lebar Airport close to Singapore Changi Airport. The runway at Singapore Changi Airport is orientated in the same true bearing as the runway at Paya Lebar Airport i.e. 023°/203°. Due to the close proximity of these two runways, pilots are cautioned against mistaking Paya Lebar Airport for the runway of Singapore Changi Airport and thus making an inadvertent visual landing or approach to land at Paya Lebar.

2.1.2 Erroneous approaches or landings usually occurred during the hours of darkness. In almost every instance, the weather prevailing at the time of the incident was generally good or fair.

2.1.3 There is intensive local flying at Paya Lebar and Seletar during the day and night. Thus, the risk of collision is very great if a wrong approach is made to any of the above two airports. Likewise, wrong approaches into Singapore Changi Airport can also be disastrous.

2.2 POINTS TO BEAR IN MIND WHEN APPROACHING SINGAPORE CHANGI AIRPORT OR PAYA LEBAR

2.2.1 The following points are highlighted to serve as a guide to assist pilots in making a correct approach into Singapore Changi Airport or Paya Lebar Airport and should be remembered and followed:

- a. The runways at Singapore Changi Airport and Paya Lebar Airport are identically aligned on 02/ 20. Therefore exercise extreme vigilance when leaving NYLON or SAMKO Holding Areas inbound and maintain correct tracks to the respective runways as listed below.
- b. Adhere strictly to IFR procedures even in VMC which calls for a procedure turn over NYLON Holding Area or SAMKO Holding Area as prescribed.
- c. Make full use of all available navigational and landing aids available and positively identify every aid used.
- d. Switch to the correct ILS localizer frequency at Singapore Changi Airport under all conditions.

2.3 AERODROME CHARACTERISTICS OF SINGAPORE CHANGI AND PAYA LEBAR AIRPORTS

2.3.1 Tabulated below are details of aerodrome characteristics of Singapore Changi Airport and Paya Lebar Airport which indicate the similarities and significant differences for ease of identification by pilots operating into these two airports.

Aeronautical Service	PAYA LEBAR Airport	SINGAPORE CHANGI Airport	Significant Differences and Remarks
Magnetic heading of RWY	02/20	02L/20R 02C/20C 02R/20L	Exercise caution due to similar RWY alignment
Approach Lights	RWY 02 Modified Calvert High INTST with centreline and 3 crossbars. High INTST white LGT with brilliancy control and sequenced flashing lights.	RWY 02L Precision APCH LGT CAT II. Extended centreline with red side row barettes, 2 crossbars, 2 APCH beacons and sequenced flashing lights.	
	RWY 20 Modified Calvert High INTST with centreline and 3 crossbars. High INTST white LGT with brilliancy control and sequenced flashing lights.	RWY 20R Precision APCH LGT CAT I. Centreline barettes flashing white, 2 APCH beacons and sequenced flashing lights. (refer to chart AD-2-WSS-ADC-2)	
ILS	RWY 20 - NIL	RWY 20R IDENT ICH No back beam LLZ 108.9 MHz GP 329.3 MHz	
	RWY 02 - NIL	RWY 02L IDENT ICW No back beam LLZ 110.9 MHz GP 330.8 MHz	
IBN	Flashing R 'PL' HN and IMC	Flashing G 'SS' HN and IMC	
ABN	NIL	ALTN Flashing W G every 2.3 SEC	

WSSS AD 2.21 NOISE ABATEMENT PROCEDURES

- 1.1 To alleviate the problem of noise, all aircraft on AWY G579 between SINJON (SJ) and GUMPU shall operate at/above 5,000ft.
- 1.2 The Standard Instrument Departure routes for aircraft departing on RWY 20R/20C/20L are for the purpose of noise abatement in addition to being used for air traffic control.
- 1.3 Departures on RWY 20R are restricted between 1600-2200UTC. This restriction is not applicable when RWY 20C/02C and RWY 20L/02R are unavailable because of maintenance works or for other reasons.
- 1.4 Unless it is necessary for operational or safety reasons, when using engine reverse, arrivals on RWY 02L/20R between 1600-2200UTC may not exceed idle reverse thrust.

WSSS AD 2.22 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 authorised flights during prolonged periods of low visibility, except during thunderstorms. RVR minima for CAT II ILS operations is limited to 350m due to runway and taxiway light spacing requirements on the airfield.

1.2 Authorisation for Category II ILS Approaches

1.2.1 Operators who wish to conduct Category II ILS operations at Singapore Changi Airport must have obtained operational approval from the relevant State of Operator and be authorised by the Civil Aviation Authority of Singapore.

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 AD-2-WSSS-IAC-1 to AD-2-WSSS-IAC-11 and the Precision Approach Terrain Charts for RWY 02L and RWY 20C at AD-2-WSSS-PATC-1 and AD-2-WSSS-PATC-2 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 800 metres.

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 centrelines 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 800 metres. 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.

1.7 Operations of flights Not Authorised for Category II ILS Operations

1.7.1 During Category II ILS operations, if the RVR is 550 metres or above, flights not authorised for Category II ILS operations may continue to make approaches and land. Airlines planning to operate flights not authorised for Category II ILS operations into Changi shall monitor the METAR to ascertain the RVR values when launching their flights and be prepared to divert if the RVR is below 550 metres.

2 RUNWAY UTILISATION

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 maximise runway utilisation. 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

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 minimise 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 instructions 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 (ROT)

- 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 minimise the occurrence of “go-arounds”.
- 2.4.2 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. 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), information below which is measured from threshold to tangent point where the exit taxiway centreline starts to curve away from the runway centreline:

RWY	Exit Taxiway (LED in metres)	Remarks
20R	<u>W6*(1655)</u> , <u>W7*(2123)</u> and W8(3061)	Note 1: Recommended exit taxiways are bold and underlined.
20C	<u>T7*(1924)</u> , <u>T8*(2375)</u> , <u>D8*(1750)</u> , <u>D9*(2225)</u> and D10*(2700)	
20L	<u>A7*(1750)</u> , <u>A8*(2225)</u> and A9*(2700)	Note 2: * Indicates Rapid Exit Taxiway (RET) and maximum design ground speed for the exit taxiway is 50kts.
02L	<u>W5*(1966)</u> , <u>W4*(2491)</u> and W3*(2876)	
02C	<u>T6*(2040)</u> , <u>T5*(2545)</u> , T4*(3245) <u>D7*(1900)</u> , <u>D6*(2375)</u> and D5*(2850)	
02R	<u>A6*(1900)</u> , <u>A5*(2375)</u> and A4*(2850)	

- 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 BTN 0830-1030 daily estimated delays of about 15 minutes can be expected for arrivals into Singapore Changi Airport.

2.5 Reduced Runway Separation Minima

- 2.5.1 Reduced Runway Separation Minima may be applied between a departing aircraft and a succeeding landing aircraft or between two successive landing aircraft on the same runway provided the following conditions exist:
 - a. During the hours of daylight from 30 minutes after local sunrise to 30 minutes before local sunset;
 - b. Visibility of at least 5km;
 - c. Cloud ceiling shall not be lower than 1,000ft;
 - d. Tailwind component shall not exceed 5 knots;
 - e. The second aircraft will be able to see the first aircraft clearly and continuously until the first aircraft is clear of the runway;
 - f. Traffic information shall be provided to the flight crew of the succeeding aircraft concerned;
 - g. The braking action shall not be adversely affected by runway contaminants such as water;
 - h. Wake turbulence separation minima shall be applied; and
 - i. Responsibility for ensuring adequate separation between the two aircraft rests with the pilot of the second aircraft.

- 2.5.2 When reduced Runway Separation Minima is applied, the successive landing aircraft may be given a clearance to land before the first aircraft has cleared the runway-in-use after landing or crossed the runway end on departure provided there is reasonable assurance that the following separation distances will exist when the landing aircraft crosses the runway threshold:

	Landing following Landing	Landing following Departure
RWY 02L/20R	The preceding aircraft has landed and has passed a point at least 2500m from the threshold of runway (abeam TWY W4 for RWY 02L or TWY V8 for RWY 20R), is in motion and will vacate the runway without backtracking.	The departing aircraft is/will be airborne and has passed a point at least 2500m from the threshold of the runway (abeam TWY W4 for RWY 02L or TWY V8 for RWY 20R).
RWY 02C/20C	The preceding aircraft has landed and has passed a point at least 2500m from the threshold of the runway (abeam TWY T5 for RWY 02C or TWY T8 for RWY 20C), is in motion and will vacate the runway without backtracking.	The departing aircraft is/will be airborne and has passed a point at least 2500m from the threshold of the runway (abeam TWY T5 for RWY 02C or TWY T8 for RWY 20C).
RWY 02R/20L	The preceding aircraft has landed and has passed a point at least 2500m from the threshold of the runway, (abeam TWY A5 for RWY 02R or TWY A8 for RWY 20L) is in motion and will vacate the runway without backtracking.	The departing aircraft is/will be airborne and has passed a point at least 2500m from the threshold of the runway (abeam TWY A5 for RWY 02R or TWY A8 for RWY 20L).

2.6 **Phraseology**

- 2.6.1 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 **AIRPORT COLLABORATIVE DECISION MAKING (A-CDM) MODE OF OPERATIONS**

- 3.1 A-CDM aims to optimise airport operations by having an efficient turnaround process and improving the predictability of operational events. It also helps to improve gate management, flight punctuality, reduce apron taxiway and holding point congestion which is beneficial to all airport partners. A-CDM involves sharing of accurate and timely operational information amongst airport partners through different airport systems and improving work processes by implementing a set of operational procedures.

- 3.2 The A-CDM procedures apply to all scheduled flights departing Singapore Changi Airport except for VVIP, CASEVAC, SAR and aircraft on special tasks. ATC shall have full discretion in conduct of such operations.

3.3 Definition of commonly used terms in A-CDM

- a. Target Off Block Time (TOBT) – The time an aircraft operator (AO) or ground handling agent (GHA) estimates that an aircraft will be ready, all doors closed, boarding bridge removed, pushback vehicle available and ready to start-up / pushback immediately upon receipt of clearance from ATC.
- b. Target Start Up Approval Time (TSAT) – The time provided by ATC that an aircraft can expect start-up / push back approval.
- c. Calculated Take Off Time (CTOT) – A time calculated as a result of tactical slot allocation, at which a flight is expected to become airborne.

4 **A-CDM PRE-DEPARTURE PROCEDURES**

- 4.1 Singapore Changi Airport's A-CDM portal will automatically calculate a system TOBT for each departure flight taking into account the estimated or actual in-block time (EIBT / AIBT), minimum turnaround time (MTT) and scheduled time of departure (STD)

- 4.2 If the calculated TOBT (EIBT / AIBT + MTT) is earlier than STD, the system will take the STD as TOBT.

- 4.3 If the calculated TOBT (EIBT / AIBT + MTT) is later than STD, the amount of turnaround delay that system predicts is equal to TOBT – STD.

- 4.4 AO are required to assess the system generated TOBT at 40 minutes prior to departure and update it if the prediction of departure readiness is different. Thereafter, TOBT needs to be monitored and updated constantly if it is expected to differ by 5 minutes or more until the flight commences pushback. AO can consider delegating the responsibility of TOBT submission to their ground handling agent (GHA) subject to prior internal arrangements between AO and GHA.

- 4.5 TOBT shall be updated through the following systems:
- a. Airport Operations Centre System (AOCS) A-CDM web based portal; or
 - b. Gate Message Input Display (GMID) at boarding rooms;
- 4.6 AO/GHA is encouraged to update TOBT through ONLY one of the above systems in order to avoid any chance of a miscommunication.
- 4.7 TOBT information is available through the following channels:
- a. AOCS A-CDM portal;
 - b. GMID;
 - c. Aircraft Docking Guidance System (ADGS) at contact stands;
 - d. Radio communication with GHA or AO.
- 4.8 The Pre-Departure Sequencer (PDS) will calculate the TSAT automatically by taking into account factors such as TOBT, calculated take-off time (CTOT), variable taxi times (VTT), wake turbulence category, departure separation, etc. A pre-departure sequence is determined from the calculated TSATs, thus the accuracy of TOBT is vital to an optimal TSAT.
- 4.9 Flights with an invalid or expired TOBT will be instructed by ATC to update TOBT when requesting for clearance. For non-compliant flights, delays can be expected. AO or GHA are strongly encouraged to update TOBT as soon as any expected delay to the aircraft readiness for pushback is made available to avoid unnecessary hold-ups.
- 4.10 TSAT information is available through the following channels:
- a. AOCS A-CDM portal;
 - b. GMID;
 - c. ADGS at contact stands;
 - d. Radio communication with GHA or AO;
 - e. ATC - Upon issuance of ATC clearance (for flights parked at aircraft stands without ADGS).

5 A-CDM START-UP PROCEDURES

- 5.1 Pilot shall ensure aircraft is ready for pushback at TOBT.
- 5.2 Pilot to maintain communication with the AO / GHA as they are responsible for updating the TOBT. Notify the AO / GHA to update the TOBT if it is expected to differ by 5 minutes or more.
- 5.3 Pilot utilising the DCL service on selected routes shall request for ATC clearance through 'Request for Departure Clearance Downlink' (RCD) message no earlier than 20 minutes before TOBT. Refer to WSSS AD 2.22 paragraph 8.4 on the applicable routes for DCL service and procedures.
- 5.4 Pilot using voice request to contact Ground Movement Planner (Clearance Delivery) and request for ATC clearance within 5 minutes of TOBT using the following phraseology:
- Callsign
 - Destination
 - Proposed flight level and alternate level, if any
 - Parking position
- a. Pilot shall only request for ATC clearance provided aircraft is ready to pushback at TOBT.
- 5.5 Regardless of clearance through voice or datalink, all departing aircraft must report to Clearance Delivery when ready for push within 5 minutes of TOBT.
- 5.6 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 centre is required, the pilot will be instructed to standby.
- 5.7 ATC will update TSAT changes if any, during issuance of ATC clearances. Note that TSAT displayed on ADGS may not be final and can be revised due to en-route clearance restrictions, ground congestion or flow measures.
- 5.8 Pilot shall request for pushback from Ground Movement Control within 5 minutes of TSAT after obtaining ATC clearance, or as directed by ATC.
- a. ATC may swap pushback sequence based on real-time readiness of aircrafts to maximise apron and runway capacity and reduce the overall delay to traffic as and when required.
 - b. At the end of pushback, the departing aircraft must 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.

- 5.9 If a flight is unable to pushback by TSAT + 5 minutes due to the aircraft being unready, ATC clearance and TSAT will be cancelled. Pilot must notify the AO / GHA to update the TOBT for a new TSAT before requesting for a new ATC clearance. This also applies to aircraft returning back to blocks after pushback.
- a. ATC will inform the aircraft when a clearance is cancelled using the phraseology; "(Callsign of aircraft) your ATC clearance and TSAT is cancelled (reason). Update TOBT before requesting for new clearance".
 - b. Flight may also have its ATC clearance cancelled if it develops a technical problem after pushback and is unable to taxi for prolonged duration.
- 5.10 Non-compliance of initial TSAT may result in an aircraft losing its existing position in the pre- departure sequence. Delay can be expected as a result of re-sequencing based on new TOBT input.
- 5.11 If delay in pushback is due to ground traffic movement or ATC clearance restrictions, the ATC clearance and TSAT will remain valid even if it exceeds TSAT + 5 minutes. TOBT need not be updated for such situations.
- 5.12 In the event that A-CDM mode of operations need to be cancelled due to any reason, the termination will be communicated to relevant parties through email by the airport operator and a NOTAM will be issued by ATC. Pilot shall follow the non-CDM procedures detailed in para 13.
- 5.13 Quick overview of WSSS start-up for pilots

Definitions of commonly used terms

- **Target Off-Block Time (TOBT)** - The time that an AO or GHA estimates that an aircraft will be ready, all doors closed, boarding bridge removed, pushback vehicle available and ready to start-up / pushback immediately upon receipt of ATC clearance.
- **Target Start-up Approval Time (TSAT)** - The time provided by ATC that an aircraft can expect start-up / pushback approval.

TOBT and TSAT requirements

- Irrespective of the TSAT, the aircraft must be ready for departure at the TOBT +/- 5 minutes as the TSAT may be revised forward at short notice.
- Any time the TOBT or TSAT cannot be met, or an earlier departure is required, the TOBT must be updated expeditiously by the aircraft operator or ground handler.

ATC Clearance

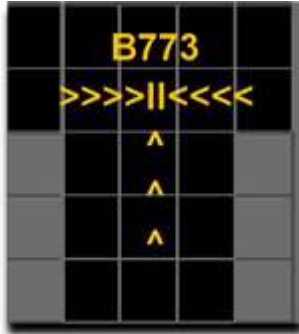



- ATC Clearance on selected ATS routes can be requested via Data Link Departure Clearance (DCL) at TOBT- 20 minutes.
- If DCL is not available, ATC Clearance should be requested via Clearance Delivery at TOBT +/-5 minutes.







Start-up / Pushback Clearance

- Pilots must be ready for start-up / pushback at TOBT +/- 5 minutes.
- Pilots should request start-up / pushback clearance at TSAT +/- 5 minutes.

6 A-CDM INFORMATION VIA AIRCRAFT DOCKING GUIDANCE SYSTEM (ADGS)

6.1 All contact stands in Singapore Changi Airport will have ADGS. The fundamental operation and usage of ADGS still remain the same for flight crew. Additional information which includes TOBT, TSAT and TOBT count-down timer will be displayed in local times as part of the improvements to support A-CDM operations.

Aircraft Docking Guidance System (ADGS)	
Description	Display on ADGS
<p>Aircraft arrival to stand</p> <ul style="list-style-type: none"> No change in existing functionality and display 	
<p>40 minutes prior to TOBT</p> <ul style="list-style-type: none"> ADGS will display TOBT submitted by AO / GHA and a count down timer (2 digits) to TOBT in minutes As ADGS can only display up to 7 characters per line, the displayed message will be scrolling. Timings displayed will be in Local Time (LT) TOBT timings will change instantly if there is an update done by AO / GHA 	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Snapshot 1</p>  </div> <div style="text-align: center;"> <p>Snapshot 2</p>  </div> </div> <div style="text-align: center; margin-top: 20px;"> <p>Snapshot 3</p>  </div>

Aircraft Docking Guidance System (ADGS)		
Description	Display on ADGS	
<p>25 minutes prior to TOBT</p> <ul style="list-style-type: none"> ADGS will display TSAT derived by PDS As ADGS can only display up to 7 characters per line, the displayed message will be scrolling. TSAT timings may change as the PDS is continuously optimising push back times based on real time traffic conditions 	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Snapshot 1</p>  </div> <div style="text-align: center;"> <p>Snapshot 2</p>  </div> </div> <div style="text-align: center; margin-top: 20px;">  <p>Snapshot 3</p> </div>	
	<p>Aircraft departure from stand</p> <ul style="list-style-type: none"> ADGS will display the actual off-block time (AOBT) As ADGS can only display up to 7 characters per line, the displayed message will be scrolling TOBT, TSAT and TOBT countdown timer will be removed AOBT display will be removed 3 minutes after AOBT 	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Snapshot 1</p>  </div> <div style="text-align: center;"> <p>Snapshot 2</p>  </div> </div> <div style="text-align: center; margin-top: 20px;">  <p>Snapshot 3</p> </div>

7 CONTACT AND INFORMATION

- 7.1 Please contact the airport operator, Changi Airport Group (CAG), at a-cdm@changiairport.com for application of AOCs A-CDM and GMID account or if you have any queries.
- 7.2 Aircraft operators may also contact their ground handling agent directly on queries regarding TOBT submission.

8 DEPARTURE CLEARANCE (DCL) VIA DATALINK PROCEDURES

- 8.1 Aircraft need to be equipped with Aircraft Communications Addressing and Reporting System (ACARS) to support DCL application and be compliant with the European Organisation for Civil Aviation Equipment (EUROCAE) ED-85A (Data Link Application System Document (DLASD) for the DCL datalink service) and ARINC Specification 623-3.
- 8.2 Singapore application of DCL is in accordance with ED-85A.
- 8.3 The logon ID of the ground system for the provision of DCL service is WSSS.

- 8.4 DCL service is only applicable for flights departing from WSSS to the following routes / destinations:
- Destinations in Peninsular Malaysia via ATS Routes A457 and B466
 - Destinations in Thailand via ATS Routes B466 and B469 / M751
 - Destinations in Indonesia via ATS Route A457, R469 and B470
 - Destinations in Australia and New Zealand via ATS Route B470
 - Flights with allocated Calculated Take-Off Time (CTOT) under Bay of Bengal Cooperative Air Traffic Flow Management (BOBCAT)
- 8.5 Pilot utilising the DCL service on selected routes shall request for ATC clearance through RCD message no earlier than 20 minutes before TOBT.
- For flights with allocated CTOT under BOBCAT, to input "CTOT HHMMz" under the free text field in RCD message.
 - For flights routed via ANITO B470, to input "ANITO FLxxx"(ANITO crossing level) under the free text field in RCD message.
 - Pilot shall contact Clearance Delivery or the next assigned frequency in 'Departure Clearance Uplink' (CLD) message within 5 minutes of TOBT using the following phraseology:
 - <"Callsign"...With P-D-C, fully ready>
 - Provide requested flight level if it differs from PFL filed in flight plan
 - Provide CTOT or ANITO crossing if not previously given in RCD message
- 8.6 DCL message format does not include the requested cruising level and final cruising level.
- The planned flight level (PFL) filed in flight plan field 15b will be used as requested level unless otherwise specified by pilot.
 - Final cruising level will be assigned by Singapore ATC after airborne and it is subjected to traffic disposition. No on-ground level negotiations or reservations are allowed.
- 8.7 DCL service does not provide clearance revision. Any revision to the clearance issued via datalink will be made by ATC through voice communications.
- 8.8 Clearance request through VHF using the existing voice procedures is still available for applicable flights under the DCL service.
- 8.9 ATC will reject the DCL request and send a "revert to voice procedures" message to the pilot if one of the following occurs:
- Flight's routes / destinations not stated in paragraph 8.4
 - RCD message does not comply with ED-85A or have inaccurate flight data, e.g. different Callsign / ADES from flight plan
 - Invalid TOBT
 - When required by ATC due to flow restriction
- 8.10 Upon receipt of any "revert to voice procedures" message, pilot shall cancel any clearance received previously (if any) and follow the existing voice procedures for clearance request, i.e. contact Clearance Delivery within 5 minutes of TOBT.
- 8.11 Pilot shall monitor the clearance delivery frequency once the DCL process is initiated. In the event of any issues encountered, ATC will revert to voice procedures.
- 8.12 ATC will revert with CLD message within 5 minutes of receipt of the RCD message. If no CLD message is received, pilot is to call on delivery frequency to verify request.
- 8.13 Pilot shall respond with 'Departure Clearance Readback Downlink' (CDA) message within 5 minutes of receipt of CLD message. Failure to comply may result in a "revert to voice procedures" message being sent.
- Note: The DCL process is only complete and clearance confirmed when CDA message is received and processed successfully.
A "CDA received – clearance confirmed" message will be sent to the pilot.
- 8.14 Aircraft operator / ground handling agent shall continue to update TOBT to reflect any changes in readiness time in accordance to A-CDM startup procedures stated in AIP Singapore section WSSS AD 2.22 paragraph 5.

8.15 ATC will check for TOBT compliance and update pilot of any revisions in departure clearance and flow restrictions before handing the flight over to Ground frequency for start-up and pushback.

8.16 ATC will cancel the clearance issued and send a "revert to voice procedures" message if pilot does not report ready for push within 5 minutes of TSAT.

9 ASSIGNMENT OF FLIGHT LEVELS TO AIRCRAFT DEPARTING FROM SINGAPORE CHANGI AIRPORT

9.1 Assignment of flight levels to departing aircraft is made on a best-planned-best-served basis (with reference to TOBT for ATC clearance request detailed in para 5.4). Aircraft will normally be assigned the level requested unless an alternate level is offered after coordination with the adjacent ATC centres.

9.2 Departing flights from Singapore requesting FL280 or FL320 on L759, M770, N571, N571/N877 or P628 will be cleared as follows:

- a. Aircraft departing Singapore will be cleared to FL280;
- b. Succeeding aircraft on the same route will be cleared to FL280 with 10min longitudinal separation provided there is no closing speed with the preceding aircraft;
- c. Additional longitudinal separation as appropriate shall be imposed by ATC when the succeeding aircraft is faster than the preceding aircraft on the same route;
- d. 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

10 DELAY IN PUSHBACK AND/OR TAXIING DUE TO OTHER AIRCRAFT

10.1 Delays may be expected for the second aircraft to pushback 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 para 5.9 is exceeded.

Note: The TSAT may not be able to predict delays arising from apron congestion as traffic movement on ground is dynamic and situations may change on a real time basis depending on aircraft readiness. ATC will facilitate pushback as soon as possible when traffic permits.

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

11.1 The ATC clearance may require an aircraft to arrive at a reporting point at a specified time and level or to depart a number of minutes behind a preceding traffic to establish the appropriate longitudinal separation. Such delay will not deprive a departing aircraft of its ATC clearance even though the 5 minutes grace period allowed for under para 5.9 is exceeded.

12 DELAY DUE TO OVERFLIGHTS

← 12.1 Overflights are flights that traverse Singapore FIR and/or airspace within the Jakarta FIR where ATS is provided by Singapore (see ENR 2.1) without landing at Singapore Changi Airport. Depending on the positions of overflights, a departing aircraft requesting the same flight level may have to accept an alternate flight level or delay its departure in order to establish the prescribed separation.

13 NON-CDM MODE OF OPERATIONS

13.1 The non-CDM procedures is applicable for non-scheduled flights departing Changi Airport or when TOBT and TSAT references used in A-CDM mode of operations become unavailable due to system issues or maintenance.

13.2 If TOBT cannot be submitted or it is unavailable through different channels stated in para 4.5,

- a. Pilots shall notify ATC when the aircraft is ready to pushback within 5 minutes.
- b. 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 centre is required, the pilot will be instructed to standby.
- c. Once 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 on expiry of the 5 minutes grace period. This also applies to situations when aircraft return to blocks after pushback or develop technical issues and is unable to continue taxi.
- d. Pilots who are ready to depart following the cancellation of an ATC clearance will adopt the procedures as if it is the first time they are ready to depart.

- 13.3 If TSAT is unavailable through different means stated in para 4.10,
- a. AO and GHA shall continue to submit TOBT and pilots shall request for ATC clearance 5 minutes within TOBT stated in para 5.4
 - b. ATC will revert to the gate hold procedures stated in para 14 and issue estimated pushback times accordingly.

14 GATE HOLD PROCEDURES FOR DEPARTING AIRCRAFT (DURING NON-CDM MODE OF OPERATIONS)

- 14.1 Whenever there are about five to seven departing aircraft at the runway holding point, subsequent pushback of departures will be regulated such that the Ground Movement Planner (GMP) on VHF frequency 121.65MHz will start to issue pilots with Expected Pushback Time (EPT) as TSAT used in A-CDM operations is not available. The determination of EPT will take into account an aircraft's parking stand as well as taxi time to the runway-in-use holding point.
- 14.2 When an EPT is issued, pilots will be instructed to either remain on GMP frequency or to monitor Singapore Ground Control (frequencies 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz or 125.65MHz). It should be noted that when instructed to monitor the Singapore Ground frequencies, pilots shall not establish contact with the Singapore Ground Control, rather, pilots shall maintain listening watch on the assigned Singapore Ground Control frequency and wait for pushback instruction. This is to prevent unnecessary frequency congestion.
- 14.3 A flight issued with an EPT but chooses to commence pushback before the assigned time will be allowed to do so subject to traffic. However, the flight should not expect an earlier departure time as the planned pre-departure sequence will be maintained.
- 14.4 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 GMP to contact Singapore Ground Movement Control for pushback for the purpose of better gate utilisation.
- 14.5 To maximise runway utilisation, departure sequence will be planned on the basis of increasing runway throughput so as to enhance overall efficiency.

15 GROUND MOVEMENT PLANNER ON VHF 121.65MHz

- 15.1 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 on this frequency.

16 GROUND MOVEMENT CONTROL ON VHF 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz, 125.65MHz AND 127.275MHz

- 16.1 This frequency shall be used for aircraft start-up/push-back clearance.
- 16.2 Unless otherwise instructed by ATC, the pilot-in-command shall prior to starting engines listen out on the Ground Movement Control frequency on 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz or 125.65MHz.
- 16.3 The pilot-in-command shall:
- a. 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.
 - b. Change from Ground Movement Control frequency to the Runway Control frequency when instructed (118.6MHz, 118.25MHz or 131.4MHz). It should be noted that when instructed to monitor Singapore Tower frequencies, pilots shall not establish contact with Singapore Tower; rather, pilots shall maintain a listening watch on the assigned Singapore Tower frequency and wait for instruction. This is to prevent unnecessary frequency congestion.
- 16.4 Departing aircraft will be instructed when to change from 118.6MHz, 118.25MHz or 131.4MHz to Singapore Departure frequency 120.3MHz.
- 16.5 In the case of the aircraft having landed, the pilot-in-command shall change from 118.6MHz, 118.25MHz or 131.4MHz to 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz, 125.65MHz or 127.275MHz immediately upon instructed by ATC after clearing the runway. He shall maintain watch on 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz, 125.65MHz or 127.275MHz for taxiing and parking instructions until he arrives at his aircraft stand.

17 TAXIING

- 17.1 Taxi clearance given by Singapore Ground Movement Control will relate to movement on the manoeuvring area, but excluding the marshalling area.
- 17.2 Aircraft taxiing on the manoeuvring 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.
- 17.3 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 manoeuvring area or to comply with ATC directions intended to regulate aircraft on the manoeuvring area. **Pilots are also advised of the possibility of misjudging the clearance between the aircraft wing tips and other obstacles, especially in areas of hot-spots or during low-light / poor visibility conditions.**
- 17.4 Pilots are reminded to always use minimum power when starting engines, when manoeuvring within the apron area or when manoeuvring 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.
- 17.5 TWY K (north of RWY 02C/20C) and TWY L (south of RWY 02C/20C) are End-Around Taxiways to facilitate aircraft movement between the east and west of RWY 02C/20C. Aircraft taxiing on these taxiways will be regulated by ATC to avoid conflict with aircraft operating on RWY 02C/20C.

18 TAKE-OFF AND LANDING

- 18.1 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 02R – TWY A10, A11 or A12
- RWY 02C - TWY T12, T13, D13, D14
- RWY 02L - TWY W8, W9 or W10
- RWY 20L – TWY A1, A2 or A3
- RWY 20C - TWY T1, T2, D1, D2
- RWY 20R - TWY W1, W2
- 18.2 The pilot-in-command shall not take-off or land without a clearance from Aerodrome Control.
- 18.3 The pilot-in-command shall not run-up on the runway in use unless authorised by Aerodrome Control. Engine 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.
- 18.4 After landing, the pilot-in-command shall vacate the runway by the shortest suitable route and to contact Singapore Ground Movement Control who will issue specific taxi route instructions to its assigned aircraft stand.
- 18.5 Aircraft with radio communication failure shall vacate the runway and stop on the taxiway and watch for light signals from Aerodrome Control.

19 STANDARD INSTRUMENT DEPARTURE (SID) AND STANDARD INSTRUMENT ARRIVAL (STAR)

19.1 INTRODUCTION

- 19.1.1 The SIDs and STARs for Singapore Changi Airport require aircraft to be GNSS-equipped and approved with navigation systems that meet the ICAO RNAV-1 navigation specification in accordance to the ICAO Performance Based Navigation Manual (Doc 9613).
- 19.1.2 To avoid proliferation of SIDs and STARs, the basic RNAV SIDs and STARs follow similar tracks as the RNAV-1 (GNSS) SIDs and STARs using the same set of SIDs and STARs identification.
- 19.1.3 Operators / pilots who are not approved to operate on the RNAV-1 (GNSS) SIDs and STARs shall notify ATC and operate on the alternate basic RNAV SIDs and STARs or expect radar vectors from ATC.

19.2 ARRIVALS

19.2.1 Arriving aircraft from the various ATS routes shall plan for the respective RNAV-1 STARs with the associated flight planning requirement as shown below:

ATS Route	RNAV-1 STAR	Remarks and Flight Planning Requirement
A464 (southbound to Singapore)	TEBUN	Arrivals into Changi to flight plan via A464 - ARAMA - TEBUN. After TEBUN, to join the TEBUN STAR. When traffic permits and WSSS Runway 20 is in use, ATC will offer LELIB STAR.
A576 (southbound to Singapore)	Not applicable	Southbound flight landing at WSSS are not permitted to flight plan via A576.
G579	REPOV	NIL
G580	KARTO	NIL
L504 / T22	UGEBO	Arrivals into Changi on L504 to flight plan via OBDOS - T22 - UGEBO. After UGEBO, to join the UGEBO STAR.
L642 ¹	ELALO	ESPOB Q801 Q802 ELALO / ESPOB DCT ELALO
L762	ASUNA	NIL
M635 / T23	UGEBO	Arrivals into Changi on M635 to flight plan via SURGA - T23 - UGEBO. After UGEBO, to join the UGEBO STAR.
M646	KARTO	NIL
Y514	Not applicable	Y514 NUFFA PIBAP PASPU. After PASPU, expect radar vectors.
M753	ELALO	IPRIX Q802 ELALO
M767	KARTO	NIL
M774 / T22		Arrivals into Changi on M774 to flight plan via OBDOS - T22 - UGEBO. After UGEBO, to join the UGEBO STAR.
M904	ELALO	UPRON Q803 ELALO
N891	ELALO	N891 ENREP DCT ELALO
N892 ¹	MABAL	MELAS DCT MABAL
R469	ASUNA	NIL
Note: The LEBAR STAR serves as a transition option to the STARs listed above. This is to facilitate arrivals joining downwind to the west of Singapore Changi Airport. ATC may clear arrivals to join the LEBAR STAR when air traffic permits.		
¹ Refer to ENR 1.3 and ENR 3.2 for Direct Routing Operations (DRO) flight planning procedures.		

19.2.2 All RNAV-1 (GNSS) STARs terminate at the initial approach fix (IAF). Arrivals can expect radar vectors for approach to the respective runways.

19.3 DEPARTURES

19.3.1 All departing aircraft will be cleared on the appropriate RNAV-1 (GNSS) SIDs or radar departure to join the planned ATS route and shall climb initially to 3,000ft.

19.3.2 RNAV-1 (GNSS) SIDs will be assigned to departures from Singapore Changi Airport that flight plan on the following ATS routes:

ATS Route	RNAV-1 SID	Remarks and Flight Planning Requirements
A457	MASBO	NIL
B470	ANITO	NIL
G580 / M646	TOMAN	NIL
L625 / N884	TOMAN	NIL
L762	MIBEL	NIL
M751	MERSING	NIL
M753	MERSING	VMR L642 EGOLO DCT IPRIX ² Expect radar vectors or further ATC clearance on approaching VMR.
M771	MERSING	VMR DOLOX M771 Expect radar vectors or further ATC clearance on approaching VMR.
N884	Not applicable	Not available for flight planning between VMR and LUSMO. Flight plan via TOMAN L625 LUSMO N884.

ATS Route	RNAV-1 SID	Remarks and Flight Planning Requirements
N891	MERSING	VMR ENREP N891 Expect radar vectors or further ATC clearance on approaching VMR.
R469	TAROS	NIL
T21 / L504	DODSO	Departures joining ATS route L504 to flight plan via DODSO T21 OBDOS.
T21 / M774	DODSO	Departures joining ATS route M774 to flight plan via DODSO T21 OBDOS.
T24 / M635	IDBUD	Departures joining ATS route M635 to flight plan via IDBUD T24 SURGA M635.
W26	KIRDA	NIL
Y513	AROSO	Flight planning permitted for flights departing from or overflying Singapore to destinations north of Kuala Lumpur and Subang Airports. For flights operating at FL220 and below, to flight plan on A457.
² Refer to ENR 1.3 and ENR 3.2 for Direct Routing Operations (DRO) flight planning procedures.		

19.4 VERTICAL AND SPEED RESTRICTIONS

19.4.1 Pilots shall comply with an ATC assigned level. Pilots shall also adhere to the vertical and speed restrictions depicted on the SIDs and STARs. ATC clearance will take precedence when the ATC clearance does not allow the pilots to adhere to the vertical and speed restrictions depicted on the SIDs and STARs.

19.5 OPERATORS' PROCEDURES

19.5.1 The operator shall ensure that in-flight procedures, crew manuals and training programmes are established in accordance with RNAV-1 (GNSS) navigation requirements.

19.5.2 Pilots shall inform ATC when on-board equipment does not meet the RNAV-1 (GNSS) navigation requirements. Pilots can then expect radar vector from ATC.

20 COORDINATES OF SID/STAR WAYPOINTS (WGS84 DATUM)

Name	Latitude	Longitude	Radius/Distance from VTK	Radius/Distance from SJ
ABVIP	010008N	1035032E	VTK R-203.5 / D27.0	SJ R-183.5 / D13.2
ADPON	010108N	1035808E	VTK R-163.1 / D13.4	SJ R-095.3 / D14.1
AGROT	010108N	1035808E	VTK R-187.7 / D24.0	SJ R-150.8 / D14.0
AGVAR	014719N	1034145E	VTK R-318.8 / D29.8	SJ R-344.3 / D35.3
AKMET	015355N	1034339E	VTK R-328.6 / D34.0	SJ R-349.3 / D41.3
AKOMA	014522N	1035443E	VTK R-342.0 / D21.4	SJ R-006.2 / D32.0
ALFA	013033N	1034942E	VTK R-295.7 / D12.9	SJ R-354.8 / D17.2
ANITO	001700S	1045200E	VTK R-153.4 / D113.4	SJ R-146.0 / D108.6
ARAMA	013654N	1030712E	VTK R-282.4 / D55.5	SJ R-298.0 / D50.0
AROSO	020846N	1032421E	VTK R-319.9 / D57.4	SJ R-334.0 / D61.7
ASITI	004906N	1035042E	VTK R-196.6 / D37.2	SJ R-181.3 / D24.1
ASOMI	010142N	1040207E	VTK R-178.1 / D23.1	SJ R-136.9 / D15.9
ASUNA	005948N	1030954E	VTK R-244.1 / D57.3	SJ R-252.0 / D43.6
ATLEX	010302N	1033331E	VTK R-232.0 / D-35.4	SJ R-240.0 / D20.5
ATRUM	013256N	1040057E	VTK R-357.3 / D8.0	SJ R-026.1 / D21.8
BETBA	013302N	1035331E	VTK R-316.1 / D11.3	SJ R-006.3 / D19.8
BIBVI	024336N	1040618E	VTK R-003.5 / D78.4	SJ R-009.6 / D91.1
BIDUS	013554N	1035755E	VTK R-326.0 / D13.2	SJ R-006.9 / D22.6
BIPOP	013122N	1041018E	VTK R-054.5 / D11.0	SJ R-046.8 / D26.2
BISOV	004229N	1025214E	VTK R-238.6 / D81.1	SJ R-242.6 / D66.6
BITAM	010813N	1040757E	VTK R-158.3 / D17.9	SJ R-107.0 / D17.5
BOBAG	010230N	1032954E	VTK R-234.7 / D38.6	SJ R-243.2 / D24.0
BTM	010813N	1040758E	VTK R-158.2 / D17.9	SJ R-107.0 / D17.5
DODSO	012225N	1061402E	VTK R-091.0 / D154.3	SJ R-086.4 / D143.3
DOVAN	011938N	1041249E	VTK R-114.6 / D12.7	SJ R-073.9 / D22.5
DUBOT	010846N	1040103E	VTK R-181.0 / D16.1	SJ R-115.0 / D10.8

Name	Latitude	Longitude	Radius/Distance from VTK	Radius/Distance from SJ
DUMUP	005430N	1035516E	VTK R-191.4 / D30.9	SJ R-167.9 / D19.2
ELALO	041240N	1043329E	VTK R-010.6 / D169.9	SJ R-013.4 / D183.3
EMRIX	012606N	1041040E	VTK R-083.0 / D9.4	SJ R-057.0 / D23.2
ERVIV	010445N	1041013E	VTK R-156.1 / D22.0	SJ R-114.3 / D20.8
GIXEM	004920N	1042539E	VTK R-145.5 / D43.0	SJ R-124.8 / D41.9
GOTGA	012013N	1044200E	VTK R-096.6 / D41.0	SJ R-082.3 / D51.3
GUMPU	013000N	1034243E	VTK R-285.1 / D19.3	SJ R-332.6 / D18.6
GUNUD	011042N	1050618E	VTK R-102.3 / D66.6	SJ R-092.0 / D75.2
GURES	002814N	1043835E	VTK R-146.4 / D67.5	SJ R-133.3 / D65.2
HOSBA	011948N	1042418E	VTK R-102.5 / D23.6	SJ R-079.0 / D33.7
IBASU	005751N	1033410E	VTK R-225.3 / D38.3	SJ R-228.0 / D23.1
IBIVA	011351N	1035637E	VTK R-203.1 / D12.0	SJ R-084.3 / D5.3
IBIXU	011621N	1035740E	VTK R-203.2 / D9.3	SJ R-064.4 / D7.0
IDBUD	001454N	1050139E	VTK R-139.1 / D92.2	SJ R-129.5 / D91.4
IDKIV	005652N	1041333E	VTK R-156.3 / D30.5	SJ R-126.3 / D27.7
IGNON	010847N	1041257E	VTK R-144.1 / D19.8	SJ R-101.8 / D22.2
IGOSI	005645N	1040644E	VTK R-169.1 / D28.6	SJ R-136.8 / D22.7
IKIRO	000849N	1044420E	VTK R-150.4 / D87.1	SJ R-140.4 / D83.4
ISGIL	004246N	1031257E	VTK R-229.1 / D64.1	SJ R-231.6 / D49.0
ISNOM	010629N	1035826E	VTK R-189.0 / D18.6	SJ R-133.6 / D9.9
KANLA	034556N	1043606E	VTK R-013.8 / D144.5	SJ R-016.5 / D158.3
KARTO	011124N	1053343E	VTK R-098.3 / D93.5	SJ R-091.1 / D102.6
KEXAS	011019N	1044818E	VTK R-107.2 / D49.2	SJ R-093.0 / D57.2
KILOT	030217N	1044023E	VTK R-022.0 / D104.5	SJ R-024.4 / D119.0
KIRDA	000009N	1045934E	VTK R-145.4 / D102.7	SJ R-136.8 / D100.1
LAVAX	010950N	1042714E	VTK R-120.1 / D30.0	SJ R-095.5 / D36.2
LEDOX	011642N	1035651E	VTK R-208.6 / D9.4	SJ R-058.5 / D6.5
LELIB	012729N	1032450E	VTK R-274.0 / D36.6	SJ R-298.0 / D30.0
LETGO	011411N	1035548E	VTK R-207.3 / D12.1	SJ R-079.1 / D4.6
MABAL	032826N	1051236E	VTK R-030.1 / D142.1	SJ R-031.2 / D157.2
MASBO	020248N	1025251E	VTK R-299.0 / D78.3	SJ R-310.2 / D76.6
MIBEL	012351N	1020816E	VTK R-269.5 / D113.2	SJ R-275.8 / D103.7
MOLVO	012955N	1040227E	VTK R-012.8 / D5.1	SJ R-034.2 / D20.0
MOXIB	012933N	1040315E	VTK R-022.7 / D5.0	SJ R-036.7 / D20.1
MUMDU	010521N	1042714E	VTK R-126.9 / D32.4	SJ R-102.5 / D36.9
NYLON	013657N	1040624E	VTK R-023.0 / D13.0	SJ R-032.9 / D30.0
PALGA	011059N	1034759E	VTK R-223.8 / D19.3	SJ R-235.1 / D4.1
PAMSI	010459N	1034845E	VTK R-212.3 / D23.6	SJ R-197.2 / D8.7
PASPU	015915N	1040618E	VTK R-008.3 / D34.5	SJ R-018.3 / D48.1
PIBAP	023023N	1040618E	VTK R-004.4 / D65.3	SJ R-011.1 / D78.1
POSUB	012725N	1040748E	VTK R-069.0 / D6.9	SJ R-049.8 / D21.7
POVEB	011344N	1040130E	VTK R-179.2 / D11.1	SJ R-087.9 / D10.3
PU	012524N	1035600E	VTK R-275.2 / D5.4	SJ R-021.1 / D13.0
REMES	004342N	1035735E	VTK R-185.2 / D41.2	SJ R-167.9 / D30.2
REPOV	001623N	1040300E	VTK R-178.6 / D68.2	SJ R-168.3 / D57.9
RWY 02R DER	012122N	1040051E	VTK R-187.8 / D3.6	SJ R-050.3 / D12.5
RWY 02C DER	012145N	1035957E	VTK R-203.3 / D3.4	SJ R-045.8 / D12.1
RWY 02L DER	012305N	1035933E	VTK R-224.1 / D2.5	SJ R-040.6 / D12.8
RWY 20C DER	011942N	1035905E	VTK R-203.0 / D5.7	SJ R-050.8 / D10.1
RWY 20R DER	012047N	1035835E	VTK R-213.7 / D4.9	SJ R-044.8 / D10.4
RWY 20L DER	011919N	1035959E	VTK R-193.7 / D5.7	SJ R-055.8 / D10.6
SABKA	015051N	1031713E	VTK R-300.4 / D51.2	SJ R-317.7 / D50.7
SALRU	011701N	1040802E	VTK R-139.5 / D10.3	SJ R-077.8 / D17.2
SAMKO	010530N	1035255E	VTK R-203.5 / D21.1	SJ R-168.0 / D8.0
SANAT	010749N	1035930E	VTK R-186.1 / D17.1	SJ R-123.7 / D9.9
SEBVO	011259N	1044028E	VTK R-109.5 / D35.6	SJ R-090.5 / D43.6

Name	Latitude	Longitude	Radius/Distance from VTK	Radius/Distance from SJ
SJ (SINJON)	011321N	1035115E	-	-
SURGA	003657S	1063119E	VTK R-129.1 / D193.3	SJ R-124.6 / D194.3
TAROS	004200N	1021612E	VTK R-247.9 / D139.4	SJ R-251.9 / D100.2
TEBUN	011455N	1031557E	VTK R-257.7 / D46.5	SJ R-272.5 / D35.4
TOMAN	012147N	1054717E	VTK R-091.7 / D106.2	SJ R-085.9 / D116.5
UGEBO	003813N	1052432E	VTK R-119.1 / D95.4	SJR-110.5 / D99.8
UKIBO	011758N	1035924E	VTK R-195.7 / D7.2	SJ R-060.6 / D9.4
UPTTEL	005925N	1040730E	VTK R-166.3 / D26.1	SJ R-130.5 / D21.4
VAMPO	005833N	1032525E	VTK R-233.9 / D44.5	SJ R-240.4 / D29.8
VANBU	010643N	1042740E	VTK R-124.5 / D32.0	SJ R-100.3 / D37.1
VASTI	004320N	1043406E	VTK R-141.6 / D52.8	SJ R-124.8 / D52.3
VEBMA	012030N	1045332E	VTK R-094.8 / D52.5	SJ R-083.5 / D57.8
VEXEL	005904N	1034254E	VTK R-215.7 / D31.7	SJ R-210.5 / D16.5
VIBOG	004310N	1034302E	VTK R-203.8 / D45.4	SJ R-195.3 / D31.2
VIGUD	011328N	1035730E	VTK R-198.6 / D69.7	SJ R-089.0 / D6.2
VIMAL	010942N	1042353E	VTK R-123.8 / D27.2	SJ R-096.4 / D22.9
VIRET	003940N	1043511E	VTK R-143.0 / D56.4	SJ R-127.3 / D55.3
VMR	022318N	1035218E	VTK R-351.2 / D58.8	SJ R-000.9 / D69.6
VOVOS	011123N	1032651E	VTK R-248.7 / D37.1	SJ R-265.4 / D24.5
VTK (TEKONG)	012455N	1040120E	-	-

21 SID / STAR PHRASEOLOGIES

21.1 SID / STAR phraseologies allow ATC and pilot to communicate and understand detailed clearance information that would otherwise require long and potentially complex transmissions. To eliminate safety risk due to a mismatch between ATC and pilot expectations when SID / STAR phraseologies are used, and what certain terms may mean, ICAO has published Amendment 7-A to Doc 4444, PANS- ATM to harmonise the core phraseologies that positively reinforce the lateral, vertical and speed requirements embedded in a SID or STAR that will continue to apply, unless explicitly cancelled or amended by the controller.

21.2 The core phraseologies are:

- i. CLIMB VIA SID TO (level)
- ii. DESCEND VIA STAR TO (level)

21.3 These require the aircraft to:

- i. Climb / descend to the cleared level in accordance with published level restrictions;
- ii. Follow the lateral profile of the procedure; and
- iii. Comply with published speed restrictions or ATC-issued speed control instructions as applicable.

21.4 Phraseologies for removal of speed or level restrictions are:

- i. CLIMB VIA SID TO (level), CANCEL SPEED RESTRICTION(S)
- ii. DESCEND VIA STAR TO (level), CANCEL LEVEL RESTRICTION(S) AT (point(s))

21.5 These phraseologies mean that:

- i. The lateral profile of the procedure continue to apply and
- ii. Speed or level restrictions which have not been referred to will continue to apply.

21.6 Phraseologies for variations to the lateral profile of the SID / STAR are:

- i. PROCEED DIRECT (waypoint), or
- ii. VECTORING

21.7 These phraseologies mean that speed and level restrictions associated with the bypassed waypoints are cancelled.

21.8 Phraseology to clear aircraft to return to SID / STAR is: REJOIN SID / STAR

21.9 This phraseology means that speed and level restrictions associated with the waypoint where the rejoin occurs, as well as those associated with all subsequent waypoints must be complied with.

21.10 The term 'VIA' will no longer be used when issuing lateral routing clearances.

22 LIGHT AIRCRAFT OPERATIONS

22.1 Light aircraft operations into and out of Singapore Changi Airport may be approved subject to the following conditions:

- a. Prior permission has been granted;
- b. Aircraft is suitably equipped;
- c. Pilot is appropriately rated;
- d. Subject to ATC.

22.2 Flight notification shall be given by filing a flight plan.

22.3 All such operations will be regulated in accordance with IFR procedures.

23 CHANGI FLOW MANAGEMENT PROCEDURES

23.1 INTRODUCTION

23.1.1 The objectives of the procedures are to improve the efficiency of Singapore's air traffic service by minimising radar vectoring as well as improving airspace capacity.

23.1.2 The procedures require the holding of Changi arrivals over established holding areas.

23.2 ENTRY AND EXIT GATES

23.2.1 'Entry gates' and 'Exit gates' are established to ensure segregation between arriving and departing aircraft operating at Singapore Changi Airport. These gates (waypoints) are incorporated in the RNAV SID/STARs which have been implemented to support the flow management procedures. The 'entry' and 'exit' gates are shown below:

<u>Entry Gate</u>	<u>Coordinates</u>
KEXAS	011019N 1044818E
PASPU	015915N 1040618E
REMES	004342N 1035735E
VAMPO	005833N 1032525E

23.3 ARRIVING AIRCRAFT TO SINGAPORE CHANGI AIRPORT

← 23.3.1 STANDARD INSTRUMENT ARRIVAL (STAR)
IFR flight should expect a Standard Instrument Arrival (STAR).

23.3.2 ENTRY GATE TIME
To regulate the flow of traffic into the Approach airspace, ATC will issue, when necessary, a time restriction at an entry gate associated with the inbound route of the flight into Singapore Changi Airport.

23.3.3 DESCENT PROFILE
Pilots shall plan their descent profile in accordance with the published STAR procedures.

23.3.4 SPEED CONTROL
Speed control restrictions are incorporated into the STARs to enhance predictability and planning of air traffic in the Approach airspace. Pilots shall adhere to the speed control restrictions published in the STAR procedures unless otherwise advised. ATC may issue further speed adjustment during the different phases of the flight if traffic situation warrants.

23.4 APPROACH AIRSPACE HOLDING PROCEDURES

23.4.1 ENTRY PROCEDURE
The entry into the holding patterns shall be in accordance with the three-sector entry procedure as prescribed in ICAO Doc 8168 - OPS/611 Edition 1993.

23.4.2 RATE OF TURN
All turns are to be made at a bank angle of 25° or at a rate of 3° per second, whichever requires the lesser bank.

23.4.3 DESCENT PROCEDURE

When instructed to join a holding pattern, pilots shall reach their assigned altitudes prior to arriving at the holding point. This will allow appropriate traffic sequencing and the reduction of step-descents in the holding pattern.

23.4.4 DETAILS OF APPROACH AIRSPACE HOLDING AREAS

Holding Fix / ID / Co-ordinates	Inbound Track °M	Direction of Turn	MAX HLDG Speed (IAS)	Time (MIN)	MNM-MAX HLDG Level	Controlling Unit and Frequency
1	2	3	4	5	6	7
NYLON 013657N 1040624E	203°	Left	220 knots	1	FL140 3,000ft	Singapore Approach 124.05MHz (PRI) 132.15MHz (SRY)
KEXAS 011019N 1044818E	268°	Left	220 knots	1	FL160 11,000ft	Singapore Approach 124.05MHz (PRI) 132.15MHz (SRY)
REMES 004342N 1035735E	348°	Left	220 knots	1	FL140 6,000ft	Singapore Approach 124.6MHz (PRI) 132.15MHz (SRY)
BOBAG 010230N 1032954E	082°	Right	220 knots	1	FL140 6,000ft	Singapore Approach 124.6MHz (PRI) 132.15MHz (SRY)
VAMPO 005833N 1032525E	149°	Right	220 knots	1	FL180 6,000ft	Singapore Approach 124.6MHz (PRI) 132.15MHz (SRY)

23.4.5 ALTERNATE HOLDING AREAS

In the event of inclement weather or capacity constraints rendering a specific holding area unusable, arrivals may be cleared to an alternate holding area for re-sequencing. To ensure smooth transition to alternate holding area, all arrivals bound for Singapore Changi Airport shall have their FMS programmed with all the four promulgated holding areas (paragraph 23.4.4).

23.5 EXPECTED TIME TO LEAVE HOLDING AREA

23.5.1 If arrival delay is processed by means of holding, pilots will be informed of the expected time to leave the respective holding area.

23.5.2 The expected time to leave is issued to serve as an early notification of the probable holding duration as well as for unforeseen circumstance such as radio failure (see ENR 1.6). Subsequently, a specified time to leave the holding area will be issued to pilots to resume the flight according to the assigned RNAV STARs.

23.6 DEPARTING AIRCRAFT FROM SINGAPORE CHANGI AIRPORT

23.6.1 DEPARTURE SPEED CONTROL

Departing aircraft shall not exceed IAS 230 knots below 4,000 feet AMSL or at the waypoints specified in the SID and not exceed IAS 250 knots below 10,000 feet AMSL. Pilots shall also comply with speed control restrictions according to published SIDs.

← 24 SIMULTANEOUS INDEPENDENT PARALLEL APPROACHES

24.1 INTRODUCTION

24.1.1 Simultaneous independent parallel approaches will be implemented daily between 0000UTC and 1500UTC to optimize runway utilization and enhance air traffic efficiency.

24.2 PROCEDURES FOR SIMULTANEOUS INDEPENDENT PARALLEL APPROACHES

24.2.1 To ensure safe operations between aircraft on parallel approaches, Normal Operating Zones (NOZs) are established for each extended runway centreline and a No Transgression Zone (NTZ) is established between the NOZs.

24.2.2 ATC will vector arriving flights into Singapore Changi Airport from the final waypoint of the respective STARs to the respective NOZs.

24.2.3 Within the NOZ, ATC shall provide a minimum vertical separation of 1,000ft or 3NM surveillance separation between pairs of aircraft until both aircraft are established on the ILS Localizer course.

24.2.4 ATC is not required to provide separation between aircraft on adjacent ILS Localizers and will monitor aircraft for deviation from the approach path.

- 24.2.5 Aircraft can expect to maintain altitude 2,500ft till Glide Path Interception for Runway 20R / 02L and 3,500ft till Glide Path Interception for Runway 20C / 02C. This is to ensure the necessary vertical separation prior to establishing on the respective ILS Localizer course.
- 24.2.6 Aircraft can expect the following radiotelephony phraseology to intercept the Localizer before clearing for ILS:
“TURN LEFT (RIGHT) HEADING (three digits) MAINTAIN (altitude) REPORT ESTABLISHED ON THE LOCALIZER RUNWAY (number) LEFT (CENTRE / RIGHT)”
followed by ...
“MAINTAIN (altitude), CLEARED FOR ILS APPROACH RUNWAY (number) LEFT (CENTRE/RIGHT)”
- 24.2.7 Aircraft can expect to maintain speed 180 knots at base turn or earlier till 8NM from touchdown.
- 24.3 BREAK-OUT MANOEUVRE**
- 24.3.1 When an aircraft is observed to have not established on the appropriate Localizer course or deviated from its course towards the NTZ, ATC will instruct the aircraft to return immediately to the correct Localizer course with the following radiotelephony phraseology:
“YOU HAVE CROSSED THE LOCALIZER, TURN LEFT (or RIGHT) IMMEDIATELY AND RETURN TO THE LOCALIZER”
or
“TURN LEFT (or RIGHT) TO RETURN TO LOCALIZER COURSE”
- 24.3.2 When ATC observed aircraft to be penetrating or will penetrate the NTZ, ATC will instruct the aircraft on the adjacent Localizer course to alter course to avoid the deviating aircraft with the following radiotelephony phraseology:
“TRAFFIC ALERT, TURN LEFT (or RIGHT) IMMEDIATELY HEADING (degrees), CLIMB AND MAINTAIN (altitude)”
- 24.4 PILOT NOTIFICATION AND CONDITIONS FOR OPERATIONS**
- 24.4.1 Simultaneous approaches to parallel runways operation will be broadcasted on ATIS during the active period.
- 24.4.2 Simultaneous approaches to the parallel runways will be suspended in the event of adverse weather or any other conditions that may affect the safe conduct of such approaches to the parallel runways.

←

WSSS AD 2.23 ADDITIONAL INFORMATION

1 BIRD CONCENTRATION IN THE VICINITY OF THE AIRPORT

- 1.1 A number of varieties of birds are found in Singapore throughout the year. The larger birds commonly found in Singapore Changi Airport include the following:
- cattle egrets (weighing approximately 400g each)
 - intermediate egrets (weighing approximately 500g each)
 - brahminy kites (weighing approximately 600g each)
 - grey herons (weighing approximately 1500g each)
 - white-bellied sea eagle (weighing approximately 2900g each)
- 1.2 There could be an increase in bird activities during the migratory months of September to March. During this period, migratory birds may use the airport as their feeding ground.
- 1.3 Various active dispersal devices generating light, sound or cracking effects are used for bird dispersal to mitigate wildlife hazards where necessary within Singapore Changi Airport (such as handheld laser device, long range acoustic device, scarecrow, stock-whip, pyrotechnic, etc.).

WSSS AD 2.24 CHARTS RELATED TO AN AERODROME

Locations of RWY 02L/20R, RWY 02C/20C and RWY 02R/20L at WSSS	AD-2-WSSS-ADC-1
Aerodrome Chart - ICAO	AD-2-WSSS-ADC-2 to 2.1
Aerodrome Advisory Chart - ICAO	AD-2-WSSS-ADC-3
Aerodrome Obstacle Chart - ICAO - TYPE A - RWY 02L/20R	AD-2-WSSS-AOC-1
Aerodrome Obstacle Chart - ICAO - TYPE A - RWY 02C/20C	AD-2-WSSS-AOC-2
Aerodrome Obstacle Chart - ICAO - TYPE B	AD-2-WSSS-AOC-3
Aerodrome Obstacle Chart - ICAO - TYPE A - RWY 02R/20L	AD-2-WSSS-AOC-4
Precision Approach Terrain Chart - ICAO - RWY 02L	AD-2-WSSS-PATC-1
Precision Approach Terrain Chart - ICAO - RWY 20C	AD-2-WSSS-PATC-2
Precision Approach Terrain Chart - ICAO - RWY 02R	AD-2-WSSS-PATC-3
Precision Approach Terrain Chart - ICAO - RWY 20L	AD-2-WSSS-PATC-4
Precision Approach Terrain Chart - ICAO - RWY 02C	AD-2-WSSS-PATC-5
RNAV_(GNSS) SIDs and STARs - Introduction	
RNAV _(GNSS) SID - RWY 02C - ANITO 7A	AD-2-WSSS-SID-1 to 1.1
RNAV _(GNSS) SID - RWY 20C - ANITO 8B	AD-2-WSSS-SID-2 to 2.1
RNAV _(GNSS) SID - RWY 02R - ANITO 1C	AD-2-WSSS-SID-3 to 3.1
RNAV _(GNSS) SID - RWY 20L - ANITO 1D	AD-2-WSSS-SID-4 to 4.1
RNAV _(GNSS) SID - RWY 02L - ANITO 7E	AD-2-WSSS-SID-5 to 5.1
RNAV _(GNSS) SID - RWY 20R - ANITO 8F	AD-2-WSSS-SID-6 to 6.1
RNAV _(GNSS) SID - RWY 02C - AROSO 3A	AD-2-WSSS-SID-7 to 7.1
RNAV _(GNSS) SID - RWY 20C - AROSO 5B	AD-2-WSSS-SID-8 to 8.1
RNAV _(GNSS) SID - RWY 02R - AROSO 1C	AD-2-WSSS-SID-9 to 9.1
RNAV _(GNSS) SID - RWY 20L - AROSO 1D	AD-2-WSSS-SID-10 to 10.1
RNAV _(GNSS) SID - RWY 02L - AROSO 3E	AD-2-WSSS-SID-11 to 11.1
RNAV _(GNSS) SID - RWY 20R - AROSO 5F	AD-2-WSSS-SID-12 to 12.1
RNAV _(GNSS) SID - RWY 02C - DODSO 1A	AD-2-WSSS-SID-13 to 13.1
RNAV _(GNSS) SID - RWY 20C - DODSO 1B	AD-2-WSSS-SID-14 to 14.1
RNAV _(GNSS) SID - RWY 02R - DODSO 1C	AD-2-WSSS-SID-15 to 15.1
RNAV _(GNSS) SID - RWY 20L - DODSO 1D	AD-2-WSSS-SID-16 to 16.1
RNAV _(GNSS) SID - RWY 02L - DODSO 1E	AD-2-WSSS-SID-17 to 17.1
RNAV _(GNSS) SID - RWY 20R - DODSO 1F	AD-2-WSSS-SID-18 to 18.1
RNAV _(GNSS) SID - RWY 02C - IDBUD 1A	AD-2-WSSS-SID-19 to 19.1
RNAV _(GNSS) SID - RWY 20C - IDBUD 1B	AD-2-WSSS-SID-20 to 20.1
RNAV _(GNSS) SID - RWY 02R - IDBUD 1C	AD-2-WSSS-SID-21 to 21.1
RNAV _(GNSS) SID - RWY 20L - IDBUD 1D	AD-2-WSSS-SID-22 to 22.1
RNAV _(GNSS) SID - RWY 02L - IDBUD 1E	AD-2-WSSS-SID-23 to 23.1
RNAV _(GNSS) SID - RWY 20R - IDBUD 1F	AD-2-WSSS-SID-24 to 24.1
RNAV _(GNSS) SID - RWY 02C - KIRDA 1A	AD-2-WSSS-SID-25 to 25.1
RNAV _(GNSS) SID - RWY 20C - KIRDA 1B	AD-2-WSSS-SID-26 to 26.1
RNAV _(GNSS) SID - RWY 02R - KIRDA 1C	AD-2-WSSS-SID-27 to 27.1
RNAV _(GNSS) SID - RWY 20L - KIRDA 1D	AD-2-WSSS-SID-28 to 28.1
RNAV _(GNSS) SID - RWY 02L - KIRDA 1E	AD-2-WSSS-SID-29 to 29.1
RNAV _(GNSS) SID - RWY 20R - KIRDA 1F	AD-2-WSSS-SID-30 to 30.1
RNAV _(GNSS) SID - RWY 02C - MASBO 3A	AD-2-WSSS-SID-31 to 31.1
RNAV _(GNSS) SID - RWY 20C - MASBO 5B	AD-2-WSSS-SID-32 to 32.1
RNAV _(GNSS) SID - RWY 02R - MASBO 1C	AD-2-WSSS-SID-33 to 33.1
RNAV _(GNSS) SID - RWY 20L - MASBO 1D	AD-2-WSSS-SID-34 to 34.1
RNAV _(GNSS) SID - RWY 02L - MASBO 3E	AD-2-WSSS-SID-35 to 35.1
RNAV _(GNSS) SID - RWY 20R - MASBO 5F	AD-2-WSSS-SID-36 to 36.1
RNAV _(GNSS) SID - RWY 02C - VMR 6A	AD-2-WSSS-SID-37 to 37.1
RNAV _(GNSS) SID - RWY 20C - VMR 9B	AD-2-WSSS-SID-38 to 38.1
RNAV _(GNSS) SID - RWY 02R - VMR 1C	AD-2-WSSS-SID-39 to 39.1
RNAV _(GNSS) SID - RWY 20L - VMR 1D	AD-2-WSSS-SID-40 to 40.1
RNAV _(GNSS) SID - RWY 02L - VMR 6E	AD-2-WSSS-SID-41 to 41.1
RNAV _(GNSS) SID - RWY 02R - VMR 9F	AD-2-WSSS-SID-42 to 42.1
RNAV _(GNSS) SID - RWY 02C - MIBEL 1A	AD-2-WSSS-SID-43 to 43.1
RNAV _(GNSS) SID - RWY 20C - MIBEL 1B	AD-2-WSSS-SID-44 to 44.1
RNAV _(GNSS) SID - RWY 02R - MIBEL 1C	AD-2-WSSS-SID-45 to 45.1

RNAV _(GNSS) SID - RWY 20L - MIBEL 1D	AD-2-WSSS-SID-46 to 46.1
RNAV _(GNSS) SID - RWY 02L - MIBEL 1E	AD-2-WSSS-SID-47 to 47.1
RNAV _(GNSS) SID - RWY 20R - MIBEL 1F	AD-2-WSSS-SID-48 to 48.1
RNAV _(GNSS) SID - RWY 02C - TAROS 1A	AD-2-WSSS-SID-49 to 49.1
RNAV _(GNSS) SID - RWY 20C - TAROS 1B	AD-2-WSSS-SID-50 to 50.1
RNAV _(GNSS) SID - RWY 02R - TAROS 1C	AD-2-WSSS-SID-51 to 51.1
RNAV _(GNSS) SID - RWY 20L - TAROS 1D	AD-2-WSSS-SID-52 to 52.1
RNAV _(GNSS) SID - RWY 02L - TAROS 1E	AD-2-WSSS-SID-53 to 53.1
RNAV _(GNSS) SID - RWY 20R - TAROS 1F	AD-2-WSSS-SID-54 to 54.1
RNAV _(GNSS) SID - RWY 02C - TOMAN 3A	AD-2-WSSS-SID-55 to 55.1
RNAV _(GNSS) SID - RWY 20C - TOMAN 5B	AD-2-WSSS-SID-56 to 56.1
RNAV _(GNSS) SID - RWY 02R - TOMAN 1C	AD-2-WSSS-SID-57 to 57.1
RNAV _(GNSS) SID - RWY 20L - TOMAN 1D	AD-2-WSSS-SID-58 to 58.1
RNAV _(GNSS) SID - RWY 02L - TOMAN 3E	AD-2-WSSS-SID-59 to 59.1
RNAV _(GNSS) SID - RWY 20R - TOMAN 5F	AD-2-WSSS-SID-60 to 60.1
RNAV _(GNSS) SID - RWY 20C - VOVOS 1B	AD-2-WSSS-SID-61 to 61.1
RNAV _(GNSS) SID - RWY 20L - VOVOS 1D	AD-2-WSSS-SID-62 to 62.1
RNAV _(GNSS) SID - RWY 20R - VOVOS 1F	AD-2-WSSS-SID-63 to 63.1
RNAV _(GNSS) SID - RWY 02R/20L - CHA 1C / CHA 1D	AD-2-WSSS-SID-64 to 64.1
RNAV _(GNSS) STAR - RWY 02L/02C/02R - ARAMA 1A	AD-2-WSSS-STAR-1 to 1.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - ARAMA 1B	AD-2-WSSS-STAR-2 to 2.1
RNAV _(GNSS) STAR - RWY 02L/02C/02R - ASUNA 2A	AD-2-WSSS-STAR-3 to 3.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - ASUNA 2B	AD-2-WSSS-STAR-4 to 4.1
RNAV _(GNSS) STAR - RWY 02L/02C/02R - ELALO 1A	AD-2-WSSS-STAR-5 to 5.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - ELALO 1B	AD-2-WSSS-STAR-6 to 6.1
RNAV _(GNSS) STAR - RWY 02L/02C/02R - KARTO 2A	AD-2-WSSS-STAR-7 to 7.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - KARTO 2B	AD-2-WSSS-STAR-8 to 8.1
RNAV _(GNSS) STAR - RWY 02L/02C/02R - LEBAR 2A	AD-2-WSSS-STAR-9 to 9.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - LEBAR 3B	AD-2-WSSS-STAR-10 to 10.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - LELIB 3B	AD-2-WSSS-STAR-11 to 11.1
RNAV _(GNSS) STAR - RWY 02L/02C/02R - MABAL 2A	AD-2-WSSS-STAR-12 to 12.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - MABAL 2B	AD-2-WSSS-STAR-13 to 13.1
RNAV _(GNSS) STAR - RWY 02L/02C/02R - REPOV 2A	AD-2-WSSS-STAR-14 to 14.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - REPOV 2B	AD-2-WSSS-STAR-15 to 15.1
RNAV _(GNSS) STAR - RWY 02L/02C/02R - TEBUN 1A	AD-2-WSSS-STAR-16 to 16.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - TEBUN 1B	AD-2-WSSS-STAR-17 to 17.1
RNAV _(GNSS) STAR - RWY 02L/02C/02R - UGEB0 1A	AD-2-WSSS-STAR-18 to 18.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - UGEB0 1B	AD-2-WSSS-STAR-19 to 19.1
← Instrument Approach Chart - ICAO - RWY 02L - ICW ILS/DME	AD-2-WSSS-IAC-1
← Instrument Approach Chart - ICAO - RWY 02C - ICE ILS/DME	AD-2-WSSS-IAC-2
Instrument Approach Chart - ICAO - RWY 02R - ICX ILS/DME	AD-2-WSSS-IAC-3
Instrument Approach Chart - ICAO - RWY 20R - ICH ILS/DME	AD-2-WSSS-IAC-5
Instrument Approach Chart - ICAO - RWY 20C - ICC ILS/DME	AD-2-WSSS-IAC-6
Instrument Approach Chart - ICAO - RWY 20C - VTK DVOR/DME	AD-2-WSSS-IAC-7
Instrument Approach Chart - ICAO - RWY 02L - RNP	AD-2-WSSS-IAC-9 to 9.1
Instrument Approach Chart - ICAO - RWY 02C - RNP	AD-2-WSSS-IAC-10 to 10.1
Instrument Approach Chart - ICAO - RWY 20R - RNP	AD-2-WSSS-IAC-11 to 11.1
Instrument Approach Chart - ICAO - RWY 20C - RNP	AD-2-WSSS-IAC-12 to 12.1
Instrument Approach Chart - ICAO - RWY 02R - RNP	AD-2-WSSS-IAC-13 to 13.1
Instrument Approach Chart - ICAO - RWY 20L - RNP	AD-2-WSSS-IAC-14 to 14.1
Visual Approach Chart - ICAO	AD-2-WSSS-VAC-1 to 1.1

AERODROME CHART - ICAO

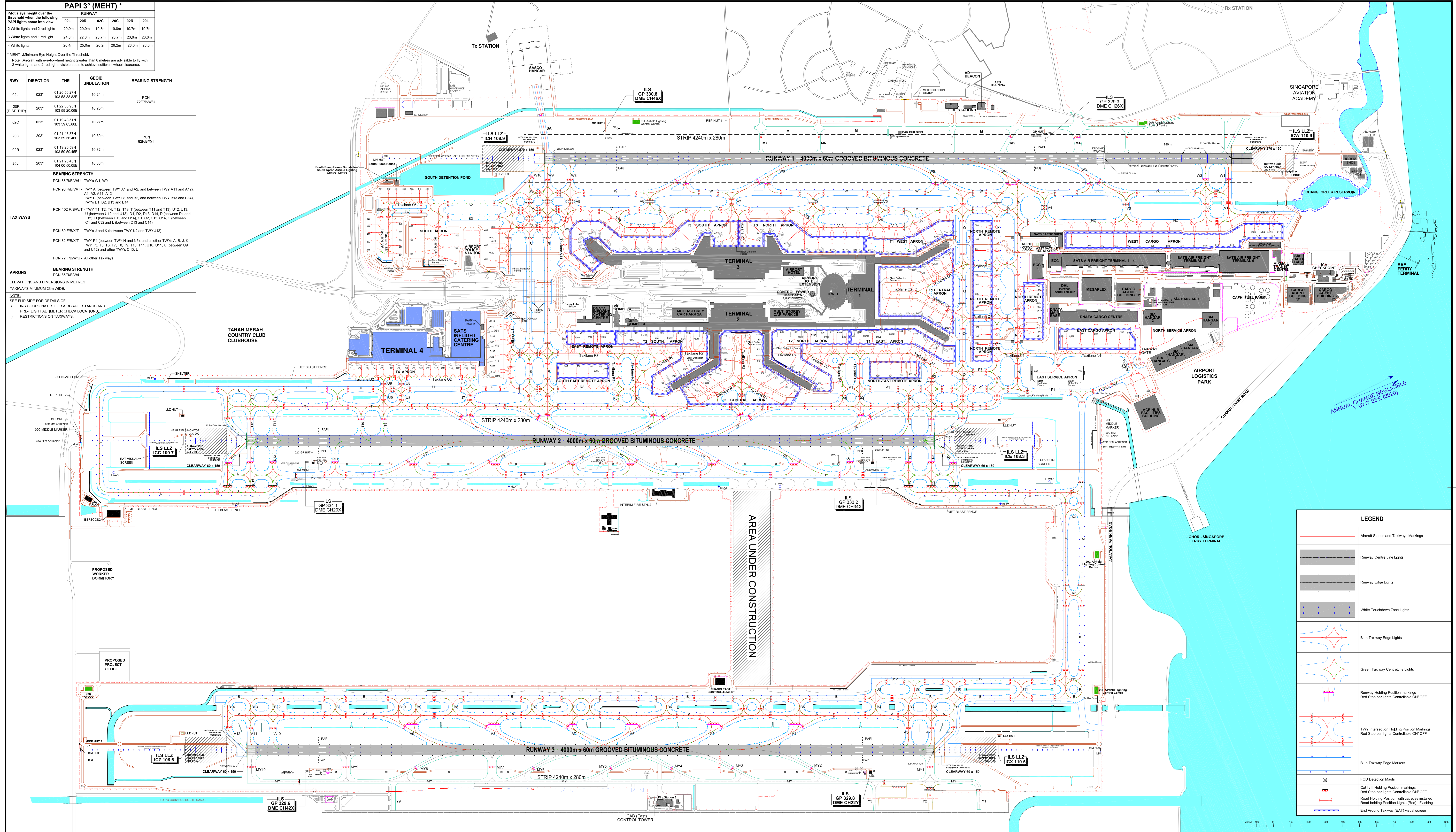
01 21' 33"N
103' 59' 22"E

AERODROME ELEVATION 6.66m

TWR 118.6 / 118.25 / 131.4
GND 124.3 / 121.85 / 121.725 / 127.275
DELIVERY 121.65 / 119.6

RAMP TWR 122.55 (GMC 4 EAST)
GND 125.65 (GMC 4 WEST)

SINGAPORE/SINGAPORE CHANGI



INS COORDINATES FOR AIRCRAFT STANDS AND PRE-FLIGHT ALTIMETER CHECK LOCATIONS

LOCATION	STAND NR	NORTH LAT	EAST LONG	ELEVATION	
T3 SOUTH APRON	A1	01 21 21.52	103 59 06.25	4.75m (15.58ft)	
	A2	01 21 21.75	103 59 04.00	4.65m (15.26ft)	
	A3	01 21 19.86	103 59 02.79	4.68m (15.29ft)	
	A4	01 21 17.61	103 59 02.54	4.79m (15.72ft)	
	A5	01 21 15.50	103 59 03.62	4.86m (15.94ft)	
	A9	01 21 12.56	103 59 03.65	5.02m (16.47ft)	
	A10	01 21 10.34	103 59 02.40	5.04m (16.54ft)	
	A11	01 21 07.93	103 59 01.41	5.25m (17.22ft)	
	A12	01 21 05.76	103 59 00.49	5.38m (17.65ft)	
	A13	01 21 03.59	103 58 59.58	5.43m (17.98ft)	
	A14	01 21 01.66	103 58 57.59	5.57m (18.27ft)	
	A15	01 21 00.77	103 58 55.41	5.48m (17.91ft)	
	A16	01 20 59.27	103 58 54.20	5.51m (18.08ft)	
	A17	01 20 57.25	103 58 54.06	5.23m (17.16ft)	
	A18	01 20 55.87	103 58 55.25	5.37m (17.62ft)	
	A19	01 20 55.26	103 58 57.13	5.40m (17.72ft)	
	A20	01 20 56.09	103 58 58.83	5.45m (17.88ft)	
	A21	01 20 57.10	103 59 00.80	5.49m (18.01ft)	
	T3 NORTH APRON	B1	01 21 26.86	103 59 08.37	4.82m (15.81ft)
		B2	01 21 28.18	103 59 06.82	4.88m (15.35ft)
		B3	01 21 30.33	103 59 07.30	4.65m (15.26ft)
		B4	01 21 33.63	103 59 08.60	4.75m (15.58ft)
B5		01 21 32.98	103 59 10.89	4.80m (15.75ft)	
B6		01 21 35.15	103 59 13.16	4.96m (16.27ft)	
B7		01 21 37.65	103 59 13.93	4.97m (16.31ft)	
B8		01 21 39.94	103 59 15.20	5.13m (16.83ft)	
B9		01 21 42.19	103 59 16.16	5.13m (16.83ft)	
B10		01 21 44.47	103 59 17.12	5.15m (16.90ft)	
T1 WEST APRON	C1	01 21 46.75	103 59 18.08	5.09m (16.70ft)	
	C20	01 21 48.83	103 59 19.23	5.09m (16.67ft)	
	C22	01 21 51.00	103 59 20.13	5.15m (16.90ft)	
	C23	01 21 53.56	103 59 20.77	5.08m (16.67ft)	
	C24	01 21 56.54	103 59 20.97	4.89m (16.04ft)	
	C25	01 21 58.12	103 59 20.99	4.89m (16.04ft)	
	C26	01 22 01.48	103 59 20.76	5.01m (16.44ft)	
T1 CENTRAL APRON	C11	01 21 47.42	103 59 23.82	5.09m (16.70ft)	
	C13	01 21 49.63	103 59 24.75	5.03m (16.50ft)	
	C15	01 21 51.89	103 59 25.70	5.08m (16.60ft)	
	C16	01 21 53.47	103 59 26.62	4.88m (15.98ft)	
	C17	01 21 55.50	103 59 26.20	5.01m (16.44ft)	
	C17L	01 21 54.75	103 59 26.22	4.96m (16.27ft)	
	C17R	01 21 56.01	103 59 25.68	5.12m (16.80ft)	
	C18	01 21 57.86	103 59 25.75	4.99m (16.37ft)	
	C19	01 21 59.79	103 59 25.63	4.95m (16.24ft)	
	D30	01 21 44.54	103 59 30.14	5.08m (16.67ft)	
	D32	01 21 46.75	103 59 31.08	5.08m (16.67ft)	
	D34	01 21 49.03	103 59 32.04	5.07m (16.63ft)	
	D35	01 21 50.87	103 59 32.82	5.02m (16.47ft)	
	D36	01 21 51.98	103 59 34.52	5.08m (16.60ft)	
	D37	01 21 53.37	103 59 36.28	4.97m (16.31ft)	
	D38	01 21 54.58	103 59 37.77	4.99m (16.37ft)	
	T1 EAST APRON	D40	01 21 38.13	103 59 32.89	5.11m (16.77ft)
		D40L	01 21 37.38	103 59 32.83	5.09m (16.70ft)
		D40R	01 21 38.77	103 59 32.84	5.13m (16.83ft)
D41		01 21 40.30	103 59 33.81	5.07m (16.63ft)	
D42		01 21 42.77	103 59 34.58	5.15m (16.89ft)	
D42L		01 21 42.00	103 59 34.47	5.12m (16.79ft)	
D42R		01 21 43.45	103 59 34.44	5.21m (17.09ft)	
D44		01 21 44.97	103 59 35.44	5.14m (16.86ft)	
D46		01 21 47.40	103 59 36.72	5.08m (16.67ft)	
D47		01 21 49.19	103 59 38.89	4.93m (16.17ft)	
D48		01 21 50.60	103 59 40.77	4.97m (16.31ft)	
D49		01 21 52.23	103 59 42.35	4.98m (16.34ft)	
T2 NORTH APRON		E8	01 21 27.99	103 59 38.45	4.68m (15.35ft)
		E10	01 21 24.15	103 59 32.67	4.71m (15.45ft)
		E11	01 21 25.57	103 59 34.37	4.78m (15.68ft)
		E12	01 21 27.20	103 59 36.42	4.75m (15.58ft)
		E20	01 21 24.36	103 59 27.08	5.04m (16.54ft)
		E22	01 21 26.64	103 59 28.04	5.07m (16.63ft)
		E24	01 21 29.01	103 59 29.06	5.09m (16.70ft)
	E24L	01 21 28.32	103 59 28.77	5.10m (16.73ft)	
	E24R	01 21 29.53	103 59 29.28	5.08m (16.67ft)	
	E26	01 21 31.19	103 59 29.96	5.08m (16.67ft)	
	E27	01 21 33.56	103 59 30.96	5.07m (16.62ft)	
	E27L	01 21 32.79	103 59 30.86	5.03m (16.48ft)	
E27R	01 21 34.20	103 59 30.91	5.12m (16.80ft)		
E28	01 21 35.74	103 59 31.89	5.08m (16.67ft)		

INS COORDINATES FOR AIRCRAFT STANDS AND PRE-FLIGHT ALTIMETER CHECK LOCATIONS

LOCATION	STAND NR	NORTH LAT	EAST LONG	ELEVATION	
T2 CENTRAL APRON	E1	01 21 20.02	103 59 25.68	4.91m (16.11ft)	
	E2	01 21 19.28	103 59 27.30	4.90m (16.08ft)	
	E3	01 21 18.44	103 59 29.27	4.82m (15.81ft)	
	E4	01 21 18.10	103 59 31.70	4.80m (15.75ft)	
	E5	01 21 19.56	103 59 33.72	4.90m (16.08ft)	
	E6	01 21 21.22	103 59 35.93	4.84m (15.88ft)	
	E7	01 21 22.48	103 59 37.46	4.73m (15.52ft)	
	F30	01 21 14.71	103 59 23.33	4.92m (16.14ft)	
	F31	01 21 13.87	103 59 25.30	4.91m (16.11ft)	
	F32	01 21 13.03	103 59 27.26	4.85m (15.91ft)	
	F33	01 21 11.30	103 59 28.54	4.91m (16.11ft)	
	F34	01 21 08.98	103 59 29.96	4.92m (16.14ft)	
	F35	01 21 06.60	103 59 29.55	4.91m (16.11ft)	
	F35L	01 21 06.06	103 59 30.13	4.74m (15.55ft)	
	F35R	01 21 06.96	103 59 29.05	5.04m (16.54ft)	
	F36	01 21 04.34	103 59 29.67	4.82m (15.81ft)	
	T2 SOUTH APRON	F37	01 20 59.83	103 59 27.87	4.75m (15.58ft)
		F40	01 21 05.82	103 59 25.34	4.85m (15.91ft)
		F41	01 21 03.19	103 59 25.58	4.82m (15.81ft)
		F42	01 21 00.61	103 59 25.96	4.72m (15.49ft)
F50		01 21 10.69	103 59 21.32	5.03m (16.50ft)	
F52		01 21 09.51	103 59 20.40	5.11m (16.77ft)	
F52L		01 21 07.82	103 59 20.11	5.16m (16.93ft)	
F52R		01 21 09.04	103 59 20.62	5.08m (16.67ft)	
F54		01 21 06.14	103 59 19.40	5.22m (17.13ft)	
F56		01 21 03.96	103 59 18.48	5.30m (17.39ft)	
F56L		01 21 03.27	103 59 18.18	5.42m (17.78ft)	
F56R		01 21 04.49	103 59 18.70	5.34m (17.52ft)	
F58		01 21 01.58	103 59 17.47	5.39m (17.68ft)	
F59		01 20 59.41	103 59 16.55	5.64m (18.50ft)	
F59L		01 20 58.72	103 59 16.26	5.67m (18.60ft)	
F59R		01 20 59.03	103 59 16.78	5.60m (18.37ft)	
F60		01 20 56.91	103 59 15.50	5.77m (18.93ft)	
EAST REMOTE APRON		200	01 20 47.83	103 59 11.67	6.23m (20.44ft)
		200L	01 20 46.91	103 59 11.92	6.28m (20.64ft)
		200R	01 20 48.35	103 59 11.89	6.18m (20.28ft)
	201	01 20 49.99	103 59 12.62	5.96m (19.55ft)	
	202	01 20 52.34	103 59 13.57	5.94m (19.49ft)	
	202L	01 20 51.65	103 59 13.28	5.76m (18.90ft)	
	202R	01 20 52.87	103 59 13.79	5.73m (18.80ft)	
	203	01 20 54.52	103 59 14.47	5.92m (19.42ft)	
	SOUTH-EAST REMOTE APRON	205	01 20 43.91	103 59 17.06	4.77m (15.65ft)
		206	01 20 46.08	103 59 17.98	4.76m (15.62ft)
		207	01 20 48.21	103 59 19.01	4.74m (15.55ft)
		208	01 20 50.68	103 59 20.05	4.75m (15.58ft)
		208L	01 20 50.01	103 59 19.76	4.74m (15.55ft)
208R		01 20 51.25	103 59 20.29	4.73m (15.42ft)	
NORTH REMOTE APRON		300	01 22 06.95	103 59 22.67	4.53m (14.86ft)
		301	01 22 06.41	103 59 24.69	4.93m (16.17ft)
	302	01 22 05.21	103 59 26.75	4.97m (16.31ft)	
	303	01 22 03.55	103 59 31.40	5.32m (17.45ft)	
	304	01 22 02.84	103 59 33.06	5.35m (17.55ft)	
	305	01 22 02.14	103 59 34.71	5.30m (17.39ft)	
	306	01 22 01.41	103 59 36.42	5.18m (16.93ft)	
	307	01 21 59.39	103 59 40.36	5.16m (16.93ft)	
	308	01 21 58.96	103 59 41.35	5.10m (16.73ft)	
	309	01 21 58.52	103 59 43.17	5.06m (16.60ft)	
	310	01 21 57.42	103 59 44.96	4.74m (15.55ft)	
	951	01 22 09.35	103 59 45.23	5.15m (16.90ft)	
	951L	01 22 08.91	103 59 44.27	5.00m (16.40ft)	
	951R	01 22 08.35	103 59 45.58	5.00m (16.40ft)	
	952	01 22 09.94	103 59 42.65	4.89m (16.04ft)	
	953	01 22 11.22	103 59 40.85	4.98m (16.34ft)	
	953L	01 22 10.78	103 59 39.89	4.83m (15.85ft)	
953R	01 22 10.41	103 59 41.28	4.87m (15.98ft)		
954	01 22 12.46	103 59 37.95	4.94m (16.08ft)		
954L	01 22 12.02	103 59 38.99	4.70m (15.42ft)		
954R	01 22 11.65	103 59 38.38	4.74m (15.55ft)		
NORTH-EAST REMOTE APRON	400	01 21 38.71	103 59 40.14	4.31m (14.14ft)	
	401	01 21 40.98	103 59 41.10	4.31m (14.14ft)	
	402	01 21 42.85	103 59 41.89	4.30m (14.11ft)	
	403	01 21 44.37	103 59 42.53	4.29m (14.07ft)	
	404	01 21 45.45	103 59 42.98	4.20m (13.78ft)	

INS COORDINATES FOR AIRCRAFT STANDS AND PRE-FLIGHT ALTIMETER CHECK LOCATIONS

LOCATION	STAND NR	NORTH LAT	EAST LONG	ELEVATION
WEST CARGO APRON	502	01 22 22.23	103 59 31.62	4.35m (14.27ft)
	503	01 22 24.98	103 59 32.78	4.29m (14.07ft)
	504	01 22 27.26	103 59 33.74	4.29m (14.07ft)
	505	01 22 29.54	103 59 34.70	4.32m (14.17ft)
	506	01 22 31.81	103 59 35.66	4.38m (14.37ft)
	507	01 22 34.11	103 59 36.64	4.36m (14.30ft)
	508	01 22 36.41	103 59 37.61	4.29m (14.07ft)
	509	01 22 39.12	103 59 38.76	4.09m (13.42ft)
	510	01 22 41.37	103 59 40.18	4.19m (13.75ft)
	511	01 22 43.64	103 59 41.09	4.22m (13.85ft)
	512	01 22 45.71	103 59 42.01	4.24m (13.91ft)
	513	01 22 47.89	103 59 42.92	4.26m (13.98ft)
	514	01 22 50.19	103 59 43.54	4.36m (14.30ft)
	515	01 22 52.90	103 59 43.20	4.09m (13.43ft)
	516	01 22 55.39	103 59 43.97	4.04m (13.26ft)
	516R	01 22 56.24	103 59 43.89	3.96m (12.98ft)
	517	01 22 58.02	103 59 43.25	3.95m (12.97ft)
	517L	01 22 58.02	103 59 43.25	3.95m (12.97ft)
	517R	01 22 57.55	103 59 44.35	3.96m (12.98ft)
	EAST CARGO APRON	600	01 22 14.	

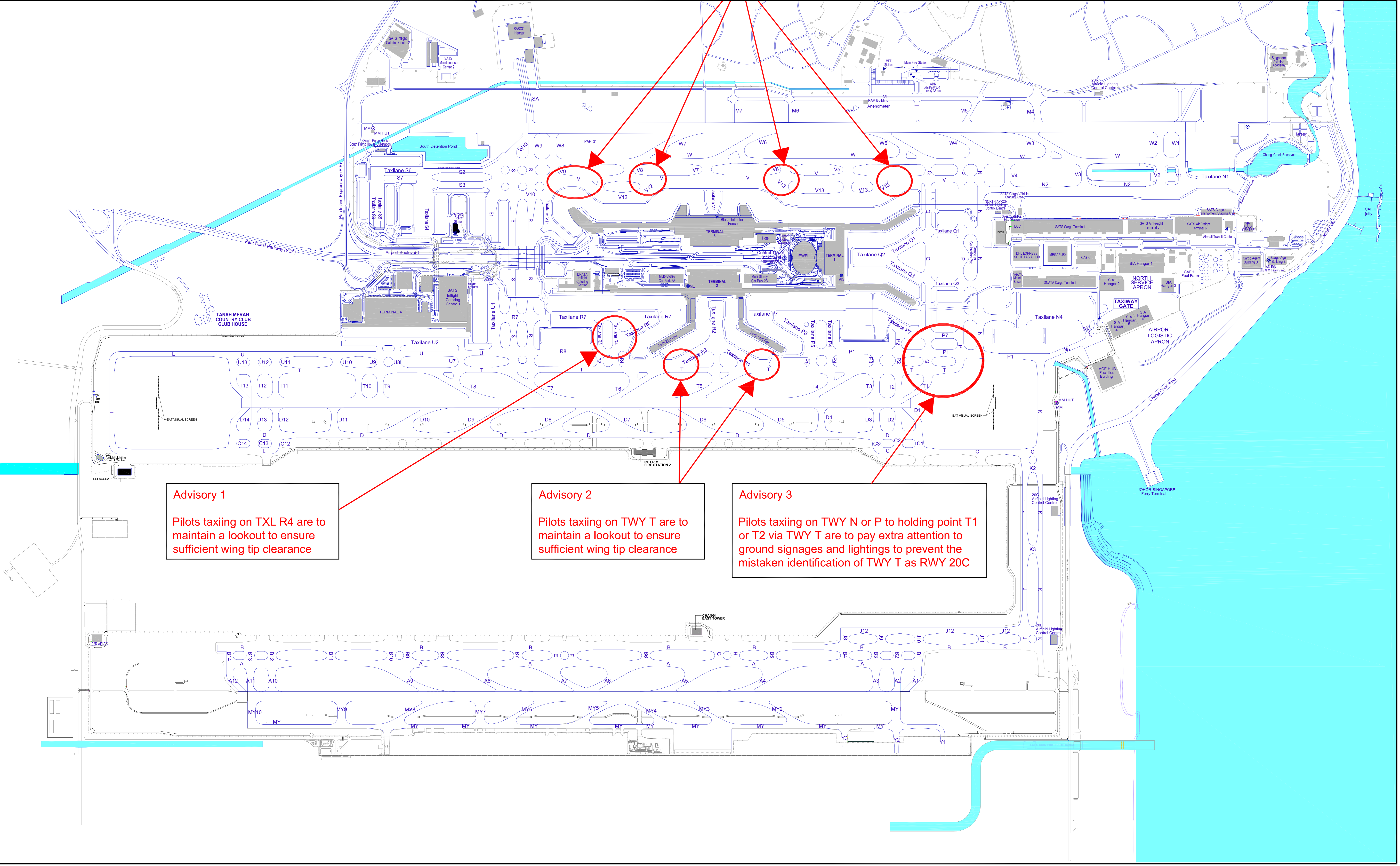
AERODROME ADVISORY CHART

Advisory 4
Pilots taxiing on TWY V are to maintain a lookout to ensure sufficient wing tip clearance

Advisory 1
Pilots taxiing on TXL R4 are to maintain a lookout to ensure sufficient wing tip clearance

Advisory 2
Pilots taxiing on TWY T are to maintain a lookout to ensure sufficient wing tip clearance

Advisory 3
Pilots taxiing on TWY N or P to holding point T1 or T2 via TWY T are to pay extra attention to ground signages and lightings to prevent the mistaken identification of TWY T as RWY 20C

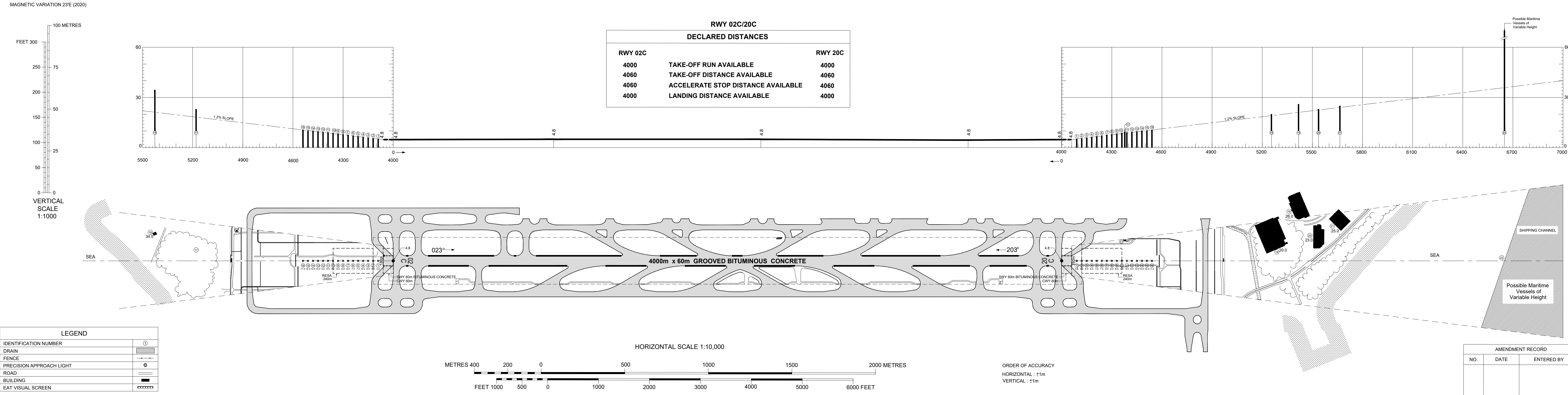


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DIMENSIONS AND ELEVATIONS IN METRES

**AERODROME OBSTACLE CHART - ICAO
TYPE A (OPERATING LIMITATIONS)**

SINGAPORE/Singapore Changi

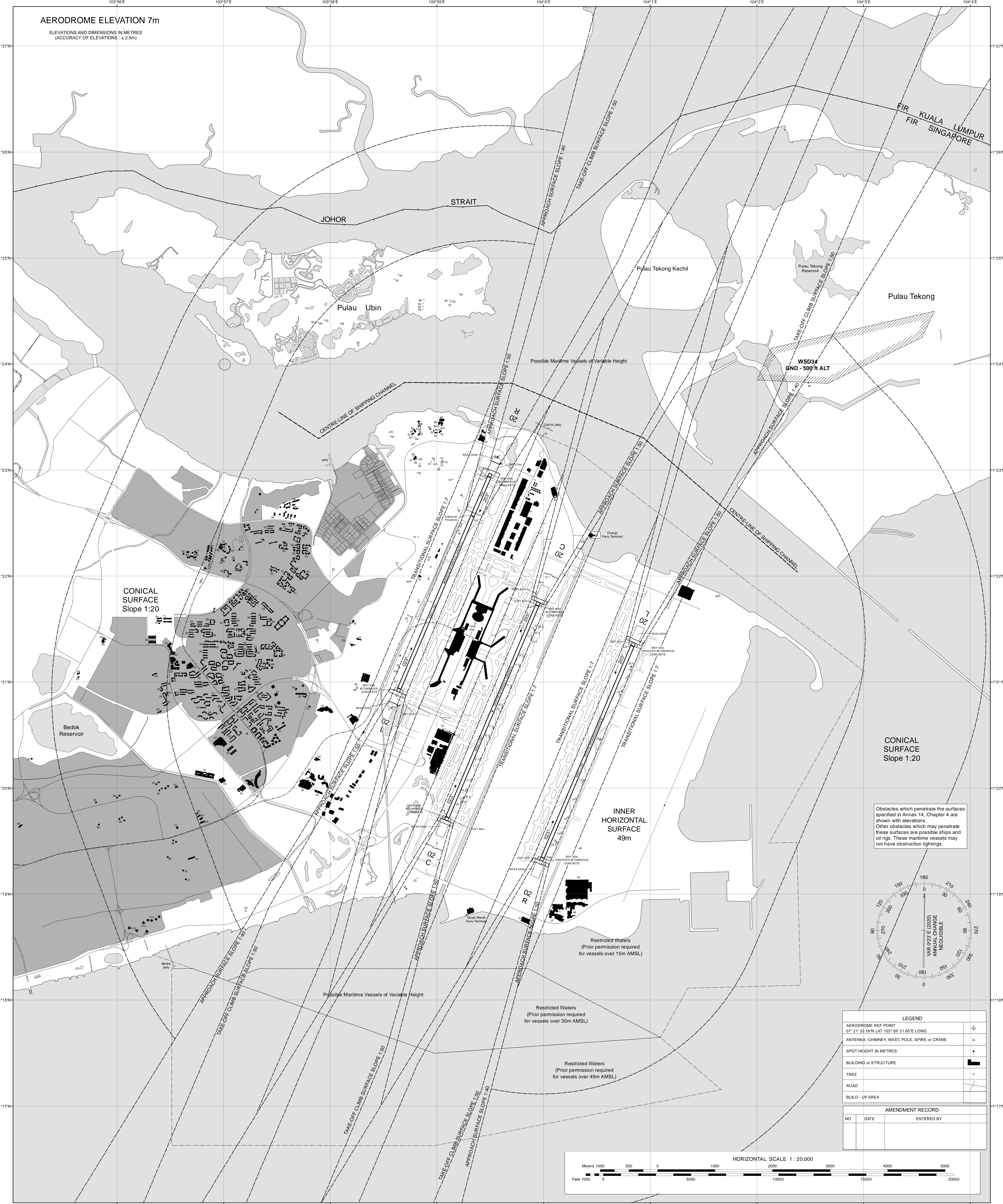


RWY 02C/20C DECLARED DISTANCES		
RWY 02C		RWY 20C
4000	TAKE-OFF RUN AVAILABLE	4000
4060	TAKE-OFF DISTANCE AVAILABLE	4060
4060	ACCELERATE STOP DISTANCE AVAILABLE	4060
4000	LANDING DISTANCE AVAILABLE	4000

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AERODROME OBSTACLE CHART - ICAO TYPE B

SINGAPORE / Singapore Changi

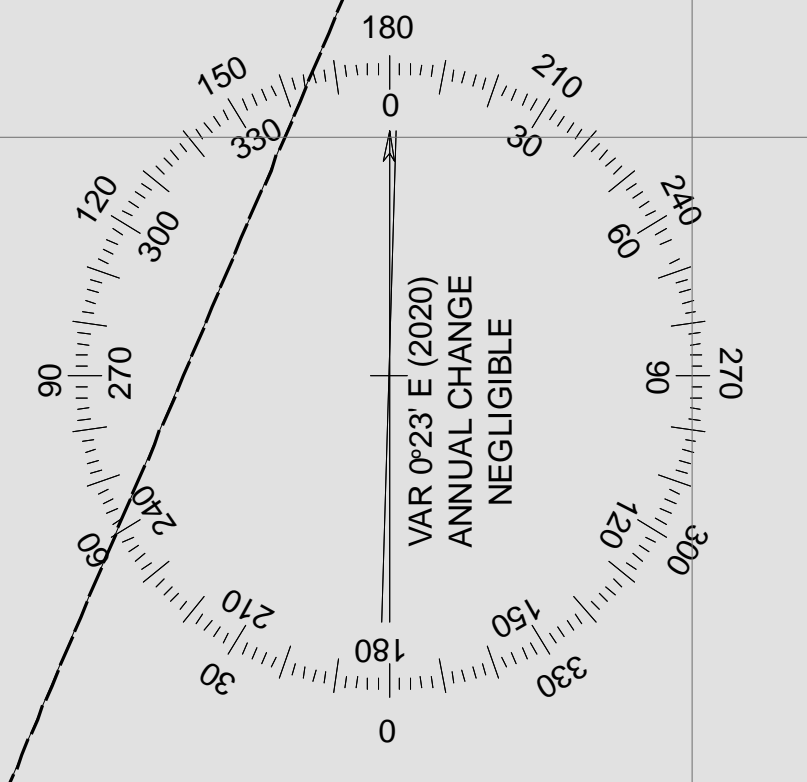


AERODROME ELEVATION 7m
ELEVATIONS AND DIMENSIONS IN METRES
(ACCURACY OF ELEVATIONS : ± 2.5m)

CONICAL SURFACE
Slope 1:20

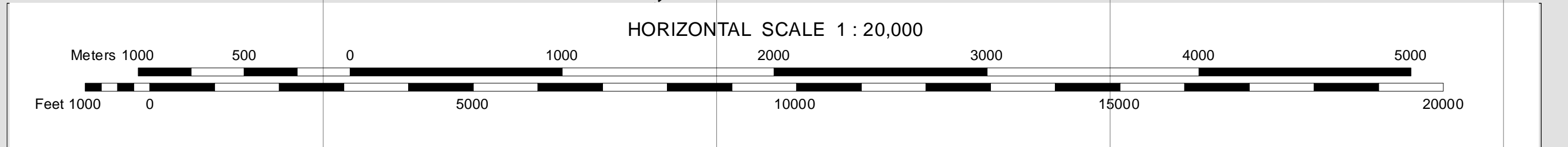
INNER HORIZONTAL SURFACE
49m

Obstacles which penetrate the surfaces specified in Annex 14, Chapter 4 are shown with elevations. Other obstacles which may penetrate these surfaces are possible ships and oil rigs. These maritime vessels may not have obstruction lightings.



LEGEND		
AERODROME REF POINT	01° 21' 33.16"N LAT 103° 59' 21.60"E LONG	⊕
ANTENNA, CHIMNEY, MAST, POLE, SPIRE or CRANE		⊙
SPOT HEIGHT IN METRES		•
BUILDING or STRUCTURE		■
TREE		+
ROAD		—
BUILD-UP AREA		▨

AMENDMENT RECORD		
NO	DATE	ENTERED BY

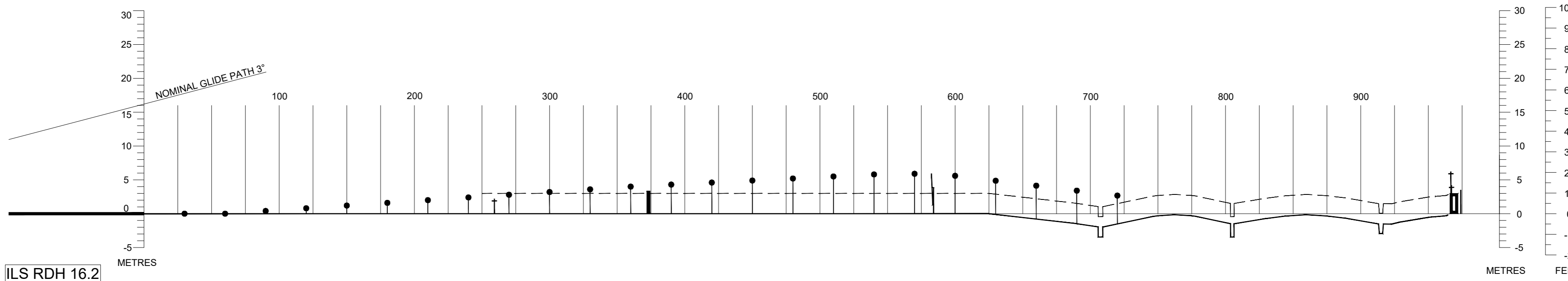
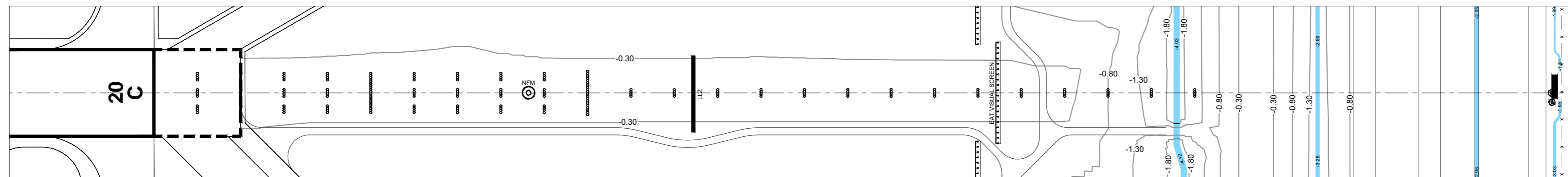


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DISTANCES AND HEIGHTS IN METRES

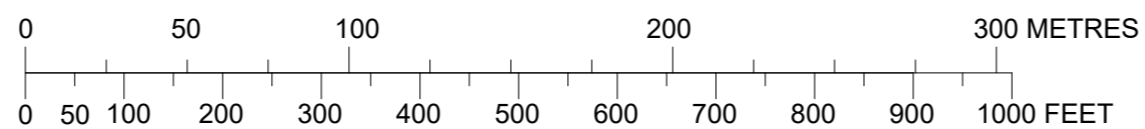
PRECISION APPROACH TERRAIN CHART - ICAO

SINGAPORE/Singapore Changi
RWY 20C



ILS RDH 16.2

SCALE 1 : 2500



HORIZONTAL SCALE 1 : 2500

VERTICAL SCALE 1 : 500

CONTOUR AND HEIGHTS ARE RELATED TO ELEVATION OF RWY THR

LEGEND

LOCALISER		
ANTENNA		
DRAIN		
FENCE		
CONTOUR		
PRECISION APPROACH LIGHT		
ROAD		
EAT VISUAL SCREEN		
BUILDING		
CENTRE-LINE PROFILE		
DEVIATION AT LEAST +/- 3M FROM CENTRE-LINE PROFILE		
AMENDMENT RECORD		
NO.	DATE	ENTERED BY

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**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25 APP 120.3 124.05 ACC 134.4	TRANSITION ALTITUDE 11 000ft
	D-ATIS AP ID-WSSS 128.6

**SINGAPORE/Singapore Changi
RWY 02C
ANITO DEPARTURES
ANITO 7A**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

TEKONG
DVOR/DME 116.5
VTK 
01° 24' 55" N
104° 01' 20" E
60M

DER (RWY 02C)
01° 21' 45" N
103° 52' 57" E

MOXIB
01° 29' 33" N
104° 03' 15" E
A020

EMRIX
01° 26' 06" N
104° 10' 40" E
A040

HOSBA
01° 19' 48" N
104° 24' 18" E
A070

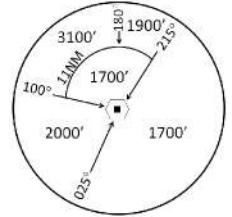
VANBU
01° 06' 43" N
104° 27' 40" E
A090

VIRET
00° 39' 40" N
104° 35' 11" E
FL160

GURES
00° 28' 14" N
104° 38' 35" E

IKIRO
00° 08' 49" N
104° 44' 20" E

ANITO
00° 17' 00" S
104° 52' 00" E



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

- NOTE:** RADAR REQUIRED
- NOTE:** RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
- NOTE:** CLOSE-IN OBSTACLES (AIRCRAFT UP TO 80FT) EXIST ON TAXIWAYS WEST OF RUNWAY 02C
- NOTE:** ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORING IF NECESSARY
- NOTE:** WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT
- NOTE:** REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

ANITO 7A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOXIB on course 023° at or above 2000ft, turn right.	MOXIB [M023; A020+; R] -	CF	N
To EMRIX at or above 4000ft.	EMRIX [A040+] -	TF	N
To HOSBA at or above 7000ft, turn right.	HOSBA [A070+; R] -	TF	N
To VANBU at or below 9000ft, turn left.	VANBU [A090-; L] -	TF	N
To VIRET at or above FL160, turn left.	VIRET [FL160+; L] -	TF	N
To GURES.	GURES -	TF	N
To IKIRO.	IKIRO -	TF	N
To ANITO.	ANITO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOXIB	-	023(023.4)	8.0	R	A020+	-	RNAV1
TF	EMRIX	-	114(114.4)	8.0	-	A040+	-	RNAV1
TF	HOSBA	-	114(114.4)	15.0	R	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	L	A090-	-	RNAV1
TF	VIRET	-	164(164.4)	28.0	L	FL160+	-	RNAV1
TF	GURES	-	163(163.3)	12.0	-	-	-	RNAV1
TF	IKIRO	-	163(163.3)	20.0	-	-	-	RNAV1
TF	ANITO	-	163(163.3)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25 APP 120.3 124.05 ACC 134.4	TRANSITION ALTITUDE 11 000ft
	D-ATIS AP ID-WSSS 128.6

**SINGAPORE/Singapore Changi
RWY 20C
ANITO DEPARTURES
ANITO 8B**

**ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)**

DISTANCES IN NM

DER (RWY 20C)
01° 19' 42" N
103° 59' 05" E

IBIXU
01° 16' 21" N
103° 57' 40" E
A015

IBIVA
01° 13' 51" N
103° 56' 37" E
A025

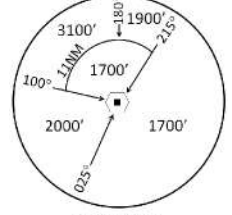
ISNOM
01° 06' 29" N
103° 58' 26" E
A040

UPTEL
00° 59' 25" N
104° 07' 30" E
A060

ASOMI
01° 01' 42" N
104° 02' 07" E

IDKIV
00° 56' 52" N
104° 13' 33" E

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55" N
104° 01' 20" E
60M



GIXEM
00° 49' 20" N
104° 25' 39" E

VASTI
00° 43' 20" N
104° 34' 06" E

VIRET
00° 39' 40" N
104° 35' 11" E
FL160

GURES
00° 28' 14" N
104° 38' 35" E

IKIRO
00° 08' 49" N
104° 44' 20" E

ANITO
00° 17' 00" S
104° 52' 00" E

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

- CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED**
- NOTE: RADAR REQUIRED**
- NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED**
- NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORED IF NECESSARY**
- NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.1 - FOR RWY 20C MINIMUM CLIMB GRADIENT**
- NOTE: REFER TO BACK PAGE FOR - FORMAL AND TABULAR DESCRIPTIONS - RADIO COM FAILURE PROCEDURES**

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 7% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
7% V/V (fpm)	532	709	1063	1418	1772	2127
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

21 MAR 2024

ANITO 8B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To IBIXU on course 203° at or above 1500ft.	IBIXU [M203; A015+] -	CF	N
To IBIVA at or above 2500ft, turn left.	IBIVA [A025+; L] -	TF	N
To ISNOM at or above 4000ft, turn left.	ISNOM [A040+; L] -	TF	N
To ASOMI, turn left.	ASOMI [L] -	TF	N
To UPTTEL at 6000ft.	UPTTEL [@A060] -	TF	N
To IDKIV, turn right.	IDKIV [R] -	TF	N
To GIXEM, turn right.	GIXEM [R] -	TF	N
To VASTI, turn right.	VASTI [R] -	TF	N
To VIRET at or above FL160.	VIRET [FL160+] -	TF	N
To GURES.	GURES -	TF	N
To IKIRO.	IKIRO -	TF	N
To ANITO.	ANITO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	4.0	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	ISNOM	-	166(166.4)	8.0	L	A040+	-	RNAV1
TF	ASOMI	-	142(142.4)	6.0	L	-	-	RNAV1
TF	UPTTEL	-	112(112.4)	6.0	-	@A060	-	RNAV1
TF	IDKIV	-	112(112.4)	7.0	R	-	-	RNAV1
TF	GIXEM	-	121(121.4)	14.0	R	-	-	RNAV1
TF	VASTI	-	125(125.4)	10.0	R	-	-	RNAV1
TF	VIRET	-	163(163.4)	4.0	-	FL160+	-	RNAV1
TF	GURES	-	163(163.4)	12.0	-	-	-	RNAV1
TF	IKIRO	-	163(163.4)	20.0	-	-	-	RNAV1
TF	ANITO	-	163(163.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 02R
ANITO DEPARTURES (RADAR)
ANITO 1C**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

TEKONG
DVOR/DME 116.5
VTK
01°24'55"N
104°01'20"E
60M

DER (RWY02R)
01°21'22"N
104°00'51"E

HOSBA
01°19'48"N
104°24'18"E
A070

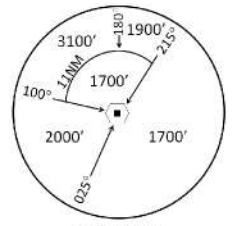
VANBU
01°06'43"N
104°27'40"E
A090

VIRET
00°39'40"N
104°35'11"E
FL160

GURES
00°28'14"N
104°38'35"E

IKIRO
00°08'49"N
104°44'20"E

ANITO
00°17'00"S
104°52'00"E



EXPECT RADAR vectors to waypoint HOSBA

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORIZING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.5 - FOR RWY 02R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

ANITO 1C (SID) RNAV GNSS RWY 02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
Climb heading 023°, Gradient 5% to 2500ft, thence 3.3%. Expect radar vectors to waypoint HOSBA.	-	VA	N
To HOSBA at or above 7000ft.	HOSBA [A070+] -	DF	N
To VANBU at or below 9000ft, turn left.	VANBU [A090-; L] -	TF	N
To VIRET at or above FL160, turn left.	VIRET [FL160+; L] -	TF	N
To GURES.	GURES -	TF	N
To IKIRO.	IKIRO -	TF	N
To ANITO.	ANITO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
VA	-	-	023(023.4)	-	-	A030	-	-
DF	HOSBA	-	-	-	-	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	L	A090-	-	RNAV1
TF	VIRET	-	164(164.4)	28.0	L	FL160+	-	RNAV1
TF	GURES	-	163(163.3)	12.0	-	-	-	RNAV1
TF	IKIRO	-	163(163.3)	20.0	-	-	-	RNAV1
TF	ANITO	-	163(163.3)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

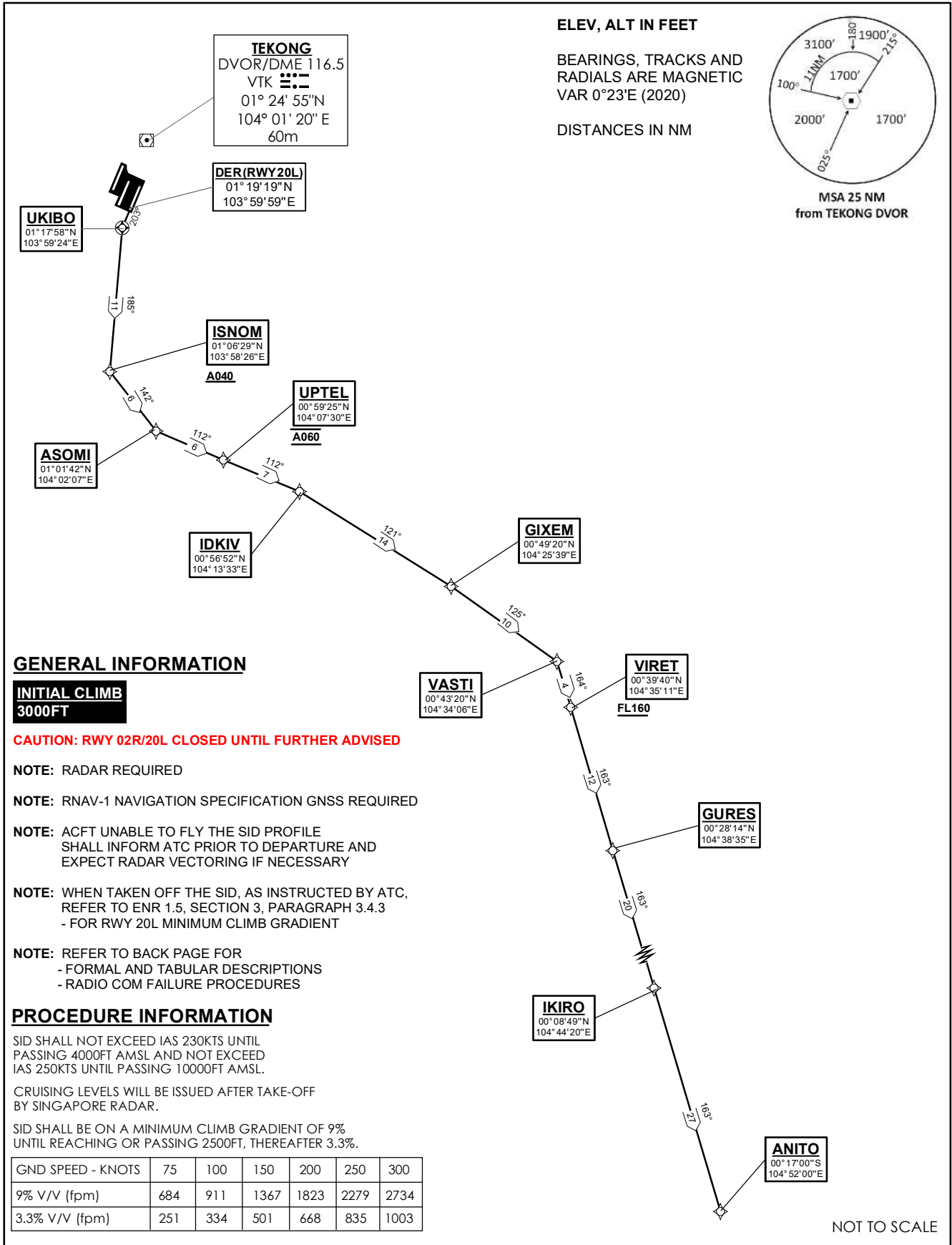
**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20L
ANITO DEPARTURES
ANITO 1D**



GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

- NOTE:** RADAR REQUIRED
- NOTE:** RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
- NOTE:** ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORING IF NECESSARY
- NOTE:** WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.3 - FOR RWY 20L MINIMUM CLIMB GRADIENT
- NOTE:** REFER TO BACK PAGE FOR
 - FORMAL AND TABULAR DESCRIPTIONS
 - RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 9% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

NOT TO SCALE

ANITO 1D (SID) RNAV GNSS RWY 20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To UKIBO on course 203°, turn left.	UKIBO [M203; L] -	CF	N
To ISNOM at or above 4000ft, turn left.	ISNOM [A040+; L] -	TF	N
To ASOMI, turn left.	ASOMI [L] -	TF	N
To UPTTEL at 6000ft.	UPTTEL [@A060] -	TF	N
To IDKIV, turn right.	IDKIV [R] -	TF	N
To GIXEM, turn right.	GIXEM [R] -	TF	N
To VASTI, turn right.	VASTI [R] -	TF	N
To VIRET at or above FL160, turn left.	VIRET [FL160+; L] -	TF	N
To GURES.	GURES -	TF	N
To IKIRO.	IKIRO -	TF	N
To ANITO.	ANITO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	UKIBO	Y	203(203.4)	1.5	L	-	-	RNAV1
TF	ISNOM	-	185(185.4)	11.0	L	A040+	-	RNAV1
TF	ASOMI	-	142(142.4)	6.0	L	-	-	RNAV1
TF	UPTTEL	-	112(112.4)	6.0	-	@A060	-	RNAV1
TF	IDKIV	-	112(112.4)	7.0	R	-	-	RNAV1
TF	GIXEM	-	121(121.4)	14.0	R	-	-	RNAV1
TF	VASTI	-	125(125.4)	10.0	R	-	-	RNAV1
TF	VIRET	-	164(164.4)	4.0	L	FL160+	-	RNAV1
TF	GURES	-	163(163.4)	12.0	-	-	-	RNAV1
TF	IKIRO	-	163(163.4)	20.0	-	-	-	RNAV1
TF	ANITO	-	163(163.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

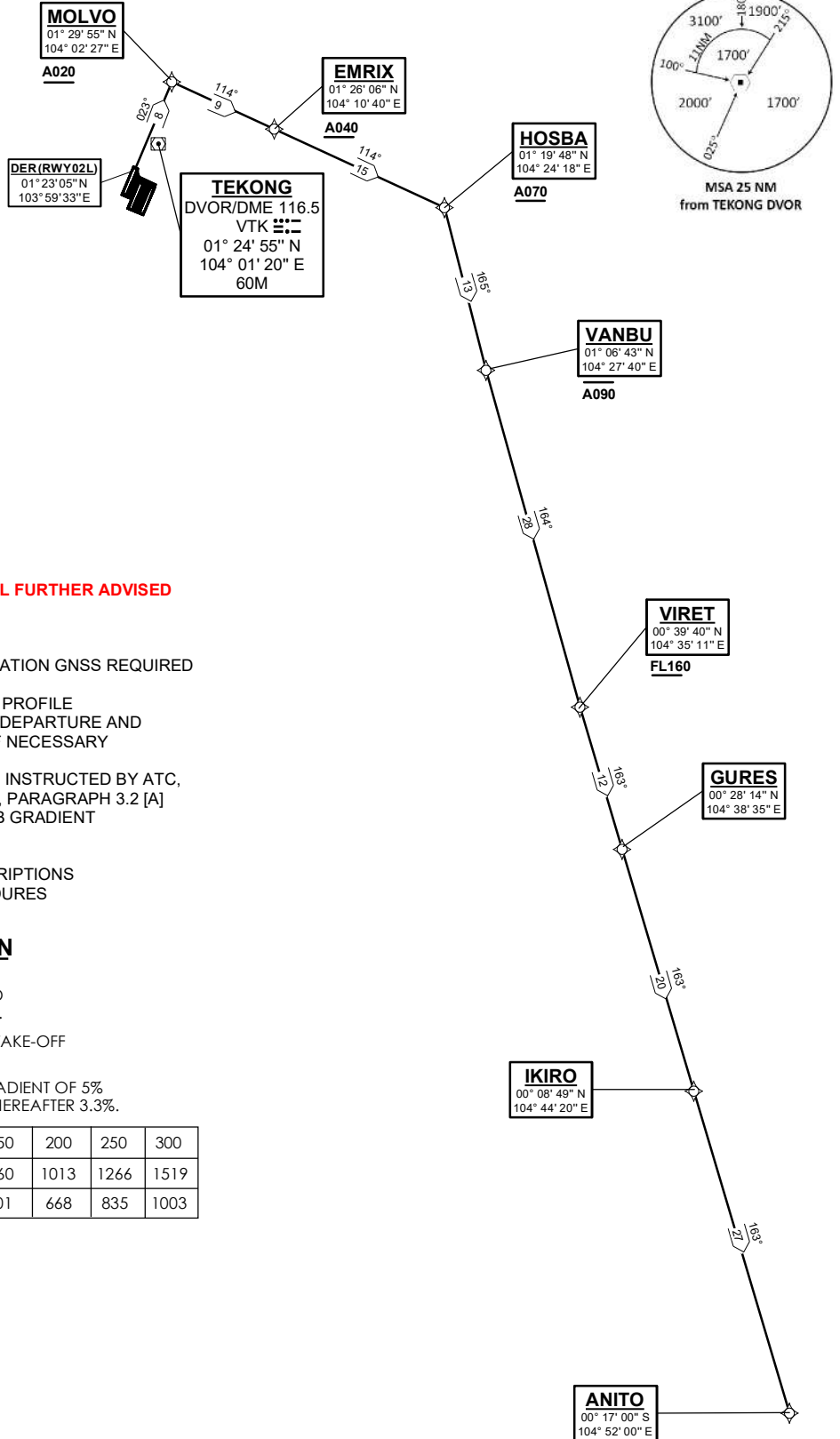
**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

**SINGAPORE/Singapore Changi
RWY 02L
ANITO DEPARTURES
ANITO 7E**

TWR 118.6 / 118.25 APP 120.3 124.05 ACC 134.4	TRANSITION ALTITUDE 11 000ft
	D-ATIS AP ID-WSSS 128.6

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

DISTANCES IN NM



GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

- NOTE:** RADAR REQUIRED
- NOTE:** RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
- NOTE:** ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORED IF NECESSARY
- NOTE:** WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A] - FOR RWY 02L MINIMUM CLIMB GRADIENT
- NOTE:** REFER TO BACK PAGE FOR
 - FORMAL AND TABULAR DESCRIPTIONS
 - RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

ANITO 7E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOLVO on course 023° at or above 2000ft, turn right.	MOLVO [M023; A020+; R] -	CF	N
To EMRIX at or above 4000ft.	EMRIX [A040+] -	TF	N
To HOSBA at or above 7000ft, turn right.	HOSBA [A070+; R] -	TF	N
To VANBU at or below 9000ft, turn left.	VANBU [A090-; L] -	TF	N
To VIRET at or above FL160, turn left.	VIRET [FL160+; L] -	TF	N
To GURES.	GURES -	TF	N
To IKIRO.	IKIRO -	TF	N
To ANITO.	ANITO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOLVO	-	023(023.4)	8.0	R	A020+	-	RNAV1
TF	EMRIX	-	114(114.4)	9.0	-	A040+	-	RNAV1
TF	HOSBA	-	114(114.4)	15.0	R	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	L	A090-	-	RNAV1
TF	VIRET	-	164(164.4)	28.0	L	FL160+	-	RNAV1
TF	GURES	-	163(163.3)	12.0	-	-	-	RNAV1
TF	IKIRO	-	163(163.3)	20.0	-	-	-	RNAV1
TF	ANITO	-	163(163.3)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

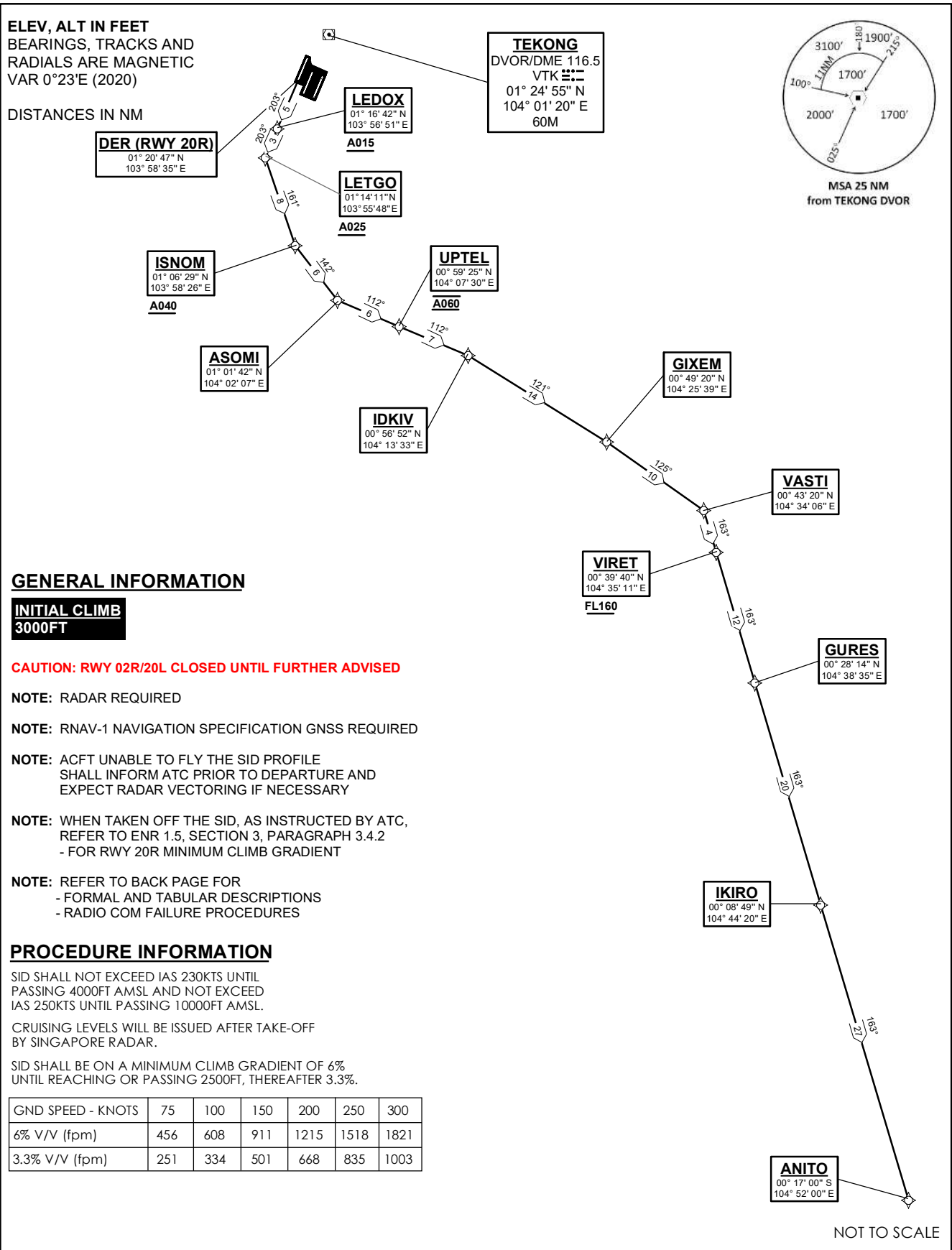
**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20R
ANITO DEPARTURES
ANITO 8F**



GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.2
- FOR RWY 20R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 6%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
6% V/V (fpm)	456	608	911	1215	1518	1821
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

ANITO 8F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To LEDOX on course 203° at or above 1500ft.	LEDOX [M203; A015+] -	CF	N
To LETGO at or above 2500ft, turn left.	LETGO [A025+; L] -	TF	N
To ISNOM at or above 4000ft, turn left.	ISNOM [A040+; L] -	TF	N
To ASOMI, turn left.	ASOMI [L] -	TF	N
To UPTTEL at 6000ft.	UPTTEL [@A060] -	TF	N
To IDKIV, turn right.	IDKIV [R] -	TF	N
To GIXEM, turn right.	GIXEM [R] -	TF	N
To VASTI, turn right.	VASTI [R] -	TF	N
To VIRET at or above FL160.	VIRET [FL160+] -	TF	N
To GURES.	GURES -	TF	N
To IKIRO.	IKIRO -	TF	N
To ANITO.	ANITO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	5.0	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	ISNOM	-	161(161.4)	8.0	L	A040+	-	RNAV1
TF	ASOMI	-	142(142.4)	6.0	L	-	-	RNAV1
TF	UPTTEL	-	112(112.4)	6.0	-	@A060	-	RNAV1
TF	IDKIV	-	112(112.4)	7.0	R	-	-	RNAV1
TF	GIXEM	-	121(121.4)	14.0	R	-	-	RNAV1
TF	VASTI	-	125(125.4)	10.0	R	-	-	RNAV1
TF	VIRET	-	163(163.4)	4.0	-	FL160+	-	RNAV1
TF	GURES	-	163(163.4)	12.0	-	-	-	RNAV1
TF	IKIRO	-	163(163.4)	20.0	-	-	-	RNAV1
TF	ANITO	-	163(163.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

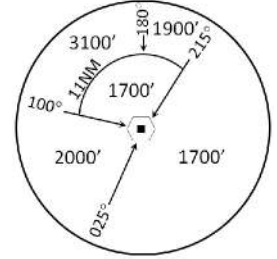
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 02C
AROSO DEPARTURES
AROSO 3A**

**ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)**

DISTANCES IN NM



AROSO
02° 08' 46" N
103° 24' 21" E

307°
24

AKMET
01° 53' 55" N
103° 43' 39" E
A110

307°
14

AKOMA
01° 45' 22" N
103° 54' 43" E
A070

331°
16

MOXIB
01° 29' 33" N
104° 03' 15" E
A020

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55" N
104° 01' 20" E
60M

DER (RWY 02C)
01° 21' 45" N
103° 59' 57" E

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: CLOSE-IN OBSTACLES (AIRCRAFT UP TO 80FT)
EXIST ON TAXIWAYS WEST OF RUNWAY 02C

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.3 [A]
- FOR RWY 02C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

AROSO 3A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOXIB on course 023° at or above 2000ft, turn left.	MOXIB [M023; A020+; L] -	CF	N
To AKOMA at or above 7000ft, turn left.	AKOMA [A070+; L] -	TF	N
To AKMET at or above 11000ft.	AKMET [A110+] -	TF	N
To AROSO.	AROSO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOXIB	-	023(023.4)	8.0	L	A020+	-	RNAV1
TF	AKOMA	-	331(331.4)	18.0	L	A070+	-	RNAV1
TF	AKMET	-	307(307.4)	14.0	-	A110+	-	RNAV1
TF	AROSO	-	307(307.4)	24.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

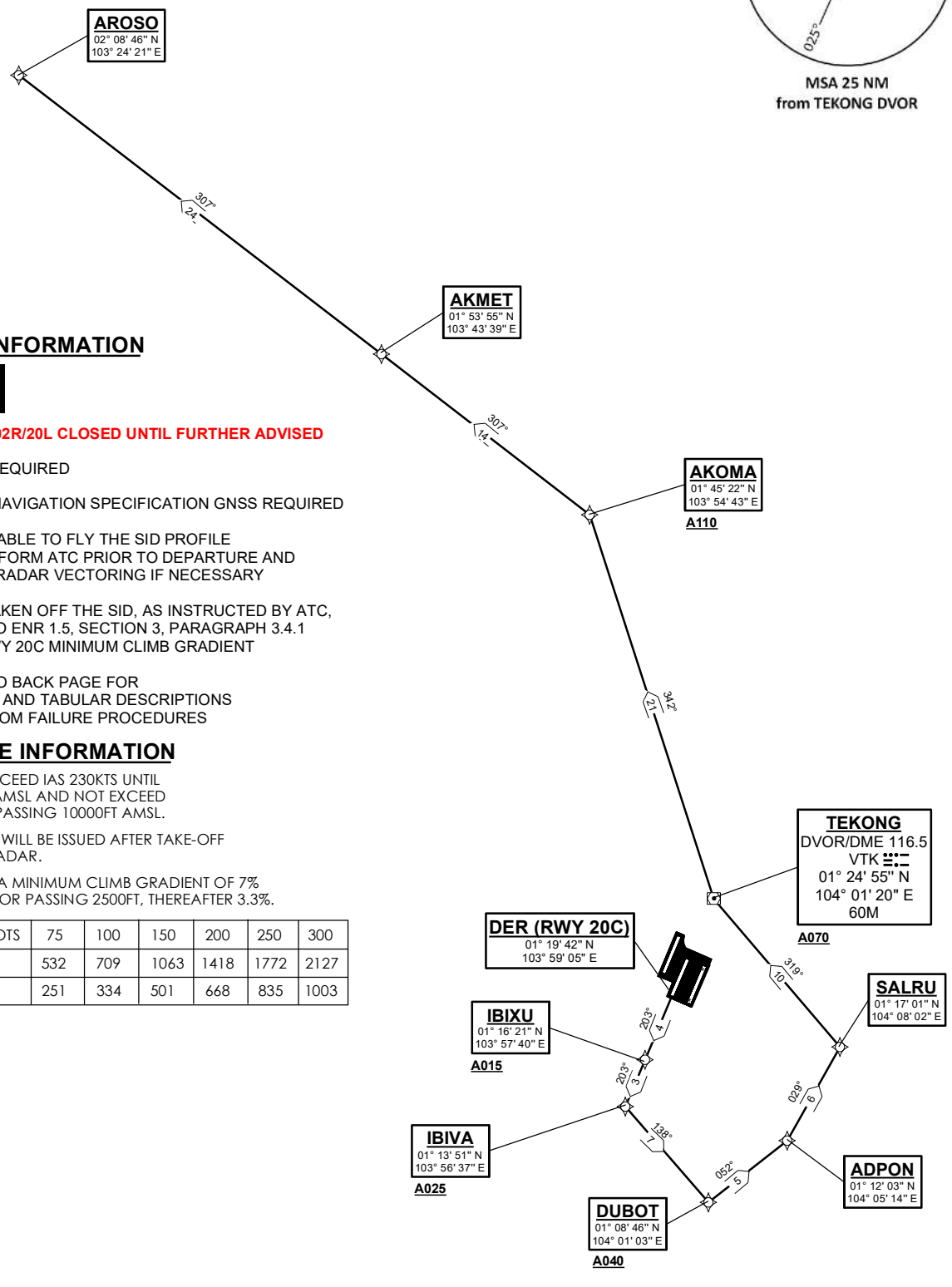
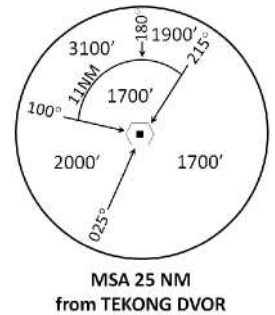
D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20C
AROSO DEPARTURES
AROSO 5B

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

NOT TO SCALE

DISTANCES IN NM



GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.1
- FOR RWY 20C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 7%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
7% V/V (fpm)	532	709	1063	1418	1772	2127
3.3% V/V (fpm)	251	334	501	668	835	1003

21 MAR 2024

AROSO 5B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To IBIXU on course 203° at or above 1500ft.	IBIXU [M203; A015+] -	CF	N
To IBIVA at or above 2500ft, turn left.	IBIVA [A025+; L] -	TF	N
To DUBOT at or above 4000ft, turn left.	DUBOT [A040+; L] -	TF	N
To ADPON, turn left.	ADPON [L] -	TF	N
To SALRU, turn left.	SALRU [L] -	TF	N
To VTK at or above 7000ft, turn right.	VTK [A070+; R] -	TF	N
To AKOMA at or above 11000ft, turn left.	AKOMA [A110+; L] -	TF	N
To AKMET.	AKMET -	TF	N
To AROSO.	AROSO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	4.0	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	DUBOT	-	138(138.4)	7.0	L	A040+	-	RNAV1
TF	ADPON	-	052(052.4)	5.0	L	-	-	RNAV1
TF	SALRU	-	029(029.4)	6.0	L	-	-	RNAV1
TF	VTK	-	319(319.4)	10.0	R	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	21.0	L	A110+	-	RNAV1
TF	AKMET	-	307(307.4)	14.0	-	-	-	RNAV1
TF	AROSO	-	307(307.4)	24.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

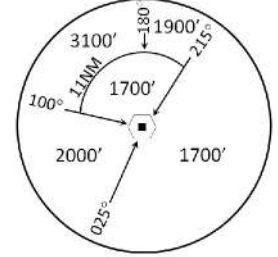
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

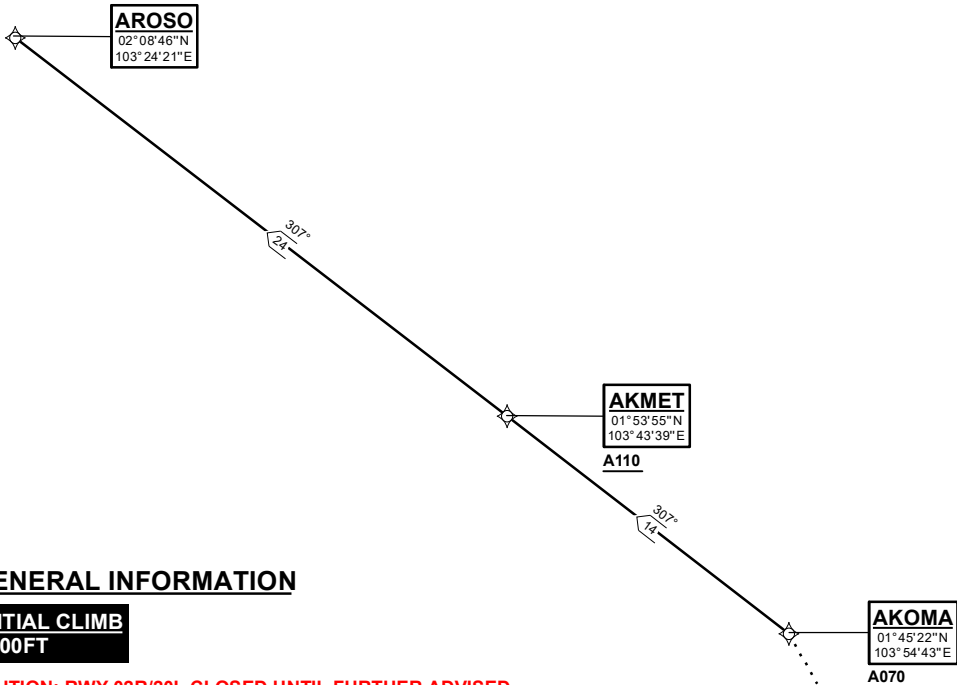
SINGAPORE/Singapore Changi
RWY 02R
AROSO DEPARTURES (RADAR)
AROSO 1C

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM
from TEKONG DVOR



GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.5
- FOR RWY 02R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

EXPECT RADAR vectors
to waypoint AKOMA

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

DER(RWY02R)
01°21'22"N
104°00'51"E

TEKONG
DVOR/DME 116.5
VTK
01°24'55"N
104°01'20"E
60M

NOT TO SCALE

AROSO 1C (SID) RNAV GNSS RWY 02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
Climb heading 023°, Gradient 5% to 2500ft, thence 3.3%. Expect radar vectors to waypoint AKOMA.	-	VA	N
To AKOMA at or above 7000ft.	AKOMA [A070+] -	DF	N
To AKMET at or above 11000ft.	AKMET [A110+] -	TF	N
To AROSO.	AROSO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
VA	-	-	023(023.4)	-	-	A030	-	-
DF	AKOMA	-	-	-	-	A070+	-	RNAV1
TF	AKMET	-	307(307.4)	14.0	-	A110+	-	RNAV1
TF	AROSO	-	307(307.4)	24.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

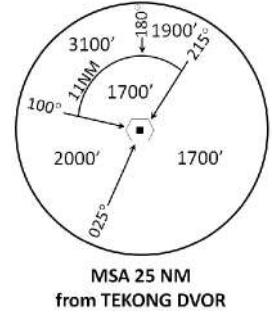
D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20L
AROSO DEPARTURES
AROSO 1D**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

NOT TO SCALE

DISTANCES IN NM



AROSO
02°08'46"N
103°24'21"E

30°
24

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.3
- FOR RWY 20L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 9%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
9% V/V (fpm)	684	911	1367	1823	2279	2734
3.3% V/V (fpm)	251	334	501	668	835	1003

AKMET
01°53'55"N
103°43'39"E

30°
14

AKOMA
01°45'22"N
103°54'43"E
A110

30°
21

TEKONG
DVOR/DME 116.5
VTK
01°24'55"N
104°01'20"E
60M
A070

DER(RWY20L)
01°19'19"N
103°59'59"E

UKIBO
01°17'58"N
103°59'24"E

SALRU
01°17'01"N
104°08'02"E

POVEB
01°13'44"N
104°01'30"E
A025

ADPON
01°12'03"N
104°05'14"E
A040

AROSO 1D (SID) RNAV GNSS RWY 20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To UKIBO on course 203°, turn left.	UKIBO [M203; L] -	CF	N
To POVEB at or above 2500ft, turn left.	POVEB [A025+; L] -	TF	N
To ADPON at or above 4000ft, turn left.	ADPON [A040+; L] -	TF	N
To SALRU, turn left.	SALRU [L] -	TF	N
To VTK at or above 7000ft, turn right.	VTK [A070+; R] -	TF	N
To AKOMA at or above 11000ft, turn left.	AKOMA [A110+; L] -	TF	N
To AKMET.	AKMET -	TF	N
To AROSO.	AROSO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	UKIBO	-	203(203.4)	1.5	L	-	-	RNAV1
TF	POVEB	-	153(153.4)	5.0	L	A025+	-	RNAV1
TF	ADPON	-	114(114.4)	4.0	L	A040+	-	RNAV1
TF	SALRU	-	029(029.4)	6.0	L	-	-	RNAV1
TF	VTK	-	319(319.4)	10.0	R	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	21.0	L	A110+	-	RNAV1
TF	AKMET	-	307(307.4)	14.0	-	-	-	RNAV1
TF	AROSO	-	307(307.4)	24.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

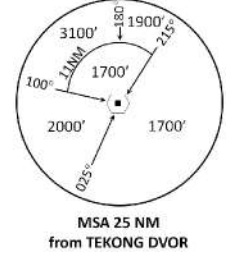
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

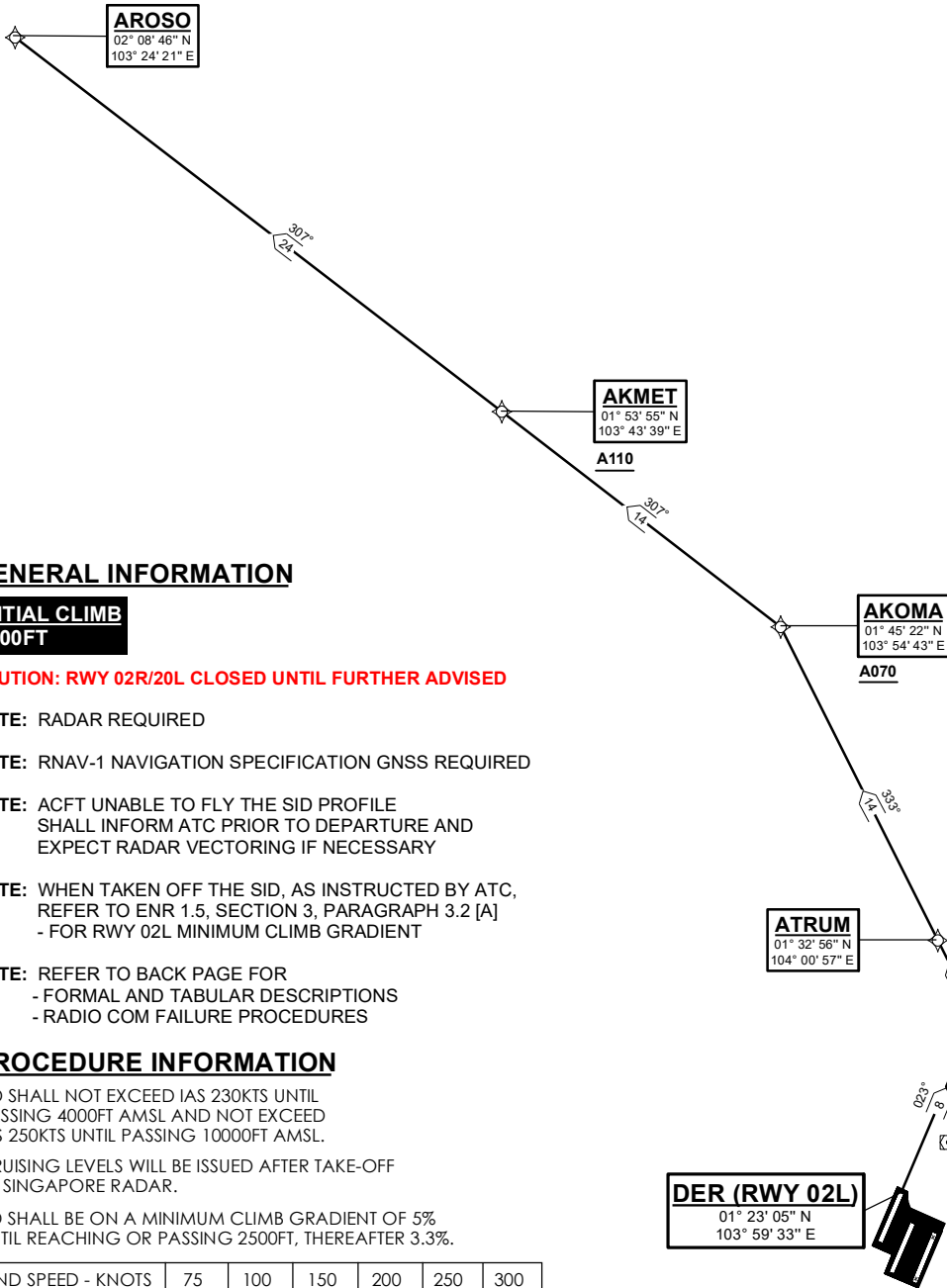
SINGAPORE/Singapore Changi
RWY 02L
AROSO DEPARTURES
AROSO 3E

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

DISTANCES IN NM



AROSO
02° 08' 46" N
103° 24' 21" E



AKMET
01° 53' 55" N
103° 43' 39" E
A110

AKOMA
01° 45' 22" N
103° 54' 43" E
A070

ATRUM
01° 32' 56" N
104° 00' 57" E

MOLVO
01° 29' 55" N
104° 02' 27" E
A020

DER (RWY 02L)
01° 23' 05" N
103° 59' 33" E

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55" N
104° 01' 20" E
60M

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A]
- FOR RWY 02L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

AROSO 3E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOLVO on course 023° at or above 2000ft, turn left.	MOLVO [M023; A020+; L] -	CF	N
To ATRUM.	ATRUM -	TF	N
To AKOMA at or above 7000ft, turn left.	AKOMA [A070+; L] -	TF	N
To AKMET at or above 11000ft.	AKMET [A110+] -	TF	N
To AROSO.	AROSO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOLVO	-	023(023.4)	8.0	L	A020+	-	RNAV1
TF	ATRUM	-	333(333.4)	3.0	-	-	-	RNAV1
TF	AKOMA	-	333(333.4)	14.0	L	A070+	-	RNAV1
TF	AKMET	-	307(307.4)	14.0	-	A110+	-	RNAV1
TF	AROSO	-	307(307.4)	24.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

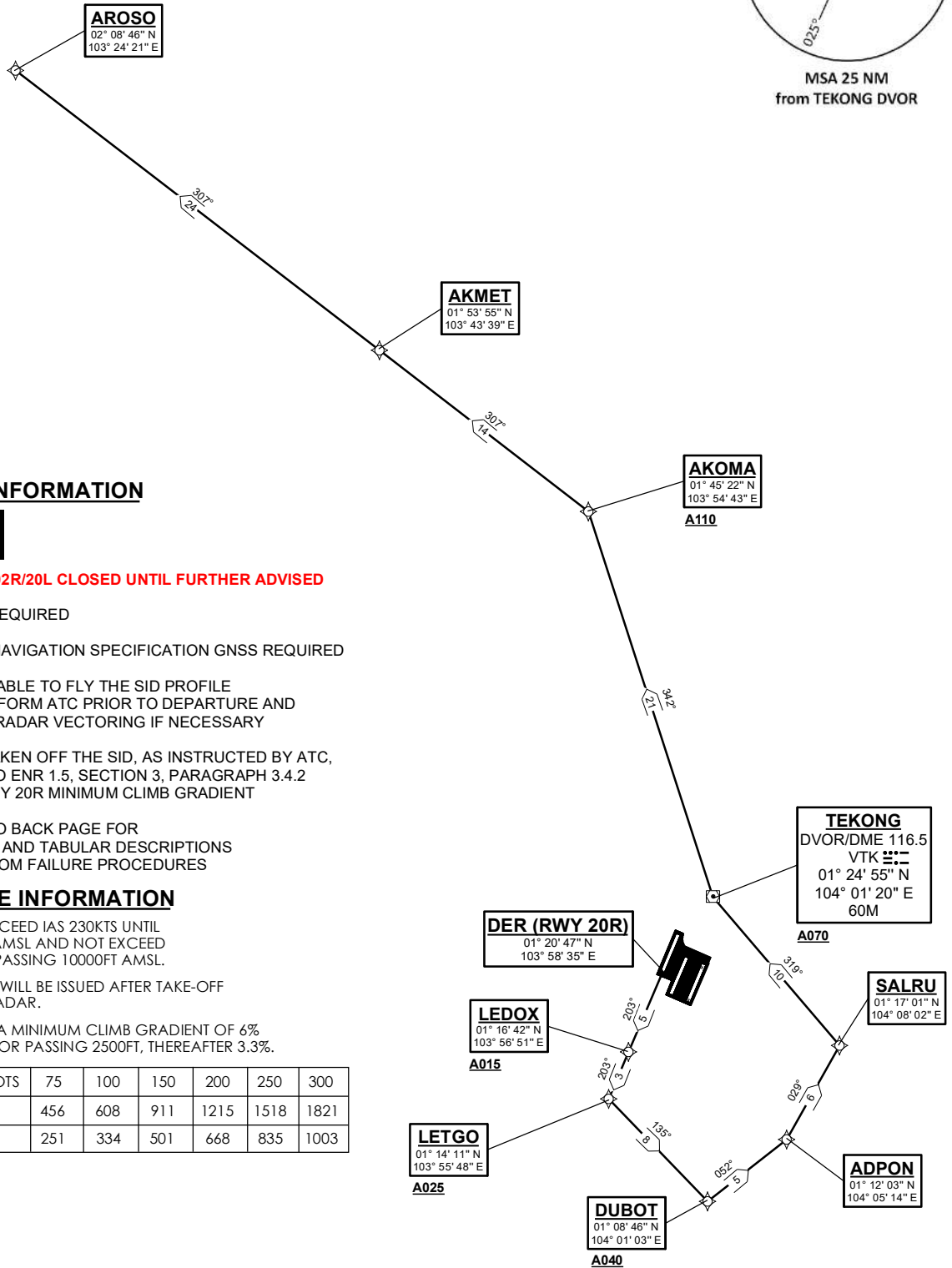
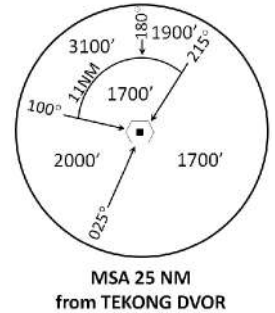
D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20R
AROSO DEPARTURES
AROSO 5F**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

NOT TO SCALE

DISTANCES IN NM



GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

**NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY**

**NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.2
- FOR RWY 20R MINIMUM CLIMB GRADIENT**

**NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES**

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 6%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
6% V/V (fpm)	456	608	911	1215	1518	1821
3.3% V/V (fpm)	251	334	501	668	835	1003

21 MAR 2024

AROSO 5F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To LEDOX on course 203° at or above 1500ft.	LEDOX [M203; A015+] -	CF	N
To LETGO at or above 2500ft, turn left.	LETGO [A025+; L] -	TF	N
To DUBOT at or above 4000ft, turn left.	DUBOT [A040+; L] -	TF	N
To ADPON, turn left.	ADPON [L] -	TF	N
To SALRU, turn left.	SALRU [L] -	TF	N
To VTK at or above 7000ft, turn right.	VTK [A070+; R] -	TF	N
To AKOMA at or above 11000ft, turn left.	AKOMA [A110+; L] -	TF	N
To AKMET.	AKMET -	TF	N
To AROSO.	AROSO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	5.0	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	DUBOT	-	135(135.4)	8.0	L	A040+	-	RNAV1
TF	ADPON	-	052(052.4)	5.0	L	-	-	RNAV1
TF	SALRU	-	029(029.4)	6.0	L	-	-	RNAV1
TF	VTK	-	319(319.4)	10.0	R	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	21.0	L	A110+	-	RNAV1
TF	AKMET	-	307(307.4)	14.0	-	-	-	RNAV1
TF	AROSO	-	307(307.4)	24.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.2

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C
DODSO DEPARTURES
DODSO 1A

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: CLOSE-IN OBSTACLES (AIRCRAFT UP TO 80FT) EXIST ON TAXIWAYS WEST OF RUNWAY 02C

NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND TO EXPECT RADAR VECTORING, IF NECESSARY

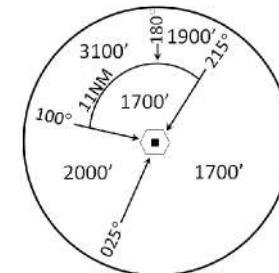
NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR - FORMAL AND TABULAR DESCRIPTIONS - RADIO COM FAILURE PROCEDURES

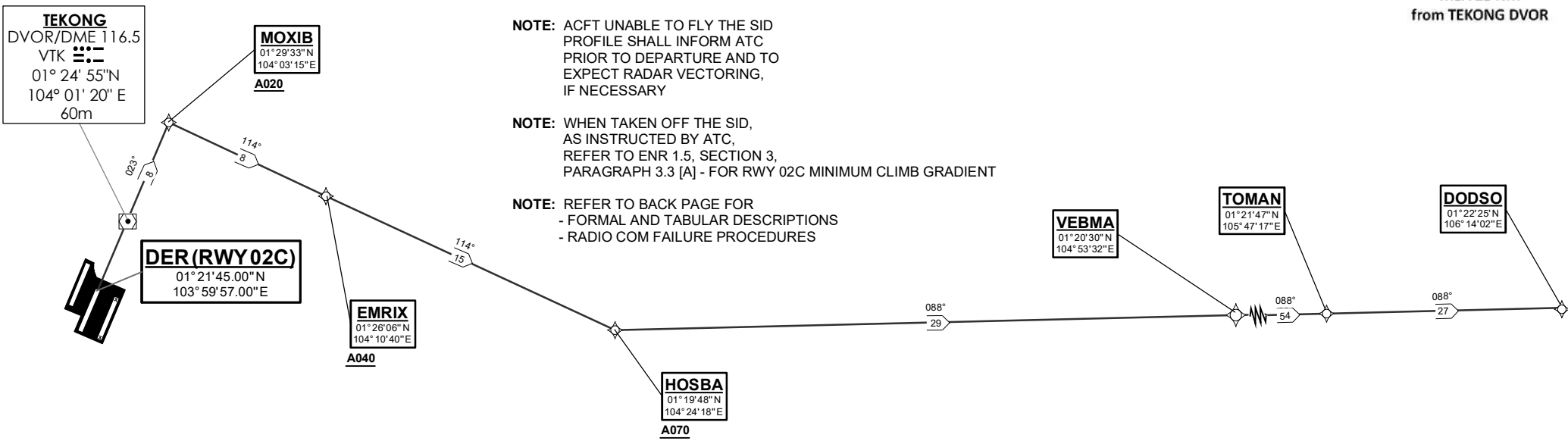
ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM
from TEKONG DVOR



NOT TO SCALE

DODSO 1A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOXIB on course 203° at or above 2000ft, turn right.	MOXIB [M203; A020+; R] -	CF	N
To EMRIX at or above 4000ft.	EMRIX [A040+] -	TF	N
To HOSBA at or above 7000ft, turn left.	HOSBA [A070+; L] -	TF	N
To VEBMA.	VEBMA -	TF	N
To TOMAN.	TOMAN -	TF	N
To DODSO.	DODSO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOXIB	-	023(023.4)	8.0	R	A020+	-	RNAV1
TF	EMRIX	-	114(114.4)	8.0	-	A040+	-	RNAV1
TF	HOSBA	-	114(114.4)	15.0	L	A070+	-	RNAV1
TF	VEBMA	-	088(088.4)	29.0	-	-	-	RNAV1
TF	TOMAN	-	088(088.4)	54.0	-	-	-	RNAV1
TF	DODSO	-	088(088.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.2

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20C
DODSO DEPARTURES
DODSO 1B**

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.1 - FOR RWY 20C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

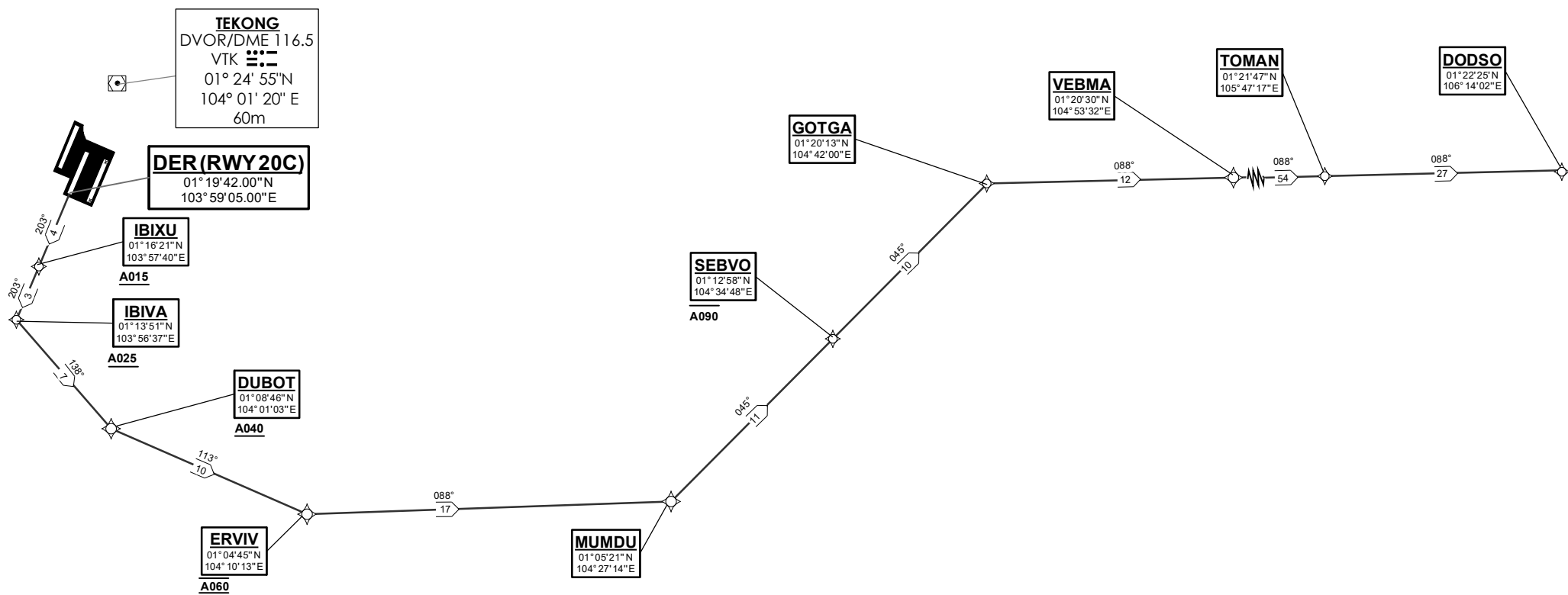
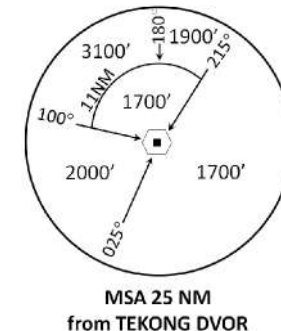
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 7% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
7% V/V (fpm)	532	709	1063	1418	1772	2127
3.3% V/V (fpm)	251	334	501	668	835	1003

ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC VAR 0°23'E (2020)

DISTANCES IN NM



NOT TO SCALE

DODSO 1B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To IBIXU on course 203° at or above 1500ft.	IBIXU [M203; A015+] -	CF	N
To IBIVA at or above 2500ft, turn left.	IBIVA [A025+; L] -	TF	N
To DUBOT at or above 4000ft, turn left.	DUBOT [A040+; L] -	TF	N
To ERVIV at 6000ft, turn left.	ERVIV [@A060; L] -	TF	N
To MUMDU, turn left.	MUMDU [L] -	TF	N
To SEBVO at or below 9000ft.	SEBVO [A090-] -	TF	N
To GOTGA, turn right.	GOTGA [R] -	TF	N
To VEBMA.	VEBMA -	TF	N
To TOMAN.	TOMAN -	TF	N
To DODSO.	DODSO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	4.0	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	DUBOT	-	138(138.4)	7.0	L	A040+	-	RNAV1
TF	ERVIV	-	113(113.4)	10.0	L	@A060	-	RNAV1
TF	MUMDU	-	088(088.4)	17.0	L	-	-	RNAV1
TF	SEBVO	-	045(045.4)	11.0	-	A090-	-	RNAV1
TF	GOTGA	-	045(045.4)	10.0	R	-	-	RNAV1
TF	VEBMA	-	088(088.4)	12.0	-	-	-	RNAV1
TF	TOMAN	-	088(088.4)	54.0	-	-	-	RNAV1
TF	DODSO	-	088(088.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.2

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02R
DODSO DEPARTURES (RADAR)
DODSO 1C

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORING IF NECESSARY

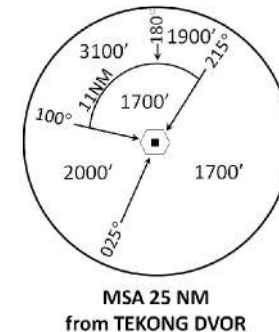
NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.5 - FOR RWY 02R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

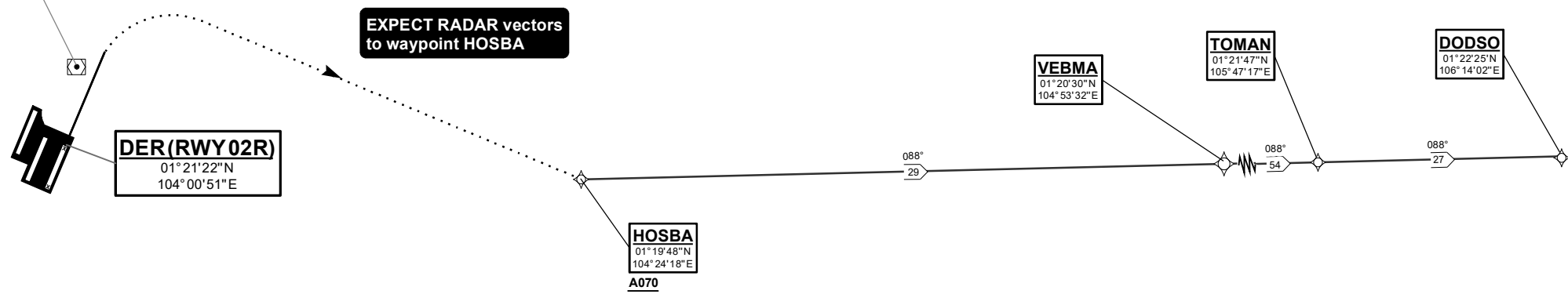
ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC VAR 0°23'E (2020)

DISTANCES IN NM



TEKONG
DVOR/DME 116.5
VTK :
01° 24' 55"N
104° 01' 20" E
60m



NOT TO SCALE

DODSO 1C (SID) RNAV GNSS RWY 02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
Climb heading 023°, Gradient 5% to 2500ft, thence 3.3%. Expect radar vectors to waypoint HOSBA.	-	VA	N
To HOSBA at or above 7000ft.	HOSBA [A070+] -	DF	N
To VEBMA.	VEBMA -	TF	N
To TOMAN.	TOMAN -	TF	N
To DODSO.	DODSO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
VA	-	-	023(023.4)	-	-	A030	-	RNAV1
DF	HOSBA	-	-	-	-	A070+	-	RNAV1
TF	VEBMA	-	088(088.4)	29.0	-	-	-	RNAV1
TF	TOMAN	-	088(088.4)	54.0	-	-	-	RNAV1
TF	DODSO	-	088(088.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.2

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20L
DODSO DEPARTURES
DODSO 1D

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.3 - FOR RWY 20L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

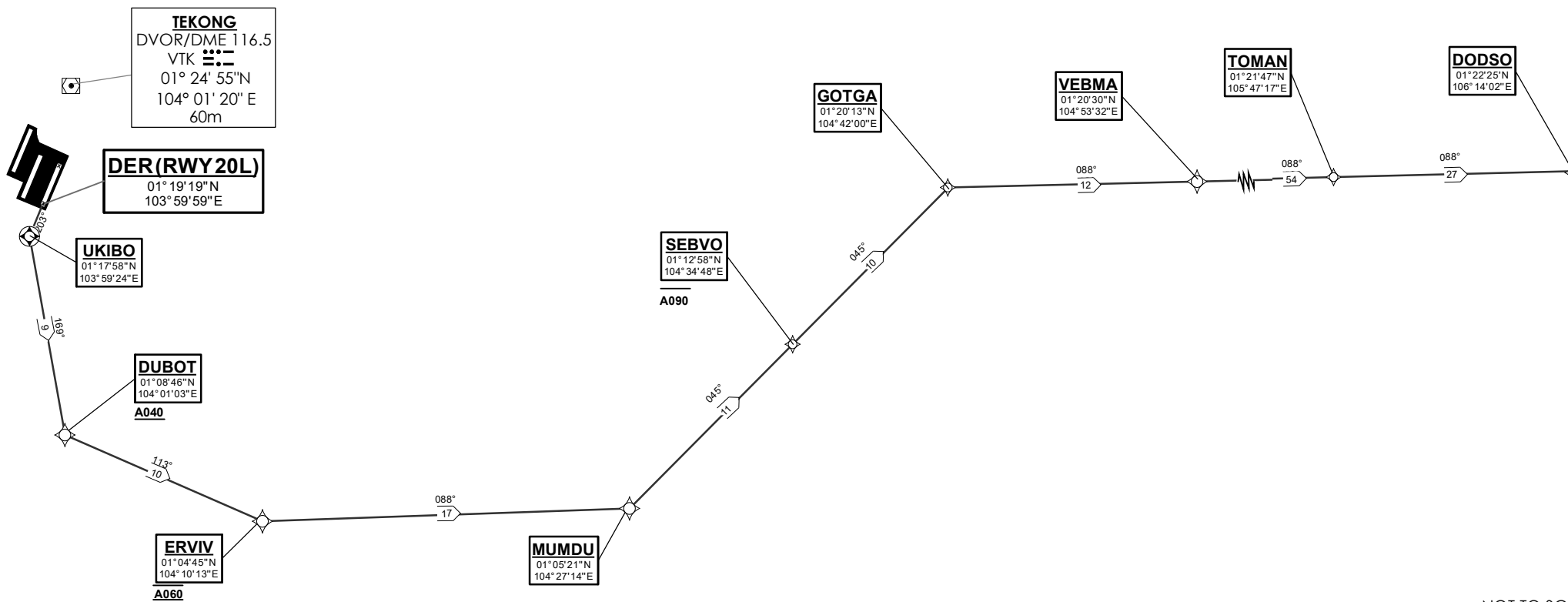
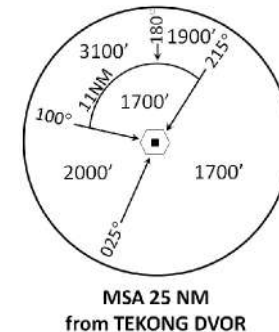
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 9% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
9% V/V (fpm)	684	911	1367	1823	2279	2734
3.3% V/V (fpm)	251	334	501	668	835	1003

ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC VAR 0°23'E (2020)

DISTANCES IN NM



NOT TO SCALE

21 MAR 2024

DODSO 1D (SID) RNAV GNSS RWY 20L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To UKIBO on course 203°, turn left.	UKIBO [M203; L] -	CF	N
To DUBOT at or above 4000ft, turn left.	DUBOT [A040+; L] -	TF	N
To ERVIV at 6000ft, turn left.	ERVIV [@A060; L] -	TF	N
To MUMDU, turn left.	MUMDU [L] -	TF	N
To SEBVO at or below 9000ft.	SEBVO [A090-] -	TF	N
To GOTGA, turn right.	GOTGA [R] -	TF	N
To VEBMA.	VEBMA -	TF	N
To TOMAN.	TOMAN -	TF	N
To DODSO.	DODSO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	UKIBO	Y	203(203.4)	1.5	L	-	-	RNAV1
TF	DUBOT	-	169(169.4)	9.0	L	A040+	-	RNAV1
TF	ERVIV	-	113(113.4)	10.0	L	@A060	-	RNAV1
TF	MUMDU	-	088(088.4)	17.0	L	-	-	RNAV1
TF	SEBVO	-	045(045.4)	11.0	-	A090-	-	RNAV1
TF	GOTGA	-	045(045.4)	10.0	R	-	-	RNAV1
TF	VEBMA	-	088(088.4)	12.0	-	-	-	RNAV1
TF	TOMAN	-	088(088.4)	54.0	-	-	-	RNAV1
TF	DODSO	-	088(088.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.2

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02L
DODSO DEPARTURES
DODSO 1E

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORING IF NECESSARY

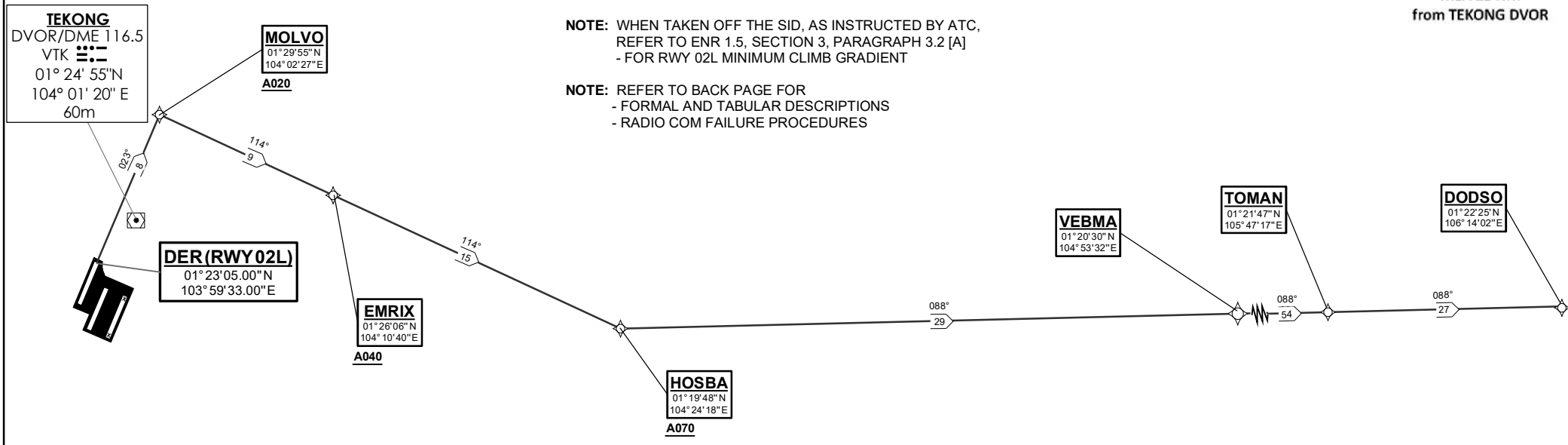
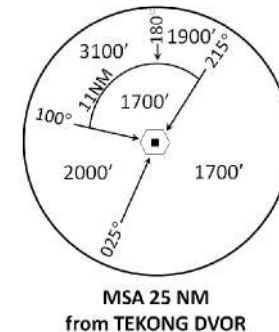
NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A] - FOR RWY 02L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC VAR 0°23'E (2020)

DISTANCES IN NM



NOT TO SCALE

DODSO 1E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOLVO on course 023° at or above 2000ft, turn right.	MOLVO [M023; A020+; R] -	CF	N
To EMRIX at or above 4000ft.	EMRIX [A040+] -	TF	N
To HOSBA at or above 7000ft, turn left.	HOSBA [A070+; L] -	TF	N
To VEBMA.	VEBMA -	TF	N
To TOMAN.	TOMAN -	TF	N
To DODSO.	DODSO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOLVO	-	023(023.4)	8.0	R	A020+	-	RNAV1
TF	EMRIX	-	114(114.4)	9.0	-	A040+	-	RNAV1
TF	HOSBA	-	114(114.4)	15.0	L	A070+	-	RNAV1
TF	VEBMA	-	088(088.4)	29.0	-	-	-	RNAV1
TF	TOMAN	-	088(088.4)	54.0	-	-	-	RNAV1
TF	DODSO	-	088(088.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.2

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20R
DODSO DEPARTURES
DODSO 1F

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.2 - FOR RWY 20R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

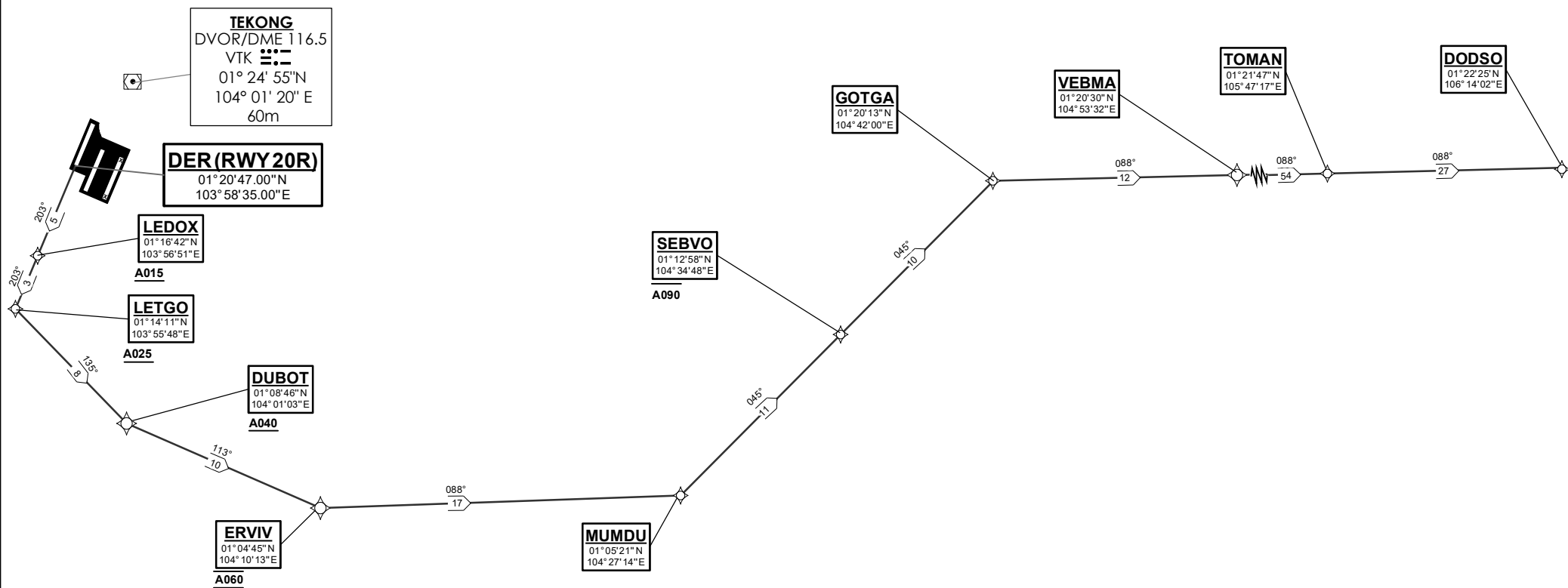
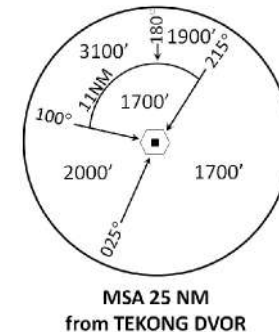
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 6% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
6% V/V (fpm)	456	608	911	1215	1518	1821
3.3% V/V (fpm)	251	334	501	668	835	1003

ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC VAR 0°23'E (2020)

DISTANCES IN NM



NOT TO SCALE

DODSO 1F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To LEDOX on course 203° at or above 1500ft.	LEDOX [M203; A015+] -	CF	N
To LETGO at or above 2500ft, turn left.	LETGO [A025+; L] -	TF	N
To DUBOT at or above 4000ft, turn left.	DUBOT [A040+; L] -	TF	N
To ERVIV at 6000ft, turn left.	ERVIV [@A060; L] -	TF	N
To MUMDU, turn left.	MUMDU [L] -	TF	N
To SEBVO at or below 9000ft.	SEBVO [A090-] -	TF	N
To GOTGA, turn right.	GOTGA [R] -	TF	N
To VEBMA.	VEBMA -	TF	N
To TOMAN.	TOMAN -	TF	N
To DODSO.	DODSO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	5.0	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	DUBOT	-	135(135.4)	8.0	L	A040+	-	RNAV1
TF	ERVIV	-	113(113.4)	10.0	L	@A060	-	RNAV1
TF	MUMDU	-	088(088.4)	17.0	L	-	-	RNAV1
TF	SEBVO	-	045(045.4)	11.0	-	A090-	-	RNAV1
TF	GOTGA	-	045(045.4)	10.0	R	-	-	RNAV1
TF	VEBMA	-	088(088.4)	12.0	-	-	-	RNAV1
TF	TOMAN	-	088(088.4)	54.0	-	-	-	RNAV1
TF	DODSO	-	088(088.4)	27.0	-	-	-	RNAV1

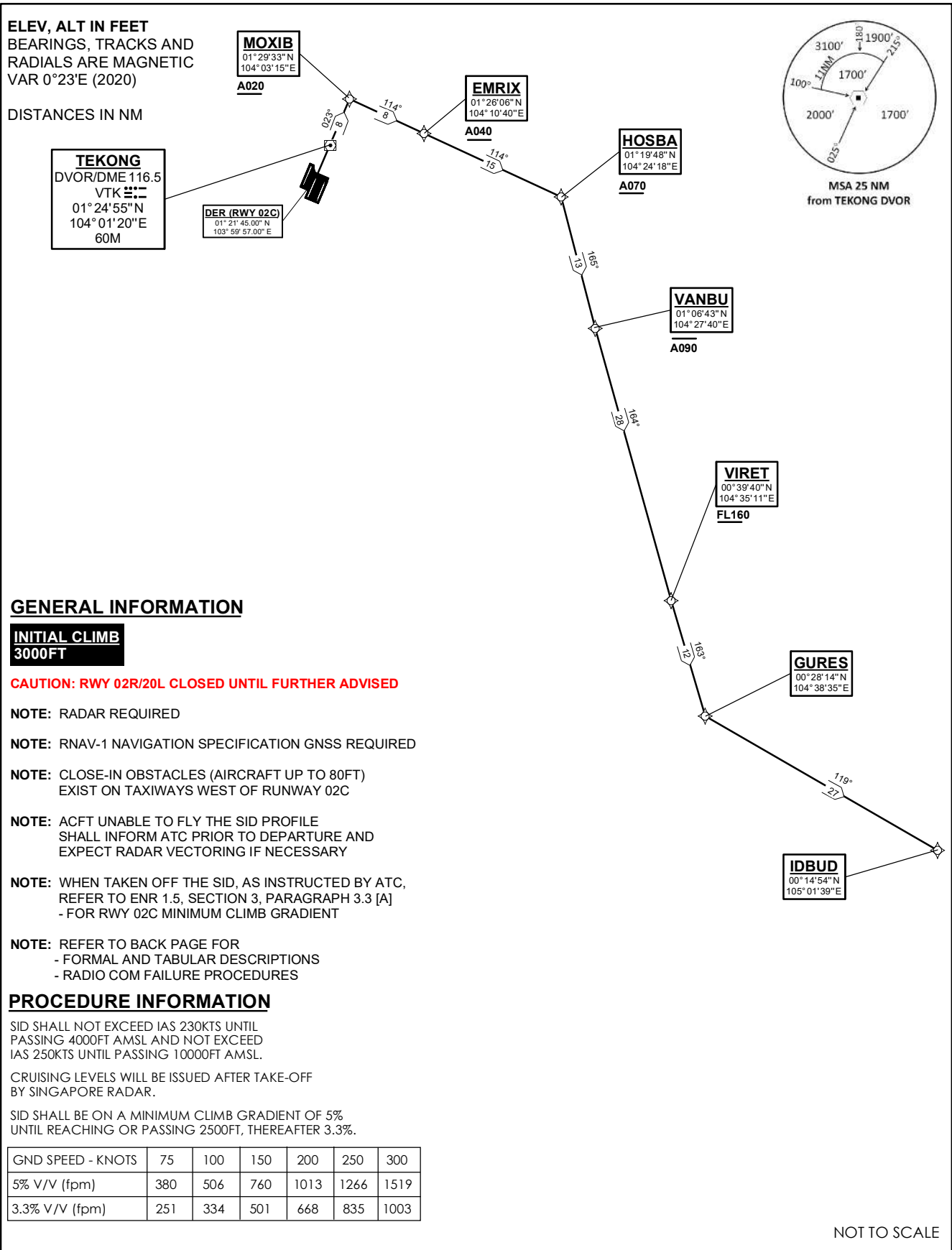
Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25 APP 120.3 124.05 ACC 134.4	TRANSITION ALTITUDE 11 000ft
	D-ATIS AP ID-WSSS 128.6

**SINGAPORE/Singapore Changi
RWY 02C
IDBUD DEPARTURES
IDBUD 1A**



21 MAR 2024

IDBUD 1A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOXIB on course 023° at or above 2000ft, turn right.	MOXIB [M023; A020+; R] -	CF	N
To EMRIX at or above 4000ft.	EMRIX [A040+] -	TF	N
To HOSBA at or above 7000ft, turn right.	HOSBA [A070+; R] -	TF	N
To VANBU at or below 9000ft, turn left.	VANBU [A090-; L] -	TF	N
To VIRET at or above FL160, turn left.	VIRET [FL160+; L] -	TF	N
To GURES, turn left	GURES [L] -	TF	N
To IDBUD.	IDBUD	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOXIB	-	023(023.4)	8.0	R	A020+	-	RNAV1
TF	EMRIX	-	114(114.4)	8.0	-	A040+	-	RNAV1
TF	HOSBA	-	114(114.4)	15.0	R	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	L	A090-	-	RNAV1
TF	VIRET	-	164(164.4)	28.0	L	FL160+	-	RNAV1
TF	GURES	-	163(163.4)	12.0	L	-	-	RNAV1
TF	IDBUD	-	119(119.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

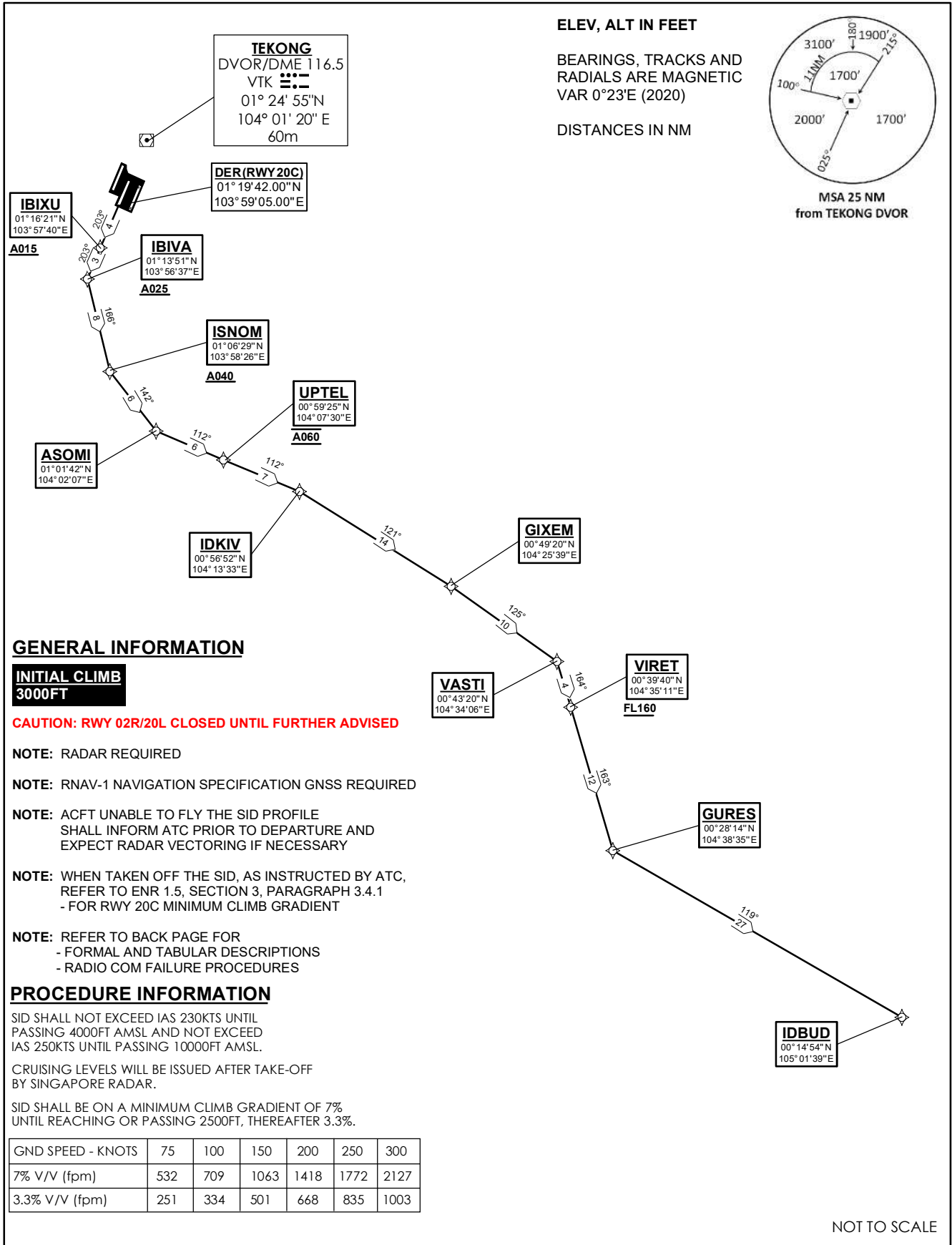
**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20C
IDBUD DEPARTURES
IDBUD 1B**



21 MAR 2024

IDBUD 1B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To IBIXU on course 203° at or above 1500ft.	IBIXU [M203; A015+] -	CF	N
To IBIVA at or above 2500ft, turn left.	IBIVA [A025+; L] -	TF	N
To ISNOM at or above 4000ft, turn left.	ISNOM [A040+; L] -	TF	N
To ASOMI, turn left.	ASOMI [L] -	TF	N
To UPTTEL at 6000ft.	UPTTEL [@A060] -	TF	N
To IDKIV, turn right.	IDKIV [R] -	TF	N
To GIXEM, turn right.	GIXEM [R] -	TF	N
To VASTI, turn right.	VASTI [R] -	TF	N
To VIRET at or above FL160, turn left.	VIRET [FL160+; L] -	TF	N
To GURES, turn left.	GURES [L] -	TF	N
To IDBUD.	IDBUD	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	4.0	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	ISNOM	-	166(166.4)	8.0	L	A040+	-	RNAV1
TF	ASOMI	-	142(142.4)	6.0	L	-	-	RNAV1
TF	UPTTEL	-	112(112.4)	6.0	-	@A060	-	RNAV1
TF	IDKIV	-	112(112.4)	7.0	R	-	-	RNAV1
TF	GIXEM	-	121(121.4)	14.0	R	-	-	RNAV1
TF	VASTI	-	125(125.4)	10.0	R	-	-	RNAV1
TF	VIRET	-	164(164.4)	4.0	L	FL160+	-	RNAV1
TF	GURES	-	163(163.4)	12.0	L	-	-	RNAV1
TF	IDBUD	-	119(119.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

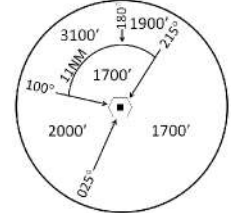
TWR 118.6 / 118.25 APP 120.3 124.05 ACC 134.4	TRANSITION ALTITUDE 11 000ft
D-ATIS AP ID-WSSS 128.6	

**SINGAPORE/Singapore Changi
RWY 02R
IDBUD DEPARTURES (RADAR)
IDBUD 1C**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

**EXPECT RADAR vectors
to waypoint HOSBA**



MSA 25 NM
from TEKONG DVOR

TEKONG
DVOR/DME 116.5
VTK
01°24'55"N
104°01'20"E
60M

DER(RWY02R)
01°21'22"N
104°00'51"E

HOSBA
01°19'48"N
104°24'18"E

VANBU
01°06'43"N
104°27'40"E

VIRET
00°39'40"N
104°35'11"E

GURES
00°28'14"N
104°38'35"E

IDBUD
00°14'54"N
105°01'39"E

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

- CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED**
- NOTE: RADAR REQUIRED**
- NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED**
- NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTURING IF NECESSARY**
- NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.5 - FOR RWY 02R MINIMUM CLIMB GRADIENT**
- NOTE: REFER TO BACK PAGE FOR - FORMAL AND TABULAR DESCRIPTIONS - RADIO COM FAILURE PROCEDURES**

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

IDBUD 1C (SID) RNAV GNSS RWY 02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
Climb heading 023°, Gradient 5% to 2500ft, thence 3.3%. Expect radar vectors to waypoint HOSBA.	-	VA	N
To HOSBA at or above 7000ft.	HOSBA [A070+] -	DF	N
To VANBU at or below 9000ft, turn left.	VANBU [A090-; L] -	TF	N
To VIRET at or above FL160, turn left.	VIRET [FL160+; L] -	TF	N
To GURES, turn left.	GURES [L] -	TF	N
To IDBUD.	IDBUD	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
VA	-	-	023(023.4)	-	-	A030	-	-
DF	HOSBA	-	-	-	-	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	L	A090-	-	RNAV1
TF	VIRET	-	164(164.4)	28.0	L	FL160+	-	RNAV1
TF	GURES	-	163(163.3)	12.0	L	-	-	RNAV1
TF	IDBUD	-	119(119.3)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

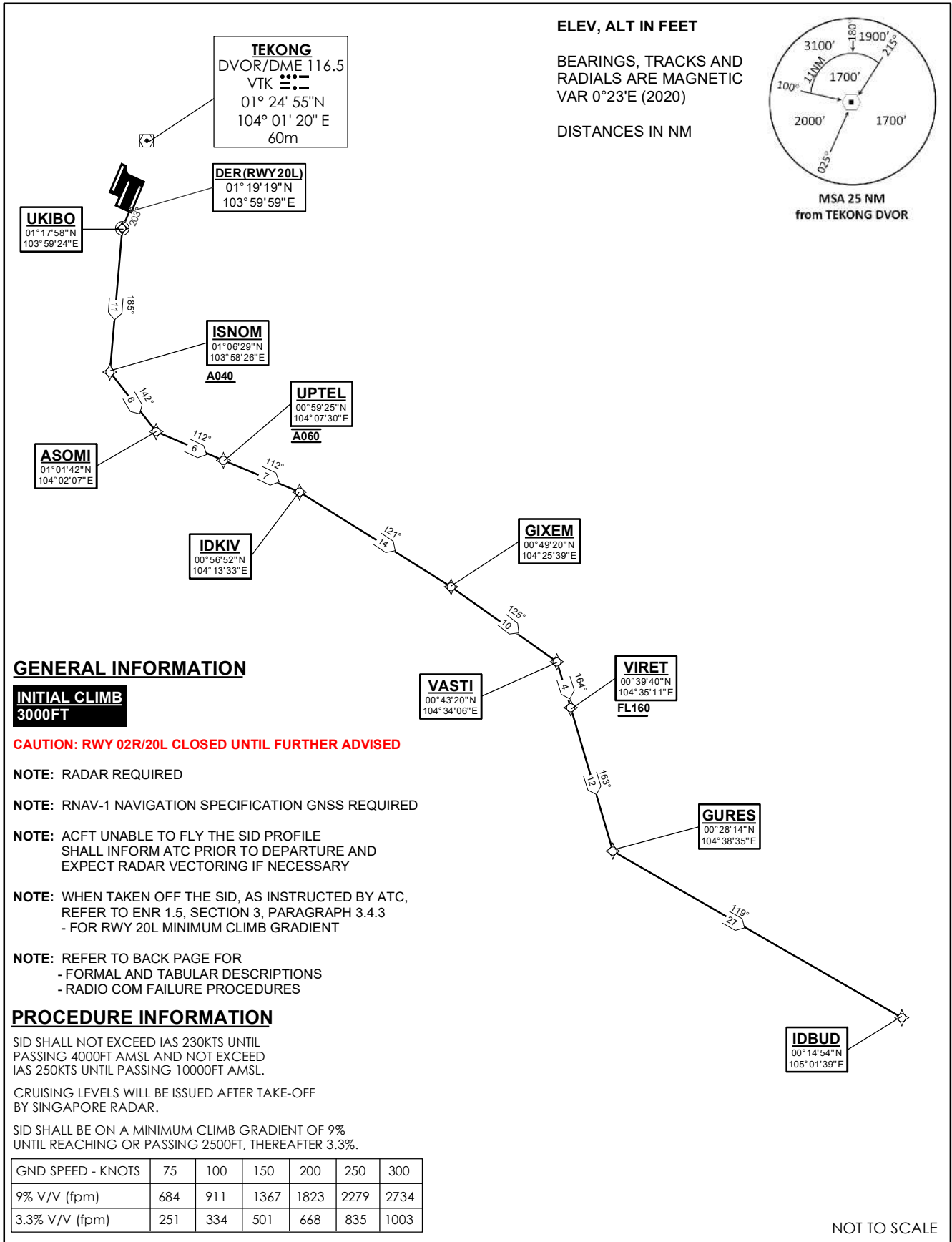
**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20L
IDBUD DEPARTURES
IDBUD 1D**



IDBUD 1D (SID) RNAV GNSS RWY 20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To UKIBO on course 203°, turn left.	UKIBO [M203; L] -	CF	N
To ISNOM at or above 4000ft, turn left.	ISNOM [A040+; L] -	TF	N
To ASOMI, turn left.	ASOMI [L] -	TF	N
To UPTTEL at 6000ft.	UPTTEL [@A060] -	TF	N
To IDKIV, turn right.	IDKIV [R] -	TF	N
To GIXEM, turn right.	GIXEM [R] -	TF	N
To VASTI, turn right.	VASTI [R] -	TF	N
To VIRET at or above FL160, turn left.	VIRET [FL160+; L] -	TF	N
To GURES, turn left.	GURES [L] -	TF	N
To IDBUD.	IDBUD	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	UKIBO	Y	203(203.4)	1.5	L	-	-	RNAV1
TF	ISNOM	-	185(185.4)	11.0	L	A040+	-	RNAV1
TF	ASOMI	-	142(142.4)	6.0	L	-	-	RNAV1
TF	UPTTEL	-	112(112.4)	6.0	-	@A060	-	RNAV1
TF	IDKIV	-	112(112.4)	7.0	R	-	-	RNAV1
TF	GIXEM	-	121(121.4)	14.0	R	-	-	RNAV1
TF	VASTI	-	125(125.4)	10.0	R	-	-	RNAV1
TF	VIRET	-	164(164.4)	4.0	L	FL160+	-	RNAV1
TF	GURES	-	163(163.4)	12.0	L	-	-	RNAV1
TF	IDBUD	-	119(119.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25 APP 120.3 124.05 ACC 134.4	TRANSITION ALTITUDE 11 000ft
	D-ATIS AP ID-WSSS 128.6

**SINGAPORE/Singapore Changi
RWY 02L
IDBUD DEPARTURES
IDBUD 1E**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

TEKONG
DVOR/DME 116.5
VTK 
01° 24' 55" N
104° 01' 20" E
60M

DER(RWY02L)
01° 23' 05.00" N
103° 59' 33.00" E

MOLVO
01° 29' 55" N
104° 02' 27" E
A020

EMRIX
01° 26' 06" N
104° 10' 40" E
A040

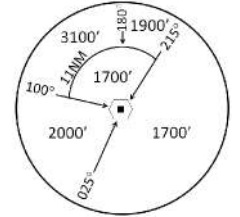
HOSBA
01° 19' 48" N
104° 24' 18" E
A070

VANBU
01° 06' 43" N
104° 27' 40" E
A090

VIRET
00° 39' 40" N
104° 35' 11" E
FL160

GURES
00° 28' 14" N
104° 38' 35" E

IDBUD
00° 14' 54" N
105° 01' 39" E



GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A]
- FOR RWY 02L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

21 MAR 2024

IDBUD 1E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOLVO on course 023° at or above 2000ft, turn right.	MOLVO [M023; A020+; R] -	CF	N
To EMRIX at or above 4000ft.	EMRIX [A040+] -	TF	N
To HOSBA at or above 7000ft, turn right.	HOSBA [A070+; R] -	TF	N
To VANBU at or below 9000ft, turn left.	VANBU [A090-; L] -	TF	N
To VIRET at or above FL160, turn left.	VIRET [FL160+; L] -	TF	N
To GURES, turn left	GURES [L] -	TF	N
To IDBUD.	IDBUD	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOLVO	-	023(023.4)	8.0	R	A020+	-	RNAV1
TF	EMRIX	-	114(114.4)	9.0	-	A040+	-	RNAV1
TF	HOSBA	-	114(114.4)	15.0	R	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	L	A090-	-	RNAV1
TF	VIRET	-	164(164.4)	28.0	L	FL160+	-	RNAV1
TF	GURES	-	163(163.4)	12.0	L	-	-	RNAV1
TF	IDBUD	-	119(119.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

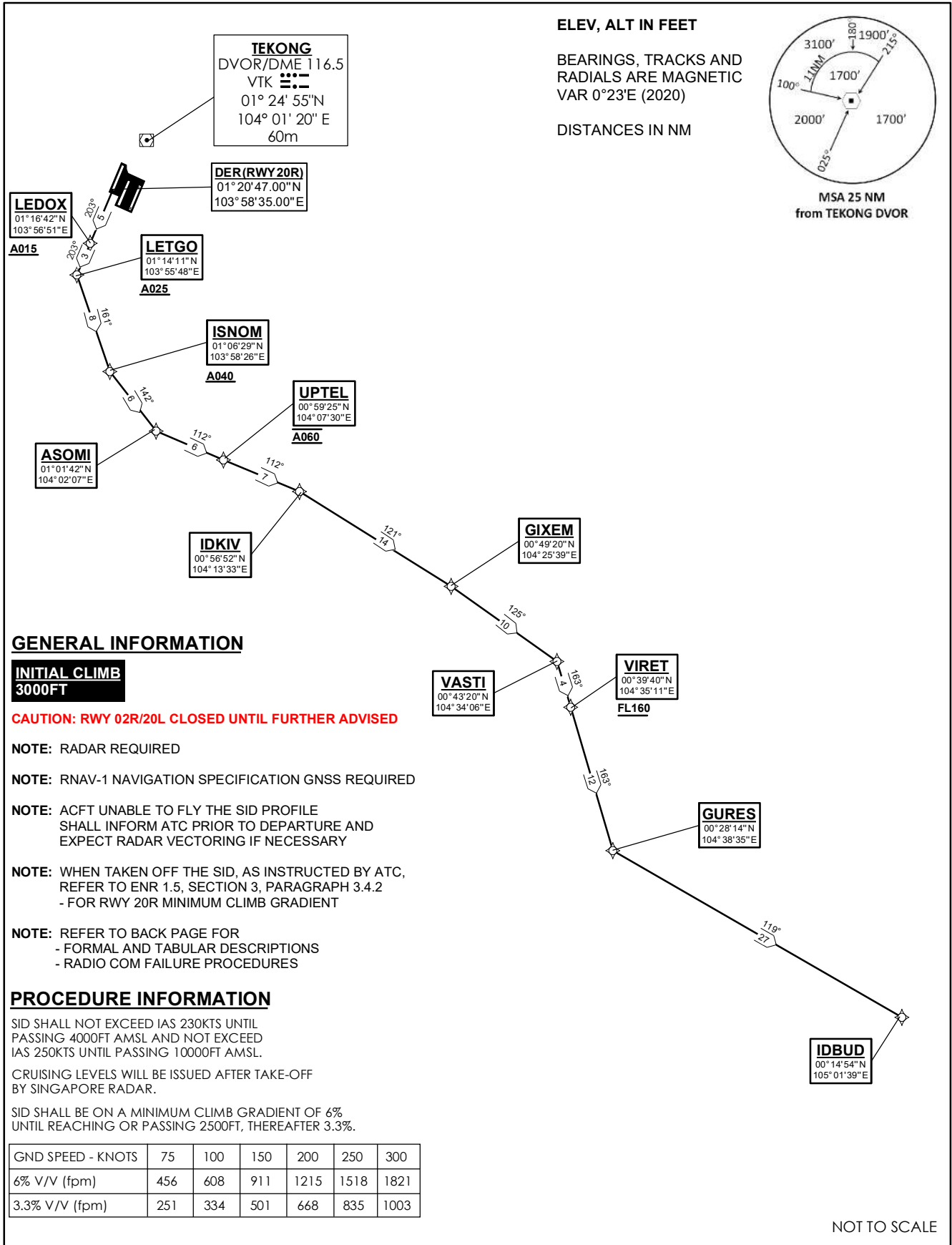
**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20R
IDBUD DEPARTURES
IDBUD 1F**



21 MAR 2024

IDBUD 1F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To LEDOX on course 203° at or above 1500ft.	LEDOX [M203; A015+] -	CF	N
To LETGO at or above 2500ft, turn left.	LETGO [A025+; L] -	TF	N
To ISNOM at or above 4000ft, turn left.	ISNOM [A040+; L] -	TF	N
To ASOMI, turn left.	ASOMI [L] -	TF	N
To UPTTEL at 6000ft.	UPTTEL [@A060] -	TF	N
To IDKIV, turn right.	IDKIV [R] -	TF	N
To GIXEM, turn right.	GIXEM [R] -	TF	N
To VASTI, turn right.	VASTI [R] -	TF	N
To VIRET at or above FL160.	VIRET [FL160+] -	TF	N
To GURES, turn left.	GURES [L] -	TF	N
To IDBUD.	IDBUD	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	5.0	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	ISNOM	-	161(161.4)	8.0	L	A040+	-	RNAV1
TF	ASOMI	-	142(142.4)	6.0	L	-	-	RNAV1
TF	UPTTEL	-	112(112.4)	6.0	-	@A060	-	RNAV1
TF	IDKIV	-	112(112.4)	7.0	R	-	-	RNAV1
TF	GIXEM	-	121(121.4)	14.0	R	-	-	RNAV1
TF	VASTI	-	125(125.4)	10.0	R	-	-	RNAV1
TF	VIRET	-	163(164.4)	4.0	-	FL160+	-	RNAV1
TF	GURES	-	163(163.4)	12.0	L	-	-	RNAV1
TF	IDBUD	-	119(119.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25 APP 120.3 124.05 ACC 134.4	TRANSITION ALTITUDE 11 000ft
	D-ATIS AP ID-WSSS 128.6

**SINGAPORE/Singapore Changi
RWY 02C
KIRDA DEPARTURES
KIRDA 1A**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

TEKONG
DVOR/DME 116.5
VTK
01°24'55"N
104°01'20"E
60M

DER (RWY 02C)
01°21'45.00"N
103°59'57.00"E

MOXIB
01°29'33"N
104°03'15"E

A020

EMRIX
01°26'06"N
104°10'40"E

A040

HOSBA
01°19'48"N
104°24'18"E

A070

VANBU
01°06'43"N
104°27'40"E

A090

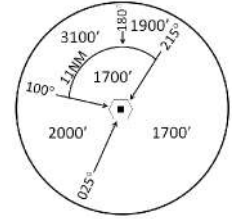
VIRET
00°39'40"N
104°35'11"E

FL160

GURES
00°28'14"N
104°38'35"E

IKIRO
00°08'49"N
104°44'20"E

KIRDA
00°00'09"N
104°59'34"E



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: CLOSE-IN OBSTACLES (AIRCRAFT UP TO 80FT)
EXIST ON TAXIWAYS WEST OF RUNWAY 02C

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORIZING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.3 [A]
- FOR RWY 02C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

KIRDA 1A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOXIB on course 023° at or above 2000ft, turn right.	MOXIB [M023; A020+; R] -	CF	N
To EMRIX at or above 4000ft.	EMRIX [A040+] -	TF	N
To HOSBA at or above 7000ft, turn right.	HOSBA [A070+; R] -	TF	N
To VANBU at or below 9000ft, turn left.	VANBU [A090-; L] -	TF	N
To VIRET at or above FL160, turn left.	VIRET [FL160+; L] -	TF	N
To GURES.	GURES -	TF	N
To IKIRO, turn left.	IKIRO [L] -	TF	N
To KIRDA.	KIRDA	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOXIB	-	023(023.4)	8.0	R	A020+	-	RNAV1
TF	EMRIX	-	114(114.4)	8.0	-	A040+	-	RNAV1
TF	HOSBA	-	114(114.4)	15.0	R	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	L	A090-	-	RNAV1
TF	VIRET	-	164(164.4)	28.0	L	FL160+	-	RNAV1
TF	GURES	-	163(163.4)	12.0	-	-	-	RNAV1
TF	IKIRO	-	163(163.4)	20.0	L	-	-	RNAV1
TF	KIRDA	-	119(119.4)	18.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

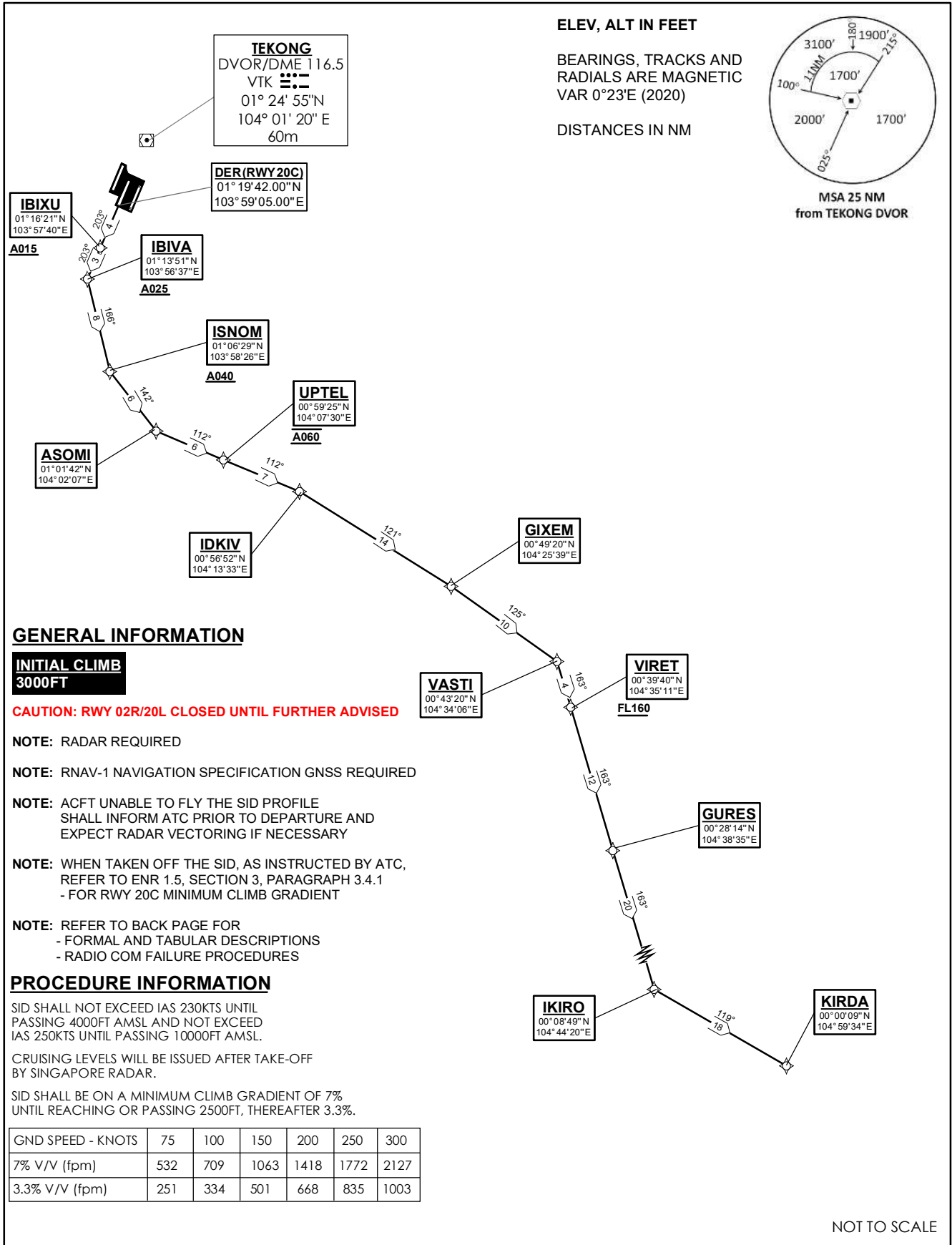
**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20C
KIRDA DEPARTURES
KIRDA 1B**



GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

- NOTE:** RADAR REQUIRED
- NOTE:** RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
- NOTE:** ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORED IF NECESSARY
- NOTE:** WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.1 - FOR RWY 20C MINIMUM CLIMB GRADIENT
- NOTE:** REFER TO BACK PAGE FOR
 - FORMAL AND TABULAR DESCRIPTIONS
 - RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 7% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

NOT TO SCALE

21 MAR 2024

KIRDA 1B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To IBIXU on course 203° at or above 1500ft.	IBIXU [M203; A015+] -	CF	N
To IBIVA at or above 2500ft, turn left.	IBIVA [A025+; L] -	TF	N
To ISNOM at or above 4000ft, turn left.	ISNOM [A040+; L] -	TF	N
To ASOMI, turn left.	ASOMI [L] -	TF	N
To UPTTEL at 6000ft.	UPTTEL [@A060] -	TF	N
To IDKIV, turn right.	IDKIV [R] -	TF	N
To GIXEM, turn right.	GIXEM [R] -	TF	N
To VASTI, turn right.	VASTI [R] -	TF	N
To VIRET at or above FL160.	VIRET [FL160+] -	TF	N
To GURES.	GURES -	TF	N
To IKIRO, turn left.	IKIRO [L] -	TF	N
To KIRDA.	KIRDA	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	4.0	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	ISNOM	-	166(166.4)	8.0	L	A040+	-	RNAV1
TF	ASOMI	-	142(142.4)	6.0	L	-	-	RNAV1
TF	UPTTEL	-	112(112.4)	6.0	-	@A060	-	RNAV1
TF	IDKIV	-	112(112.4)	7.0	R	-	-	RNAV1
TF	GIXEM	-	121(121.4)	14.0	R	-	-	RNAV1
TF	VASTI	-	125(125.4)	10.0	R	-	-	RNAV1
TF	VIRET	-	163(163.4)	4.0	-	FL160+	-	RNAV1
TF	GURES	-	163(163.4)	12.0	-	-	-	RNAV1
TF	IKIRO	-	163(163.4)	20.0	L	-	-	RNAV1
TF	KIRDA	-	119(119.4)	18.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

TRANSITION ALTITUDE
11 000ft

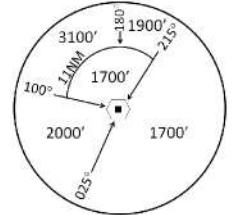
D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 02R
KIRDA DEPARTURES (RADAR)
KIRDA 1C**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

**EXPECT RADAR vectors
to waypoint HOSBA**



MSA 25 NM
from TEKONG DVOR

TEKONG
DVOR/DME 116.5
VTK
01°24'55"N
104°01'20"E
60M

DER(RWY02R)
01°21'22"N
104°00'51"E

HOSBA
01°19'48"N
104°24'18"E
A070

VANBU
01°06'43"N
104°27'40"E
A090

VIRET
00°39'40"N
104°35'11"E
FL160

GURES
00°28'14"N
104°38'35"E

IKIRO
00°08'49"N
104°44'20"E

KIRDA
00°00'09"N
104°59'34"E

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTURING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.5
- FOR RWY 02R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

KIRDA 1C (SID) RNAV GNSS RWY 02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
Climb heading 023°, Gradient 5% to 2500ft, thence 3.3%. Expect radar vectors to waypoint HOSBA.	-	VA	N
To HOSBA at or above 7000ft.	HOSBA [A070+] -	DF	N
To VANBU at or below 9000ft, turn left.	VANBU [A090-; L] -	TF	N
To VIRET at or above FL160, turn left.	VIRET [FL160+; L] -	TF	N
To GURES.	GURES -	TF	N
To IKIRO, turn left.	IKIRO [L] -	TF	N
To KIRDA.	KIRDA	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
VA	-	-	023(023.4)	-	-	A030	-	-
DF	HOSBA	-	-	-	-	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	L	A090-	-	RNAV1
TF	VIRET	-	164(164.4)	28.0	L	FL160+	-	RNAV1
TF	GURES	-	163(163.3)	12.0	-	-	-	RNAV1
TF	IKIRO	-	163(163.3)	20.0	L	-	-	RNAV1
TF	KIRDA	-	119(119.3)	18.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

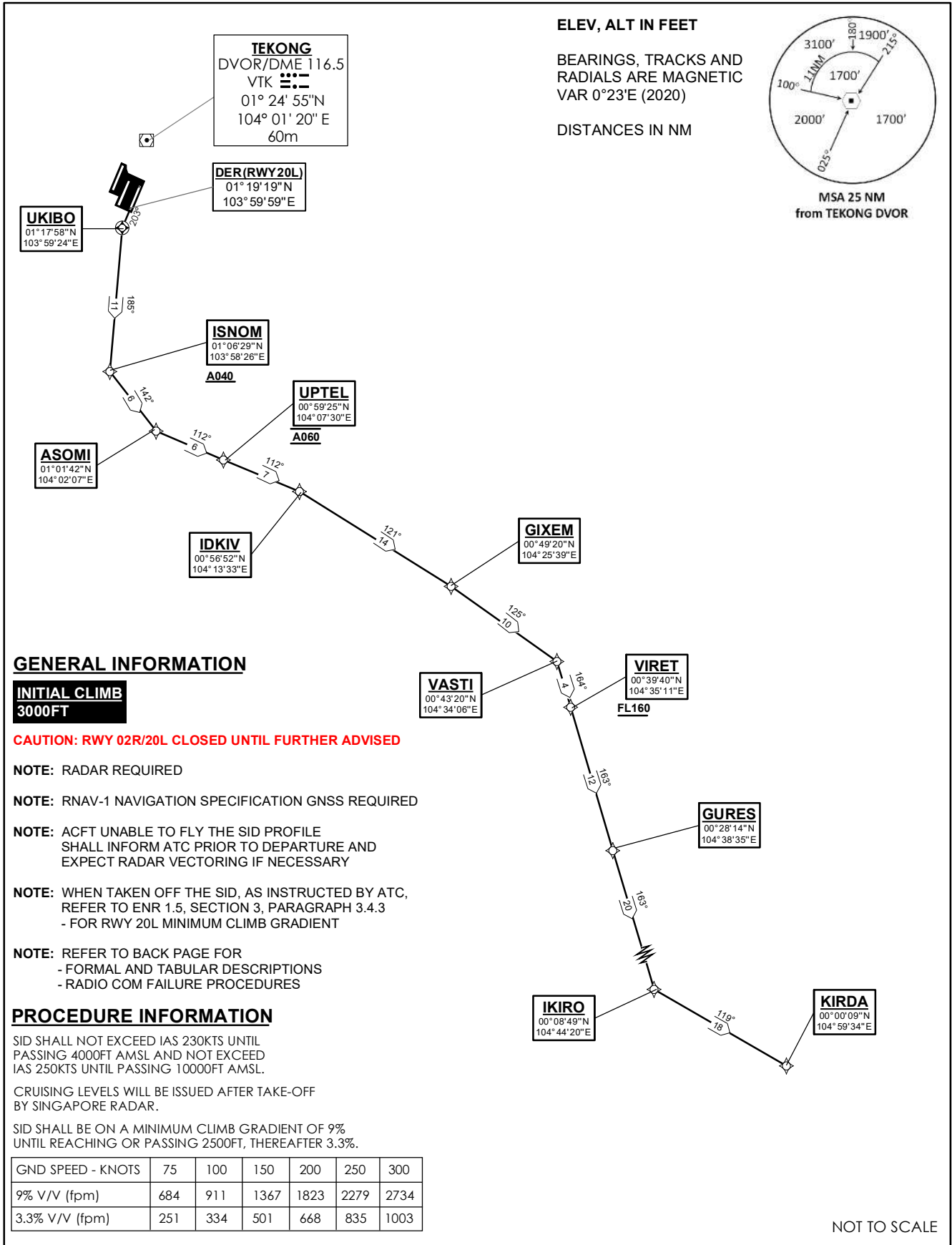
**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20L
KIRDA DEPARTURES
KIRDA 1D**



KIRDA 1D (SID) RNAV GNSS RWY 20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To UKIBO on course 203°, turn left.	UKIBO [M203; L] -	CF	N
To ISNOM at or above 4000ft, turn left.	ISNOM [A040+; L] -	TF	N
To ASOMI, turn left.	ASOMI [L] -	TF	N
To UPTTEL at 6000ft.	UPTTEL [@A060] -	TF	N
To IDKIV, turn right.	IDKIV [R] -	TF	N
To GIXEM, turn right.	GIXEM [R] -	TF	N
To VASTI, turn right.	VASTI [R] -	TF	N
To VIRET at or above FL160, turn left.	VIRET [FL160+; L] -	TF	N
To GURES.	GURES -	TF	N
To IKIRO, turn left.	IKIRO [L] -	TF	N
To KIRDA.	KIRDA	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	UKIBO	Y	203(203.4)	1.5	L	-	-	RNAV1
TF	ISNOM	-	185(185.4)	11.0	L	A040+	-	RNAV1
TF	ASOMI	-	142(142.4)	6.0	L	-	-	RNAV1
TF	UPTTEL	-	112(112.4)	6.0	-	@A060	-	RNAV1
TF	IDKIV	-	112(112.4)	7.0	R	-	-	RNAV1
TF	GIXEM	-	121(121.4)	14.0	R	-	-	RNAV1
TF	VASTI	-	125(125.4)	10.0	R	-	-	RNAV1
TF	VIRET	-	164(164.4)	4.0	L	FL160+	-	RNAV1
TF	GURES	-	163(163.4)	12.0	-	-	-	RNAV1
TF	IKIRO	-	163(163.4)	20.0	L	-	-	RNAV1
TF	KIRDA	-	119(119.4)	18.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4


TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 02L
KIRDA DEPARTURES
KIRDA 1E**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

TEKONG
DVOR/DME 116.5
VTK 
01° 24' 55" N
104° 01' 20" E
60M

DER(RWY02L)
01° 23' 05.00" N
103° 59' 33.00" E

MOLVO
01° 29' 55" N
104° 02' 27" E
A020

EMRIX
01° 26' 06" N
104° 10' 40" E
A040

HOSBA
01° 19' 48" N
104° 24' 18" E
A070

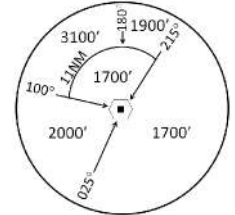
VANBU
01° 06' 43" N
104° 27' 40" E
A090

VIRET
00° 39' 40" N
104° 35' 11" E
FL160

GURES
00° 28' 14" N
104° 38' 35" E

IKIRO
00° 08' 49" N
104° 44' 20" E

KIRDA
00° 00' 09" N
104° 59' 34" E



GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A]
- FOR RWY 02L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

KIRDA 1E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOLVO on course 023° at or above 2000ft, turn right.	MOLVO [M023; A020+; R] -	CF	N
To EMRIX at or above 4000ft.	EMRIX [A040+] -	TF	N
To HOSBA at or above 7000ft, turn right.	HOSBA [A070+; R] -	TF	N
To VANBU at or below 9000ft, turn left.	VANBU [A090-; L] -	TF	N
To VIRET at or above FL160, turn left.	VIRET [FL160+; L] -	TF	N
To GURES.	GURES -	TF	N
To IKIRO, turn left.	IKIRO [L] -	TF	N
To KIRDA.	KIRDA	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOLVO	-	023(023.4)	8.0	R	A020+	-	RNAV1
TF	EMRIX	-	114(114.4)	9.0	-	A040+	-	RNAV1
TF	HOSBA	-	114(114.4)	15.0	R	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	L	A090-	-	RNAV1
TF	VIRET	-	164(164.4)	28.0	L	FL160+	-	RNAV1
TF	GURES	-	163(163.4)	12.0	-	-	-	RNAV1
TF	IKIRO	-	163(163.4)	20.0	L	-	-	RNAV1
TF	KIRDA	-	119(119.4)	18.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

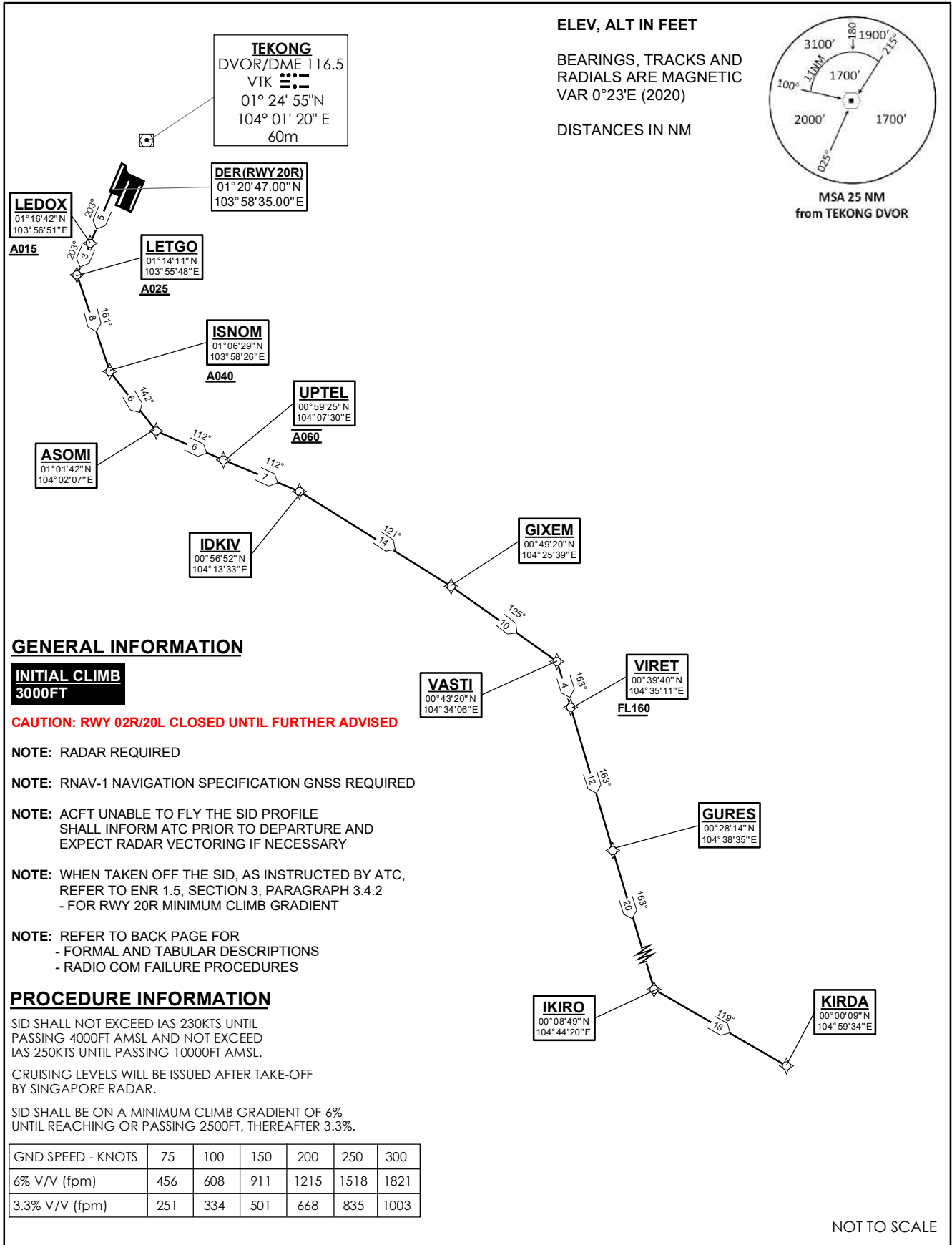
**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20R
KIRDA DEPARTURES
KIRDA 1F**



GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

- NOTE:** RADAR REQUIRED
- NOTE:** RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
- NOTE:** ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTURING IF NECESSARY
- NOTE:** WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.2 - FOR RWY 20R MINIMUM CLIMB GRADIENT
- NOTE:** REFER TO BACK PAGE FOR
 - FORMAL AND TABULAR DESCRIPTIONS
 - RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 6% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

NOT TO SCALE

21 MAR 2024

KIRDA 1F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To LEDOX on course 203° at or above 1500ft.	LEDOX [M203; A015+] -	CF	N
To LETGO at or above 2500ft, turn left.	LETGO [A025+; L] -	TF	N
To ISNOM at or above 4000ft, turn left.	ISNOM [A040+; L] -	TF	N
To ASOMI, turn left.	ASOMI [L] -	TF	N
To UPTTEL at 6000ft.	UPTTEL [@A060] -	TF	N
To IDKIV, turn right.	IDKIV [R] -	TF	N
To GIXEM, turn right.	GIXEM [R] -	TF	N
To VASTI, turn right.	VASTI [R] -	TF	N
To VIRET at or above FL160.	VIRET [FL160+] -	TF	N
To GURES.	GURES -	TF	N
To IKIRO, turn left.	IKIRO [L] -	TF	N
To KIRDA.	KIRDA	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	5.0	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	ISNOM	-	161(161.4)	8.0	L	A040+	-	RNAV1
TF	ASOMI	-	142(142.4)	6.0	L	-	-	RNAV1
TF	UPTTEL	-	112(112.4)	6.0	-	@A060	-	RNAV1
TF	IDKIV	-	112(112.4)	7.0	R	-	-	RNAV1
TF	GIXEM	-	121(121.4)	14.0	R	-	-	RNAV1
TF	VASTI	-	125(125.4)	10.0	R	-	-	RNAV1
TF	VIRET	-	163(163.4)	4.0	-	FL160+	-	RNAV1
TF	GURES	-	163(163.4)	12.0	-	-	-	RNAV1
TF	IKIRO	-	163(163.4)	20.0	L	-	-	RNAV1
TF	KIRDA	-	119(119.4)	18.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

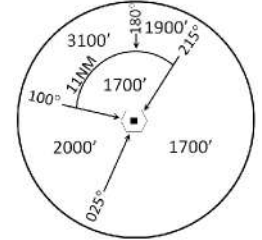
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 02C
MASBO DEPARTURES
MASBO 3A**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



MASBO
02° 02' 48" N
102° 52' 51" E

296°
27

SABKA
01° 50' 51" N
103° 17' 13" E

278°
25

AGVAR
01° 47' 19" N
103° 41' 45" E
A110

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

NOTE: CLOSE-IN OBSTACLES (AIRCRAFT UP TO 80FT)
EXIST ON TAXIWAYS WEST OF RUNWAY 02C

NOTE: ACFT UNABLE TO FLY THE SID
PROFILE SHALL INFORM ATC
PRIOR TO DEPARTURE AND TO
EXPECT RADAR VECTURING,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND
NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

AKOMA
01° 45' 22" N
103° 54' 43" E
A070

331°
18

MOXIB
01° 29' 33" N
104° 03' 15" E
A020

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55" N
104° 01' 20" E
60M

DER (RWY 02C)
01° 21' 45" N
103° 59' 57" E

NOT TO SCALE

MASBO 3A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOXIB on course 023° at or above 2000ft, turn left.	MOXIB [M023; A020+; L] -	CF	N
To AKOMA at or above 7000ft, turn left.	AKOMA [A070+; L] -	TF	N
To AGVAR at or above 11000ft.	AGVAR [A110+] -	TF	N
To SABKA, turn right.	SABKA [R] -	TF	N
To MASBO.	MASBO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOXIB	-	023(023.4)	8.0	L	A020+	-	RNAV1
TF	AKOMA	-	331(331.4)	18.0	L	A070+	-	RNAV1
TF	AGVAR	-	278(278.4)	13.0	-	A110+	-	RNAV1
TF	SABKA	-	278(278.4)	25.0	R	-	-	RNAV1
TF	MASBO	-	296(296.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

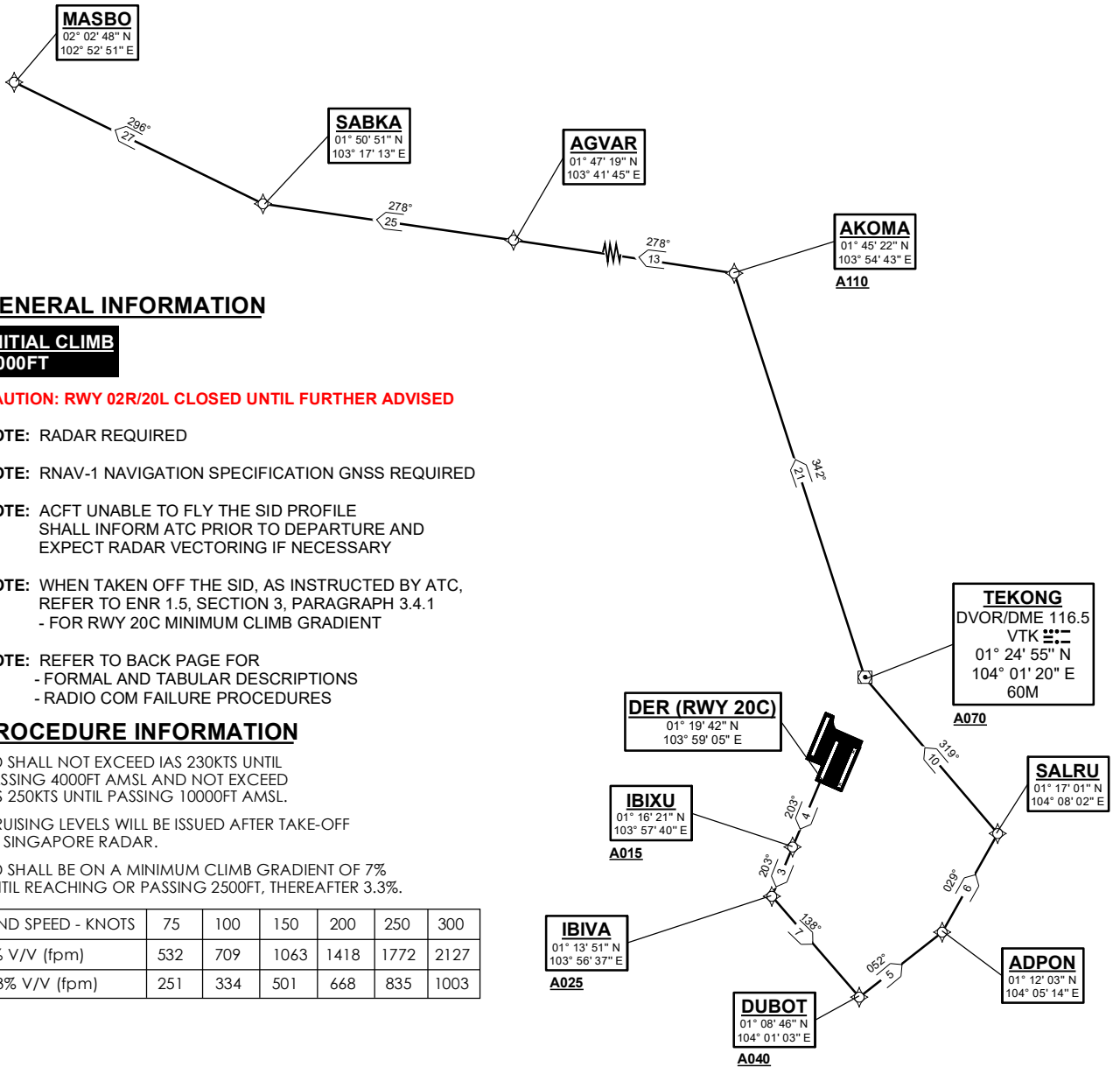
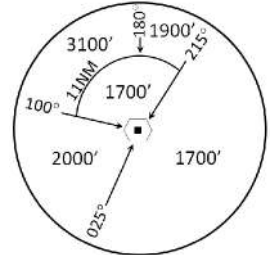
D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20C
MASBO DEPARTURES
MASBO 5B**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

NOT TO SCALE

DISTANCES IN NM



GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

- NOTE:** RADAR REQUIRED
- NOTE:** RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
- NOTE:** ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORING IF NECESSARY
- NOTE:** WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.1 - FOR RWY 20C MINIMUM CLIMB GRADIENT
- NOTE:** REFER TO BACK PAGE FOR - FORMAL AND TABULAR DESCRIPTIONS - RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 7% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
7% V/V (fpm)	532	709	1063	1418	1772	2127
3.3% V/V (fpm)	251	334	501	668	835	1003

21 MAR 2024

MASBO 5B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To IBIXU on course 203° at or above 1500ft.	IBIXU [M203; A015+] -	CF	N
To IBIVA at or above 2500ft, turn left.	IBIVA [A025+; L] -	TF	N
To DUBOT at or above 4000ft, turn left.	DUBOT [A040+; L] -	TF	N
To ADPON, turn left.	ADPON [L] -	TF	N
To SALRU, turn left.	SALRU [L] -	TF	N
To VTK at or above 7000ft, turn right.	VTK [A070+; R] -	TF	N
To AKOMA at or above 11000ft, turn left.	AKOMA [A110+; L] -	TF	N
To AGVAR.	AGVAR -	TF	N
To SABKA, turn right.	SABKA [R] -	TF	N
To MASBO.	MASBO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	4.0	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	DUBOT	-	138(138.4)	7.0	L	A040+	-	RNAV1
TF	ADPON	-	052(052.4)	5.0	L	-	-	RNAV1
TF	SALRU	-	029(029.4)	6.0	L	-	-	RNAV1
TF	VTK	-	319(319.4)	10.0	R	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	21.0	L	A110+	-	RNAV1
TF	AGVAR	-	278(278.4)	13.0	-	-	-	RNAV1
TF	SABKA	-	278(278.4)	25.0	R	-	-	RNAV1
TF	MASBO	-	296(296.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

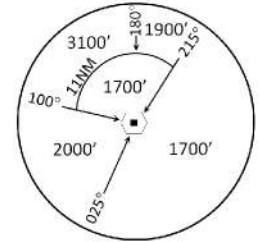
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02R
MASBO DEPARTURES (RADAR)
MASBO 1C

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



MASBO
02°02'48"N
102°52'51"E

296°
27

SABKA
01°50'51"N
103°17'13"E

278°
25

AGVAR
01°47'19"N
103°41'45"E

A110

278°
13

AKOMA
01°45'22"N
103°54'43"E

A070

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.5
- FOR RWY 02R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

**EXPECT RADAR vectors
to waypoint AKOMA**

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

TEKONG
DVOR/DME 116.5
VTK
01°24'55"N
104°01'20"E
60M

DER (RWY 02R)
01°21'22"N
104°00'51"E

NOT TO SCALE

21 MAR 2024

MASBO 1C (SID) RNAV GNSS RWY 02R - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
Climb heading 023°, Gradient 5% to 2500ft, thence 3.3%. Expect radar vectors to waypoint AKOMA.	-	VA	N
To AKOMA at or above 7000ft.	AKOMA [A070+] -	DF	N
To AGVAR at or above 11000ft.	AGVAR [A110+] -	TF	N
To SABKA, turn right.	SABKA [R] -	TF	N
To MASBO.	MASBO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
VA	-	-	023(023.4)	-	-	A030	-	-
DF	AKOMA	-	-	-	-	A070+	-	RNAV1
TF	AGVAR	-	278(278.4)	13.0	-	A110+	-	RNAV1
TF	SABKA	-	278(278.4)	25.0	R	-	-	RNAV1
TF	MASBO	-	296(296.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

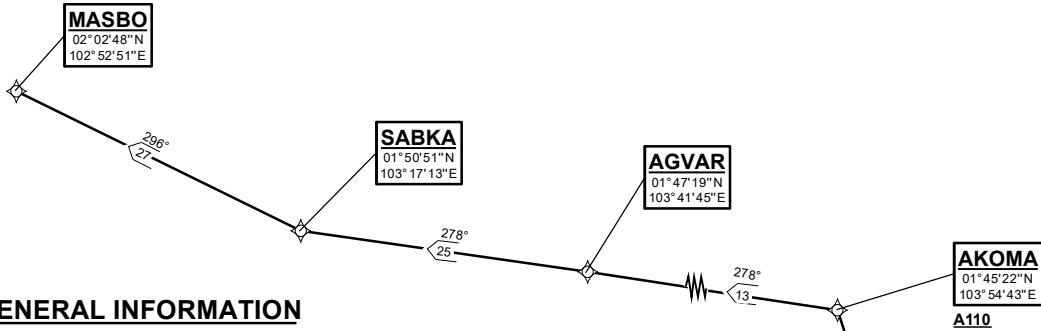
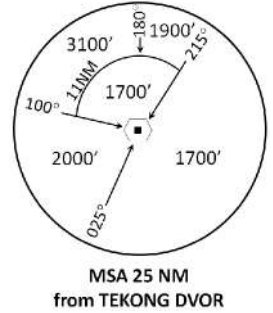
TWR 118.6 / 118.25 APP 120.3 124.05 ACC 133.25	TRANSITION ALTITUDE 11 000ft
	D-ATIS AP ID-WSSS 128.6

**SINGAPORE/Singapore Changi
RWY 20L
MASBO DEPARTURES
MASBO 1D**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

NOT TO SCALE

DISTANCES IN NM



GENERAL INFORMATION

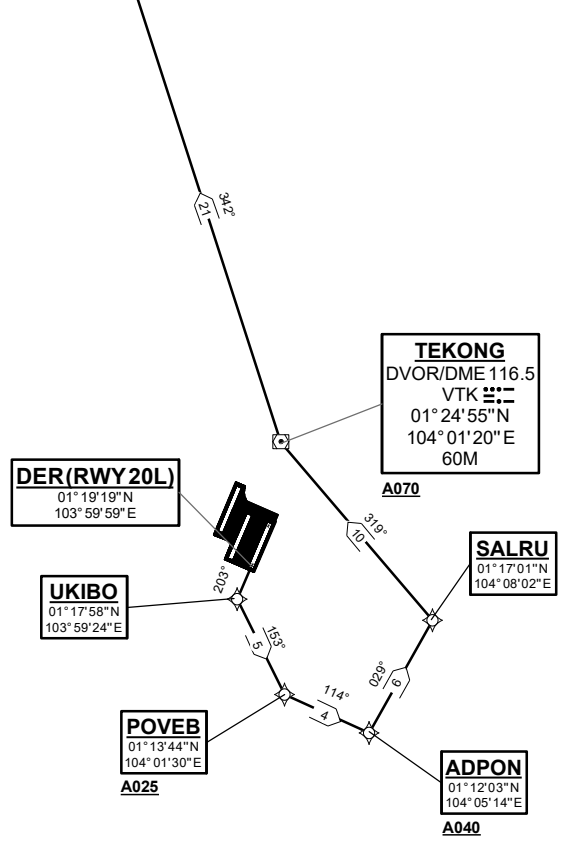
**INITIAL CLIMB
3000FT**

- CAUTION:** RWY 02R/20L CLOSED UNTIL FURTHER ADVISED
- NOTE:** RADAR REQUIRED
- NOTE:** RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
- NOTE:** ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORING IF NECESSARY
- NOTE:** WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.3 - FOR RWY 20L MINIMUM CLIMB GRADIENT
- NOTE:** REFER TO BACK PAGE FOR - FORMAL AND TABULAR DESCRIPTIONS - RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 9% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
9% V/V (fpm)	684	911	1367	1823	2279	2734
3.3% V/V (fpm)	251	334	501	668	835	1003



21 MAR 2024

MASBO 1D (SID) RNAV GNSS RWY 20L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To UKIBO on course 203°, turn left.	UKIBO [M203; L] -	CF	N
To POVEB at or above 2500ft, turn left.	POVEB [A025+; L] -	TF	N
To ADPON at or above 4000ft, turn left.	ADPON [A040+; L] -	TF	N
To SALRU, turn left.	SALRU [L] -	TF	N
To VTK at or above 7000ft, turn right.	VTK [A070+; R] -	TF	N
To AKOMA at or above 11000ft, turn left.	AKOMA [A110+; L] -	TF	N
To AGVAR.	AGVAR -	TF	N
To SABKA, turn right.	SABKA [R] -	TF	N
To MASBO.	MASBO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	UKIBO	-	203(203.4)	1.5	L	-	-	RNAV1
TF	POVEB	-	153(153.4)	5.0	L	A025+	-	RNAV1
TF	ADPON	-	114(114.4)	4.0	L	A040+	-	RNAV1
TF	SALRU	-	029(029.4)	6.0	L	-	-	RNAV1
TF	VTK	-	319(319.4)	10.0	R	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	21.0	L	A110+	-	RNAV1
TF	AGVAR	-	278(278.4)	13.0	-	-	-	RNAV1
TF	SABKA	-	278(278.4)	25.0	R	-	-	RNAV1
TF	MASBO	-	296(296.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

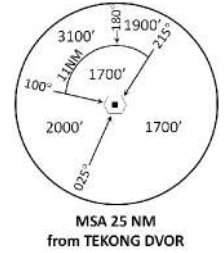
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 02L
MASBO DEPARTURES
MASBO 3E**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

DISTANCES IN NM



MASBO
02° 02' 48" N
102° 52' 51" E

296°
27

SABKA
01° 50' 51" N
103° 17' 13" E

278°
25

AGVAR
01° 47' 19" N
103° 41' 45" E
A110

278°
13

AKOMA
01° 45' 22" N
103° 54' 43" E
A070

323°
14

ATRUM
01° 32' 56" N
104° 00' 57" E

323°
15

MOLVO
01° 29' 55" N
104° 02' 27" E
A020

023°
8

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55" N
104° 01' 20" E
60M

DER (RWY 02L)
01° 23' 05" N
103° 59' 33" E

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A]
- FOR RWY 02L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

MASBO 3E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOLVO on course 023° at or above 2000ft, turn left.	MOLVO [M023; A020+; L] -	CF	N
To ATRUM.	ATRUM -	TF	N
To AKOMA at or above 7000ft, turn left.	AKOMA [A070+; L] -	TF	N
To AGVAR at or above 11000ft.	AGVAR [A110+] -	TF	N
To SABKA, turn right.	SABKA [R] -	TF	N
To AROSO.	AROSO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOLVO	-	023(023.4)	8.0	L	A020+	-	RNAV1
TF	ATRUM	-	333(333.4)	3.0	-	-	-	RNAV1
TF	AKOMA	-	333(333.4)	14.0	L	A070+	-	RNAV1
TF	AGVAR	-	278(278.4)	13.0	-	A110+	-	RNAV1
TF	SABKA	-	278(278.4)	25.0	R	-	-	RNAV1
TF	MASBO	-	296(296.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

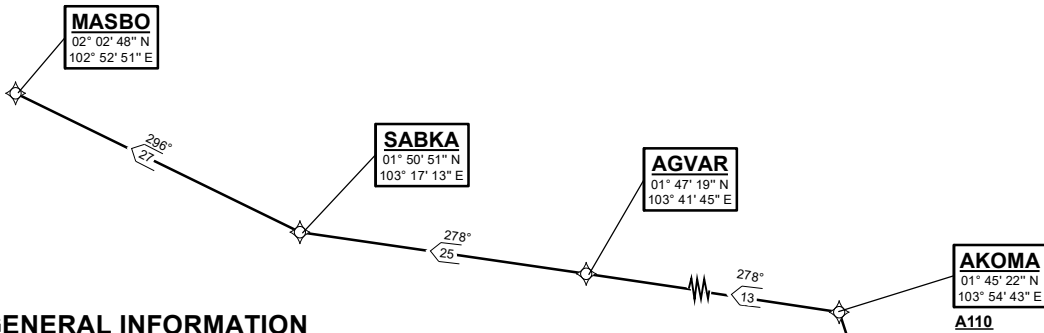
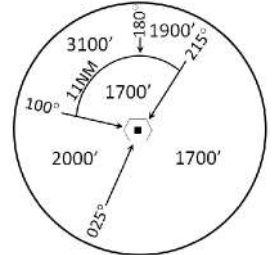
TWR 118.6 / 118.25 APP 120.3 124.05 ACC 133.25	TRANSITION ALTITUDE 11 000ft
	D-ATIS AP ID-WSSS 128.6

**SINGAPORE/Singapore Changi
RWY 20R
MASBO DEPARTURES
MASBO 5F**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

NOT TO SCALE

DISTANCES IN NM



GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.2
- FOR RWY 20R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

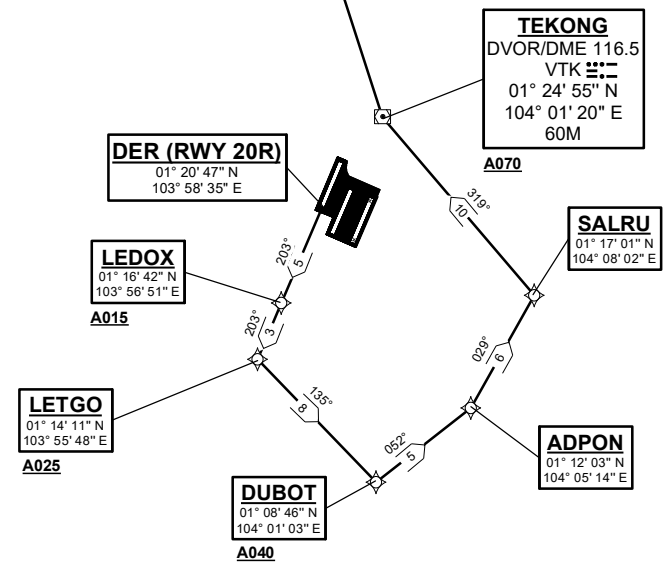
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 6%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
6% V/V (fpm)	456	608	911	1215	1518	1821
3.3% V/V (fpm)	251	334	501	668	835	1003



21 MAR 2024

MASBO 5F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To LEDOX on course 203° at or above 1500ft.	LEDOX [M203; A015+] -	CF	N
To LETGO at or above 2500ft, turn left.	LETGO [A025+; L] -	TF	N
To DUBOT at or above 4000ft, turn left.	DUBOT [A040+; L] -	TF	N
To ADPON, turn left.	ADPON [L] -	TF	N
To SALRU, turn left.	SALRU [L] -	TF	N
To VTK at or above 7000ft, turn right.	VTK [A070+; R] -	TF	N
To AKOMA at or above 11000ft, turn left.	AKOMA [A110+; L] -	TF	N
To AGVAR.	AGVAR -	TF	N
To SABKA, turn right.	SABKA [R] -	TF	N
To MASBO.	MASBO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	5.0	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	DUBOT	-	135(135.4)	8.0	L	A040+	-	RNAV1
TF	ADPON	-	052(052.4)	5.0	L	-	-	RNAV1
TF	SALRU	-	029(029.4)	6.0	L	-	-	RNAV1
TF	VTK	-	319(319.4)	10.0	R	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	21.0	L	A110+	-	RNAV1
TF	AGVAR	-	278(278.4)	13.0	-	-	-	RNAV1
TF	SABKA	-	278(278.4)	25.0	R	-	-	RNAV1
TF	MASBO	-	296(296.4)	27.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.8

TRANSITION ALTITUDE
11 000ft

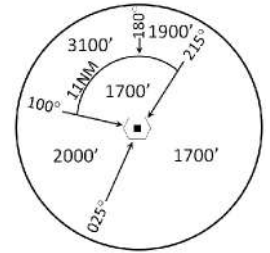
D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C
MERSING DEPARTURES
VMR 6A

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 23°E (2020)

DISTANCES IN NM

VMR
02° 23' 18" N
103° 52' 18" E



CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

NOTE: CLOSE-IN OBSTACLES (AIRCRAFT UP TO 80FT)
EXIST ON TAXIWAYS WEST OF RUNWAY 02C

NOTE: ACFT UNABLE TO FLY THE SID
PROFILE SHALL INFORM ATC
PRIOR TO DEPARTURE AND TO
EXPECT RADAR VECTORING,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

GENERAL INFORMATION

INITIAL CLIMB
3000FT

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

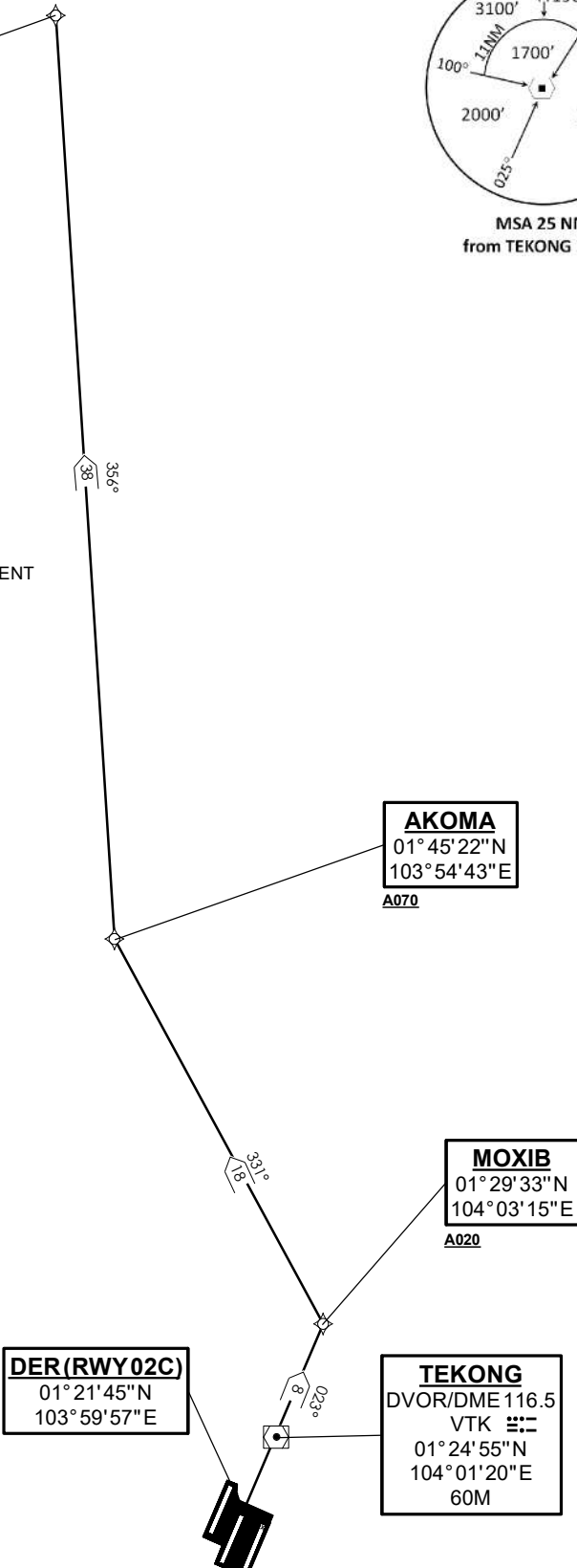
RWY 02C

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND
NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003



AKOMA
01° 45' 22" N
103° 54' 43" E
A070

MOXIB
01° 29' 33" N
104° 03' 15" E
A020

DER(RWY 02C)
01° 21' 45" N
103° 59' 57" E

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55" N
104° 01' 20" E
60M

NOT TO SCALE

VMR 6A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOXIB on course 023° at or above 2000ft, turn left.	MOXIB [M023; A020+; L] -	CF	N
To AKOMA at or above 7000ft, turn right.	AKOMA [A070+; R] -	TF	N
To VMR.	VMR	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOXIB	-	023(023.4)	8.0	L	A020+	-	RNAV1
TF	AKOMA	-	331(331.4)	18.0	R	A070+	-	RNAV1
TF	VMR	-	356(356.4)	38.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25 APP 120.3 124.05 ACC 133.8	TRANSITION ALTITUDE 11 000ft
	D-ATIS AP ID-WSSS 128.6

**SINGAPORE/Singapore Changi
RWY 20C
MERSING DEPARTURES
VMR 9B**

**ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2022)**

DISTANCES IN NM

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.1
- FOR RWY 20C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

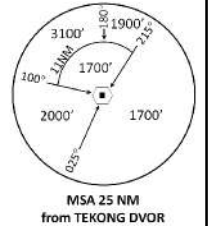
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 7%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
7% V/V (fpm)	532	709	1063	1418	1772	2127
3.3% V/V (fpm)	251	334	501	668	835	1003



VMR
02° 23' 18" N
103° 52' 18" E

AKOMA
01° 45' 22" N
103° 54' 43" E
A110

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55" N
104° 01' 20" E
60M
A070

DER (RWY 20C)
01° 19' 42" N
103° 59' 05" E

IBIXU
01° 16' 21" N
103° 57' 40" E
A015

SALRU
01° 17' 01" N
104° 08' 02" E

IBIVA
01° 13' 51" N
103° 56' 37" E
A025

DUBOT
01° 08' 46" N
104° 01' 03" E
A040

ADPON
01° 12' 03" N
104° 05' 14" E

NOT TO SCALE

21 MAR 2024

VMR 9B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To IBIXU on course 203° at or above 1500ft.	IBIXU [M203; A015+] -	CF	N
To IBIVA at or above 2500ft, turn left.	IBIVA [A025+; L] -	TF	N
To DUBOT at or above 4000ft, turn left.	DUBOT [A040+; L] -	TF	N
To ADPON, turn left.	ADPON [L] -	TF	N
To SALRU, turn left.	SALRU [L] -	TF	N
To VTK at or above 7000ft, turn right.	VTK [A070+; R] -	TF	N
To AKOMA at or above 11000ft, turn right.	AKOMA [A110+; R] -	TF	N
To VMR.	VMR	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	4.0	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	DUBOT	-	138(138.4)	7.0	L	A040+	-	RNAV1
TF	ADPON	-	052(052.4)	5.0	L	-	-	RNAV1
TF	SALRU	-	029(029.4)	6.0	L	-	-	RNAV1
TF	VTK	-	319(319.4)	10.0	R	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	21.0	R	A110+	-	RNAV1
TF	VMR	-	356(356.4)	38.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.8

TRANSITION ALTITUDE
11 000ft

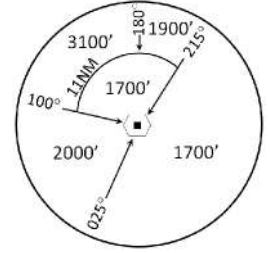
D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02R
MERSING DEPARTURES (RADAR)
VMR 1C

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 23°E (2020)

DISTANCES IN NM

VMR
02°23'18"N
103°52'18"E



GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.5
- FOR RWY 02R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003



AKOMA
01°45'22"N
103°54'43"E

A070

EXPECT RADAR vectors
to waypoint AKOMA

TEKONG
DVOR/DME 116.5
VTK
01°24'55"N
104°01'20"E
60M

DER(RWY 02R)
01°21'22"N
104°00'51"E

NOT TO SCALE

21 MAR 2024

VMR 1C (SID) RNAV GNSS RWY 02R - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
Climb heading 023°, Gradient 5% to 2500ft, thence 3.3%. Expect radar vectors to waypoint AKOMA.	-	VA	N
To AKOMA at or above 7000ft.	AKOMA [A070+] -	DF	N
To VMR.	VMR	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
VA	-	-	023(023.4)	-	-	A030	-	-
DF	AKOMA	-	-	-	-	A070+	-	RNAV1
TF	VMR	-	356(356.4)	38.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25 APP 120.3 124.05 ACC 133.8	TRANSITION ALTITUDE 11 000ft
	D-ATIS AP ID-WSSS 128.6

**SINGAPORE/Singapore Changi
RWY 20L
MERSING DEPARTURES
VMR 1D**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

DISTANCES IN NM

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.3
- FOR RWY 20L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

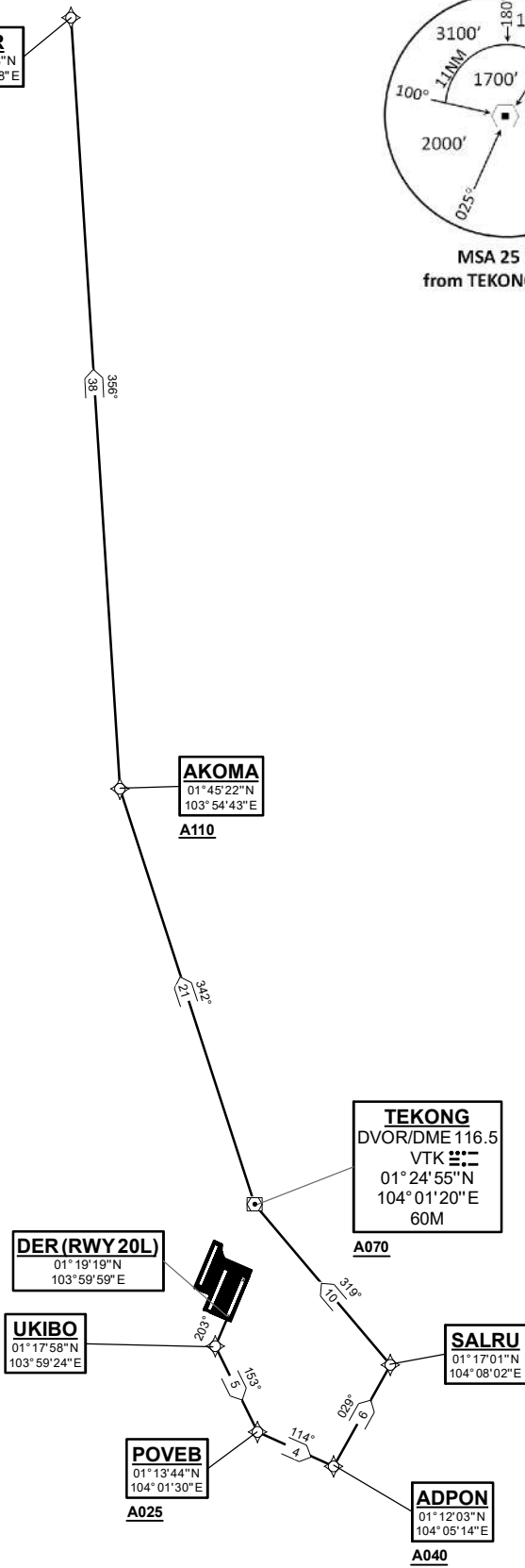
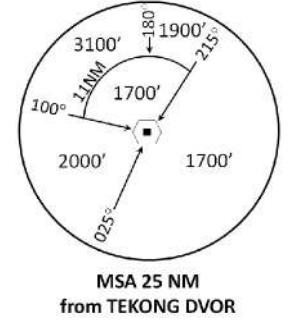
SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 9%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
9% V/V (fpm)	684	911	1367	1823	2279	2734
3.3% V/V (fpm)	251	334	501	668	835	1003

VMR
02°23'18"N
103°52'18"E



NOT TO SCALE

VMR 1D (SID) RNAV GNSS RWY 20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To UKIBO on course 203°, turn left.	UKIBO [M203; L] -	CF	N
To POVEB at or above 2500ft, turn left.	POVEB [A025+; L] -	TF	N
To ADPON at or above 4000ft, turn left.	ADPON [A040+; L] -	TF	N
To SALRU, turn left.	SALRU [L] -	TF	N
To VTK at or above 7000ft, turn right.	VTK [A070+; R] -	TF	N
To AKOMA at or above 11000ft, turn right.	AKOMA [A110+; R] -	TF	N
To VMR.	VMR	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	UKIBO	-	203(203.4)	1.5	L	-	-	RNAV1
TF	POVEB	-	153(153.4)	5.0	L	A025+	-	RNAV1
TF	ADPON	-	114(114.4)	4.0	L	A040+	-	RNAV1
TF	SALRU	-	029(029.4)	6.0	L	-	-	RNAV1
TF	VTK	-	319(319.4)	10.0	R	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	21.0	R	A110+	-	RNAV1
TF	VMR	-	356(356.4)	38.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.8

TRANSITION ALTITUDE
11 000ft

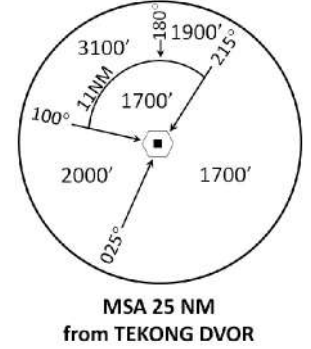
D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02L
MERSING DEPARTURES
VMR 6E

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

VMR
02° 23' 18" N
103° 52' 18" E



GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORIZING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A]
- FOR RWY 02L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

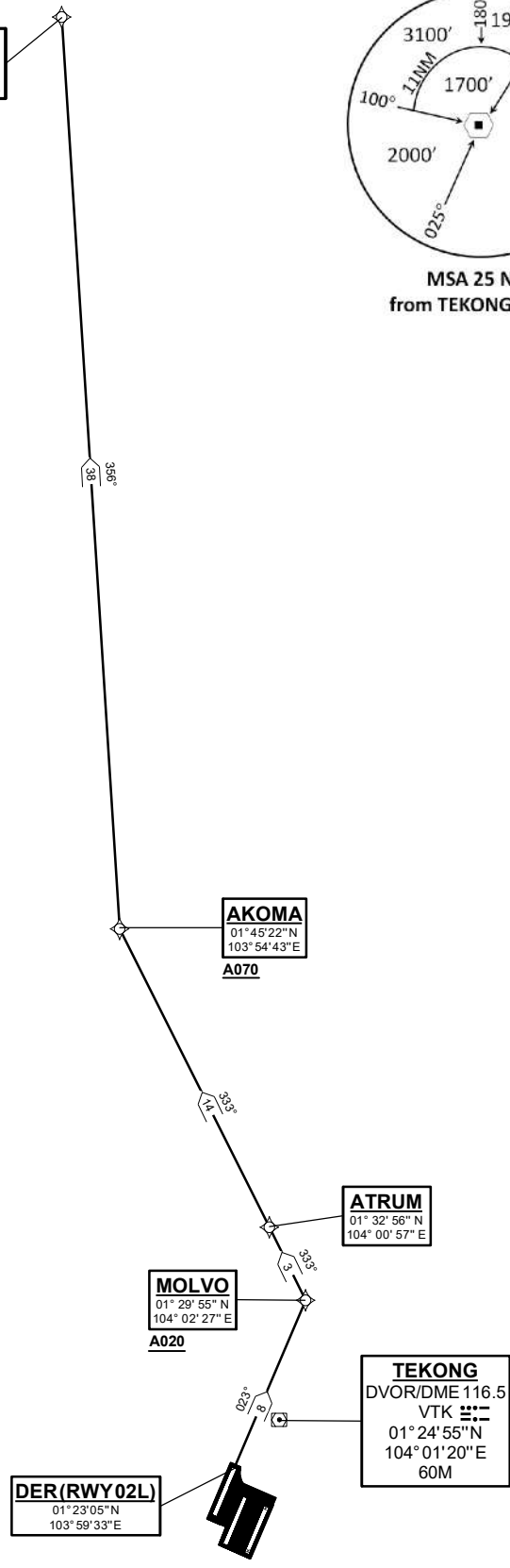
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003



NOT TO SCALE

21 MAR 2024

VMR 6E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOLVO on course 023° at or above 2000ft, turn left.	MOLVO [M023; A020+; L] -	CF	N
To ATRUM.	ATRUM -	TF	N
To AKOMA at or above 7000ft, turn right.	AKOMA [A070+; R] -	TF	N
To VMR.	VMR	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOLVO	-	023(023.4)	8.0	L	A020+	-	RNAV1
TF	ATRUM	-	333(333.4)	3.0	-	-	-	RNAV1
TF	AKOMA	-	333(333.4)	14.0	R	A070+	-	RNAV1
TF	VMR	-	356(356.4)	38.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

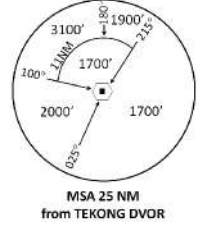
**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25 APP 120.3 124.05 ACC 133.8	TRANSITION ALTITUDE 11 000ft
	D-ATIS AP ID-WSSS 128.6

**SINGAPORE/Singapore Changi
RWY 20R
MERSING DEPARTURES
VMR 9F**

**ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2022)**

DISTANCES IN NM



GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.2
- FOR RWY 20R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

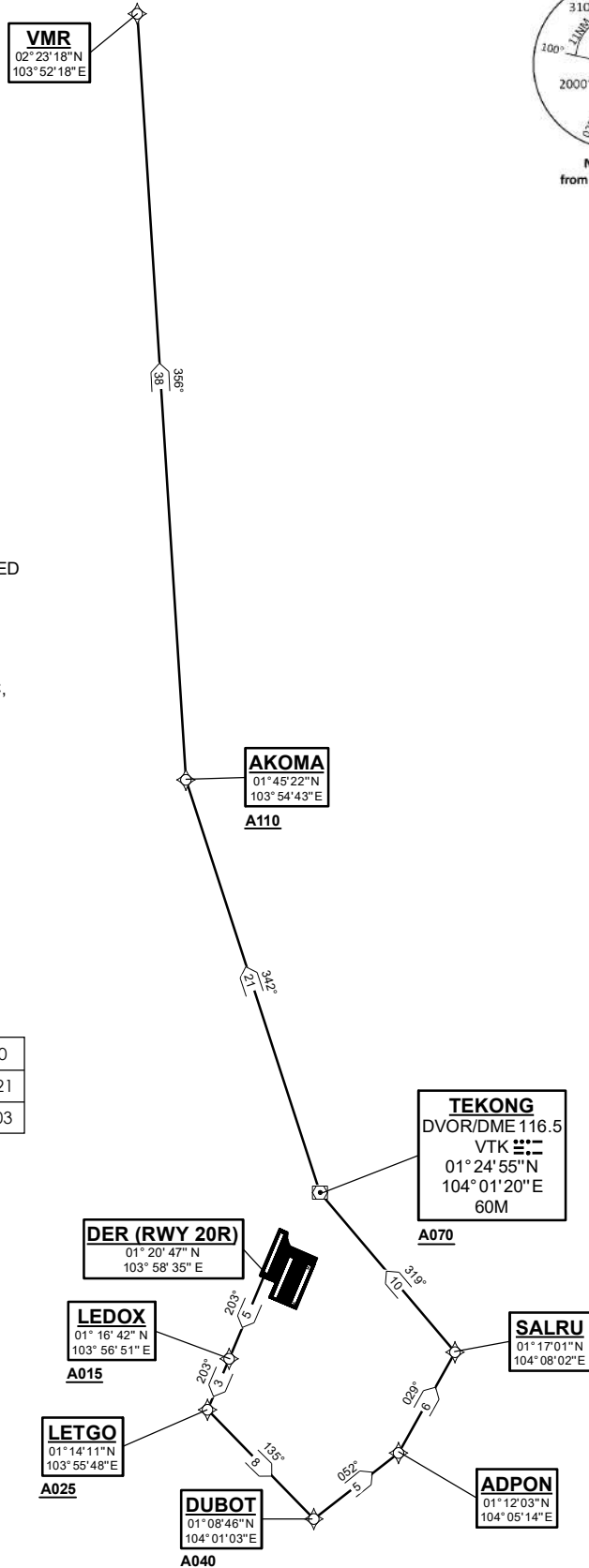
SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 6%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
6% V/V (fpm)	456	608	911	1215	1518	1821
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE



21 MAR 2024

VMR 9F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To LEDOX on course 203° at or above 1500ft.	LEDOX [M203; A015+] -	CF	N
To LETGO at or above 2500ft, turn left.	LETGO [A025+; L] -	TF	N
To DUBOT at or above 4000ft, turn left.	DUBOT [A040+; L] -	TF	N
To ADPON, turn left.	ADPON [L] -	TF	N
To SALRU, turn left.	SALRU [L] -	TF	N
To VTK at or above 7000ft, turn right.	VTK [A070+; R] -	TF	N
To AKOMA at or above 11000ft, turn right.	AKOMA [A110+; R] -	TF	N
To VMR.	VMR	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	5.0	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	DUBOT	-	135(135.4)	8.0	L	A040+	-	RNAV1
TF	ADPON	-	052(052.4)	5.0	L	-	-	RNAV1
TF	SALRU	-	029(029.4)	6.0	L	-	-	RNAV1
TF	VTK	-	319(319.4)	10.0	R	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	21.0	R	A110+	-	RNAV1
TF	VMR	-	356(356.4)	38.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 02C
MIBEL DEPARTURES
MIBEL 1A**

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

NOTE: CLOSE-IN OBSTACLES (AIRCRAFT UP TO 80FT)
EXIST ON TAXIWAYS WEST OF RUNWAY 02C

NOTE: ACFT UNABLE TO FLY THE SID
PROFILE SHALL INFORM ATC
PRIOR TO DEPARTURE AND TO
EXPECT RADAR VECTORING,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

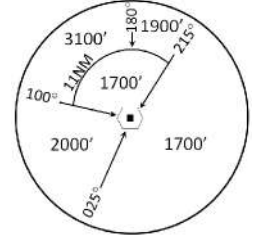
RWY 02C

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND
NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

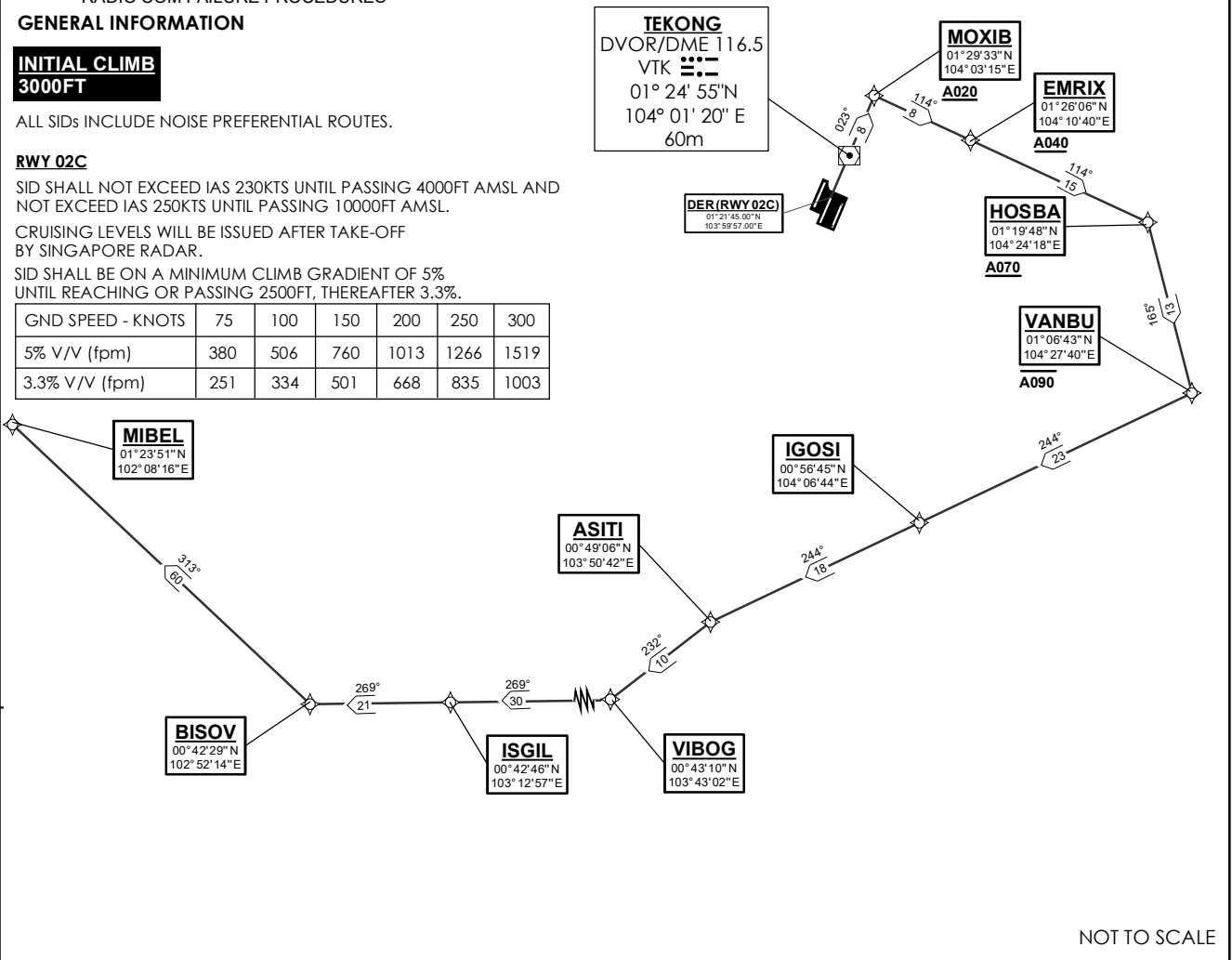
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003



MSA 25 NM
from TEKONG DVOR



NOT TO SCALE

MIBEL 1A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOXIB on course 023° at or above 2000ft, turn right.	MOXIB [M023; A020+; R] -	CF	N
To EMRIX at or above 4000ft.	EMRIX [A040+] -	TF	N
To HOSBA at or above 7000ft, turn right.	HOSBA [A070+; R] -	TF	N
To VANBU at or below 9000ft, turn right.	VANBU [A090-; R] -	TF	N
To IGOSI.	IGOSI -	TF	N
To ASITI, turn left.	ASITI [L] -	TF	N
To VIBOG, turn right.	VIBOG [R] -	TF	N
To ISGIL.	ISGIL -	TF	N
To BISOV, turn right.	BISOV [R] -	TF	N
To MIBEL.	MIBEL	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOXIB	-	023(023.4)	8.0	R	A020+	-	RNAV1
TF	EMRIX	-	114(114.4)	8.0	-	A040+	-	RNAV1
TF	HOSBA	-	114(114.4)	15.0	R	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	R	A090-	-	RNAV1
TF	IGOSI	-	244(244.4)	23.0	-	-	-	RNAV1
TF	ASITI	-	244(244.4)	18.0	L	-	-	RNAV1
TF	VIBOG	-	232(232.3)	10.0	R	-	-	RNAV1
TF	ISGIL	-	269(269.4)	30.0	-	-	-	RNAV1
TF	BISOV	-	269(269.4)	21.0	R	-	-	RNAV1
TF	MIBEL	-	313(313.4)	60.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20C
MIBEL DEPARTURES
MIBEL 1B**

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.1
- FOR RWY 20C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

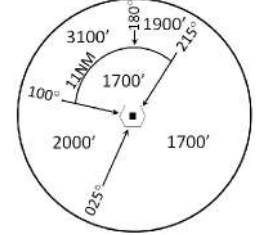
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 7%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
7% V/V (fpm)	532	709	1063	1418	1772	2127
3.3% V/V (fpm)	251	334	501	668	835	1003



TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

DER (RWY 20C)
01° 19' 42.00"N
103° 59' 05.00"E

IBIXU
01° 16' 21"N
103° 57' 40"E
A015

IBIVA
01° 13' 51"N
103° 56' 37"E
A025

SAMKO
01° 05' 30"N
103° 52' 55"E
A040

MIBEL
01° 23' 51"N
102° 08' 16"E

BISOV
00° 42' 29"N
102° 52' 14"E

ISGIL
00° 42' 46"N
103° 12' 57"E
**FL160
FL140**

VIBOG
00° 43' 10"N
103° 43' 02"E

NOT TO SCALE

21 MAR 2024

MIBEL 1B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To IBIXU on course 203° at or above 1500ft.	IBIXU [M203; A015+] -	CF	N
To IBIVA at or above 2500ft, turn right.	IBIVA [A025+; R] -	TF	N
To SAMKO at or above 4000ft.	SAMKO [A040+] -	TF	N
To VIBOG, turn right.	VIBOG [R] -	TF	N
To ISGIL, between FL140 to FL160.	ISGIL [FL140+; FL160-] -	TF	N
To BISOV, turn right.	BISOV [R] -	TF	N
To MIBEL.	MIBEL	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	4.0	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	3.0	R	A025+	-	RNAV1
TF	SAMKO	-	204(204.4)	9.0	-	A040+	-	RNAV1
TF	VIBOG	-	204(204.4)	24.0	R	-	-	RNAV1
TF	ISGIL	-	269(269.4)	30.0	-	FL140+ FL160-	-	RNAV1
TF	BISOV	-	269(269.4)	21.0	R	-	-	RNAV1
TF	MIBEL	-	313(313.4)	60.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

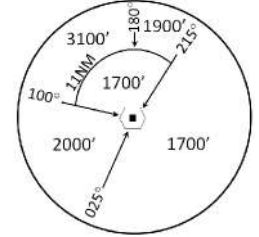
D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 02R
MIBEL DEPARTURES (RADAR)
MIBEL 1C**

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.5
- FOR RWY 02R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

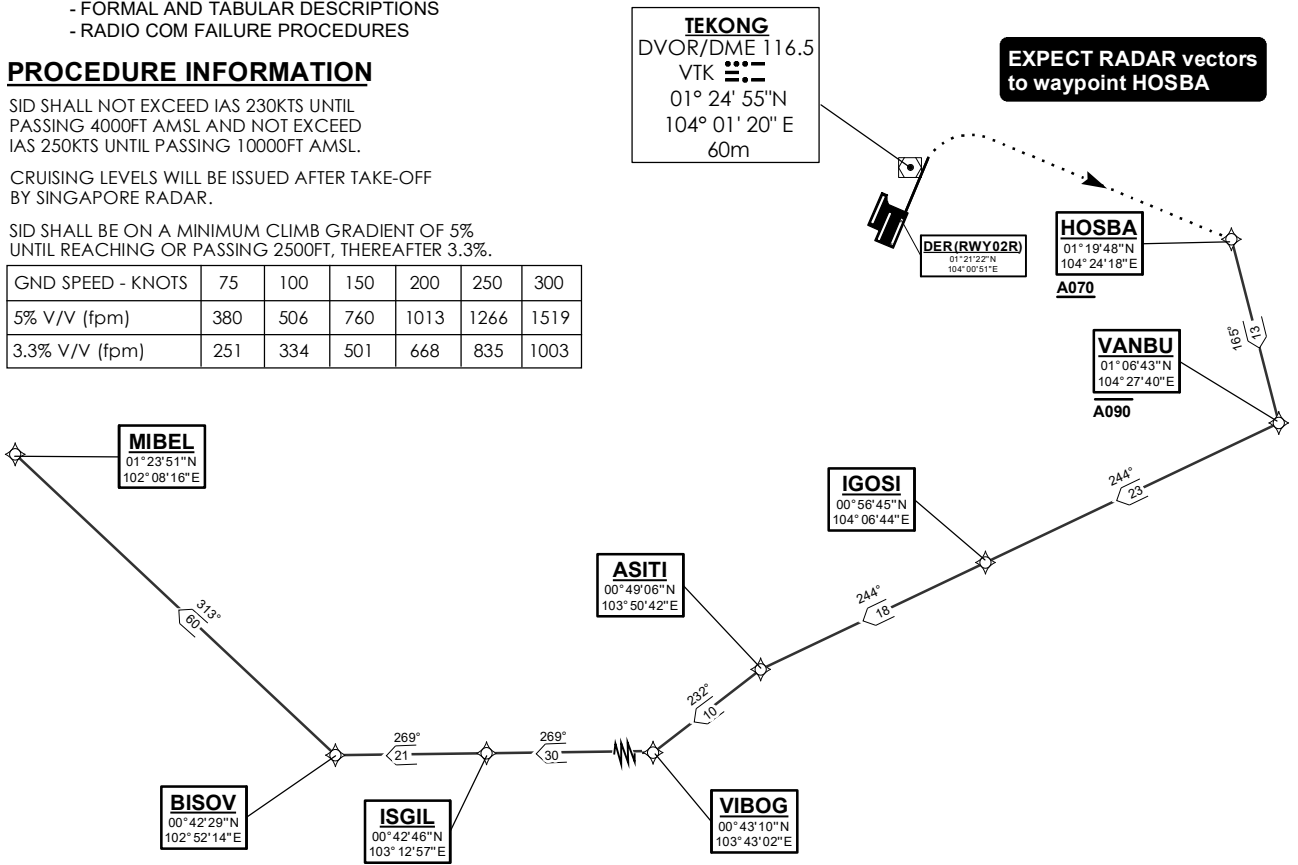
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003



NOT TO SCALE

MIBEL 1C (SID) RNAV GNSS RWY 02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
Climb heading 023°, Gradient 5% to 2500ft, thence 3.3%. Expect radar vectors to waypoint HOSBA.	-	VA	N
To HOSBA at or above 7000ft.	HOSBA [A070+] -	DF	N
To VANBU at or below 9000ft, turn right.	VANBU [A090-; R] -	TF	N
To IGOSI.	IGOSI -	TF	N
To ASITI, turn left.	ASITI [L] -	TF	N
To VIBOG, turn right.	VIBOG [R] -	TF	N
To ISGIL.	ISGIL -	TF	N
To BISOV, turn right.	BISOV [R] -	TF	N
To MIBEL.	MIBEL	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
VA	-	-	023(023.4)	-	-	A030	-	RNAV1
DF	HOSBA	-	-	-	-	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	R	A090-	-	RNAV1
TF	IGOSI	-	244(244.4)	23.0	-	-	-	RNAV1
TF	ASITI	-	244(244.4)	18.0	L	-	-	RNAV1
TF	VIBOG	-	232(232.3)	10.0	R	-	-	RNAV1
TF	ISGIL	-	269(269.4)	30.0	-	-	-	RNAV1
TF	BISOV	-	269(269.4)	21.0	R	-	-	RNAV1
TF	MIBEL	-	313(313.4)	60.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20L
MIBEL DEPARTURES
MIBEL 1D

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.3
- FOR RWY 20L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

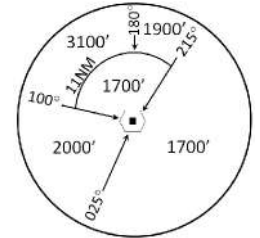
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 9%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
9% V/V (fpm)	684	911	1367	1823	2279	2734
3.3% V/V (fpm)	251	334	501	668	835	1003



TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

DER (RWY 20L)
01° 19' 19"N
103° 59' 59"E

UKIBO
01° 17' 58"N
103° 59' 24"E

VIGUD
01° 13' 28"N
103° 57' 30"E
A025

SAMKO
01° 05' 30"N
103° 52' 55"E
A040

MIBEL
01° 23' 51"N
102° 08' 16"E

BISOV
00° 42' 29"N
102° 52' 14"E

VIBOG
00° 43' 10"N
103° 43' 02"E

ISGIL
00° 42' 46"N
103° 12' 57"E
FL160
FL140

NOT TO SCALE

MIBEL 1D (SID) RNAV GNSS RWY 20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To UKIBO on course 203°.	UKIBO [M203] -	CF	N
To VIGUD at or above 2500ft, turn right.	VIGUD [A025+; R] -	TF	N
To SAMKO at or above 4000ft, turn left.	SAMKO [A040+; L] -	TF	N
To VIBOG, turn right.	VIBOG [R] -	TF	N
To ISGIL, between FL140 to FL160.	ISGIL [FL140+; FL160-] -	TF	N
To BISOV, turn right.	BISOV [R] -	TF	N
To MIBEL.	MIBEL	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	UKIBO	Y	203(203.4)	1.5	-	-	-	RNAV1
TF	VIGUD	-	203(203.4)	5.0	R	A025+	-	RNAV1
TF	SAMKO	-	210(210.4)	9.0	L	A040+	-	RNAV1
TF	VIBOG	-	204(204.4)	24.0	R	-	-	RNAV1
TF	ISGIL	-	269(269.4)	30.0	-	FL140+ FL160-	-	RNAV1
TF	BISOV	-	269(269.4)	21.0	R	-	-	RNAV1
TF	MIBEL	-	313(313.4)	60.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 02L
MIBEL DEPARTURES
MIBEL 1E**

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A]
- FOR RWY 02L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

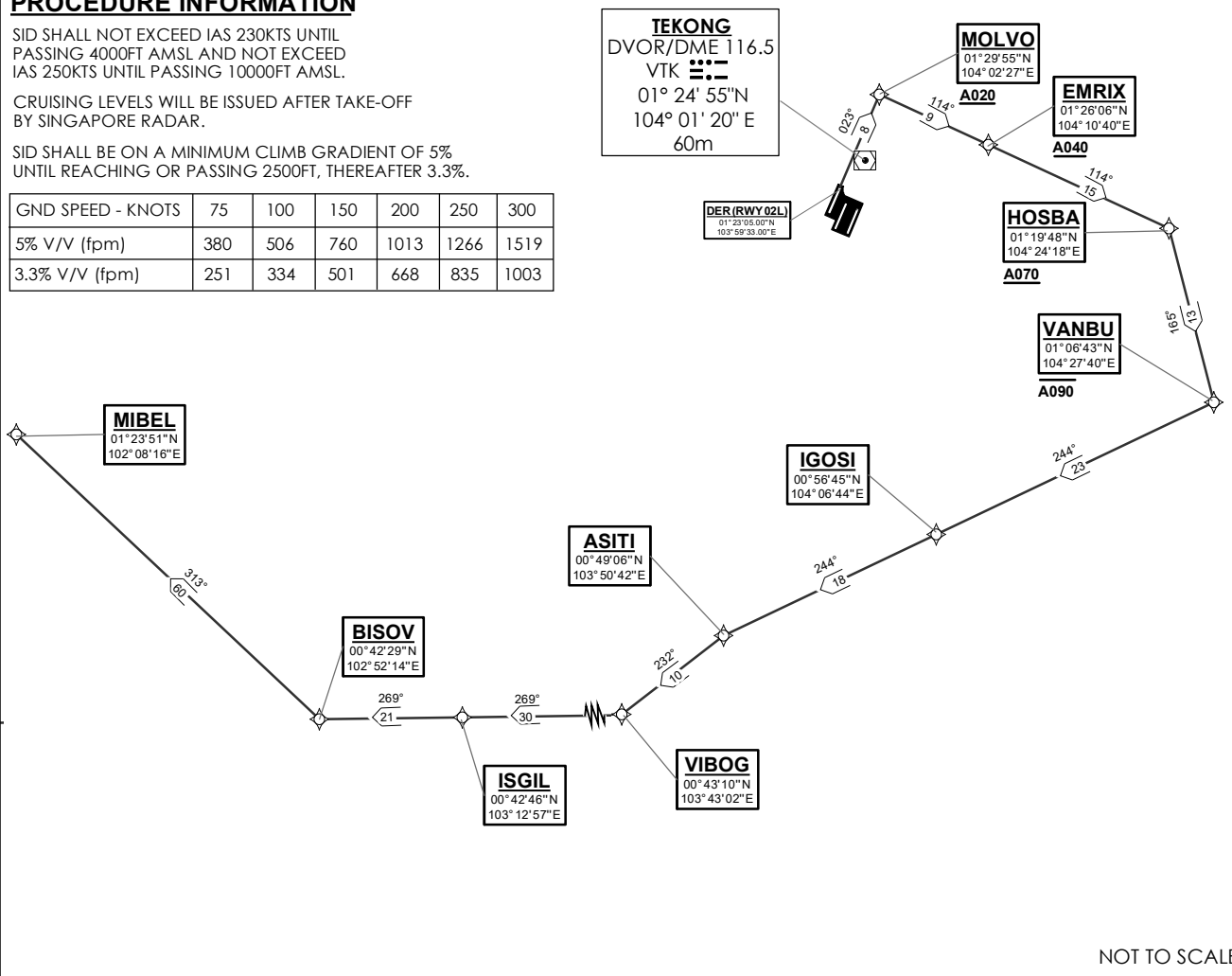
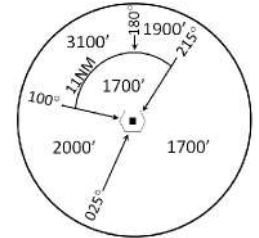
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003



NOT TO SCALE

21 MAR 2024

MIBEL 1E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOLVO on course 023° at or above 2000ft, turn right.	MOLVO [M023; A020+; R] -	CF	N
To EMRIX at or above 4000ft.	EMRIX [A040+] -	TF	N
To HOSBA at or above 7000ft, turn right.	HOSBA [A070+; R] -	TF	N
To VANBU at or below 9000ft, turn right.	VANBU [A090-; R] -	TF	N
To IGOSI.	IGOSI -	TF	N
To ASITI, turn left.	ASITI [L] -	TF	N
To VIBOG, turn right.	VIBOG [R] -	TF	N
To ISGIL.	ISGIL -	TF	N
To BISOV, turn right.	BISOV [R] -	TF	N
To MIBEL.	MIBEL	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOLVO	-	023(023.4)	8.0	R	A020+	-	RNAV1
TF	EMRIX	-	114(114.4)	9.0	-	A040+	-	RNAV1
TF	HOSBA	-	114(114.4)	15.0	R	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	R	A090-	-	RNAV1
TF	IGOSI	-	244(244.4)	23.0	-	-	-	RNAV1
TF	ASITI	-	244(244.4)	18.0	L	-	-	RNAV1
TF	VIBOG	-	232(232.3)	10.0	R	-	-	RNAV1
TF	ISGIL	-	269(269.4)	30.0	-	-	-	RNAV1
TF	BISOV	-	269(269.4)	21.0	R	-	-	RNAV1
TF	MIBEL	-	313(313.4)	60.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20R
MIBEL DEPARTURES
MIBEL 1F

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.2
- FOR RWY 20R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

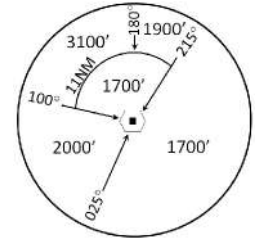
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 6%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
6% V/V (fpm)	456	608	911	1215	1518	1821
3.3% V/V (fpm)	251	334	501	668	835	1003



TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

DER (RWY 20R)
01° 20' 47.00"N
103° 58' 35.00"E

LEDOX
01° 16' 42"N
103° 56' 51"E
A015

LETGO
01° 14' 11"N
103° 55' 48"E
A025

SAMKO
01° 05' 30"N
103° 52' 55"E
A040

MIBEL
01° 23' 51"N
102° 08' 16"E

BISOV
00° 42' 29"N
102° 52' 14"E

ISGIL
00° 42' 46"N
103° 12' 57"E
FL160
FL140

VIBOG
00° 43' 10"N
103° 43' 02"E

NOT TO SCALE

MIBEL 1F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To LEDOX on course 203° at or above 1500ft.	LEDOX [M203; A015+] -	CF	N
To LETGO at or above 2500ft, turn left.	LETGO [A025+; L] -	TF	N
To SAMKO at or above 4000ft, turn right.	SAMKO [A040+; R] -	TF	N
To VIBOG, turn right.	VIBOG [R] -	TF	N
To ISGIL, between FL140 to FL160.	ISGIL [FL140+; FL160-] -	TF	N
To BISOV, turn right.	BISOV [R] -	TF	N
To MIBEL.	MIBEL	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	5.0	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	SAMKO	-	198(198.4)	9.0	R	A040+	-	RNAV1
TF	VIBOG	-	204(204.4)	24.0	R	-	-	RNAV1
TF	ISGIL	-	269(269.4)	30.0	-	FL140+ FL160-	-	RNAV1
TF	BISOV	-	269(269.4)	21.0	R	-	-	RNAV1
TF	MIBEL	-	313(313.4)	60.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 02C
TAROS DEPARTURES
TAROS 1A**

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

NOTE: CLOSE-IN OBSTACLES (AIRCRAFT UP TO 80FT)
EXIST ON TAXIWAYS WEST OF RUNWAY 02C

NOTE: ACFT UNABLE TO FLY THE SID
PROFILE SHALL INFORM ATC
PRIOR TO DEPARTURE AND TO
EXPECT RADAR VECTORING,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

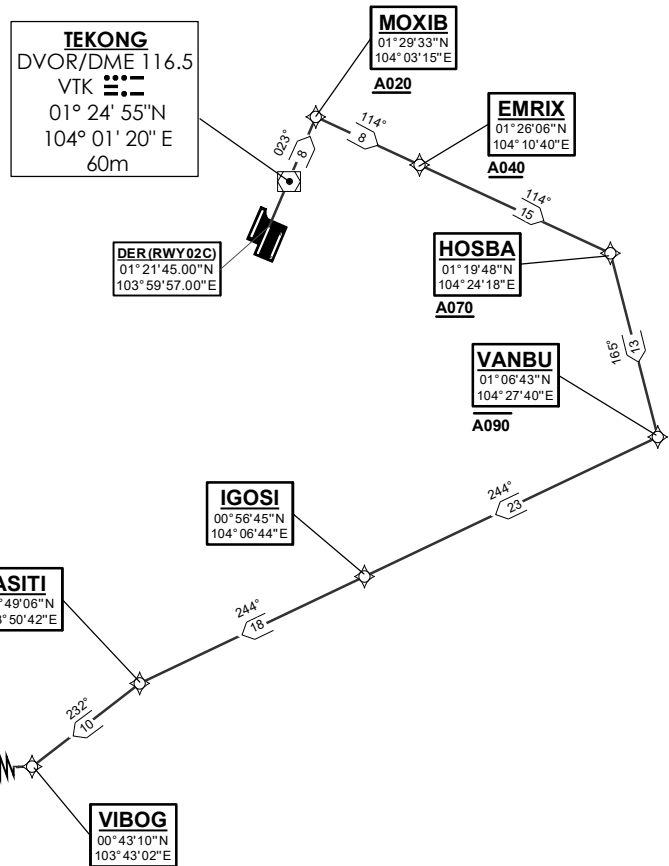
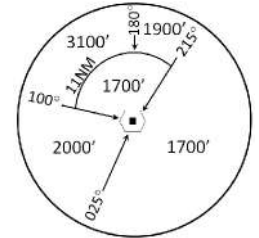
RWY 02C

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND
NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003



NOT TO SCALE

21 MAR 2024

TAROS 1A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOXIB on course 023° at or above 2000ft, turn right.	MOXIB [M023; A020+; R] -	CF	N
To EMRIX at or above 4000ft.	EMRIX [A040+] -	TF	N
To HOSBA at or above 7000ft, turn right.	HOSBA [A070+; R] -	TF	N
To VANBU at or below 9000ft, turn right.	VANBU [A090-; R] -	TF	N
To IGOSI.	IGOSI -	TF	N
To ASITI, turn left.	ASITI [L] -	TF	N
To VIBOG, turn right.	VIBOG [R] -	TF	N
To ISGIL.	ISGIL -	TF	N
To BISOV.	BISOV -	TF	N
To TAROS.	TAROS	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOXIB	-	023(023.4)	8.0	R	A020+	-	RNAV1
TF	EMRIX	-	114(114.4)	8.0	-	A040+	-	RNAV1
TF	HOSBA	-	114(114.4)	15.0	R	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	R	A090-	-	RNAV1
TF	IGOSI	-	244(244.4)	23.0	-	-	-	RNAV1
TF	ASITI	-	244(244.4)	18.0	L	-	-	RNAV1
TF	VIBOG	-	232(232.3)	10.0	R	-	-	RNAV1
TF	ISGIL	-	269(269.4)	30.0	-	-	-	RNAV1
TF	BISOV	-	269(269.4)	21.0	-	-	-	RNAV1
TF	TAROS	-	269(269.4)	36.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20C
TAROS DEPARTURES
TAROS 1B

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.1
- FOR RWY 20C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

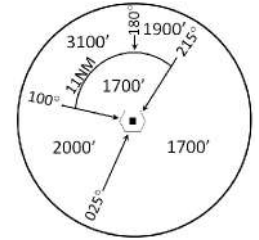
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 7%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
7% V/V (fpm)	532	709	1063	1418	1772	2127
3.3% V/V (fpm)	251	334	501	668	835	1003



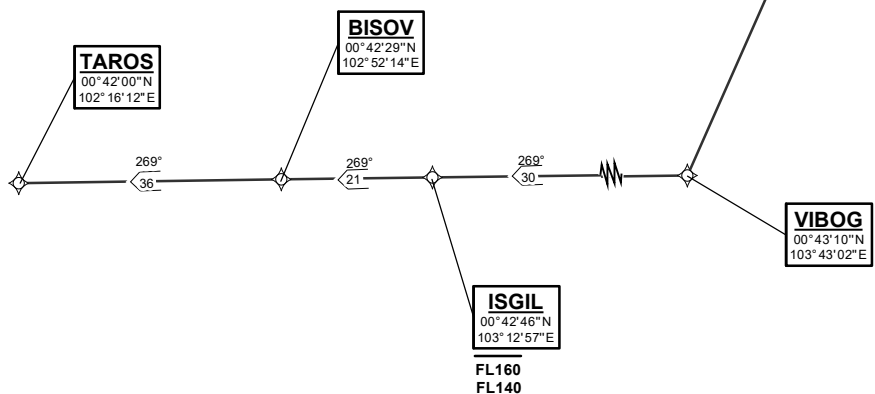
TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

DER (RWY 20C)
01° 19' 42.00"N
103° 59' 05.00"E

IBIXU
01° 16' 21"N
103° 57' 40"E
A015

IBIVA
01° 13' 51"N
103° 56' 37"E
A025

SAMKO
01° 05' 30"N
103° 52' 55"E
A040



NOT TO SCALE

TAROS 1B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To IBIXU on course 203° at or above 1500ft.	IBIXU [M203; A015+] -	CF	N
To IBIVA at or above 2500ft, turn right.	IBIVA [A025+; R] -	TF	N
To SAMKO at or above 4000ft.	SAMKO [A040+] -	TF	N
To VIBOG, turn right.	VIBOG [R] -	TF	N
To ISGIL, between FL140 to FL160.	ISGIL [FL140+; FL160-] -	TF	N
To BISOV.	BISOV -	TF	N
To TAROS.	TAROS	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	4.0	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	3.0	R	A025+	-	RNAV1
TF	SAMKO	-	204(204.4)	9.0	-	A040+	-	RNAV1
TF	VIBOG	-	204(204.4)	24.0	R	-	-	RNAV1
TF	ISGIL	-	269(269.4)	30.0	-	FL140+ FL160-	-	RNAV1
TF	BISOV	-	269(269.4)	21.0	-	-	-	RNAV1
TF	TAROS	-	269(269.4)	36.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

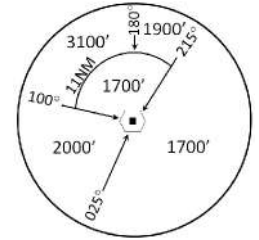
D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 02R
TAROS DEPARTURES (RADAR)
TAROS 1C**

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.5
- FOR RWY 02R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

**EXPECT RADAR vectors
to waypoint HOSBA**

DER (RWY02R)
01° 21' 22"N
104° 00' 51"E

HOSBA
01° 19' 48"N
104° 24' 18"E
A070

VANBU
01° 06' 43"N
104° 27' 40"E
A090

IGOSI
00° 56' 45"N
104° 06' 44"E

ASITI
00° 49' 06"N
103° 50' 42"E

TAROS
00° 42' 00"N
102° 16' 12"E

BISOV
00° 42' 29"N
102° 52' 14"E

ISGIL
00° 42' 46"N
103° 12' 57"E

VIBOG
00° 43' 10"N
103° 43' 02"E

NOT TO SCALE

TAROS 1C (SID) RNAV GNSS RWY 02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
Climb heading 023°, Gradient 5% to 2500ft, thence 3.3%. Expect radar vectors to waypoint HOSBA.	-	VA	N
To HOSBA at or above 7000ft.	HOSBA [A070+] -	DF	N
To VANBU at or below 9000ft, turn right.	VANBU [A090-; R] -	TF	N
To IGOSI.	IGOSI -	TF	N
To ASITI, turn left.	ASITI [L] -	TF	N
To VIBOG, turn right.	VIBOG [R] -	TF	N
To ISGIL.	ISGIL -	TF	N
To BISOV.	BISOV -	TF	N
To TAROS.	TAROS	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
VA	-	-	023(023.4)	-	-	A030	-	RNAV1
DF	HOSBA	-	-	-	-	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	R	A090-	-	RNAV1
TF	IGOSI	-	244(244.4)	23.0	-	-	-	RNAV1
TF	ASITI	-	244(244.4)	18.0	L	-	-	RNAV1
TF	VIBOG	-	232(232.3)	10.0	R	-	-	RNAV1
TF	ISGIL	-	269(269.4)	30.0	-	-	-	RNAV1
TF	BISOV	-	269(269.4)	21.0	-	-	-	RNAV1
TF	TAROS	-	269(269.4)	36.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20L
TAROS DEPARTURES
TAROS 1D

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.3
- FOR RWY 20L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

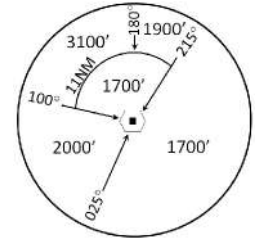
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 9%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
9% V/V (fpm)	684	911	1367	1823	2279	2734
3.3% V/V (fpm)	251	334	501	668	835	1003



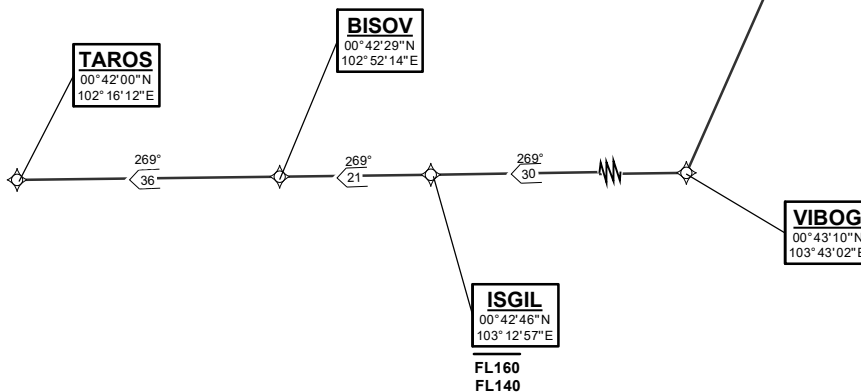
TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

DER (RWY 20L)
01° 19' 19"N
103° 59' 59"E

UKIBO
01° 17' 58"N
103° 59' 24"E

VIGUD
01° 13' 28"N
103° 57' 30"E
A025

SAMKO
01° 05' 30"N
103° 52' 55"E
A040



NOT TO SCALE

TAROS 1D (SID) RNAV GNSS RWY 20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To UKIBO on course 203°.	UKIBO [M203] -	CF	N
To VIGUD at or above 2500ft, turn right.	VIGUD [A025+; R] -	TF	N
To SAMKO at or above 4000ft, turn left.	SAMKO [A040+; L] -	TF	N
To VIBOG, turn right.	VIBOG [R] -	TF	N
To ISGIL, between FL140 to FL160.	ISGIL [FL140+; FL160-] -	TF	N
To BISOV.	BISOV -	TF	N
To TAROS.	TAROS	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	UKIBO	Y	203(203.4)	1.5	-	-	-	RNAV1
TF	VIGUD	-	203(203.4)	5.0	R	A025+	-	RNAV1
TF	SAMKO	-	210(210.4)	9.0	L	A040+	-	RNAV1
TF	VIBOG	-	204(204.4)	24.0	R	-	-	RNAV1
TF	ISGIL	-	269(269.4)	30.0	-	FL140+ FL160-	-	RNAV1
TF	BISOV	-	269(269.4)	21.0	-	-	-	RNAV1
TF	TAROS	-	269(269.4)	36.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 02L
TAROS DEPARTURES
TAROS 1E**

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A]
- FOR RWY 02L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

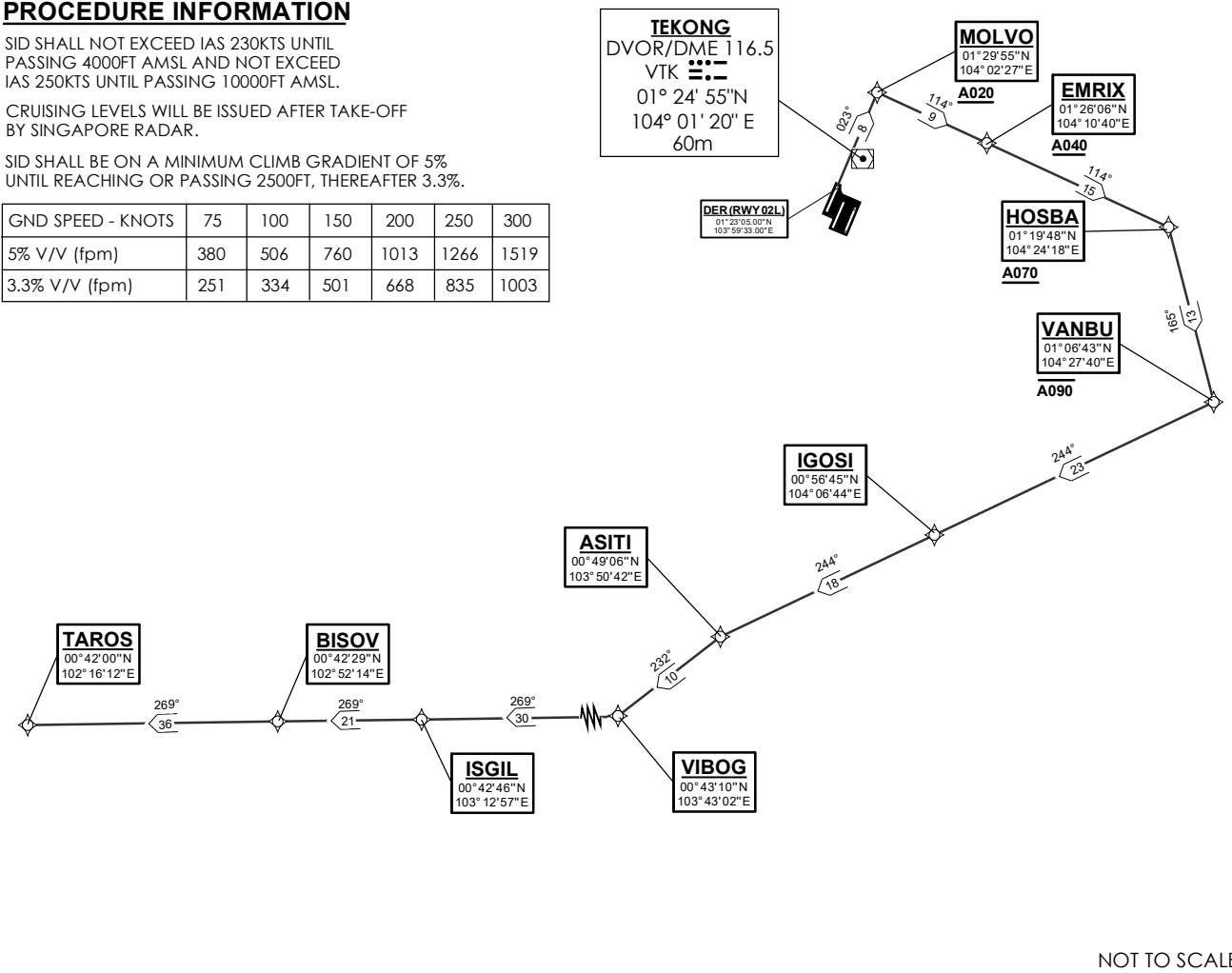
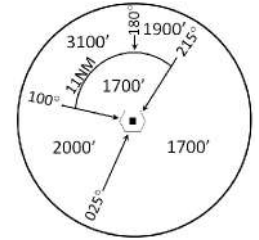
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003



NOT TO SCALE

TAROS 1E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOLVO on course 023° at or above 2000ft, turn right.	MOLVO [M023; A020+; R] -	CF	N
To EMRIX at or above 4000ft.	EMRIX [A040+] -	TF	N
To HOSBA at or above 7000ft, turn right.	HOSBA [A070+; R] -	TF	N
To VANBU at or below 9000ft, turn right.	VANBU [A090-; R] -	TF	N
To IGOSI.	IGOSI -	TF	N
To ASITI, turn left.	ASITI [L] -	TF	N
To VIBOG, turn right.	VIBOG [R] -	TF	N
To ISGIL.	ISGIL -	TF	N
To BISOV.	BISOV -	TF	N
To TAROS.	TAROS	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOLVO	-	023(023.4)	8.0	R	A020+	-	RNAV1
TF	EMRIX	-	114(114.4)	9.0	-	A040+	-	RNAV1
TF	HOSBA	-	114(114.4)	15.0	R	A070+	-	RNAV1
TF	VANBU	-	165(165.4)	13.0	R	A090-	-	RNAV1
TF	IGOSI	-	244(244.4)	23.0	-	-	-	RNAV1
TF	ASITI	-	244(244.4)	18.0	L	-	-	RNAV1
TF	VIBOG	-	232(232.3)	10.0	R	-	-	RNAV1
TF	ISGIL	-	269(269.4)	30.0	-	-	-	RNAV1
TF	BISOV	-	269(269.4)	21.0	-	-	-	RNAV1
TF	TAROS	-	269(269.4)	36.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

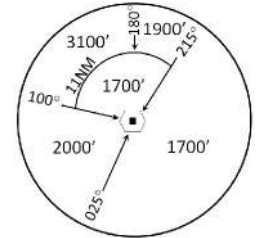
TWR 118.6 / 118.25 APP 120.3 124.05 ACC 133.25	TRANSITION ALTITUDE 11 000ft
	D-ATIS AP ID-WSSS 128.6

**SINGAPORE/Singapore Changi
RWY 20R
TAROS DEPARTURES
TAROS 1F**

ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC VAR 0°23'E (2020)

DISTANCES IN NM



GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.2 - FOR RWY 20R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

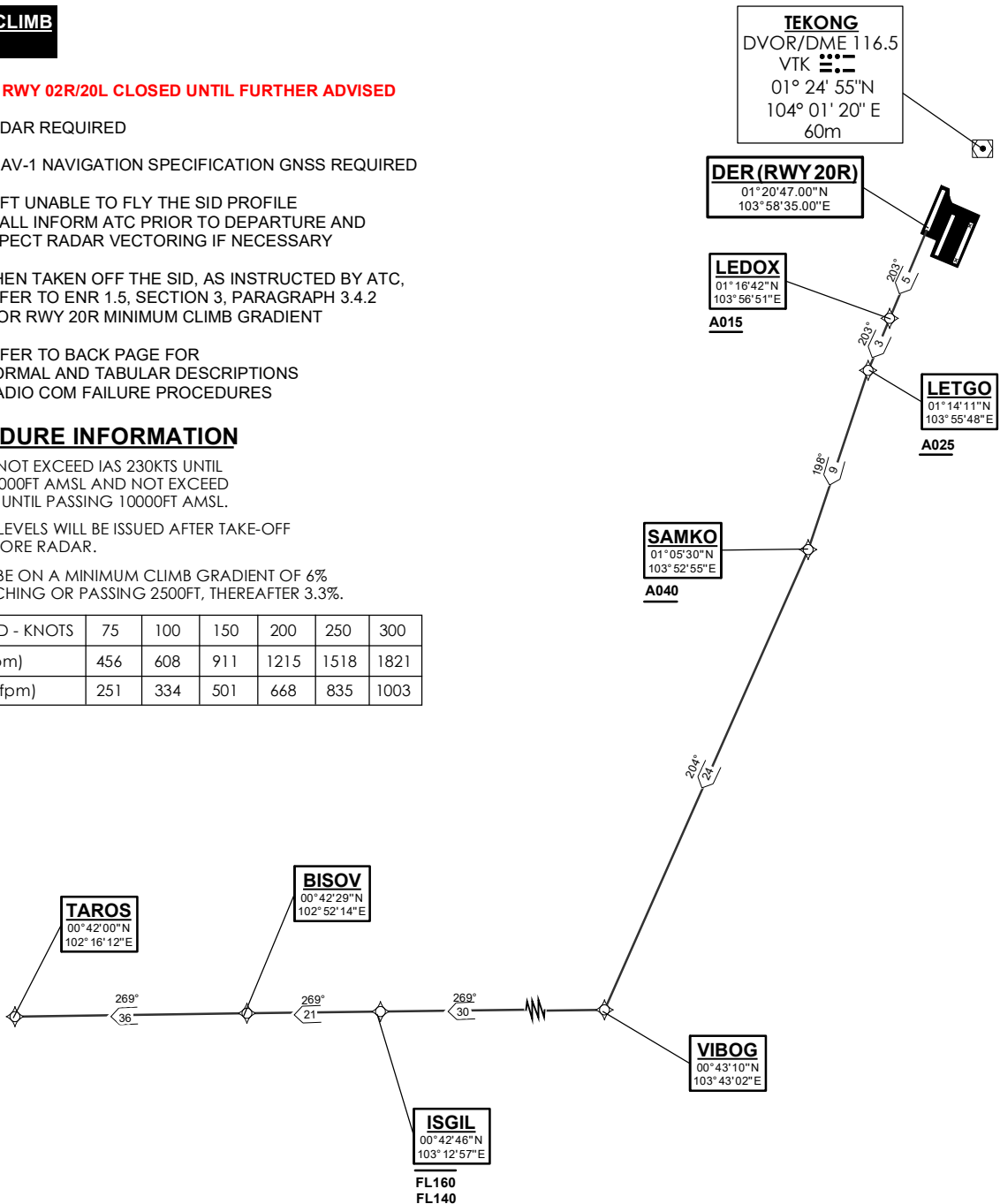
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 6% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
6% V/V (fpm)	456	608	911	1215	1518	1821
3.3% V/V (fpm)	251	334	501	668	835	1003



NOT TO SCALE

TAROS 1F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To LEDOX on course 203° at or above 1500ft.	LEDOX [M203; A015+] -	CF	N
To LETGO at or above 2500ft, turn left.	LETGO [A025+; L] -	TF	N
To SAMKO at or above 4000ft, turn right.	SAMKO [A040+; R] -	TF	N
To VIBOG, turn right.	VIBOG [R] -	TF	N
To ISGIL, between FL140 to FL160.	ISGIL [FL140+; FL160-] -	TF	N
To BISOV.	BISOV -	TF	N
To TAROS.	TAROS	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	5.0	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	SAMKO	-	198(198.4)	9.0	R	A040+	-	RNAV1
TF	VIBOG	-	204(204.4)	24.0	R	-	-	RNAV1
TF	ISGIL	-	269(269.4)	30.0	-	FL140+ FL160-	-	RNAV1
TF	BISOV	-	269(269.4)	21.0	-	-	-	RNAV1
TF	TAROS	-	269(269.4)	36.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.2

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C
TOMAN DEPARTURES
TOMAN 3A

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 23°E (2020)

DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

NOTE: CLOSE-IN OBSTACLES (AIRCRAFT UP TO 80FT)
EXIST ON TAXIWAYS WEST OF RUNWAY 02C

NOTE: ACFT UNABLE TO FLY THE SID
PROFILE SHALL INFORM ATC
PRIOR TO DEPARTURE AND TO
EXPECT RADAR VECTORING,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

GENERAL INFORMATION

INITIAL CLIMB
3000FT

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

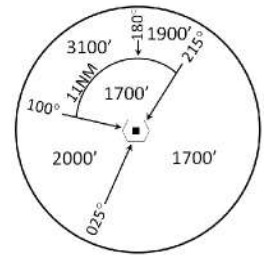
RWY 02C

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND
NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

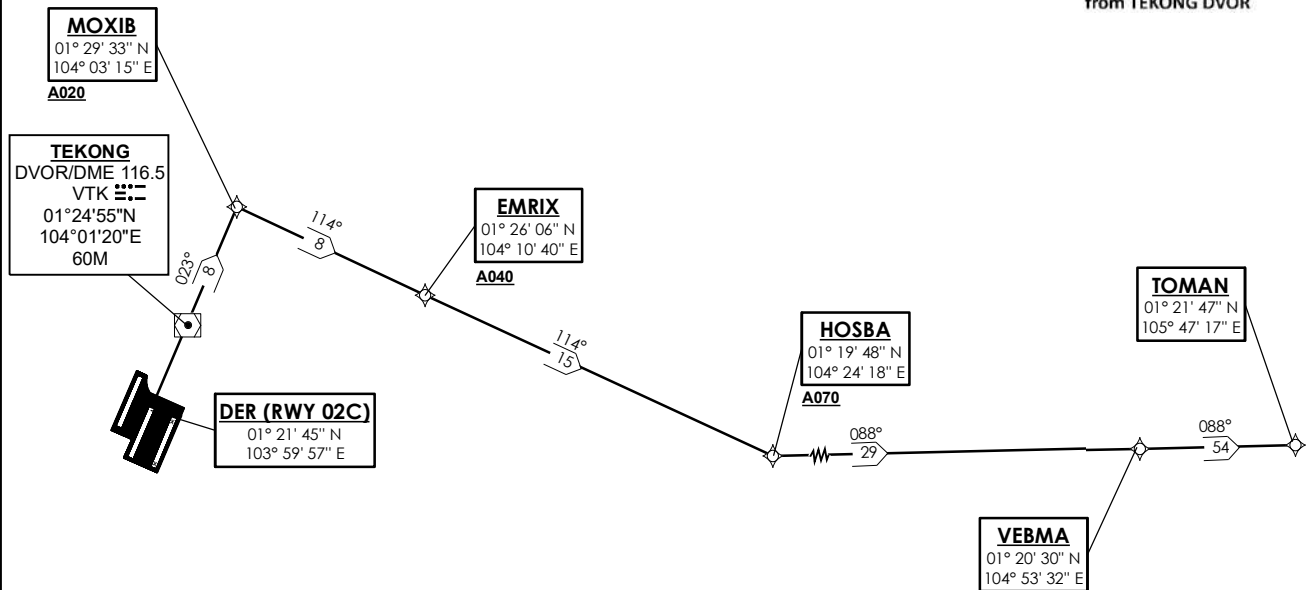
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003



MSA 25 NM
from TEKONG DVOR



NOT TO SCALE

TOMAN 3A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOXIB on course 023° at or above 2000ft, turn right.	MOXIB [M023; A020+; R] -	CF	N
To EMRIX at or above 4000ft.	EMRIX [A040+] -	TF	N
To HOSBA at or above 7000ft, turn left.	HOSBA [A070+; L] -	TF	N
To VEBMA.	VEBMA -	TF	N
To TOMAN.	TOMAN	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOXIB	-	023(023.4)	8.0	R	A020+	-	RNAV1
TF	EMRIX	-	114(114.4)	8.0	-	A040+	-	RNAV1
TF	HOSBA	-	114(114.4)	15.0	L	A070+	-	RNAV1
TF	VEBMA	-	088(088.4)	29.0	-	-	-	RNAV1
TF	TOMAN	-	088(088.4)	54.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.2

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20C
TOMAN DEPARTURES
TOMAN 5B**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

DISTANCES IN NM

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.1
- FOR RWY 20C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

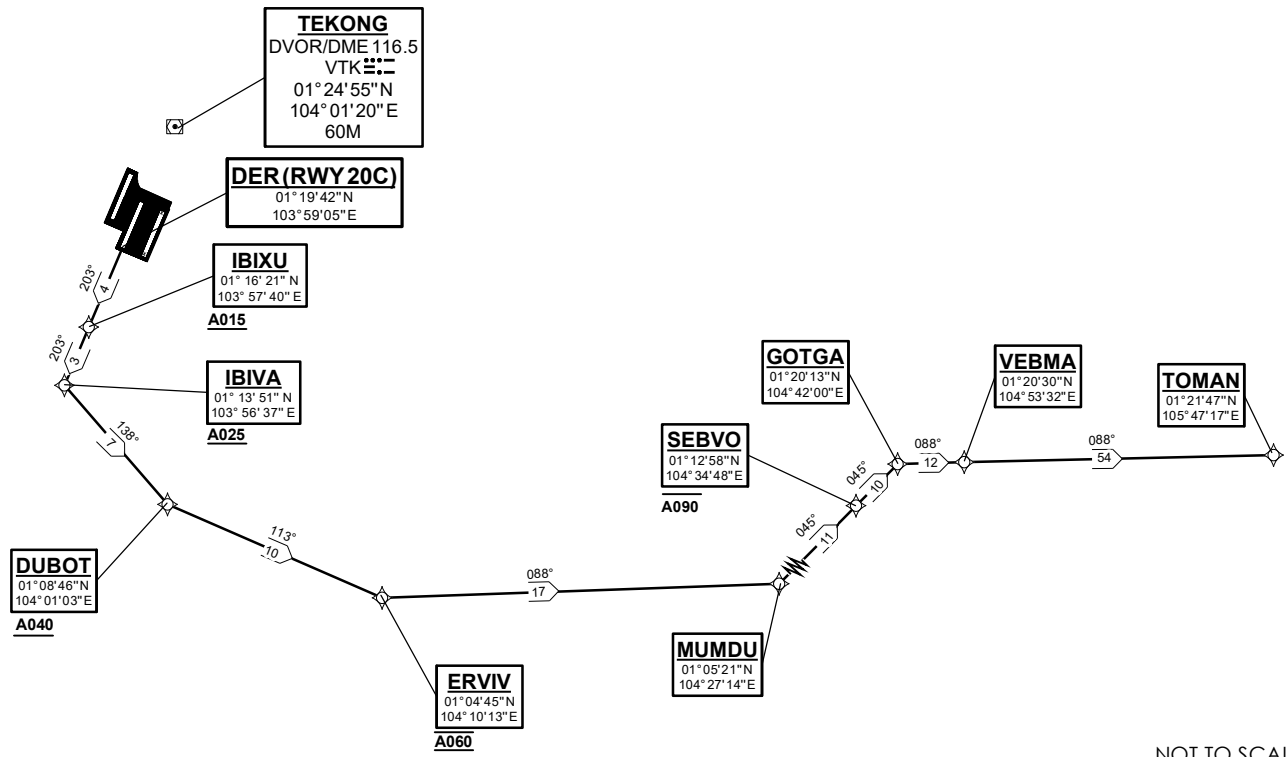
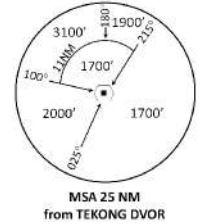
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 7%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
7% V/V (fpm)	532	709	1063	1418	1772	2127
3.3% V/V (fpm)	251	334	501	668	835	1003



TOMAN 5B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To IBIXU on course 203° at or above 1500ft.	IBIXU [M203; A015+] -	CF	N
To IBIVA at or above 2500ft, turn left.	IBIVA [A025+; L] -	TF	N
To DUBOT at or above 4000ft, turn left.	DUBOT [A040+; L] -	TF	N
To ERVIV at 6000ft, turn left.	ERVIV [@A060; L] -	TF	N
To MUMDU, turn left.	MUMDU [L] -	TF	N
To SEBVO at or below 9000ft.	SEBVO [A090-] -	TF	N
To GOTGA, turn right.	GOTGA [R] -	TF	N
To VEBMA.	VEBMA -	TF	N
To TOMAN.	TOMAN	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	4.0	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	DUBOT	-	138(138.4)	7.0	L	A040+	-	RNAV1
TF	ERVIV	-	113(113.4)	10.0	L	@A060	-	RNAV1
TF	MUMDU	-	088(088.4)	17.0	L	-	-	RNAV1
TF	SEBVO	-	045(045.4)	11.0	-	A090-	-	RNAV1
TF	GOTGA	-	045(045.4)	10.0	R	-	-	RNAV1
TF	VEBMA	-	088(088.4)	12.0	-	-	-	RNAV1
TF	TOMAN	-	088(088.4)	54.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

SINGAPORE/Singapore Changi
RWY 02R
TOMAN DEPARTURES (RADAR)
TOMAN 1C

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.2

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORING IF NECESSARY

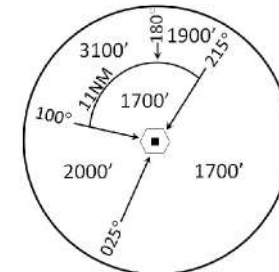
NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.5 - FOR RWY 02R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

ELEV, ALT IN FEET

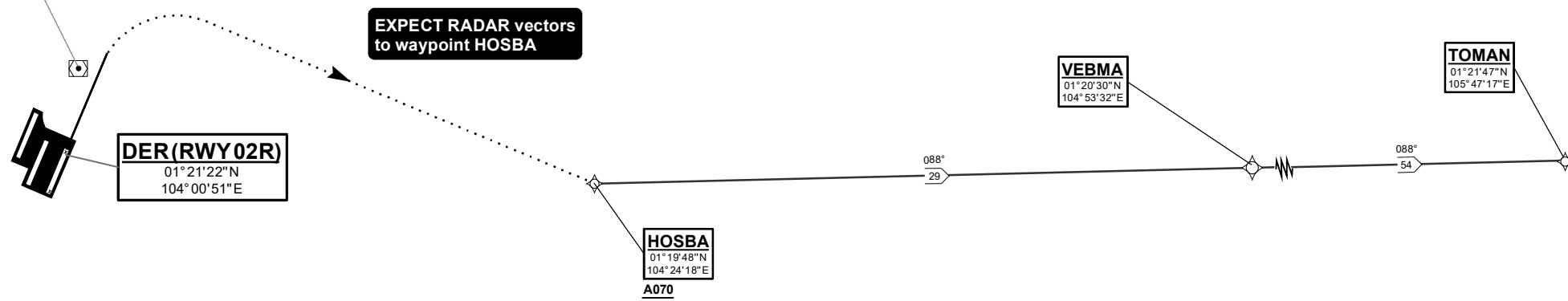
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM
from TEKONG DVOR

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m



NOT TO SCALE

TOMAN 1C (SID) RNAV GNSS RWY 02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
Climb heading 023°, Gradient 5% to 2500ft, thence 3.3%. Expect radar vectors to waypoint HOSBA.	-	VA	N
To HOSBA at or above 7000ft.	HOSBA [A070+] -	DF	N
To VEBMA.	VEBMA -	TF	N
To TOMAN.	TOMAN	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
VA	-	-	023(023.4)	-	-	A030	-	RNAV1
DF	HOSBA	-	-	-	-	A070+	-	RNAV1
TF	VEBMA	-	088(088.4)	29.0	-	-	-	RNAV1
TF	TOMAN	-	088(088.4)	54.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.2

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20L
TOMAN DEPARTURES
TOMAN 1D

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.3 - FOR RWY 20L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

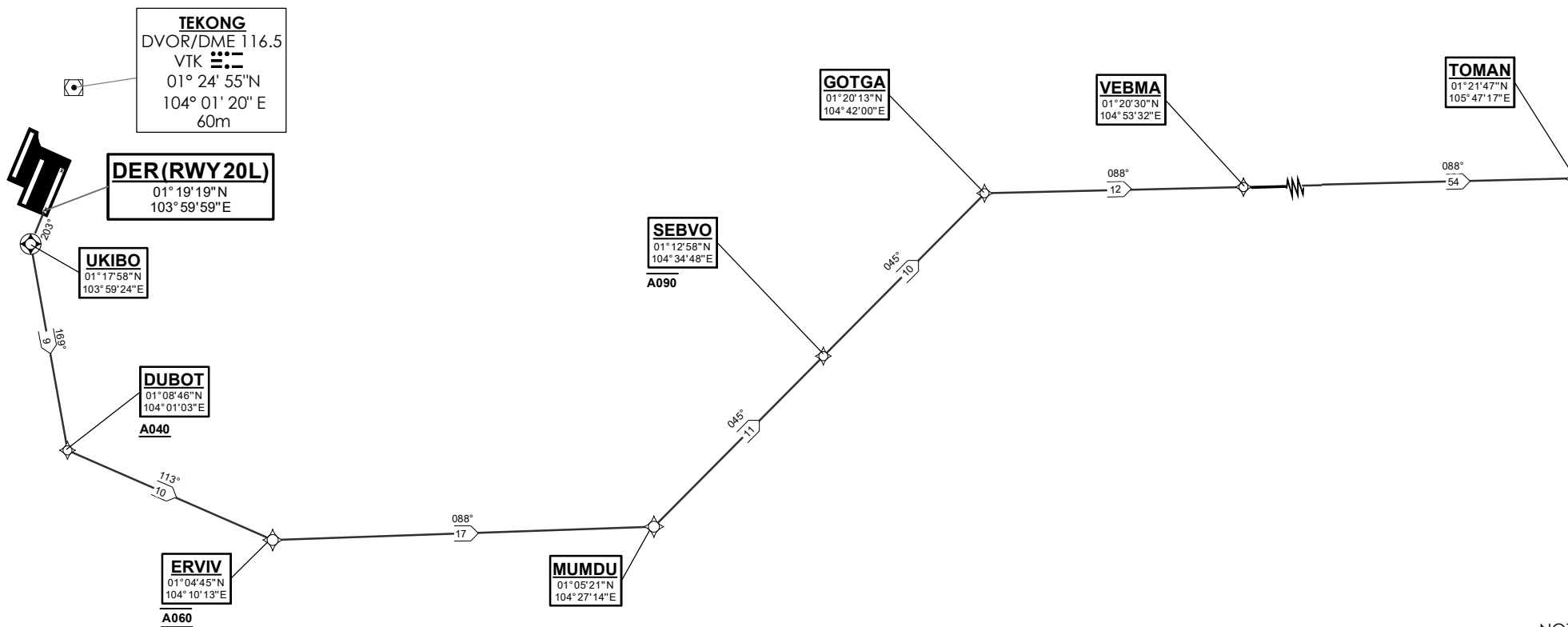
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 9% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
9% V/V (fpm)	684	911	1367	1823	2279	2734
3.3% V/V (fpm)	251	334	501	668	835	1003

ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC VAR 0°23'E (2020)

DISTANCES IN NM



NOT TO SCALE

21 MAR 2024

TOMAN 1D (SID) RNAV GNSS RWY 20L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To UKIBO on course 203°, turn left.	UKIBO [M203; L] -	CF	N
To DUBOT at or above 4000ft, turn left.	DUBOT [A040+; L] -	TF	N
To ERVIV at 6000ft, turn left.	ERVIV [@A060; L] -	TF	N
To MUMDU, turn left.	MUMDU [L] -	TF	N
To SEBVO at or below 9000ft.	SEBVO [A090-] -	TF	N
To GOTGA, turn right.	GOTGA [R] -	TF	N
To VEBMA.	VEBMA -	TF	N
To TOMAN.	TOMAN	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	UKIBO	Y	203(203.4)	1.5	L	-	-	RNAV1
TF	DUBOT	-	169(169.4)	9.0	L	A040+	-	RNAV1
TF	ERVIV	-	113(113.4)	10.0	L	@A060	-	RNAV1
TF	MUMDU	-	088(088.4)	17.0	L	-	-	RNAV1
TF	SEBVO	-	045(045.4)	11.0	-	A090-	-	RNAV1
TF	GOTGA	-	045(045.4)	10.0	R	-	-	RNAV1
TF	VEBMA	-	088(088.4)	12.0	-	-	-	RNAV1
TF	TOMAN	-	088(088.4)	54.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.2

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 02L
TOMAN DEPARTURES
TOMAN 3E**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

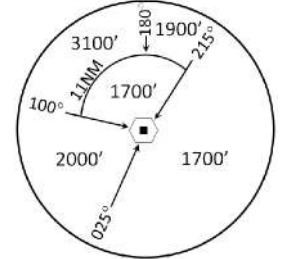
NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A]
- FOR RWY 02L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



MSA 25 NM
from TEKONG DVOR

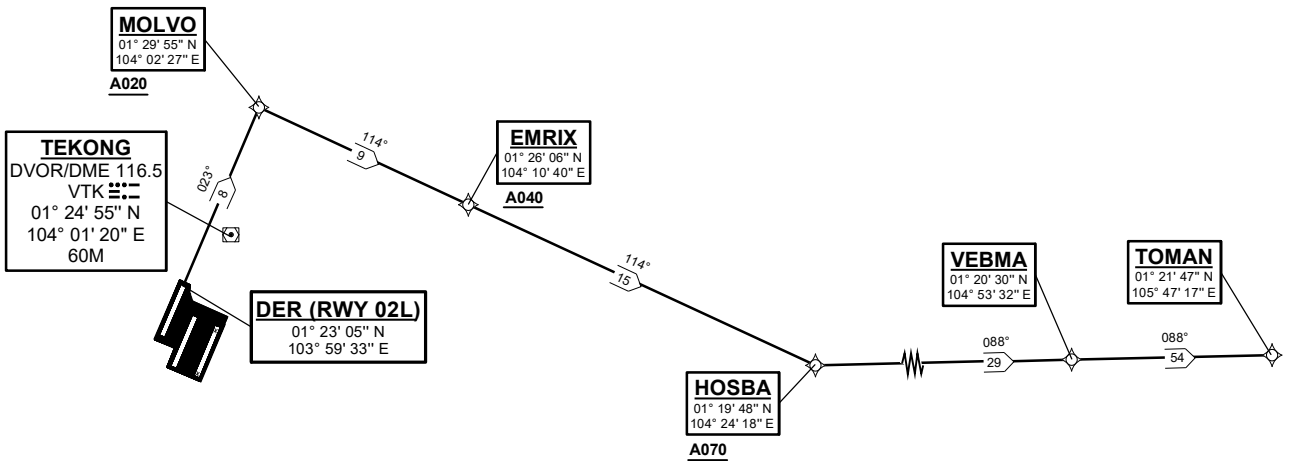
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003



NOT TO SCALE

21 MAR 2024

TOMAN 3E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To MOLVO on course 023° at or above 2000ft, turn right.	MOLVO [M023; A020+; R] -	CF	N
To EMRIX at or above 4000ft.	EMRIX [A040+] -	TF	N
To HOSBA at or above 7000ft, turn left.	HOSBA [A070+; L] -	TF	N
To VEBMA.	VEBMA -	TF	N
To TOMAN.	TOMAN	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	MOLVO	-	023(023.4)	8.0	R	A020+	-	RNAV1
TF	EMRIX	-	114(114.4)	9.0	-	A040+	-	RNAV1
TF	HOSBA	-	114(114.4)	15.0	L	A070+	-	RNAV1
TF	VEBMA	-	088(088.4)	29.0	-	-	-	RNAV1
TF	TOMAN	-	088(088.4)	54.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE: PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.2

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20R
TOMAN DEPARTURES
TOMAN 5F**

**ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2022)**

DISTANCES IN NM

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

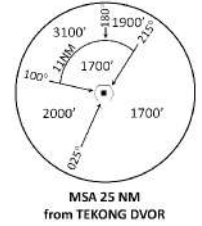
NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORED IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.2
- FOR RWY 20R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



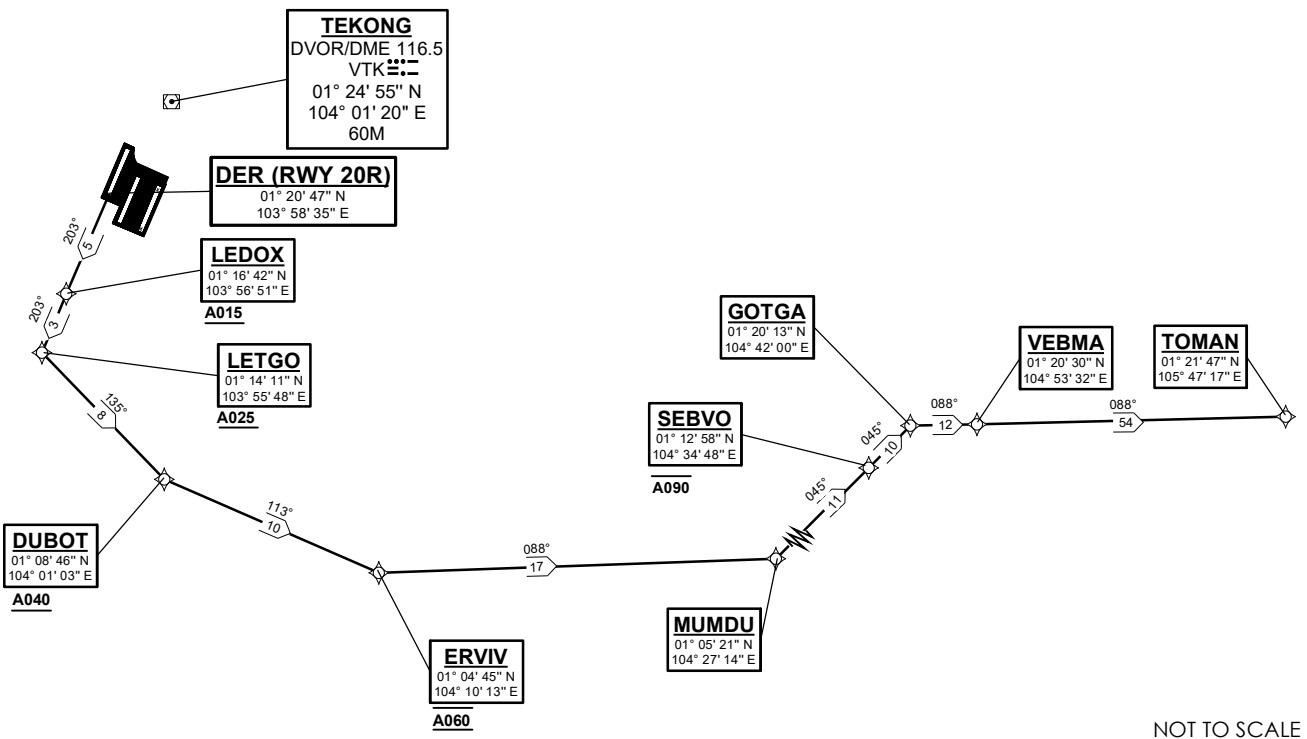
PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 6%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
6% V/V (fpm)	456	608	911	1215	1518	1821
3.3% V/V (fpm)	251	334	501	668	835	1003



NOT TO SCALE

TOMAN 5F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To LEDOX on course 203° at or above 1500ft.	LEDOX [M203; A015+] -	CF	N
To LETGO at or above 2500ft, turn left.	LETGO [A025+; L] -	TF	N
To DUBOT at or above 4000ft, turn left.	DUBOT [A040+; L] -	TF	N
To ERVIV at 6000ft, turn left.	ERVIV [@A060; L] -	TF	N
To MUMDU, turn left.	MUMDU [L] -	TF	N
To SEBVO at or below 9000ft.	SEBVO [A090-] -	TF	N
To GOTGA, turn right.	GOTGA [R] -	TF	N
To VEBMA.	VEBMA -	TF	N
To TOMAN.	TOMAN	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	5.0	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	DUBOT	-	135(135.4)	8.0	L	A040+	-	RNAV1
TF	ERVIV	-	113(113.4)	10.0	L	@A060	-	RNAV1
TF	MUMDU	-	088(088.4)	17.0	L	-	-	RNAV1
TF	SEBVO	-	045(045.4)	11.0	-	A090-	-	RNAV1
TF	GOTGA	-	045(045.4)	10.0	R	-	-	RNAV1
TF	VEBMA	-	088(088.4)	12.0	-	-	-	RNAV1
TF	TOMAN	-	088(088.4)	54.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20C
VOVOS DEPARTURES
VOVOS 1B**

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

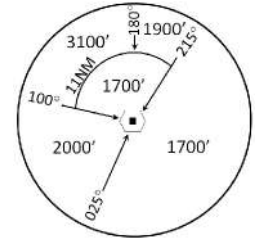
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.1
- FOR RWY 20C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

NOTE: VOVOS SID WILL NOT BE AVAILABLE FOR
FLIGHT PLANNING UNTIL FURTHER ADVISED



MSA 25 NM
from TEKONG DVOR

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 7%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
7% V/V (fpm)	532	709	1063	1418	1772	2127
3.3% V/V (fpm)	251	334	501	668	835	1003

**TEKONG
DVOR/DME 116.5
VTK**
01° 24' 55"N
104° 01' 20" E
60m

DER (RWY 20C)
01° 19' 42.00"N
103° 59' 05.00"E

IBIXU
01° 16' 21"N
103° 57' 40"E
A015

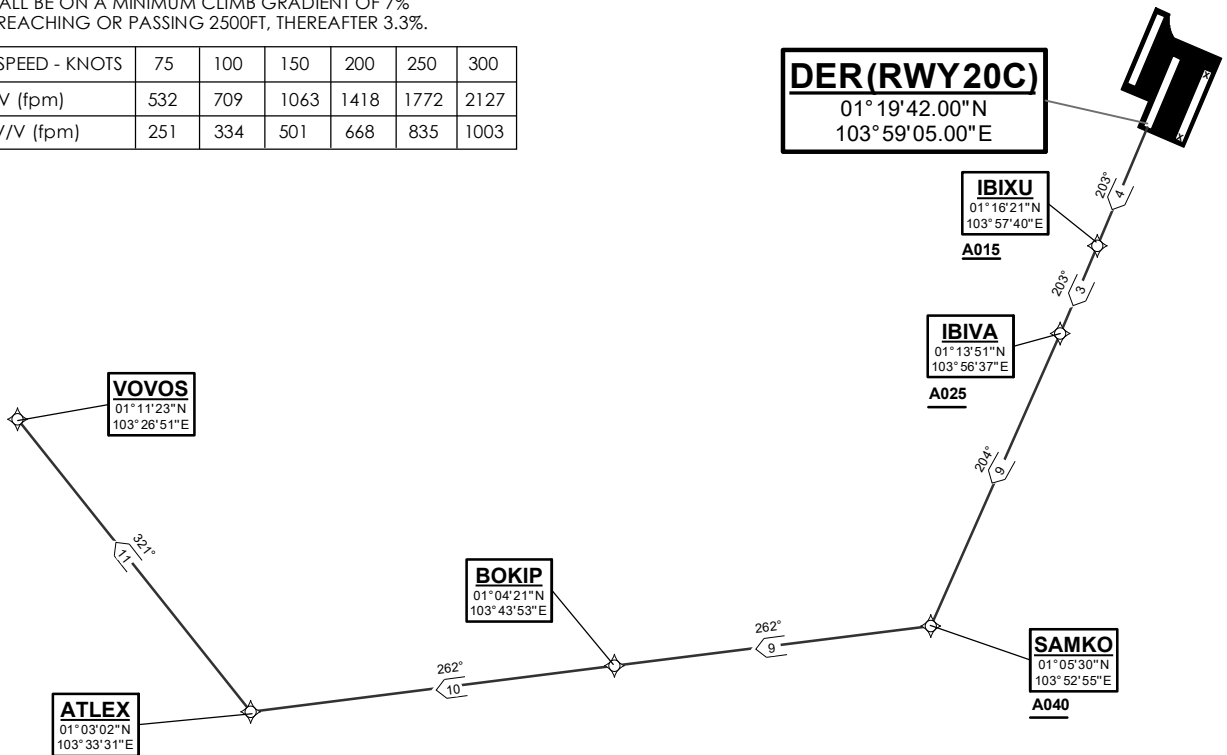
IBIVA
01° 13' 51"N
103° 56' 37"E
A025

SAMKO
01° 05' 30"N
103° 52' 55"E
A040

BOKIP
01° 04' 21"N
103° 43' 53"E

VOVOS
01° 11' 23"N
103° 26' 51"E

ATLEX
01° 03' 02"N
103° 33' 31"E



NOT TO SCALE

VOVOS 1B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To IBIXU on course 203° at or above 1500ft.	IBIXU [M203; A015+] -	CF	N
To IBIVA at or above 2500ft, turn right.	IBIVA [A025+; R] -	TF	N
To SAMKO at or above 4000ft, turn right.	SAMKO [A040+; R] -	TF	N
To BOKIP.	BOKIP -	TF	N
To ATLEX, turn right.	ATLEX [R] -	TF	N
To VOVOS.	VOVOS	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	4.0	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	3.0	R	A025+	-	RNAV1
TF	SAMKO	-	204(204.4)	9.0	R	A040+	-	RNAV1
TF	BOKIP	-	262(262.4)	9.0	-	-	-	RNAV1
TF	ATLEX	-	262(262.4)	10.0	R	-	-	RNAV1
TF	VOVOS	-	321(321.4)	11.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20L
VOVOS DEPARTURES
VOVOS 1D**

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

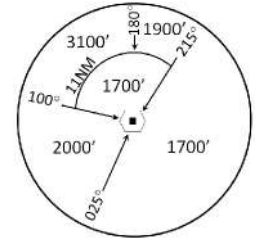
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.3
- FOR RWY 20L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

NOTE: VOVOS SID WILL NOT BE AVAILABLE FOR
FLIGHT PLANNING UNTIL FURTHER ADVISED



MSA 25 NM
from TEKONG DVOR

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 9%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
9% V/V (fpm)	684	911	1367	1823	2279	2734
3.3% V/V (fpm)	251	334	501	668	835	1003

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

DER (RWY 20L)
01° 19' 19"N
103° 59' 59"E

UKIBO
01° 17' 58"N
103° 59' 24"E

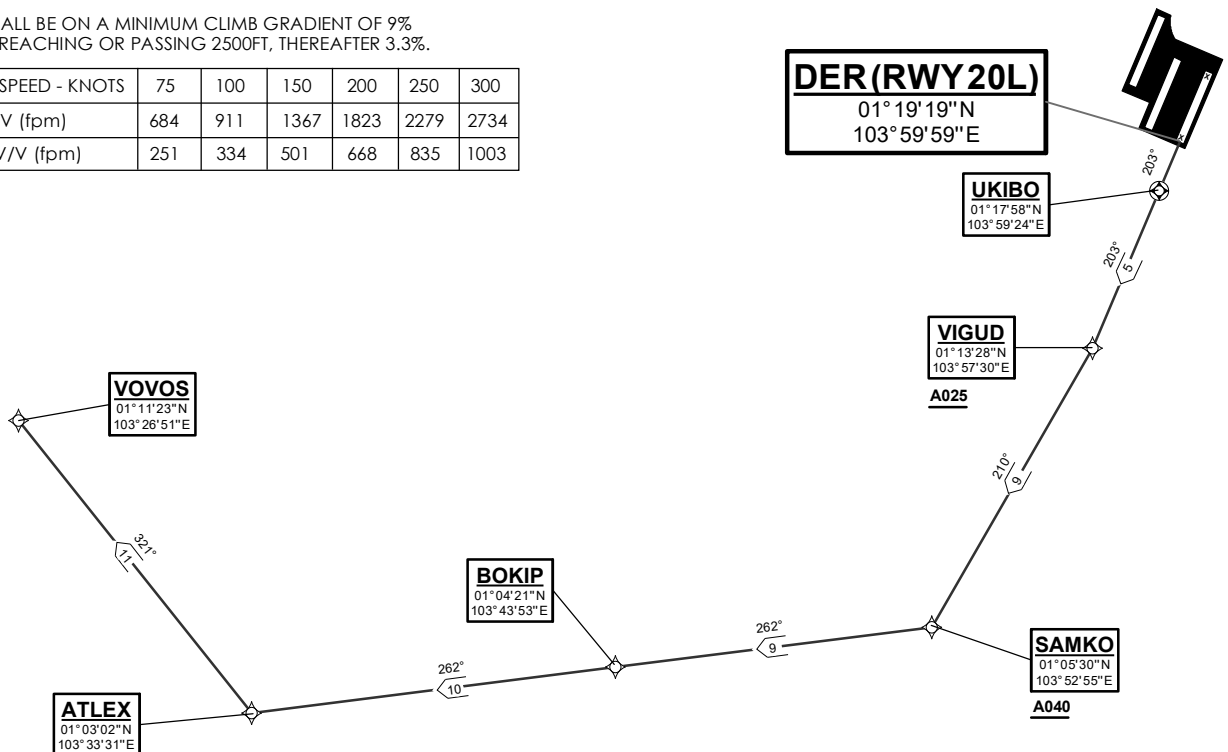
VIGUD
01° 13' 28"N
103° 57' 30"E
A025

SAMKO
01° 05' 30"N
103° 52' 55"E
A040

BOKIP
01° 04' 21"N
103° 43' 53"E

VOVOS
01° 11' 23"N
103° 26' 51"E

ATLEX
01° 03' 02"N
103° 33' 31"E



NOT TO SCALE

VOVOS 1D (SID) RNAV GNSS RWY 20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To UKIBO on course 203°.	UKIBO [M203] -	CF	N
To VIGUD at or above 2500ft, turn right.	VIGUD [A025+; R] -	TF	N
To SAMKO at or above 4000ft, turn right.	SAMKO [A040+; R] -	TF	N
To BOKIP.	BOKIP -	TF	N
To ATLEX, turn right.	ATLEX [R] -	TF	N
To VOVOS.	VOVOS	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	UKIBO	Y	203(203.4)	1.5	-	-	-	RNAV1
TF	VIGUD	-	203(203.4)	5.0	R	A025+	-	RNAV1
TF	SAMKO	-	210(210.4)	9.0	R	A040+	-	RNAV1
TF	BOKIP	-	262(262.4)	9.0	-	-	-	RNAV1
TF	ATLEX	-	262(262.4)	10.0	R	-	-	RNAV1
TF	VOVOS	-	321(321.4)	11.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)**

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 20R
VOVOS DEPARTURES
VOVOS 1F**

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

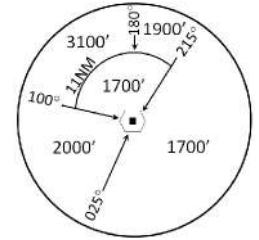
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE
SHALL INFORM ATC PRIOR TO DEPARTURE AND
EXPECT RADAR VECTORING IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.4.2
- FOR RWY 20R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

NOTE: VOVOS SID WILL NOT BE AVAILABLE FOR
FLIGHT PLANNING UNTIL FURTHER ADVISED



MSA 25 NM
from TEKONG DVOR

PROCEDURE INFORMATION

SID SHALL NOT EXCEED IAS 230KTS UNTIL
PASSING 4000FT AMSL AND NOT EXCEED
IAS 250KTS UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 6%
UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
6% V/V (fpm)	456	608	911	1215	1518	1821
3.3% V/V (fpm)	251	334	501	668	835	1003

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

DER (RWY 20R)
01° 20' 47.00"N
103° 58' 35.00"E

LEDGX
01° 16' 42"N
103° 56' 51"E
A015

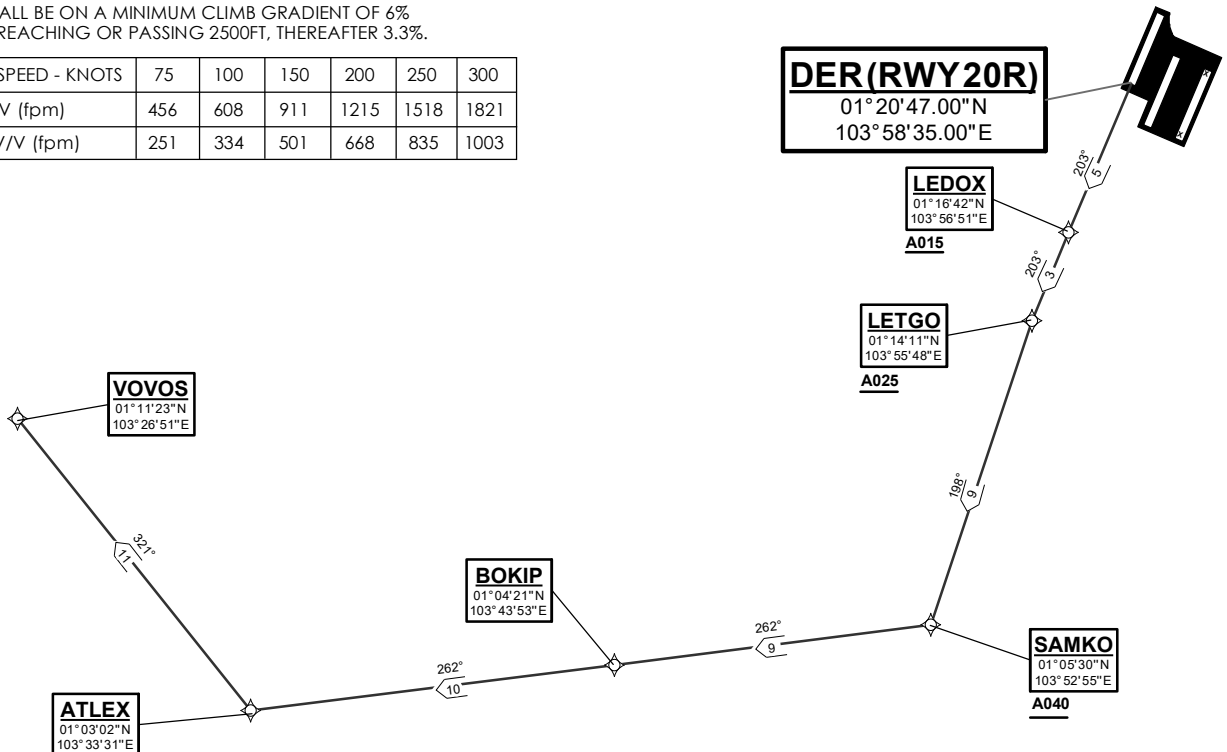
LETGO
01° 14' 11"N
103° 55' 48"E
A025

SAMKO
01° 05' 30"N
103° 52' 55"E
A040

BOKIP
01° 04' 21"N
103° 43' 53"E

VOVOS
01° 11' 23"N
103° 26' 51"E

ATLEX
01° 03' 02"N
103° 33' 31"E



NOT TO SCALE

VOVOS 1F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To LEDOX on course 203° at or above 1500ft.	LEDOX [M203; A015+] -	CF	N
To LETGO at or above 2500ft, turn left.	LETGO [A025+; L] -	TF	N
To SAMKO at or above 4000ft, turn right.	SAMKO [A040+; R] -	TF	N
To BOKIP.	BOKIP -	TF	N
To ATLEX, turn right.	ATLEX [R] -	TF	N
To VOVOS.	VOVOS	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	5.0	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	3.0	L	A025+	-	RNAV1
TF	SAMKO	-	198(198.4)	9.0	R	A040+	-	RNAV1
TF	BOKIP	-	262(262.4)	9.0	-	-	-	RNAV1
TF	ATLEX	-	262(262.4)	10.0	R	-	-	RNAV1
TF	VOVOS	-	321(321.4)	11.0	-	-	-	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE:</p> <p>PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD INSTRUMENT
DEPARTURES (SID)
CHART**

TWR	131.4
APP	120.3
ACC	133.8/134.4/133.25/ 134.2

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

**SINGAPORE/Singapore Changi
RWY 02R/20L
CHANGI DEPARTURE (RADAR)
CHA 1C (R02R)
CHA 1D (R20L)**

ELEV, ALT IN FEET

BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

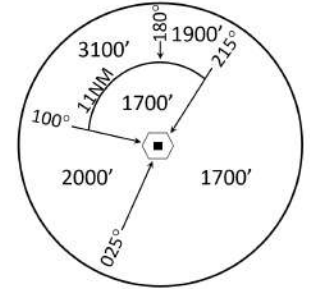
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: ACFT UNABLE TO COMPLY WITH CLIMB GRADIENT
RESTRICTION SHALL INFORM ATC DURING THE TIME
ACFT COMMENCES TAXIING TO HOLDING POINT FOR
DEPARTURE

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



**MSA 25 NM
from TEKONG DVOR**

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

ACFT ON DEPARTURE SHALL NOT EXCEED IAS 230KTS
UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS
UNTIL PASSING 10000FT AMSL.

CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

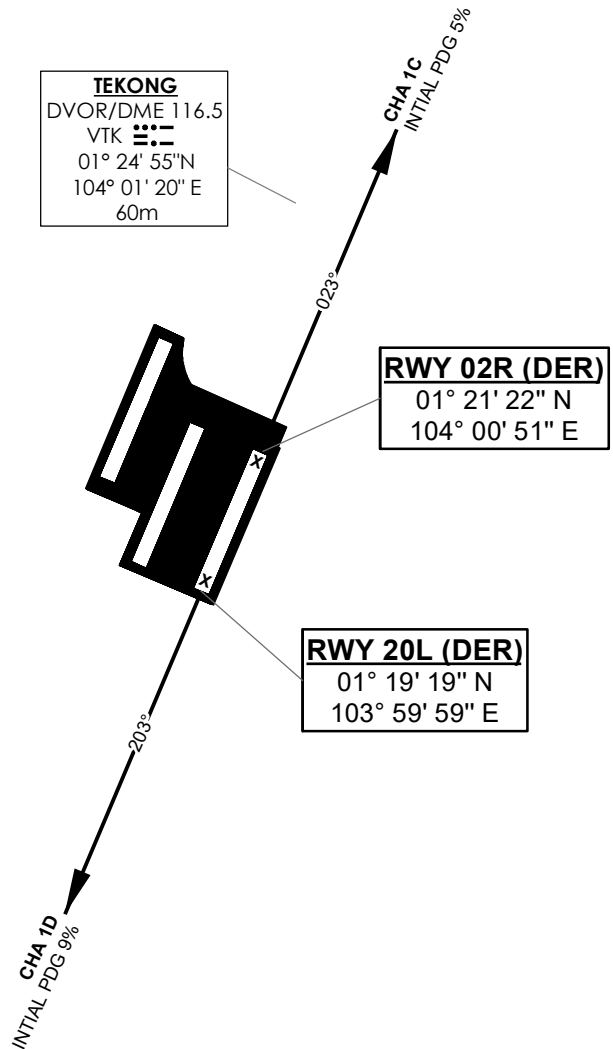
ACFT ON DEPARTURE **02R** SHALL BE ON A MINIMUM CLIMB GRADIENT
OF 5% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
5% V/V (fpm)	380	506	760	1013	1266	1519
3.3% V/V (fpm)	251	334	501	668	835	1003

ACFT ON DEPARTURE **20L** SHALL BE ON A MINIMUM CLIMB GRADIENT
OF 9% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

GND SPEED - KNOTS	75	100	150	200	250	300
9% V/V (fpm)	684	911	1367	1823	2279	2734
3.3% V/V (fpm)	251	334	501	668	835	1003

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m



NOT TO SCALE

CHA 1C SID (RADAR) RWY 02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator
Climb heading 023°, Gradient 5% to 2500ft, thence 3.3%. Expect radar vectors to the planned ATS route or waypoints listed in table A.	-	VA

Tabular Descriptions

Path Terminator	Turn Direction	Course °M (°T)	Altitude	Speed Limit
VA	-	023 (023.4)	A030	-

CHA 1D SID (RADAR) RWY 20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator
Climb heading 203°, Gradient 9% to 2500ft, thence 3.3%. Expect radar vectors to the planned ATS route or waypoints listed in table A.	-	VA

Tabular Descriptions

Path Terminator	Turn Direction	Course °M (°T)	Altitude	Speed Limit
VA	-	203 (203.4)	A030	-

Table A

Planned ATS Routes	Expect Radar Vectors to the waypoints listed below and thereafter to join the respective planned ATS Route
A457	AKOMA DCT SABKA DCT MASBO
B470	VIRET DCT ANITO
G580 / M646 / L625 / T21 - L504 / T21 - M774	VEBMA DCT TOMAN
L762	VIBOG DCT BISOV DCT MIBEL
B469 / M751 / M771 / L642 / M753	AKOMA DCT VMR
T24 - M635	VIRET DCT GURES DCT IDBUD
W26	VIRET DCT GURES DCT IKIRO DCT KIRDA
R469	VIBOG DCT TAROS
Y513	AKOMA DCT AKMET DCT AROSO

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:</p> <p>RWY 02R - PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p> <p>RWY 20L - PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p>

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 133.25
APP 124.6
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSSS
ARR 128.025

**SINGAPORE/Singapore Changi
RWY 02L/C/R
ARAMA ONE ALPHA ARRIVAL
ARAMA 1A**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

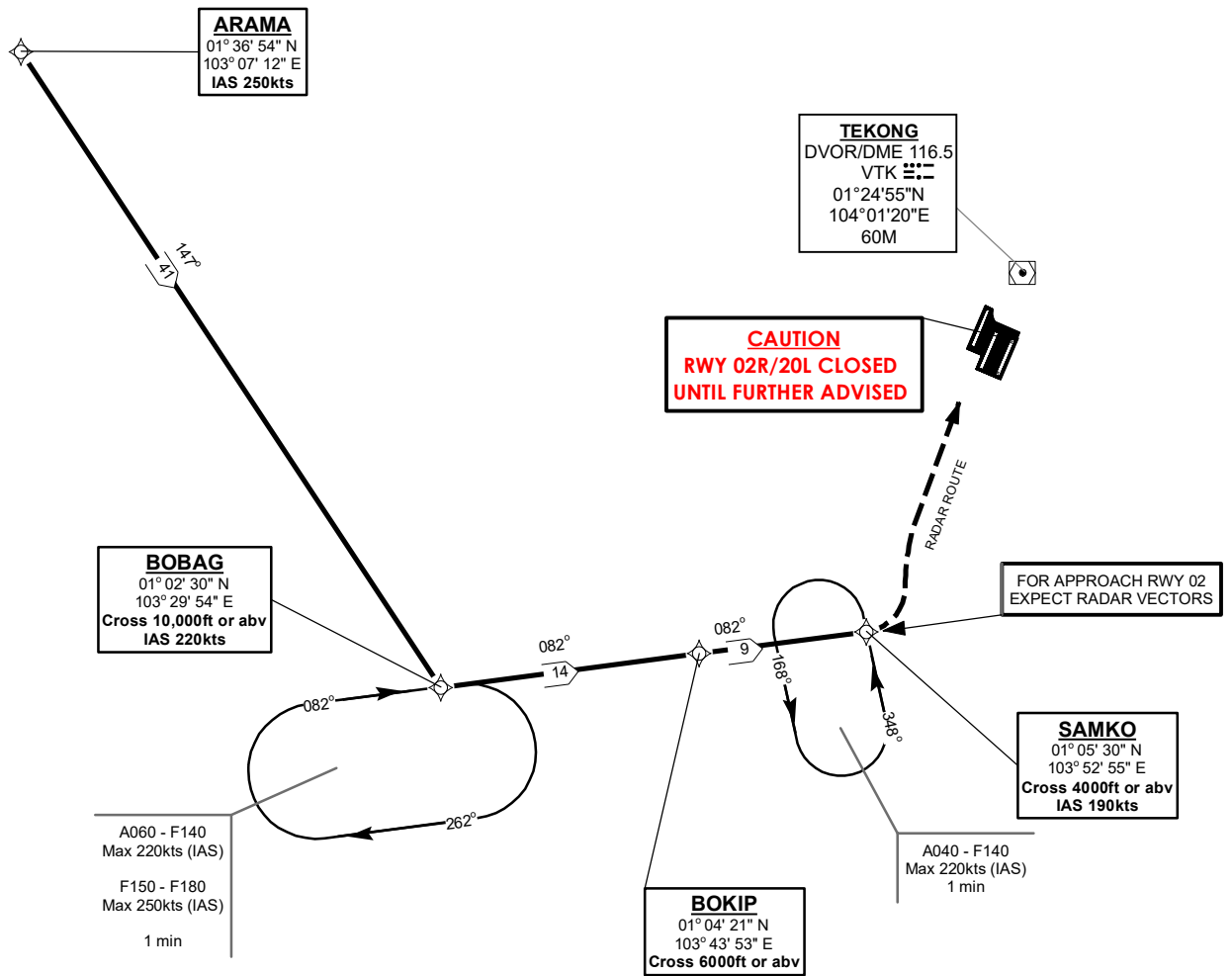
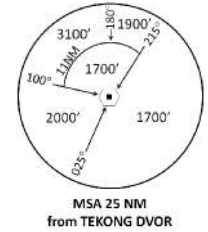
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



NOT TO SCALE

21 MAR 2024

ARAMA 1A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From ARAMA, speed 250kts.	ARAMA [K250] -	IF	N
To BOBAG at or above 10000ft, speed 220kts, turn left.	BOBAG [A100+; K220; L] -	TF	N
To BOKIP at or above 6000ft.	BOKIP [A060+] -	TF	N
To SAMKO at or above 4000ft, speed 190kts.	SAMKO [A040+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	ARAMA	-	-	-	-	-	K250	RNAV1
TF	BOBAG	-	147(147.4)	41.0	L	A100+	K220	RNAV1
TF	BOKIP	-	082(082.4)	14.0	-	A060+	-	RNAV1
TF	SAMKO	-	082(082.4)	9.0	-	A040+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via ARAMA 1A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on ARAMA 1A to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 133.25
APP 124.6
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSSS
128.025

**SINGAPORE/Singapore Changi
RWY 20R/C/L
ARAMA ONE BRAVO ARRIVAL
ARAMA 1B**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

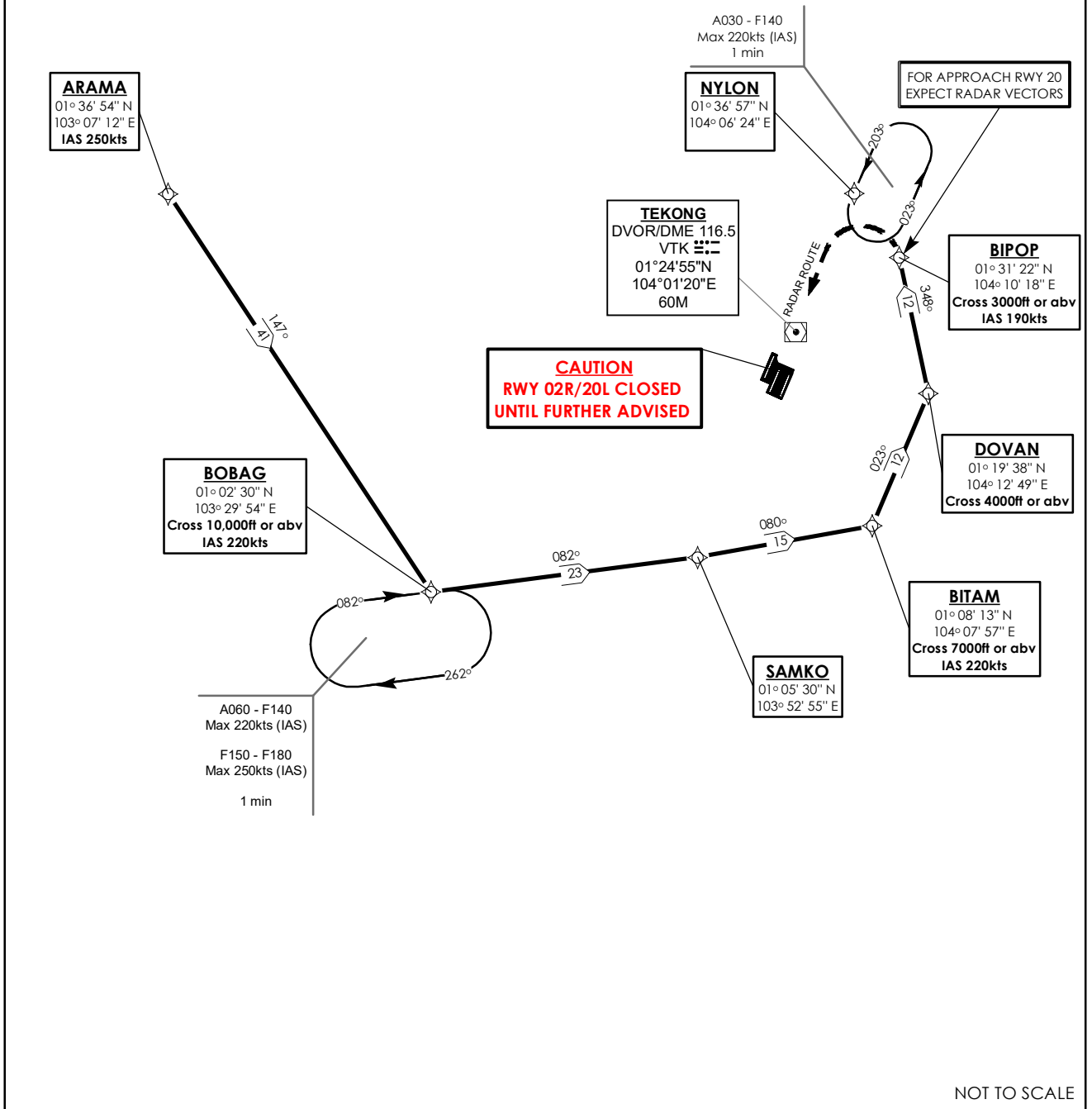
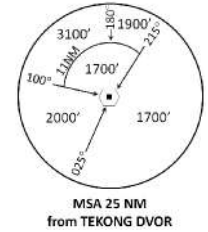
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



21 MAR 2024

ARAMA 1B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From ARAMA, speed 250kts.	ARAMA [K250] -	IF	N
To BOBAG at or above 10000ft, speed 220kts, turn left.	BOBAG [A100+; K220; L] -	TF	N
To SAMKO, turn left.	SAMKO [L] -	TF	N
To BITAM at or above 7000ft, speed 220kts, turn left.	BITAM [A070+; K220; L] -	TF	N
To DOVAN at or above 4000ft, turn left.	DOVAN [A040+; L] -	TF	N
To BIPOP at or above 3000ft, speed 190kts.	BIPOP [A030+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	ARAMA	-	-	-	-	-	K250	RNAV1
TF	BOBAG	-	147(147.4)	41.0	L	A100+	K220	RNAV1
TF	SAMKO	-	082(082.4)	23.0	L	-	-	RNAV1
TF	BITAM	-	080(080.4)	15.0	L	A070+	K220	RNAV1
TF	DOVAN	-	023(023.4)	12.0	L	A040+	-	RNAV1
TF	BIPOP	-	348(348.4)	12.0	-	A030+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via ARAMA 1B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on ARAMA 1B to BIPOP, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 133.25
APP 124.6
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
ARR 128.025

**SINGAPORE/Singapore Changi
RWY 02L/C/R
ASUNA TWO ALPHA ARRIVAL
ASUNA 2A**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

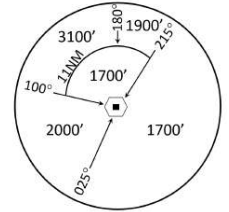
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

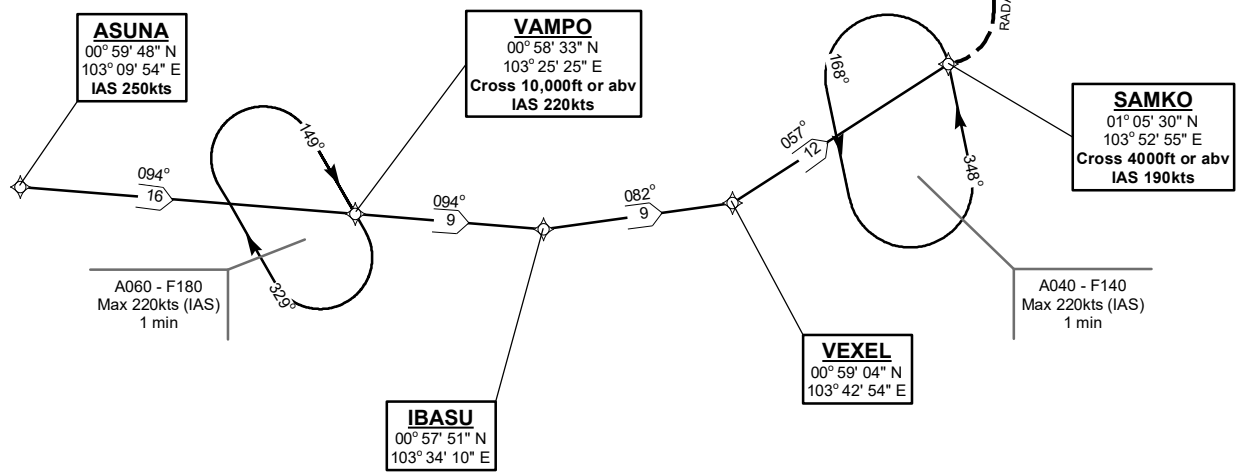


MSA 25 NM
from TEKONG DVOR

**CAUTION
RWY 02R/20L CLOSED
UNTIL FURTHER ADVISED**

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55" N
104° 01' 20" E
60m

FOR APPROACH RWY 02
EXPECT RADAR VECTORS



NOT TO SCALE

21 MAR 2024

ASUNA 2A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From ASUNA, speed 250kts.	ASUNA [K250] -	IF	N
To VAMPO at or above 10000ft, speed 220kts.	VAMPO [A100+; K220] -	TF	N
To IBASU, turn left.	IBASU [L] -	TF	N
To VEXEL, turn left.	VEXEL [L] -	TF	N
To SAMKO at or above 4000ft, speed 190kts.	SAMKO [A040+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	ASUNA	-	-	-	-	-	K250	RNAV1
TF	VAMPO	-	094(094.4)	16.0	-	A100+	K220	RNAV1
TF	IBASU	-	094(094.4)	9.0	L	-	-	RNAV1
TF	VEXEL	-	082(082.4)	9.0	L	-	-	RNAV1
TF	SAMKO	-	057(057.4)	12.0	-	A040+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via ASUNA 2A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on ASUNA 2A to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 133.25
APP 124.6
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
ARR 128.025

**SINGAPORE/Singapore Changi
RWY 20R/C/L
ASUNA TWO BRAVO ARRIVAL
ASUNA 2B**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

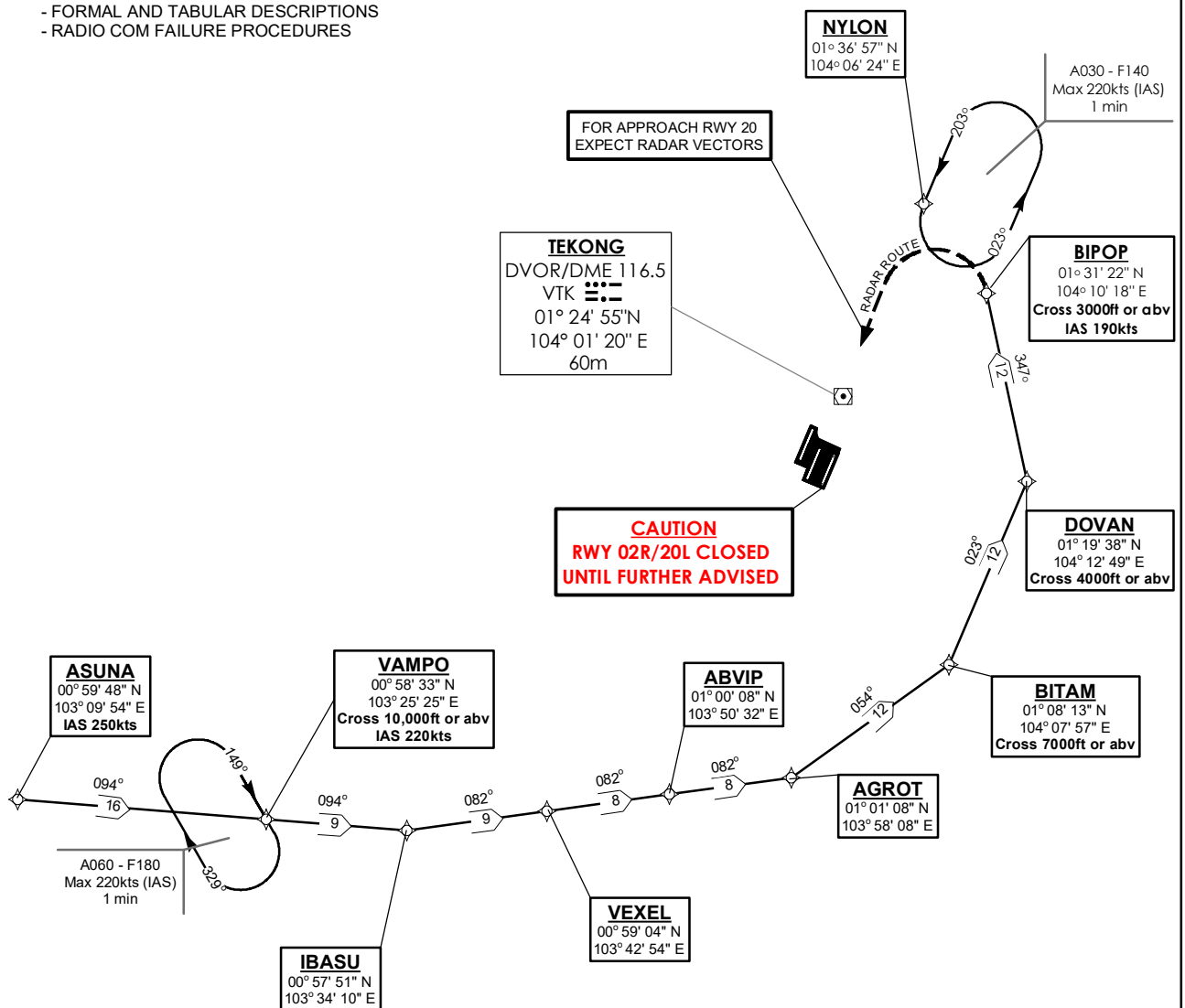
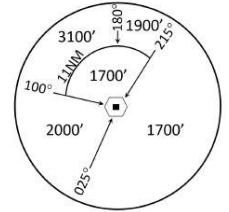
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



NOT TO SCALE

21 MAR 2024

ASUNA 2B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From ASUNA, speed 250kts.	ASUNA [K250] -	IF	N
To VAMPO at or above 10000ft, speed 220kts.	VAMPO [A100+; K220] -	TF	N
To IBASU, turn left.	IBASU [L] -	TF	N
To VEXEL.	VEXEL -	TF	N
To ABVIP.	ABVIP -	TF	N
To AGROT, turn left.	AGROT [L] -	TF	N
To BITAM at or above 7000ft, turn left.	BITAM [A070+; L] -	TF	N
To DOVAN at or above 4000ft, turn left.	DOVAN [A040+; L] -	TF	N
To BIPOP at or above 3000ft, speed 190kts.	BIPOP [A030+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	ASUNA	-	-	-	-	-	K250	RNAV1
TF	VAMPO	-	094(094.4)	16.0	-	A100+	K220	RNAV1
TF	IBASU	-	094(094.4)	9.0	L	-	-	RNAV1
TF	VEXEL	-	082(082.4)	9.0	-	-	-	RNAV1
TF	ABVIP	-	082(082.4)	8.0	-	-	-	RNAV1
TF	AGROT	-	082(082.4)	8.0	L	-	-	RNAV1
TF	BITAM	-	054(054.4)	12.0	L	A070+	-	RNAV1
TF	DOVAN	-	023(023.4)	12.0	L	A040+	-	RNAV1
TF	BIPOP	-	347(347.4)	12.0	-	A030+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via ASUNA 2B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on ASUNA 2B to BIPOP, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 133.8
APP 124.05
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

**SINGAPORE/Singapore Changi
RWY 02L/C/R
ELALO ONE ALPHA ARRIVAL
ELALO 1A**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

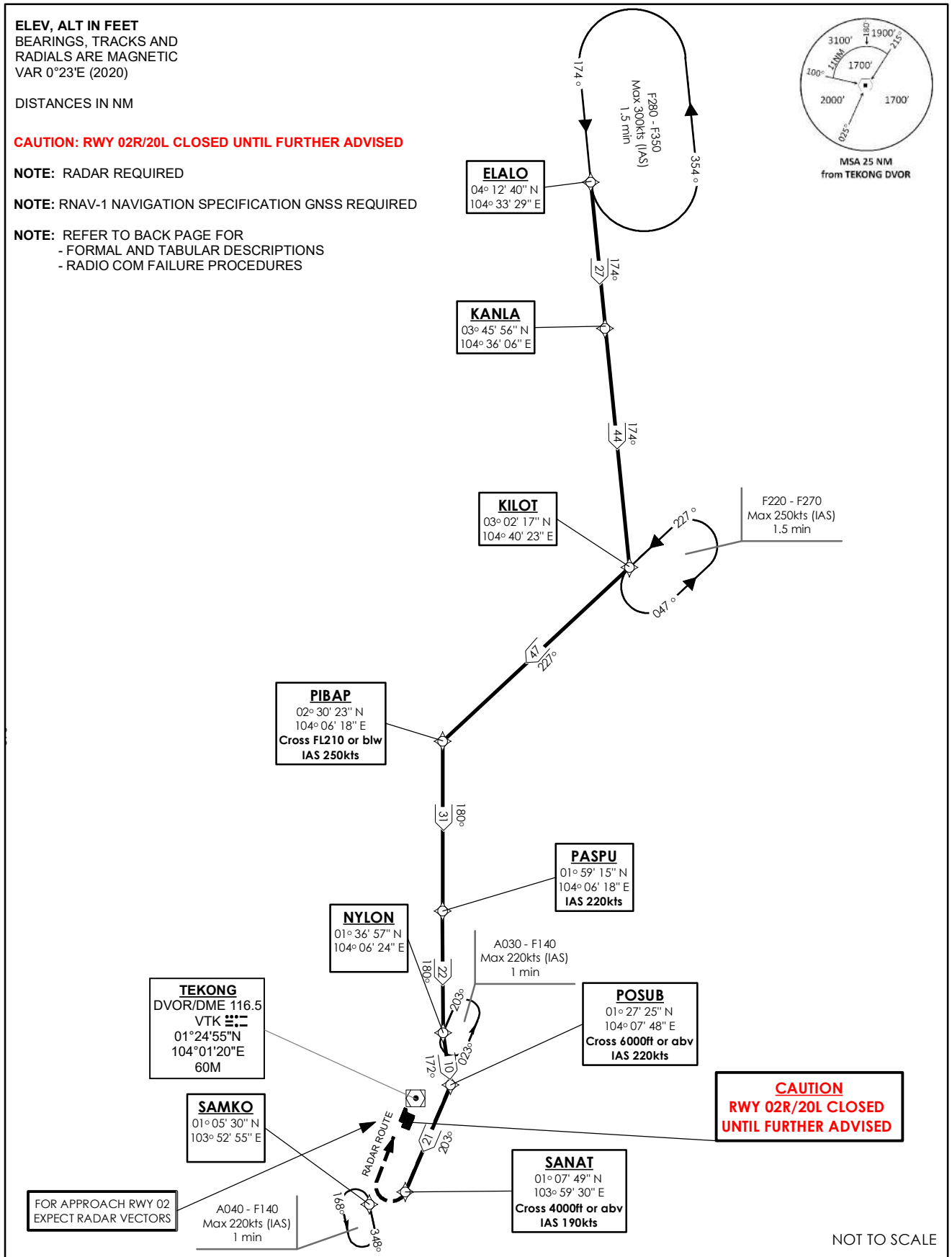
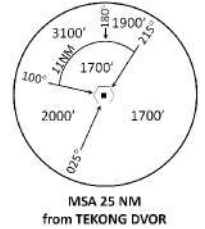
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



21 MAR 2024

ELALO 1A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From ELALO.	ELALO -	IF	N
To KANLA.	KANLA -	TF	N
To KILOT, turn right.	KILOT [R] -	TF	N
To PIBAP at or below FL210, speed 250kts, turn left.	PIBAP [FL210-; K250; L] -	TF	N
To PASPU, speed 220kts.	PASPU [K220] -	TF	N
To NYLON, turn left.	NYLON [L] -	TF	N
To POSUB at or above 6000ft, speed 220kts, turn right.	POSUB [A060+; K220; R] -	TF	N
To SANAT at or above 4000ft, speed 190kts.	SANAT [A040+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	ELALO	-	-	-	-	-	-	RNAV1
TF	KANLA	-	174(174.4)	27.0	-	-	-	RNAV1
TF	KILOT	-	174(174.4)	44.0	R	-	-	RNAV1
TF	PIBAP	-	227(227.4)	47.0	L	FL210-	K250	RNAV1
TF	PASPU	-	180(180.4)	31.0	-	-	K220	RNAV1
TF	NYLON	-	180(180.4)	22.0	L	-	-	RNAV1
TF	POSUB	-	172(172.4)	10.0	R	A060+	K220	RNAV1
TF	SANAT	-	203(203.4)	21.0	-	A040+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via ELALO 1A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on ELALO 1A to SANAT, then direct to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 133.8
APP 124.05
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

**SINGAPORE/Singapore Changi
RWY 20R/C/L
ELALO ONE BRAVO ARRIVAL
ELALO 1B**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

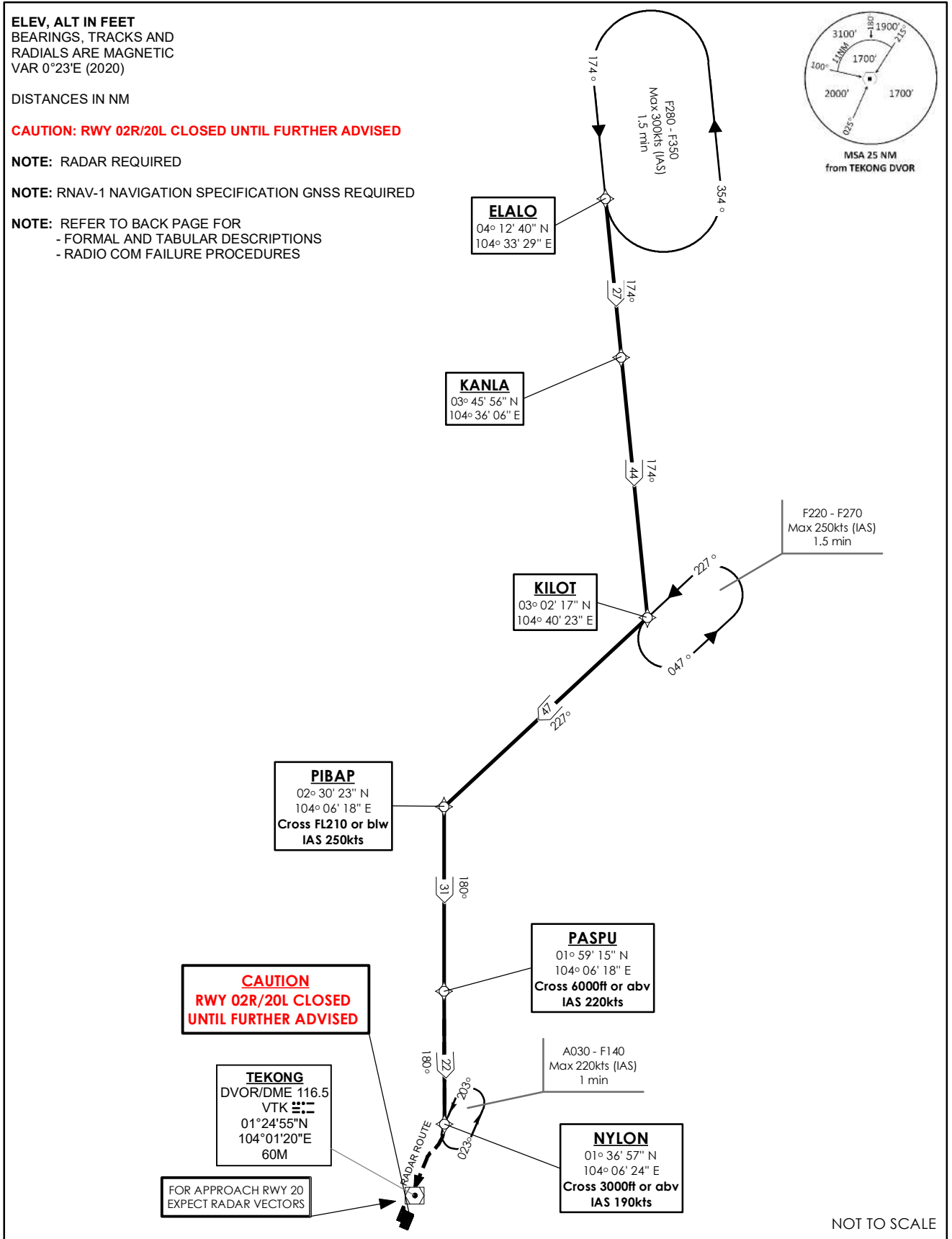
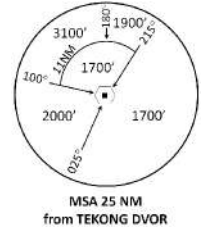
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



21 MAR 2024

ELALO 1B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From ELALO.	ELALO -	IF	N
To KANLA.	KANLA -	TF	N
To KILOT, turn right.	KILOT [R] -	TF	N
To PIBAP at or below FL210, speed 250kts turn left.	PIBAP [FL210-; K250; L] -	TF	N
To PASPU, at or above 6000ft, speed 220kts.	PASPU [A060+; K220] -	TF	N
To NYLON at or above 3000ft, speed 190kts.	NYLON [A030+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	ELALO	-	-	-	-	-	-	RNAV1
TF	KANLA	-	174(174.4)	27.0	-	-	-	RNAV1
TF	KILOT	-	174(174.4)	44.0	R	-	-	RNAV1
TF	PIBAP	-	227(227.4)	47.0	L	FL210-	K250	RNAV1
TF	PASPU	-	180(180.4)	31.0	-	A060+	K220	RNAV1
TF	NYLON	-	180(180.4)	22.0	-	A030+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via ELALO 1B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on ELALO 1B to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 134.2
APP 124.05
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

SINGAPORE/Singapore Changi
RWY 02L/C/R
KARTO TWO ALPHA ARRIVAL
KARTO 2A

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

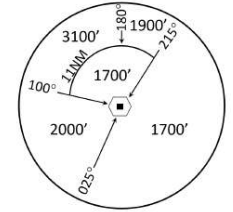
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

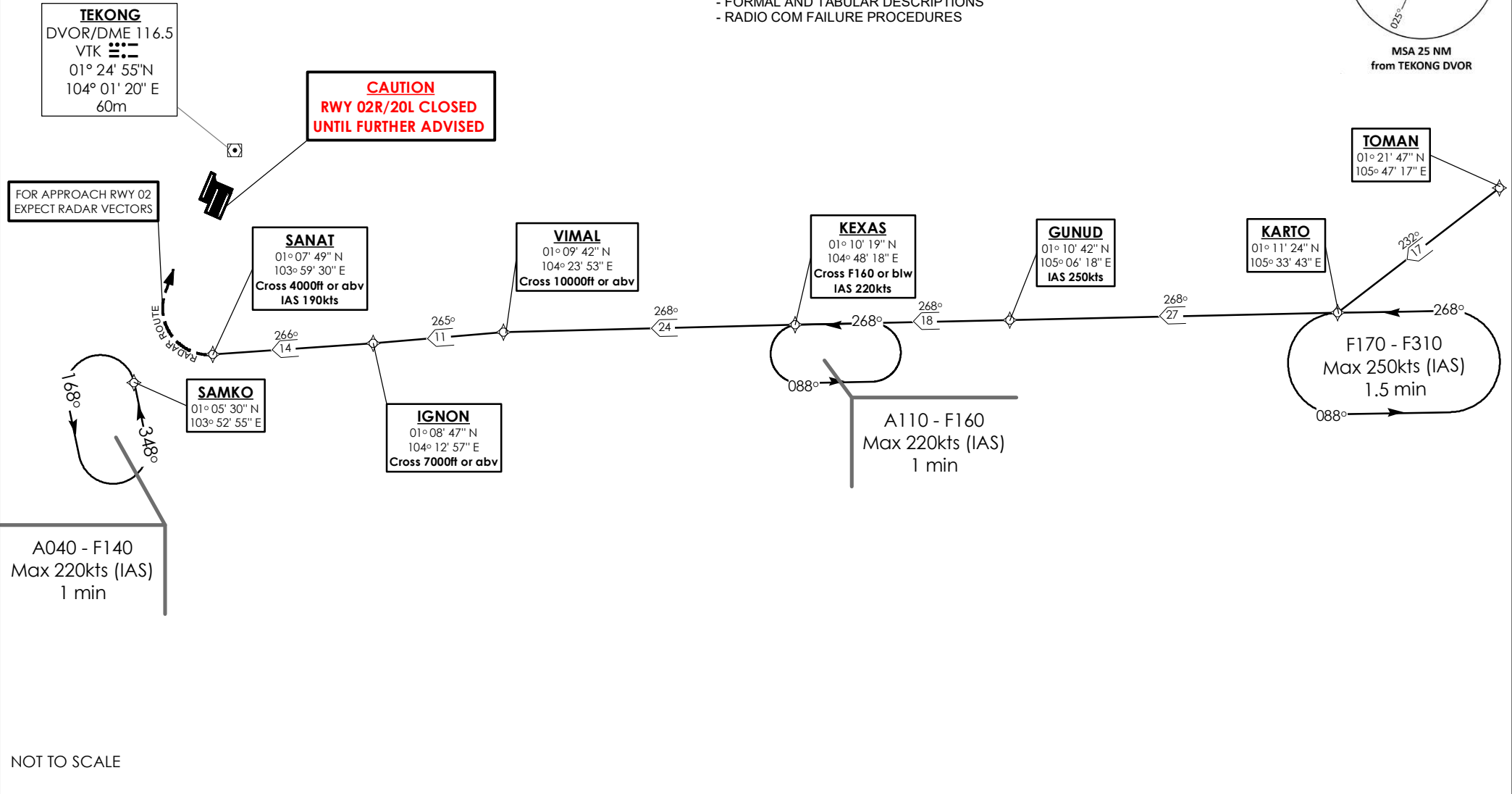
NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



MSA 25 NM
from TEKONG DVOR



NOT TO SCALE

KARTO 2A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From TOMAN.	TOMAN -	IF	N
To KARTO, turn right.	KARTO [R] -	TF	N
To GUNUD, speed 250kts	GUNUD [K250] -	TF	N
To KEXAS at or below FL160, speed 220kts.	KEXAS [FL160-; K220] -	TF	N
To VIMAL at or above 10000ft, turn left.	VIMAL [A100+; L] -	TF	N
To IGNON at or above 7000ft, turn right.	IGNON [A070+; R] -	TF	N
To SANAT at or above 4000ft, speed 190kts.	SANAT [A040+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	TOMAN	-	-	-	-	-	-	RNAV1
TF	KARTO	-	232(232.4)	17.0	R	-	-	RNAV1
TF	GUNUD	-	268(268.4)	27.0	-	-	K250	RNAV1
TF	KEXAS	-	268(268.4)	18.0	-	FL160-	K220	RNAV1
TF	VIMAL	-	268(268.4)	24.0	L	A100+	-	RNAV1
TF	IGNON	-	265(265.4)	11.0	R	A070+	-	RNAV1
TF	SANAT	-	266(266.4)	14.0	-	A040+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via KARTO 2A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on KARTO 2A to SANAT, then direct to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 134.2
APP 124.05
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

SINGAPORE/Singapore Changi
RWY 20R/C/L
KARTO TWO BRAVO ARRIVAL
KARTO 2B

ELEV. ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

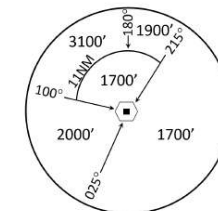
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

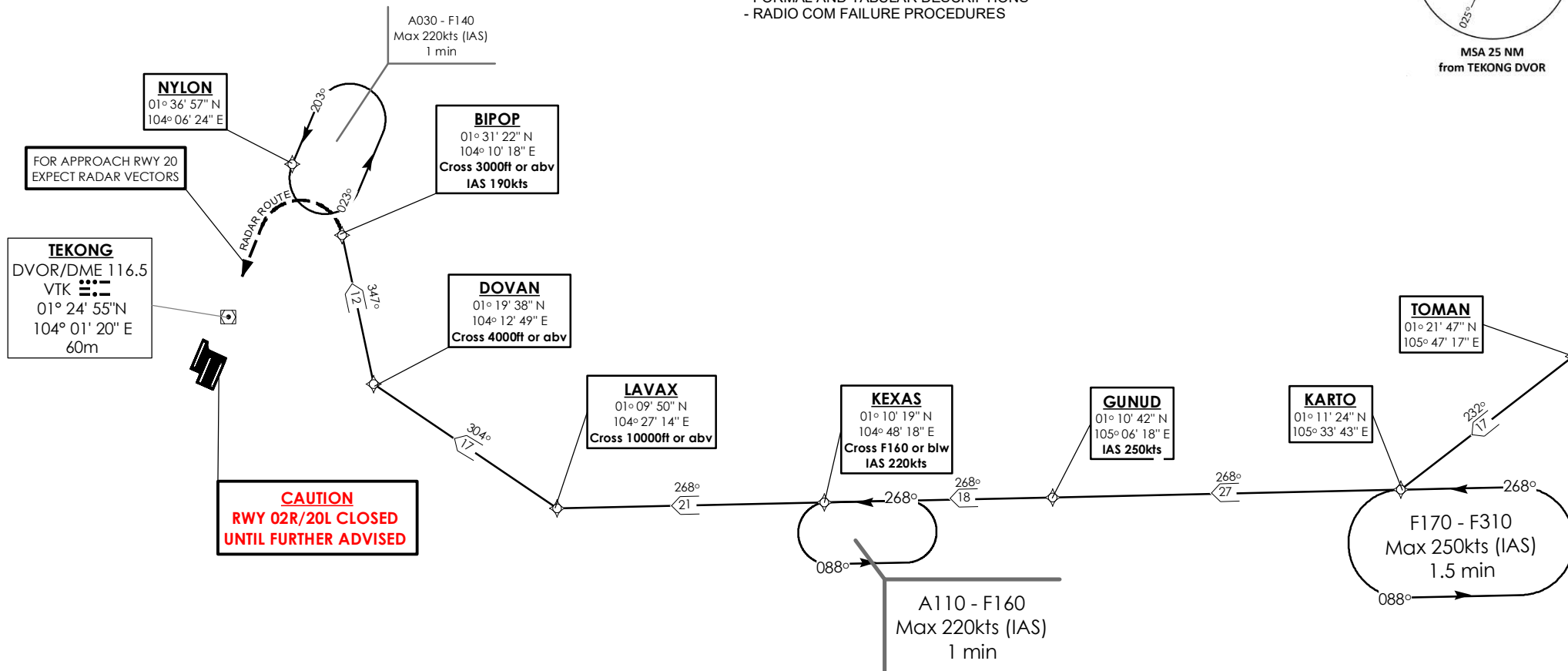
NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



MSA 25 NM
from TEKONG DVOR



NOT TO SCALE

CHANGES : 1. Procedure revised due to FIR Realignment
2. Indication of Runway 3 closure annotation and crosses "X"
3. AIP Page Reference

21 MAR 2024

KARTO 2B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From TOMAN.	TOMAN -	IF	N
To KARTO, turn right.	KARTO [R] -	TF	N
To GUNUD, speed 250kts.	GUNUD [K250] -	TF	N
To KEXAS at or below FL160, speed 220kts.	KEXAS [FL160-; K220] -	TF	N
To LAVAX at or above 10000ft, turn right.	LAVAX [A100+; R] -	TF	N
To DOVAN at or above 4000ft, turn right.	DOVAN [A040+; R] -	TF	N
To BIPOP at or above 3000ft, speed 190kts.	BIPOP [A030+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	TOMAN	-	-	-	-	-	-	RNAV1
TF	KARTO	-	232(232.4)	17.0	R	-	-	RNAV1
TF	GUNUD	-	268(268.4)	27.0	-	-	K250	RNAV1
TF	KEXAS	-	268(268.4)	18.0	-	FL160-	K220	RNAV1
TF	LAVAX	-	268(268.4)	21.0	R	A100+	-	RNAV1
TF	DOVAN	-	304(304.4)	17.0	R	A040+	-	RNAV1
TF	BIPOP	-	347(347.4)	12.0	-	A030+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via KARTO 2B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on KARTO 2B to BIPOP, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 133.8
APP 124.05
119.3
TWR 118.6

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

**SINGAPORE/Singapore Changi
RWY 02L/C/R
LEBAR TWO ALPHA ARRIVAL
LEBAR 2A**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

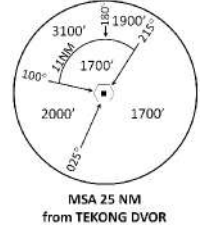
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



PASPU
01° 59' 15" N
104° 06' 18" E
IAS 220kts

PAPA UNIFORM
DVOR/DME 115.1
PU :---
01° 25' 24" N
103° 56' 00" E
60M
Cross 7,000ft or abv

TEKONG
DVOR/DME 116.5
VTK :---
01° 24' 55" N
104° 01' 20" E
60M

DEVIATION IS NOT PERMITTED
BETWEEN SJ AND PU

CAUTION
RWY 02R/20L CLOSED
UNTIL FURTHER ADVISED

SINJON
DVOR/DME 113.5
SJ :---
01° 13' 21.34" N
103° 51' 15.22" E
60M
Cross 7,000ft or abv

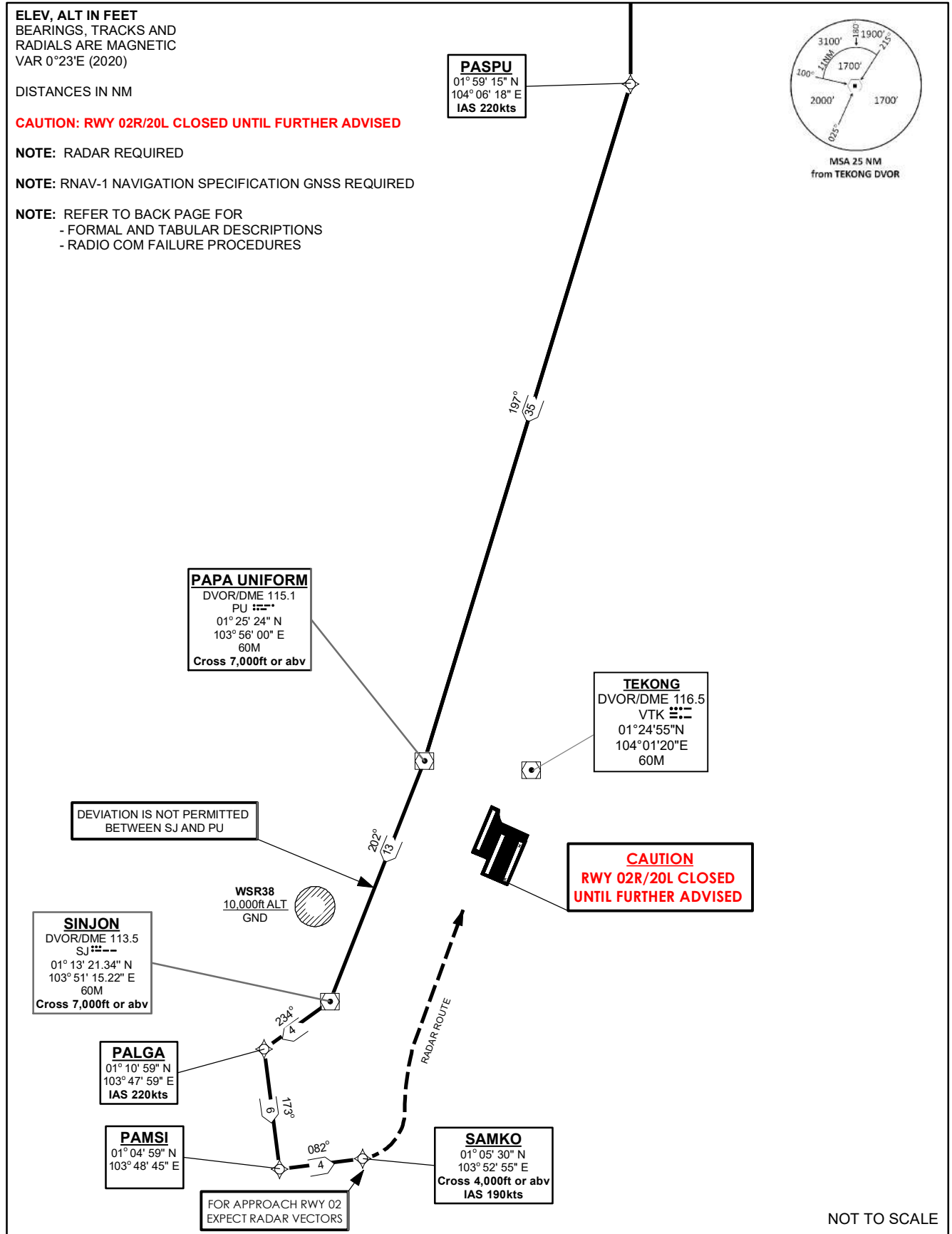
WSR38
10,000ft ALT
GND

PALGA
01° 10' 59" N
103° 47' 59" E
IAS 220kts

PAMSI
01° 04' 59" N
103° 48' 45" E

SAMKO
01° 05' 30" N
103° 52' 55" E
Cross 4,000ft or abv
IAS 190kts

FOR APPROACH RWY 02
EXPECT RADAR VECTORS



NOT TO SCALE

LEBAR 2A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From PASPU, speed 220kts.	PASPU [K220] -	IF	N
To PU at or above 7000ft, turn right.	PU [A070+; R] -	TF	N
To SJ at or above 7000ft, turn right.	SJ [A070+; R] -	TF	N
To PALGA, speed 220kts, turn left.	PALGA [K220; L] -	TF	N
To PAMSI, turn left.	PAMSI [L] -	TF	N
To SAMKO at or above 4000ft, speed 190kts.	SAMKO [A040+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	PASPU	-	-	-	-	-	K220	RNAV1
TF	PU	-	197(197.4)	35.0	R	A070+	-	RNAV1
TF	SJ	-	202(202.4)	13.0	R	A070+	-	RNAV1
TF	PALGA	-	234(234.4)	4.0	L	-	K220	RNAV1
TF	PAMSI	-	173(173.4)	6.0	L	-	-	RNAV1
TF	SAMKO	-	082(082.4)	4.0	-	A040+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via LEBAR 2A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on LEBAR 2A to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02L as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 134.4
APP 124.6
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE 11 000ft
D-ATIS AP ID-WSSS 128.025

**SINGAPORE/Singapore Changi
RWY 20R/C/L
LEBAR THREE BRAVO ARRIVAL
LEBAR 3B**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

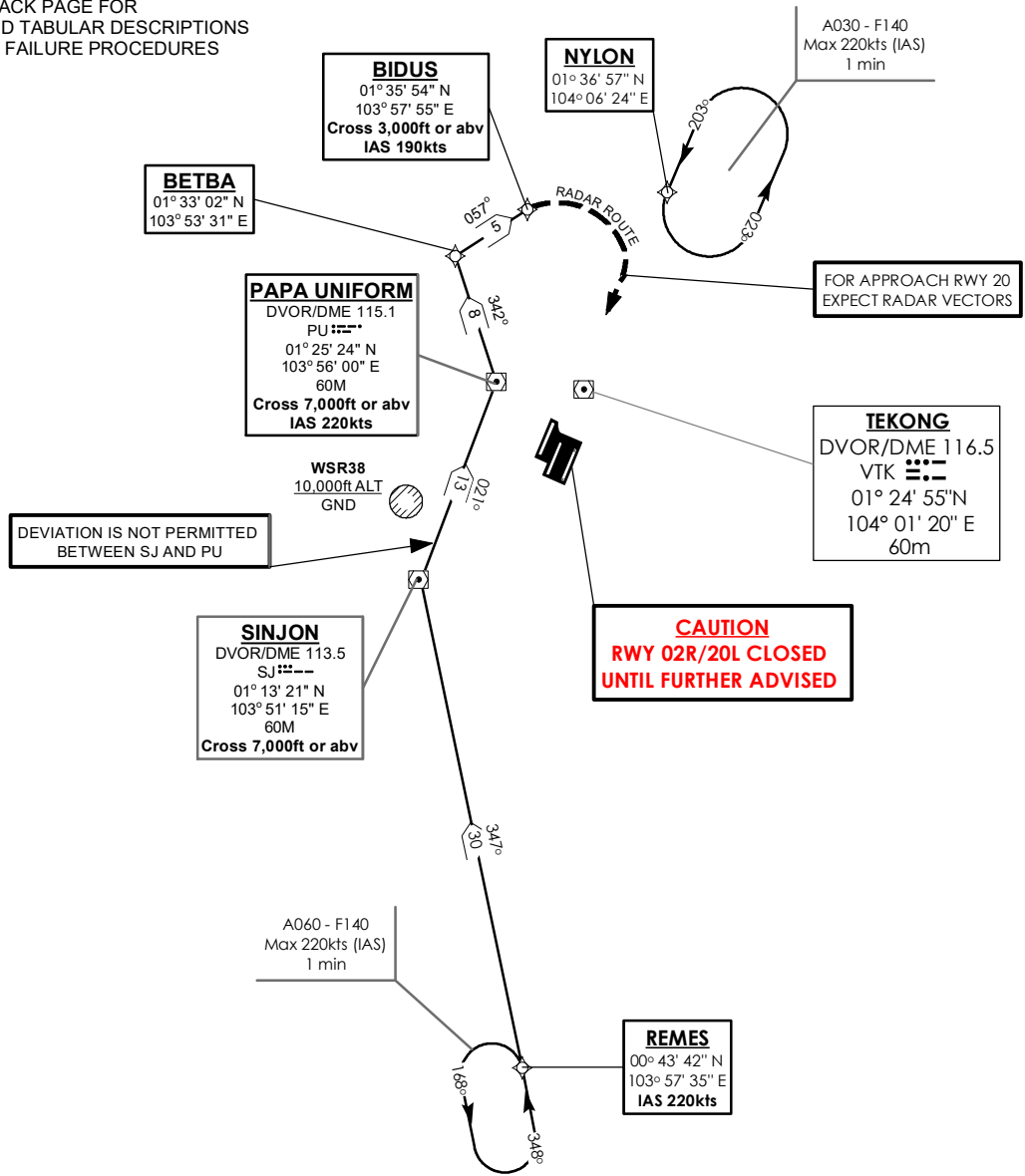
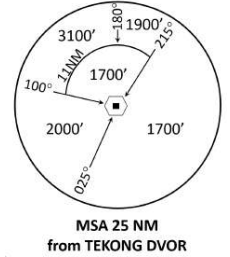
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



NOT TO SCALE

21 MAR 2024

LEBAR 3B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From REMES, speed 220kts.	REMES [K220] -	IF	N
To SJ at or above 7000ft, turn right.	SJ [A070+; R] -	TF	N
To PU at or above 7000ft, speed 220kts, turn left.	PU [A070+; K220; L] -	TF	N
To BETBA, turn right.	BETBA [R] -	TF	N
To BIDUS at or above 3000ft, speed 190kts.	BIDUS [A030+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	REMES	-	-	-	-	-	K220	RNAV1
TF	SJ	-	347(347.4)	30.0	R	A070+	-	RNAV1
TF	PU	-	021(021.4)	13.0	L	A070+	K220	RNAV1
TF	BETBA	-	342(342.4)	8.0	R	-	-	RNAV1
TF	BIDUS	-	057(057.4)	5.0	-	A030+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via LEBAR 3B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on LEBAR 3B to BIDUS, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 133.25
APP 124.6
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

**SINGAPORE/Singapore Changi
RWY 20R/C/L
LELIB THREE BRAVO ARRIVAL
LELIB 3B**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

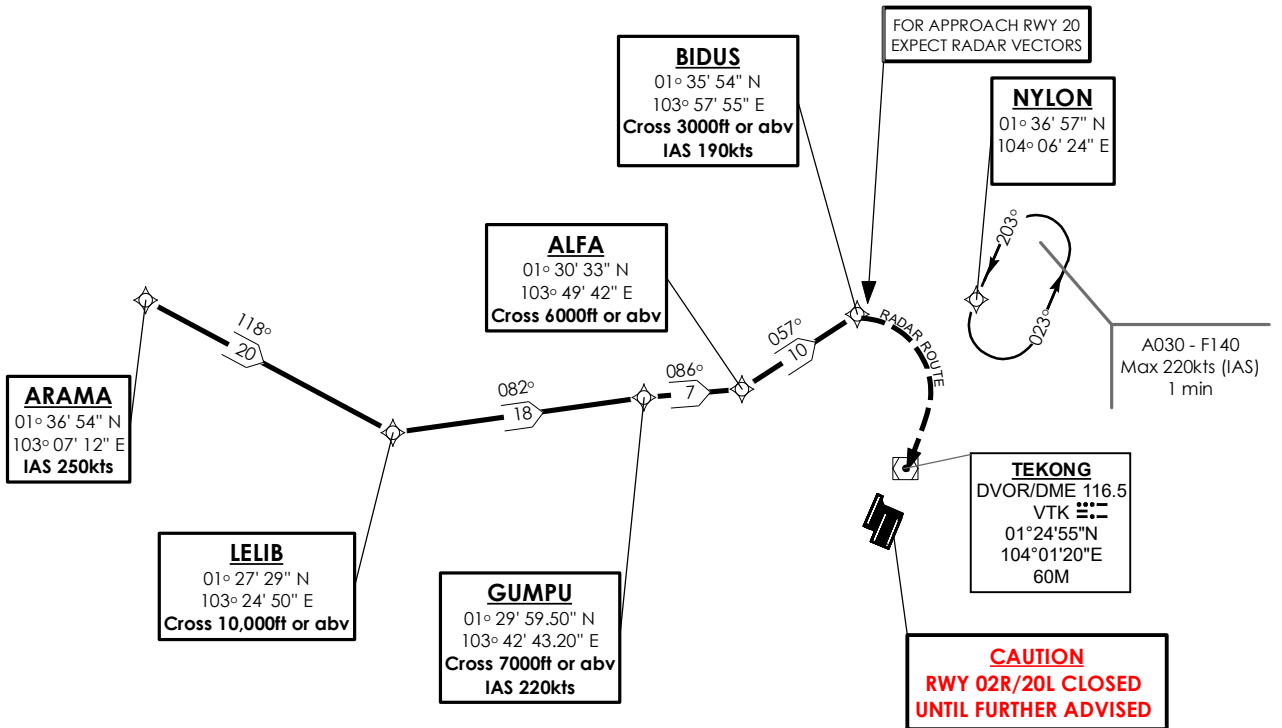
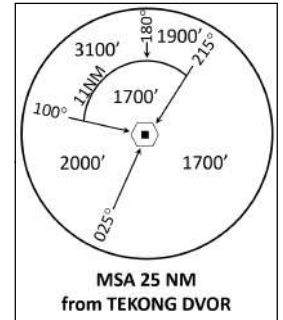
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



TEBUN 1B shall be the default STAR for WSSS RWY 20.
ATC will offer LELIB 3B when traffic permits.

NOT TO SCALE

21 MAR 2024

LELIB 3B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From ARAMA, speed 250kts.	ARAMA [K250] -	IF	N
To LELIB at or above 10000ft, turn left.	LELIB [A100+; L] -	TF	N
To GUMPU at or above 7000ft, speed 220kts, turn right.	GUMPU [A070+; K220; R] -	TF	N
To ALFA at or above 6000ft, turn left.	ALFA [A060+; L] -	TF	N
To BIDUS at or above 3000ft, speed 190kts.	BIDUS [A030+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	ARAMA	-	-	-	-	-	K250	RNAV1
TF	LELIB	-	118(118.4)	20.0	L	A100+	-	RNAV1
TF	GUMPU	-	082(082.4)	18.0	R	A070+	K220	RNAV1
TF	ALFA	-	086(086.4)	7.0	L	A060+	-	RNAV1
TF	BIDUS	-	057(057.4)	10.0	-	A030+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via LELIB 3B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on LELIB 3B to BIDUS, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 133.8
APP 124.05
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

**SINGAPORE/Singapore Changi
RWY 02L/C/R
MABAL TWO ALPHA ARRIVAL
MABAL 2A**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

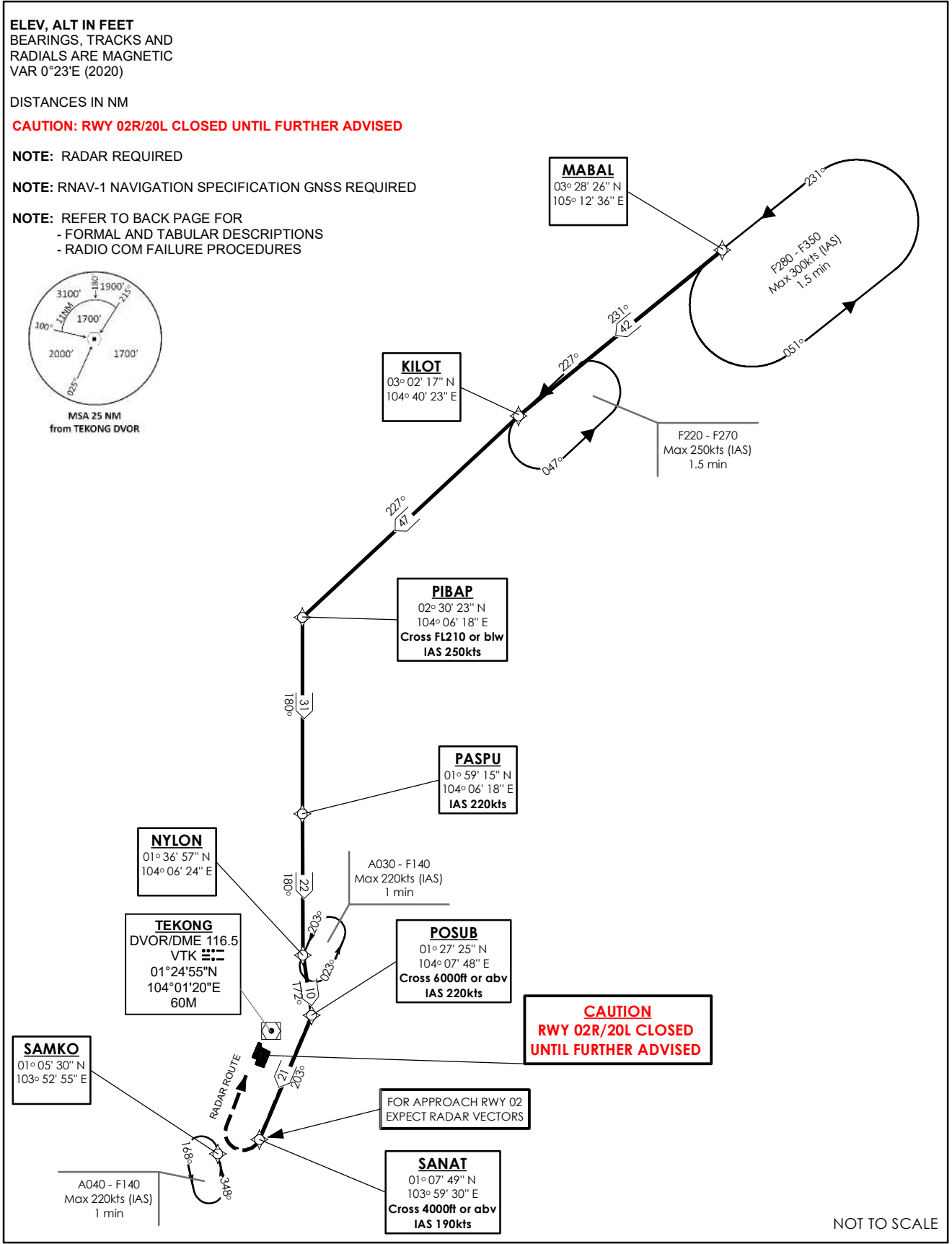
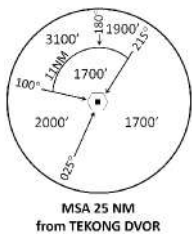
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



21 MAR 2024

MABAL 2A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From MABAL.	MABAL -	IF	N
To KILOT, turn left.	KILOT [L] -	TF	N
To PIBAP at or below FL210, speed 250kts, turn left.	PIBAP [FL210-; K250; L] -	TF	N
To PASPU, speed 220kts.	PASPU [K220] -	TF	N
To NYLON, turn left.	NYLON [L] -	TF	N
To POSUB at or above 6000ft, speed 220kts, turn right.	POSUB [A060+; K220; R] -	TF	N
To SANAT at or above 4000ft, speed 190kts.	SANAT [A040+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	MABAL	-	-	-	-	-	-	RNAV1
TF	KILOT	-	231(231.4)	42.0	L	-	-	RNAV1
TF	PIBAP	-	227(227.4)	47.0	L	FL210-	K250	RNAV1
TF	PASPU	-	180(180.4)	31.0	-	-	K220	RNAV1
TF	NYLON	-	180(180.4)	22.0	L	-	-	RNAV1
TF	POSUB	-	172(172.4)	10.0	R	A060+	K220	RNAV1
TF	SANAT	-	203(203.4)	21.0	-	A040+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via MABAL 2A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on MABAL 2A to SANAT, then direct to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 133.8
APP 124.05
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

SINGAPORE/Singapore Changi
RWY 20R/C/L
MABAL TWO BRAVO ARRIVAL
MABAL 2B

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

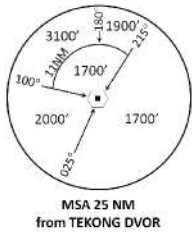
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



FOR APPROACH RWY 20
EXPECT RADAR VECTORS

TEKONG
DVOR/DME 116.5
VTK
01°24'55"N
104°01'20"E
60M



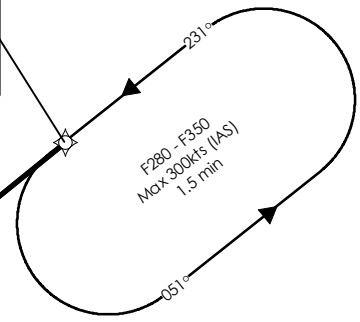
PIBAP
02° 30' 23" N
104° 06' 18" E
Cross FL210 or blw
IAS 250kts

PASPU
01° 59' 15" N
104° 06' 18" E
Cross 6000ft or abv
IAS 220kts

NYLON
01° 36' 57" N
104° 06' 24" E
Cross 3000ft or abv
IAS 190kts

CAUTION
RWY 02R/20L CLOSED
UNTIL FURTHER ADVISED

MABAL
03° 28' 26" N
105° 12' 36" E



F220 - F270
Max 250kts (IAS)
1.5 min

NOT TO SCALE

21 MAR 2024

MABAL 2B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From MABAL.	MABAL -	IF	N
To KILOT, turn left.	KILOT [L] -	TF	N
To PIBAP at or below FL210, speed 250kts, turn left.	PIBAP [FL210-; K250; L] -	TF	N
To PASPU, at or above 6000ft, speed 220kts.	PASPU [A060+; K220] -	TF	N
To NYLON at or above 3000ft, speed 190kts.	NYLON [A030+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	MABAL	-	-	-	-	-	-	RNAV1
TF	KILOT	-	231(231.4)	42.0	L	-	-	RNAV1
TF	PIBAP	-	227(227.4)	47.0	L	FL210-	K250	RNAV1
TF	PASPU	-	180(180.4)	31.0	-	A060+	K220	RNAV1
TF	NYLON	-	180(180.4)	22.0	-	A030+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via MABAL 2B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on MABAL 2B to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 134.4
APP 124.6
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE 11 000ft

D-ATIS AP ID-WSSS 128.025

**SINGAPORE/Singapore Changi
RWY 02L/C/R
REPOV TWO ALPHA ARRIVAL
REPOV 2A**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)


DISTANCES IN NM

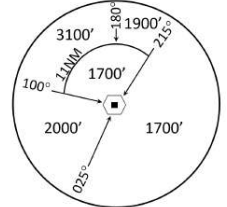
CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

TEKONG DVOR/DME 116.5 VTK  01° 24' 55"N 104° 01' 20" E 60m



MSA 25 NM
from TEKONG DVOR

**CAUTION
RWY 02R/20L CLOSED
UNTIL FURTHER ADVISED**

FOR APPROACH RWY 02
EXPECT RADAR VECTORS

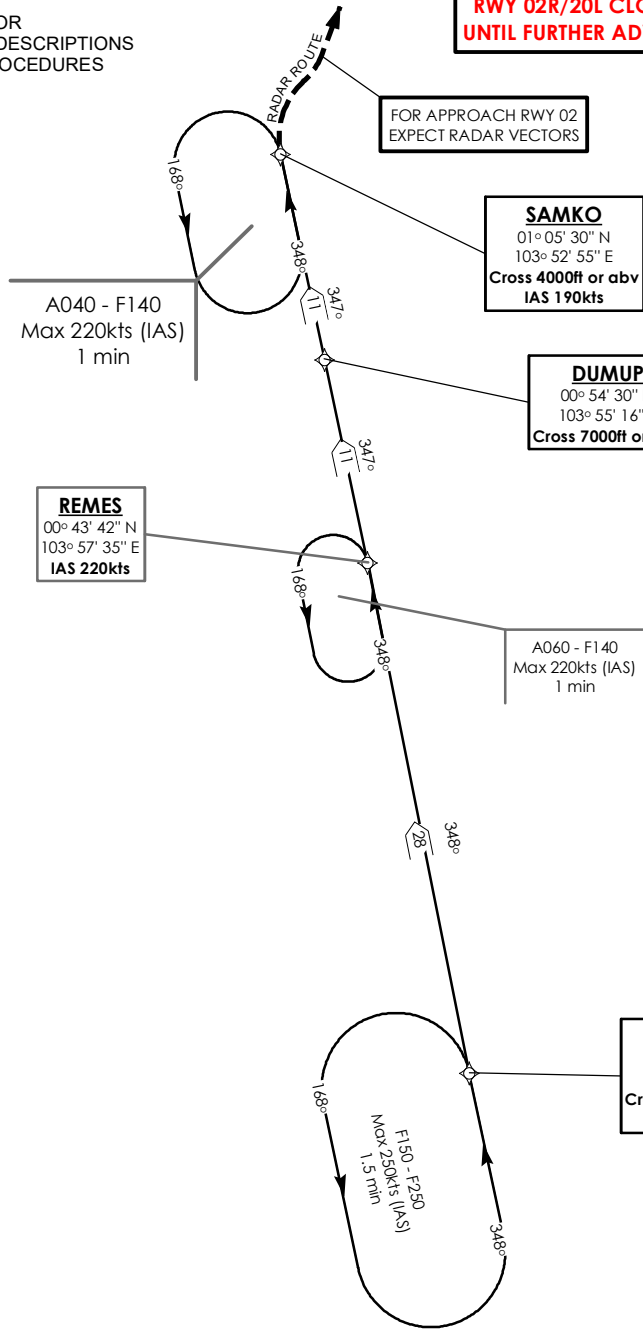
SAMKO 01° 05' 30" N 103° 52' 55" E Cross 4000ft or abv IAS 190kts
--

DUMUP 00° 54' 30" N 103° 55' 16" E Cross 7000ft or abv
--

REMES 00° 43' 42" N 103° 57' 35" E IAS 220kts

A060 - F140
Max 220kts (IAS)
1 min

REPOV 00° 16' 23" N 104° 03' 00" E Cross FL210 or blw IAS 250kts



NOT TO SCALE

21 MAR 2024

REPOV 2A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From REPOV at or below FL210, speed 250kts.	REPOV [FL210-; K250] -	IF	N
To REMES, speed 220kts, turn left.	REMES [K220; L] -	TF	N
To DUMUP at or above 7000ft.	DUMUP [A070+] -	TF	N
To SAMKO at or above 4000ft, speed 190kts.	SAMKO [A040+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	REPOV	-	-	-	-	FL210-	K250	RNAV1
TF	REMES	-	348(348.4)	28.0	L	-	K220	RNAV1
TF	DUMUP	-	347(347.4)	11.0	-	A070+	-	RNAV1
TF	SAMKO	-	347(347.4)	11.0	-	A040+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via REPOV 2A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on REPOV 2A to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 134.4
APP 124.6
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

SINGAPORE/Singapore Changi
RWY 20R/C/L
REPOV TWO BRAVO ARRIVAL
REPOV 2B

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)


DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

TEKONG
DVOR/DME 116.5
VTK 
01° 24' 55"N
104° 01' 20" E
60m

CAUTION
RWY 02R/20L CLOSED
UNTIL FURTHER ADVISED

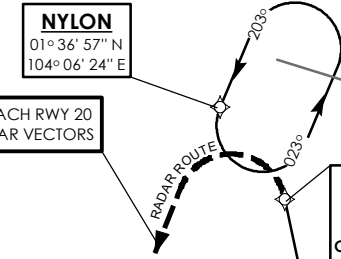
DOVAN
01° 19' 38" N
104° 12' 49" E
Cross 4000ft or abv

BITAM
01° 08' 13" N
104° 07' 57" E
Cross 7000ft or abv

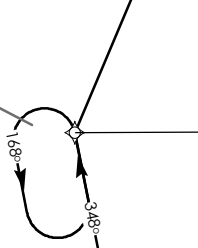
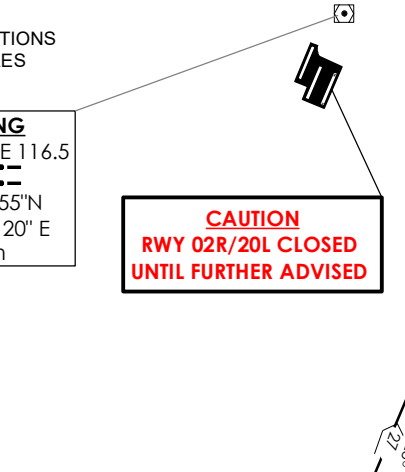
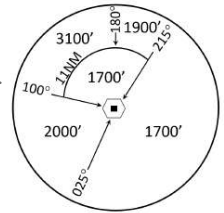
REMES
00° 43' 42" N
103° 57' 35" E
IAS 220kts

REPOV
00° 16' 23" N
104° 03' 00" E
Cross FL210 or blw
IAS 250kts

A060 - F140
Max 220kts (IAS)
1 min



A030 - F140
Max 220kts (IAS)
1 min



NOT TO SCALE

21 MAR 2024

REPOV 2B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From REPOV at or below FL210, speed 250kts.	REPOV [FL210-; K250] -	IF	N
To REMES, speed 220kts, turn right.	REMES [K220; R] -	TF	N
To BITAM at or above 7000ft.	BITAM [A070+] -	TF	N
To DOVAN at or above 4000ft, turn left.	DOVAN [A040+; L] -	TF	N
To BIPOP at or above 3000ft, speed 190kts.	BIPOP [A030+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	REPOV	-	-	-	-	FL210-	K250	RNAV1
TF	REMES	-	348(348.4)	28.0	R	-	K220	RNAV1
TF	BITAM	-	023(023.4)	27.0	-	A070+	-	RNAV1
TF	DOVAN	-	023(023.4)	12.0	L	A040+	-	RNAV1
TF	BIPOP	-	347(347.4)	12.0		A030+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via REPOV 2B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on REPOV 2B to BIPOP, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 133.25
APP 124.6
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
ARR 128.025

SINGAPORE/Singapore Changi
RWY 02L/C/R
TEBUN ONE ALPHA ARRIVAL
TEBUN 1A

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

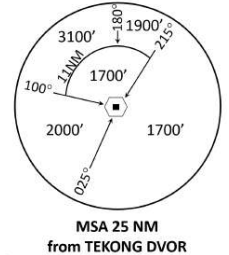
CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

NOTE: FLIGHT PLANNING INSTRUCTIONS:
- AIRCRAFT TO FLY ARAMA DIRECT TO TEBUN
TO JOIN TEBUN 1A STAR



CAUTION
RWY 02R/20L CLOSED
UNTIL FURTHER ADVISED

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55" N
104° 01' 20" E
60m

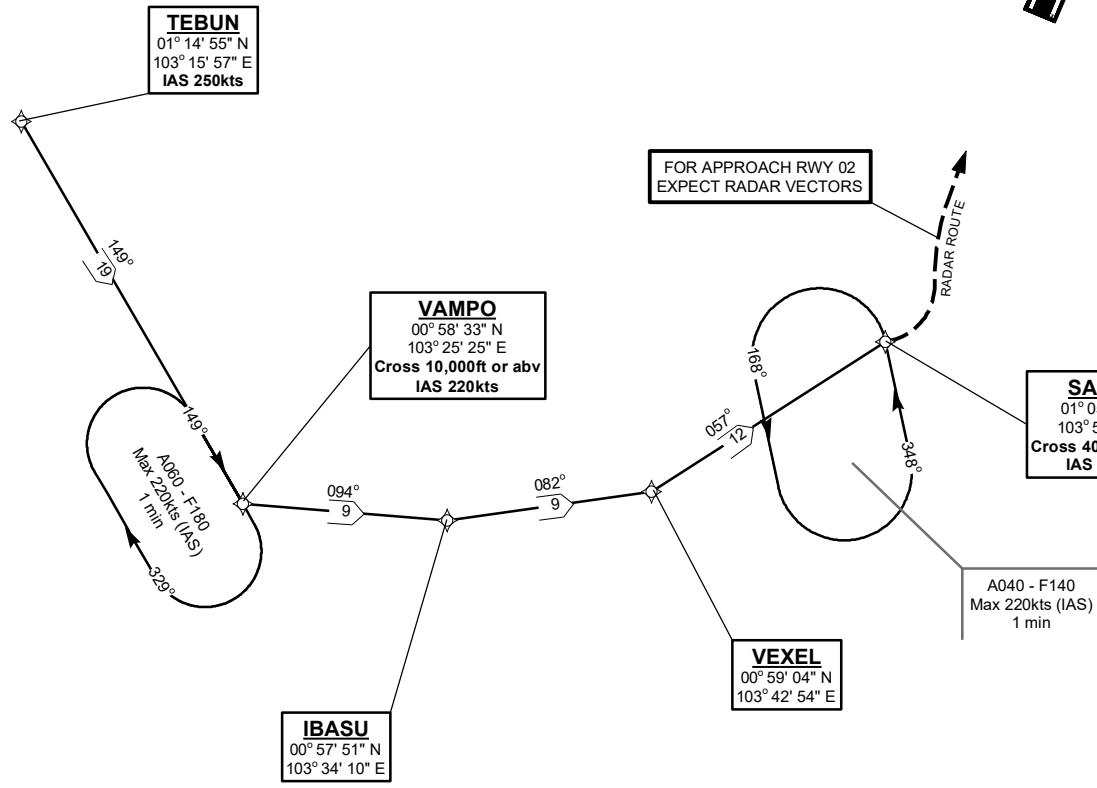
TEBUN
01° 14' 55" N
103° 15' 57" E
IAS 250kts

VAMPO
00° 58' 33" N
103° 25' 25" E
Cross 10,000ft or abv
IAS 220kts

SAMKO
01° 05' 30" N
103° 52' 55" E
Cross 4000ft or abv
IAS 190kts

VESEL
00° 59' 04" N
103° 42' 54" E

IBASU
00° 57' 51" N
103° 34' 10" E



FOR APPROACH RWY 02
EXPECT RADAR VECTORS

NOT TO SCALE

21 MAR 2024

TEBUN 1A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From TEBUN, Speed 250kts.	TEBUN [K250] -	IF	N
To VAMPO at or above 10000ft, speed 220kts, turn left.	VAMPO [A100+; K220; L] -	TF	N
To IBASU, turn left.	IBASU [L] -	TF	N
To VEXEL, turn left.	VEXEL [L] -	TF	N
To SAMKO at or above 4000ft, speed 190kts.	SAMKO [A040+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	TEBUN	-	-	-	-	-	K250	RNAV1
TF	VAMPO	-	149(149.4)	19.0	L	A100+	K220	RNAV1
TF	IBASU	-	094(094.4)	9.0	L	-	-	RNAV1
TF	VEXEL	-	082(082.4)	9.0	L	-	-	RNAV1
TF	SAMKO	-	057(057.4)	12.0	-	A040+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via TEBUN 1A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on TEBUN 1A to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 133.25
APP 124.6
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
ARR 128.025

**SINGAPORE/Singapore Changi
RWY 20R/C/L
TEBUN ONE BRAVO ARRIVAL
TEBUN 1B**

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

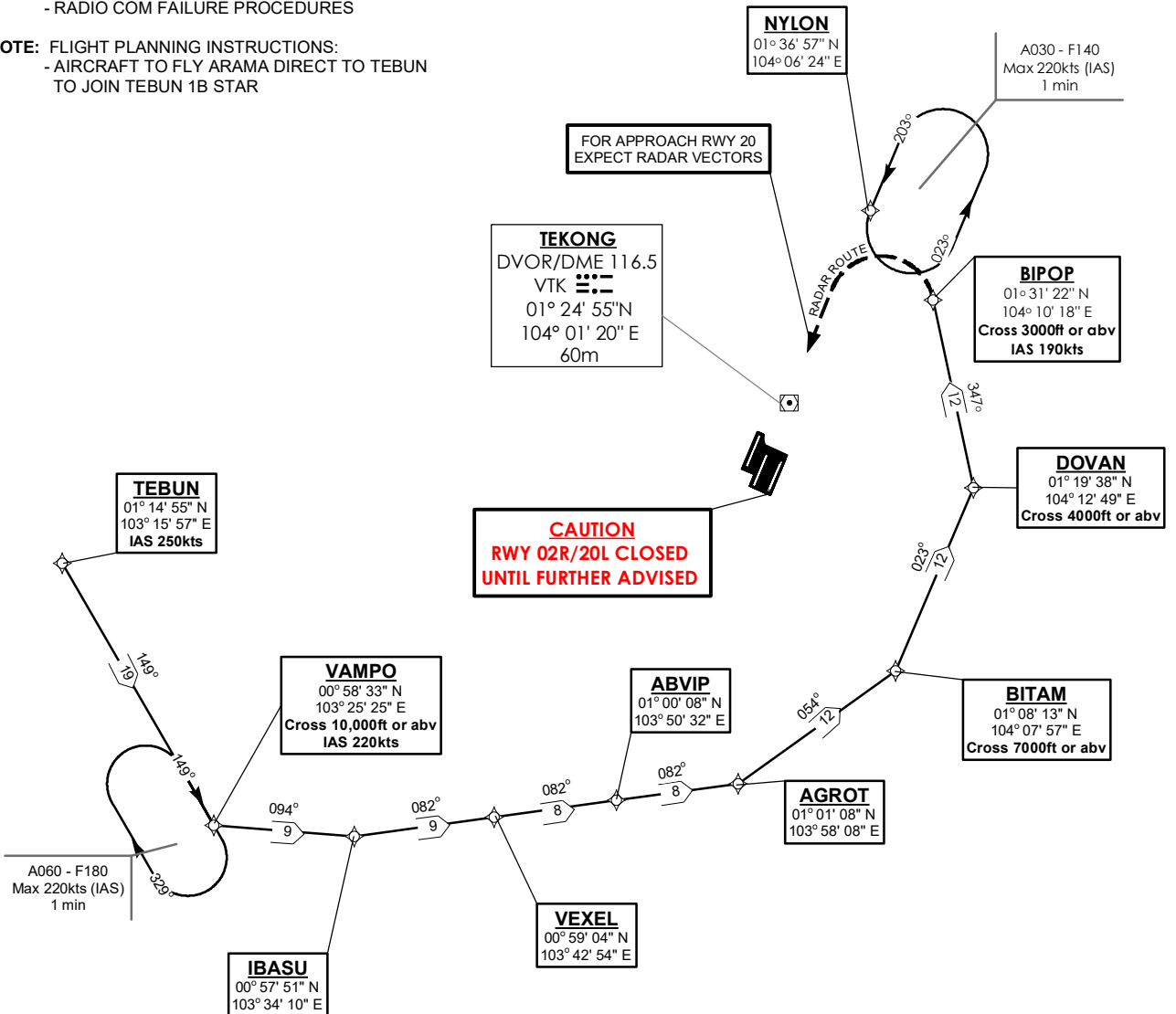
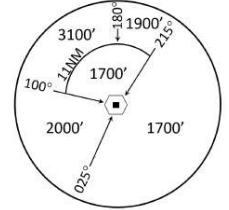
CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

NOTE: FLIGHT PLANNING INSTRUCTIONS:
- AIRCRAFT TO FLY ARAMA DIRECT TO TEBUN
TO JOIN TEBUN 1B STAR



NOT TO SCALE

21 MAR 2024

TEBUN 1B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From TEBUN, speed 250kts.	TEBUN [K250] -	IF	N
To VAMPO at or above 10000ft, speed 220kts, turn left,	VAMPO [A100+; K220; L] -	TF	N
To IBASU, turn left.	IBASU [L] -	TF	N
To VEXEL.	VEXEL -	TF	N
To ABVIP.	ABVIP -	TF	N
To AGROT, turn left.	AGROT [L] -	TF	N
To BITAM at or above 7000ft, turn left.	BITAM [A070+; L] -	TF	N
To DOVAN at or above 4000ft, turn left.	DOVAN [A040+; L] -	TF	N
To BIPOP at or above 3000ft, speed 190kts.	BIPOP [A030+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	TEBUN	-	-	-	-	-	K250	RNAV1
TF	VAMPO	-	149(149.4)	19.0	L	A100+	K220	RNAV1
TF	IBASU	-	094(094.4)	9.0	L	-	-	RNAV1
TF	VEXEL	-	082(082.4)	9.0	-	-	-	RNAV1
TF	ABVIP	-	082(082.4)	8.0	-	-	-	RNAV1
TF	AGROT	-	082(082.4)	8.0	L	-	-	RNAV1
TF	BITAM	-	054(054.4)	12.0	L	A070+	-	RNAV1
TF	DOVAN	-	023(023.4)	12.0	L	A040+	-	RNAV1
TF	BIPOP	-	347(347.4)	12.0	-	A030+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via TEBUN 1B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on TEBUN 1B to BIPOP, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	No clearance or instruction received from Singapore ATC
	- Refer to Singapore AIP for radio communications failure procedure

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 134.2
APP 124.05
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

SINGAPORE/Singapore Changi
RWY 02L/C/R
UGEBO ONE ALPHA ARRIVAL
UGEBO 1A

ELEV. ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

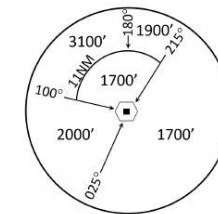
DISTANCES IN NM

CAUTION: RWY 02R/20L CLOSED UNTIL FURTHER ADVISED

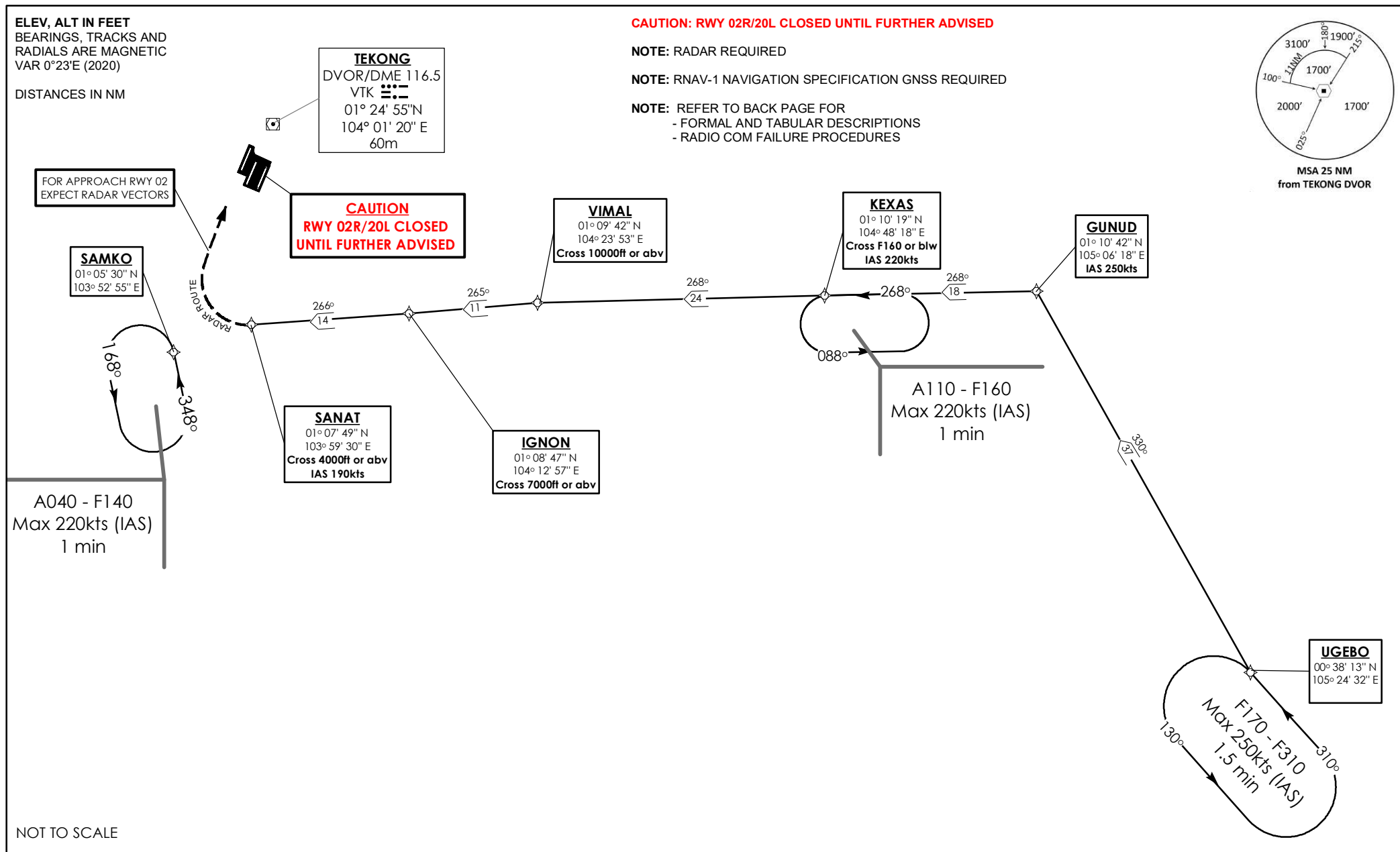
NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



MSA 25 NM
from TEKONG DVOR



NOT TO SCALE

21 MAR 2024

UGEBO 1A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From UGEB0.	UGEBO -	IF	N
To GUNUD, speed 250kts, turn left.	GUNUD [K250; L] -	TF	N
To KEXAS at or below FL160, speed 220kts.	KEXAS [FL160-; K220] -	TF	N
To VIMAL at or above 10000ft, turn left.	VIMAL [A100+; L] -	TF	N
To IGNON at or above 7000ft, turn right.	IGNON [A070+; R] -	TF	N
To SANAT at or above 4000ft, speed 190kts.	SANAT [A040+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	UGEBO	-	-	-	-	-	-	RNAV1
TF	GUNUD	-	330(330.4)	37.0	L	-	K250	RNAV1
TF	KEXAS	-	268(268.4)	18.0	-	FL160-	K220	RNAV1
TF	VIMAL	-	268(268.4)	24.0	L	A100+	-	RNAV1
TF	IGNON	-	265(265.4)	11.0	R	A070+	-	RNAV1
TF	SANAT	-	266(266.4)	14.0	-	A040+	K190	RNAV1

Radio Communications Failure Procedure

1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via UGEB0 1A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on UGEB0 1A to SANAT, then direct to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 134.2
APP 124.05
119.3
TWR 118.6 / 118.25

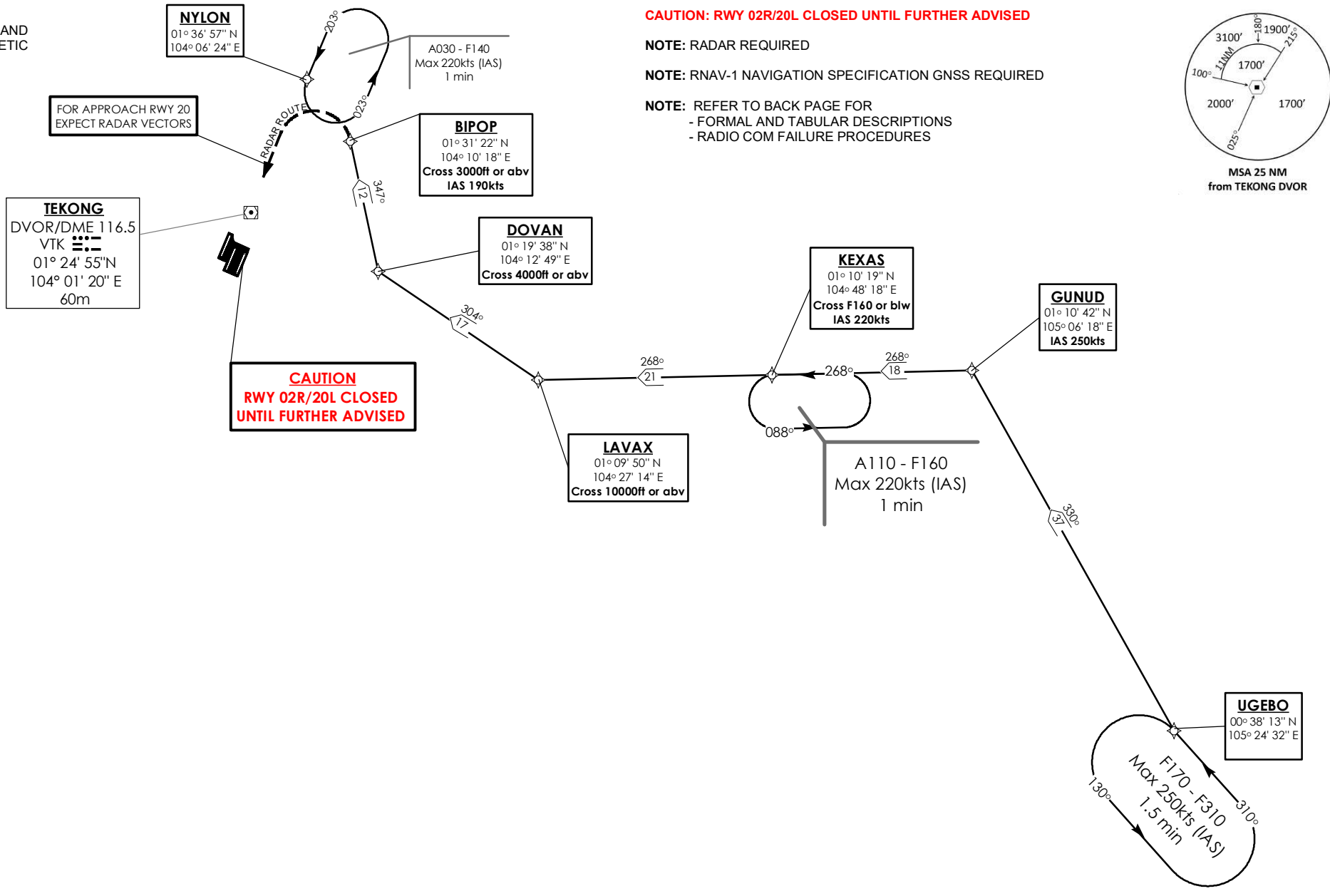
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

SINGAPORE/Singapore Changi
RWY 20R/C/L
UGEBO ONE BRAVO ARRIVAL
UGEBO 1B

ELEV. ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



NOT TO SCALE

21 MAR 2024

UGEBO 1B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS**Formal & Abbreviated Descriptions**

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From UGEB0.	UGEBO -	IF	N
To GUNUD, speed 250kts, turn left.	GUNUD [K250; L] -	TF	N
To KEXAS at or below FL160, speed 220kts.	KEXAS [FL160-; K220] -	TF	N
To LAVAX at or above 10000ft, turn right.	LAVAX [A100+; R] -	TF	N
To DOVAN at or above 4000ft, turn right.	DOVAN [A040+; R] -	TF	N
To BIPOP at or above 3000ft, speed 190kts.	BIPOP [A030+; K190]	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Distance (NM)	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	UGEBO	-	-	-	-	-	-	RNAV1
TF	GUNUD	-	330(330.4)	37.0	L	-	K250	RNAV1
TF	KEXAS	-	268(268.4)	18.0	-	FL160-	K220	RNAV1
TF	LAVAX	-	268(268.4)	21.0	R	A100+	-	RNAV1
TF	DOVAN	-	304(304.4)	17.0	R	A040+	-	RNAV1
TF	BIPOP	-	347(347.4)	12.0	-	A030+	K190	RNAV1

Radio Communications Failure Procedure

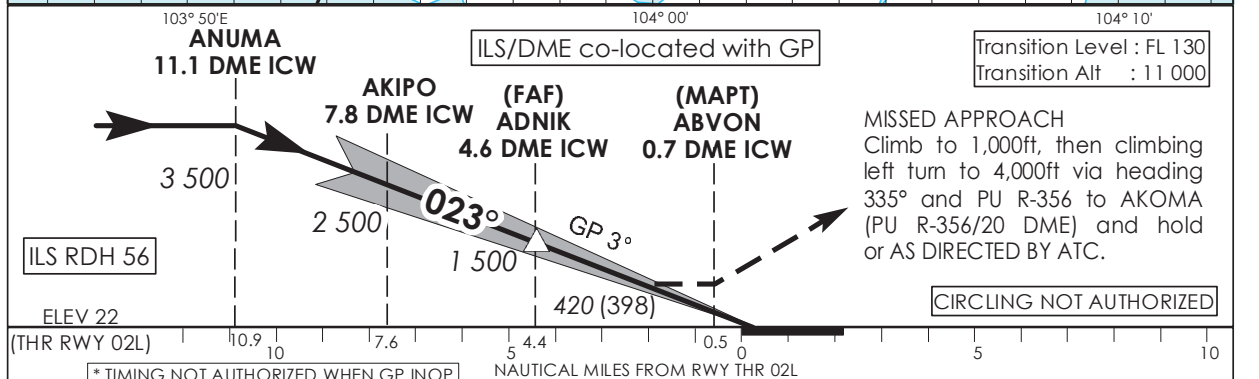
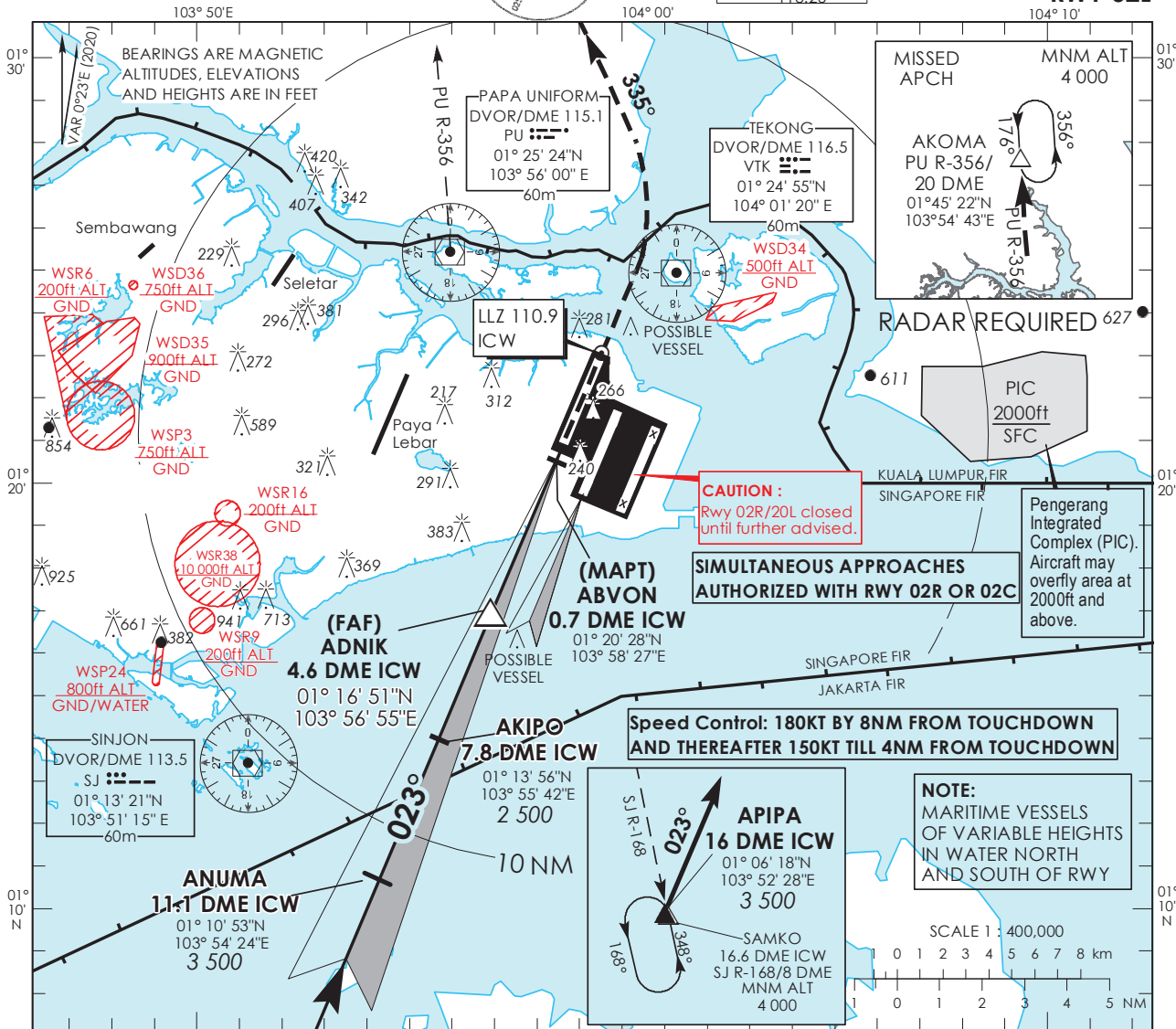
1	SET TRANSPONDER TO MODE A/C CODE 7600
2	<p>When cleared via UGEB0 1B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on UGEB0 1B to BIPOP, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p>
3	<p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p>

INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO THR RWY 02L - ELEV 22ft

D-ATIS AP ID WSSS
128.025
APP 124.05
TWR 119.3
118.6
118.25

SINGAPORE/ SINGAPORE CHANGI ICW ILS/DME RWY 02L



* TIMING NOT AUTHORIZED WHEN GP INOP

OCA (OCH)						
Category of Aircraft	A	B	C	D	D _L	
Straight-in	CAT I ILS	173 (151)	187 (165)	203 (181)	216 (194)	219 (197)
	CAT II ILS	88 (66)	98 (76)	108 (86)	127 (105)	127 (105)
	GP INOP	420 (398)				
Distance	4 DME		3 DME		2 DME	
Altitude (Height)	1290 (1268)		970 (948)		660 (638)	
Speed	knots	70	120	150	185	
FAF - MAPT 3.9nm	min : s *	3 : 21	1 : 57	1 : 34	1 : 16	
Rate of descent/GS	ft/min	370	635	795	980	

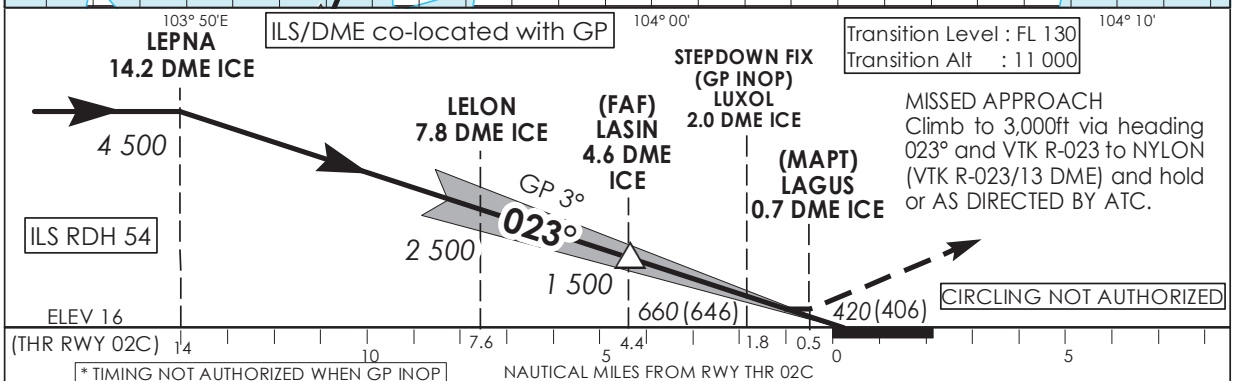
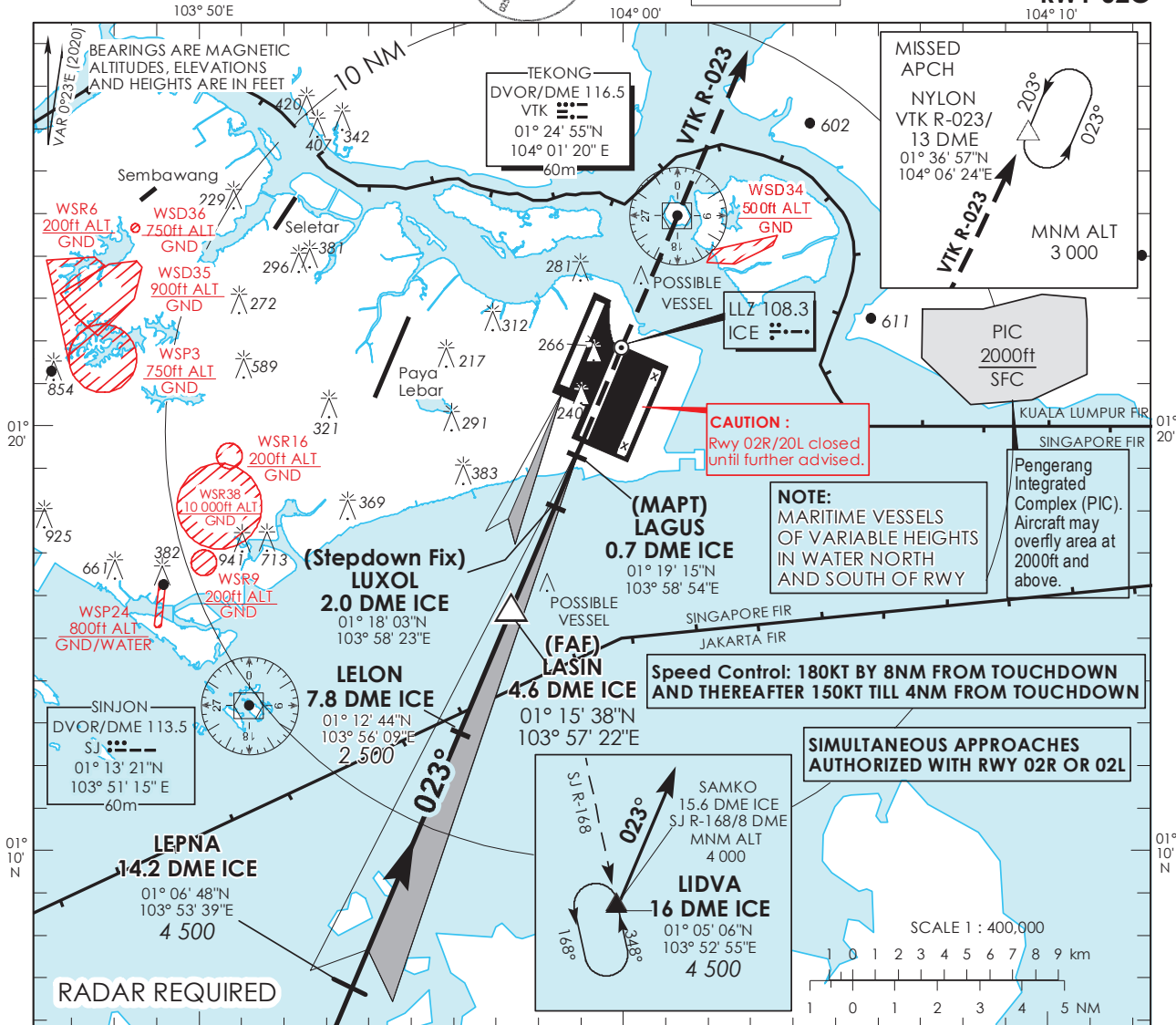
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**INSTRUMENT
APPROACH
CHART - ICAO**

AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 02C - ELEV 16ft

D-ATIS AP ID WSSS
128.025
APP 124.05
TWR 119.3
118.6
118.25

**SINGAPORE/
SINGAPORE CHANGI
ICE ILS/DME
RWY 02C**



* TIMING NOT AUTHORIZED WHEN GP INOP

		OCA (OCH)				
Category of Aircraft		A	B	C	D	D _L
Straight-in	CAT I ILS	170 (156)	180 (166)	196 (182)	209 (195)	212 (198)
	GP INOP (with stepdown fix)	420 (406)				
	GP INOP (without stepdown fix)	660 (646)				
Distance		4 DME			3 DME	
Altitude (Height)		1290 (1276)			970 (956)	
Speed		knots	70	120	150	185
FAF - MAPT 3.9nm		min : s*	3 : 21	1 : 57	1 : 34	1 : 16
Rate of descent/GS		ft/min	370	635	795	980

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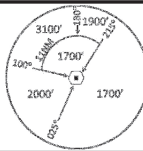
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INSTRUMENT APPROACH CHART - ICAO

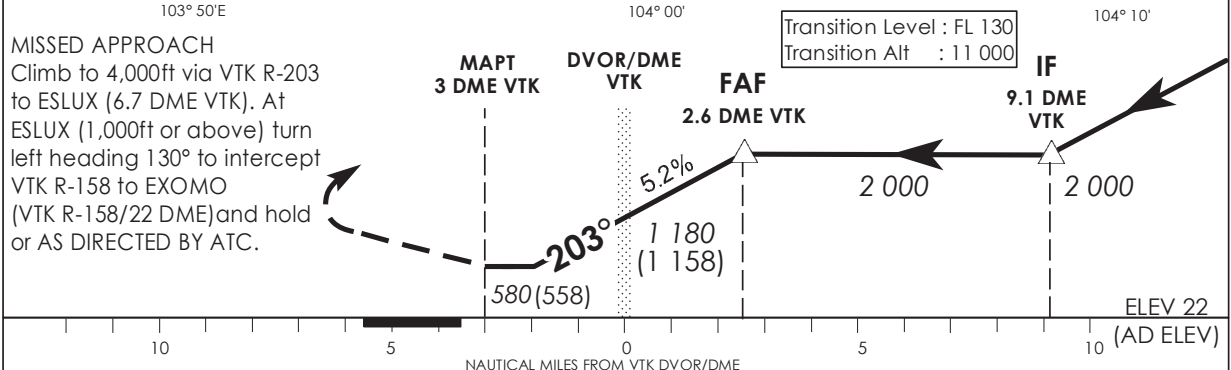
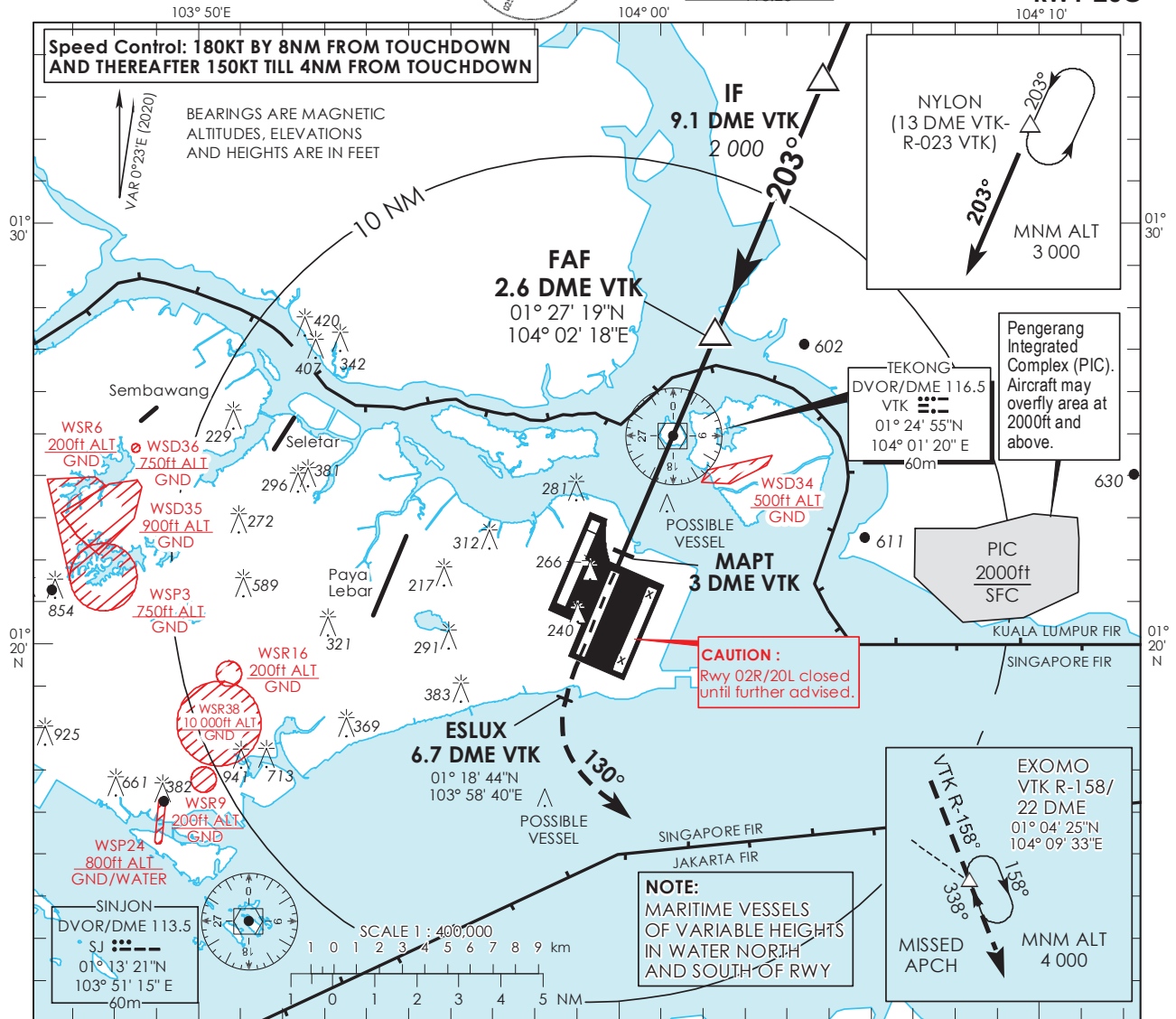
AERODROME ELEV **22ft**
HEIGHT RELATED TO
AD ELEV



MSA 35 NMA
from TEKONG DVOR

D-ATIS AP ID WSSS	128.025
APP	124.05
TWR	119.3
	118.6
	118.25

SINGAPORE/ SINGAPORE CHANGI VTK DVOR/DME RWY 20C



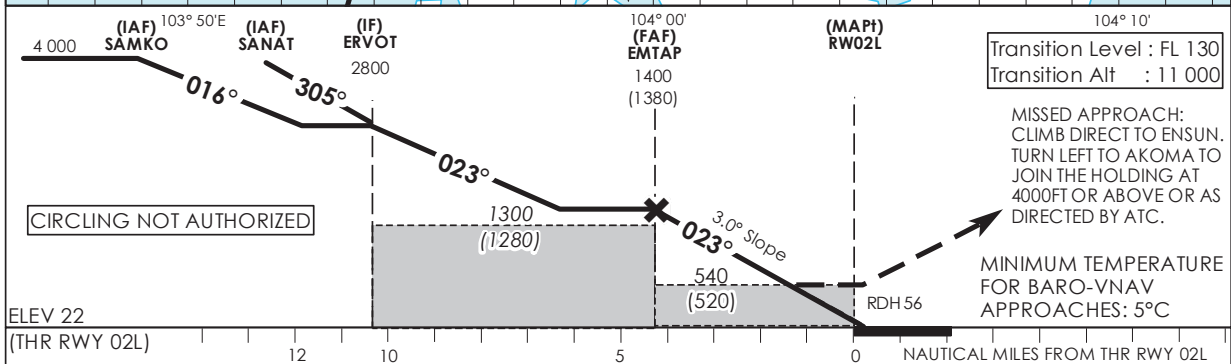
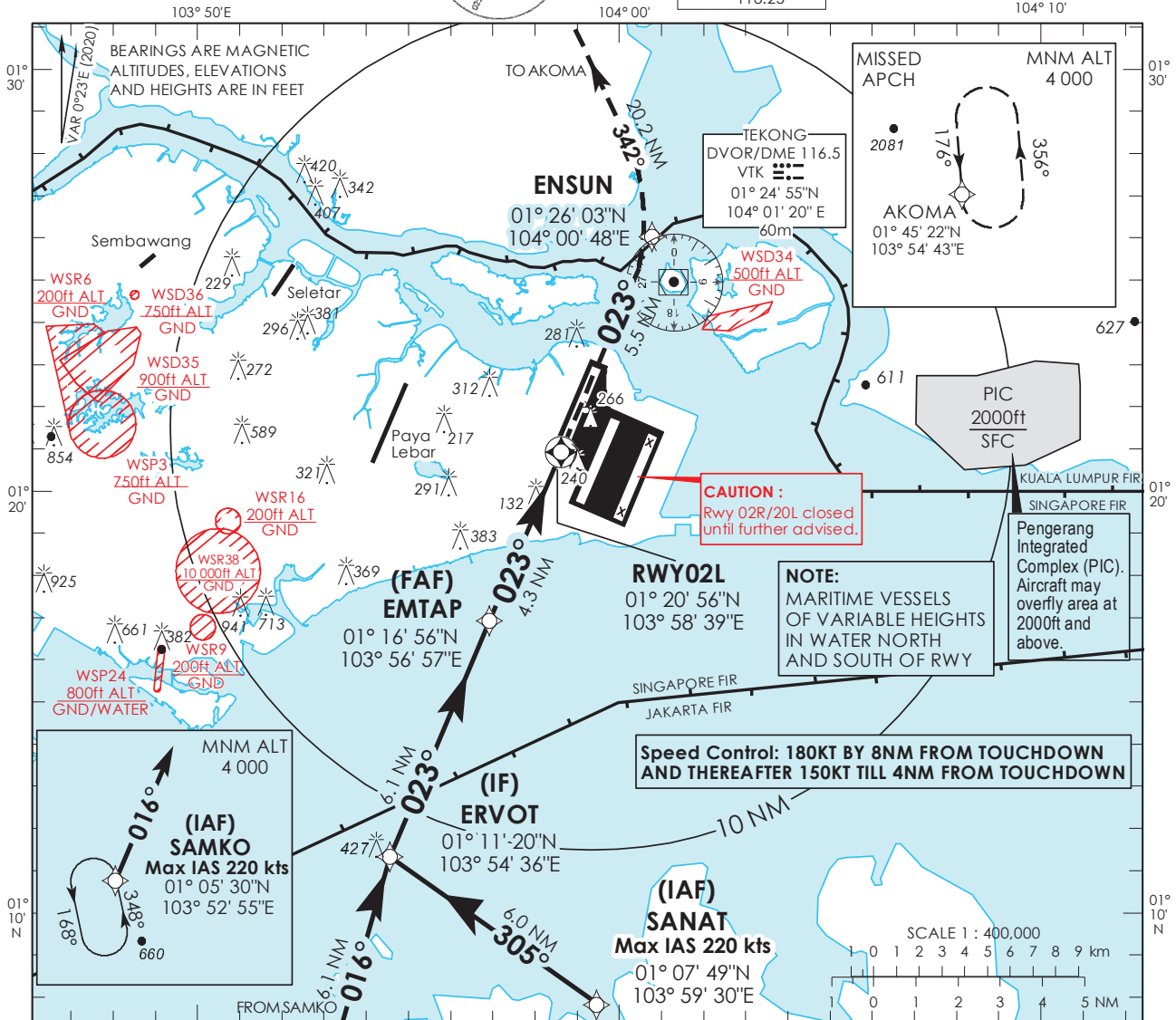
OCA (OCH)					
Category of Aircraft	A	B	C	D	
Straight-in	580 (558)				
Distance	2 DME	1 DME	VTK	1 DME	
Altitude (Height)	1820 (1798)	1500 (1478)	1180 (1158)	860 (838)	
Speed	knots	70	120	150	185
FAF - MAPT 5.6nm	min : s	4 : 48	2 : 48	2 : 15	1 : 49
Rate of descent/GS	ft/min	370	635	795	980

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INSTRUMENT APPROACH CHART - ICAO AERODROME ELEV 22ft
HEIGHT RELATED TO THR RWY 02L - ELEV 22ft

D-ATIS AP ID WSSS
128.025
APP 124.05
119.3
TWR 118.6
118.25

SINGAPORE/ SINGAPORE CHANGI RNP RWY 02L



		OCA (OCH)					
Category of Aircraft		A	B	C	D		
LNAV/VNAV	2.5%	450 (430)					
LNAV	2.5%	540 (520)					
Fix		SAMKO	SANAT	ERVOT	EMTAP	RW02L	ENSUN AKOMA
Altitude (Height)		4000 (3978)	4000 (3978)	2800 (2778)	1400 (1378)	540 (518)	880 (858) 4000 (3978)
Speed	knots	80		100	120	140	160 180
FAF - MAPt 4.3nm	min : s	3 : 14		2 : 35	2 : 09	1 : 51	1 : 37 1 : 26
Rate of descent/GS	ft/min	424		530	637	743	849 955

SINGAPORE CHANGI RNP-APCH RWY 02L – Approach from SAMKO

Path Terminator	Waypoint	Fly-Over	Course °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Altitude (FT)	Speed Limit (KT)	VPA/ TCH(FT)	Navigation Specification
IF	SAMKO	-	-	-0.4	-	-	A040+	220	-	RNP APCH
TF	ERVOT	-	016 (016.4)	-0.4	6.1	R	A028+	-	-	RNP APCH
TF	EMTAP	-	023 (023.4)	-0.4	6.1	-	A014+	-	-	RNP APCH
TF	RW02L	Y	023 (023.4)	-0.4	4.3	-	-	-	-3.0° / 50	RNP APCH
DF	ENSUN	-	-	-0.4	-	L	-	-	-	RNP APCH
TF	AKOMA	-	342 (342.4)	-0.4	20.2	-	A040+	-	-	RNP APCH

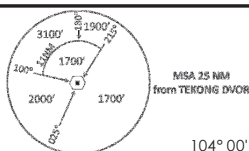
SINGAPORE CHANGI RNP-APCH RWY 02L – Approach from SANAT

Path Terminator	Waypoint	Fly-Over	Course °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Altitude (FT)	Speed Limit (KT)	VPA/ TCH(FT)	Navigation Specification
IF	SANAT	-	-	-0.4	-	-	A040+	220	-	RNP APCH
TF	ERVOT	-	305 (305.4)	-0.4	6.0	R	A028+	-	-	RNP APCH
TF	EMTAP	-	023 (023.4)	-0.4	6.1	-	A014+	-	-	RNP APCH
TF	RW02L	Y	023 (023.4)	-0.4	4.3	-	-	-	-3.0° / 50	RNP APCH
DF	ENSUN	-	-	-0.4	-	L	-	-	-	RNP APCH
TF	AKOMA	-	342 (342.4)	-0.4	20.2	-	A040+	-	-	RNP APCH

Waypoint Coordinates

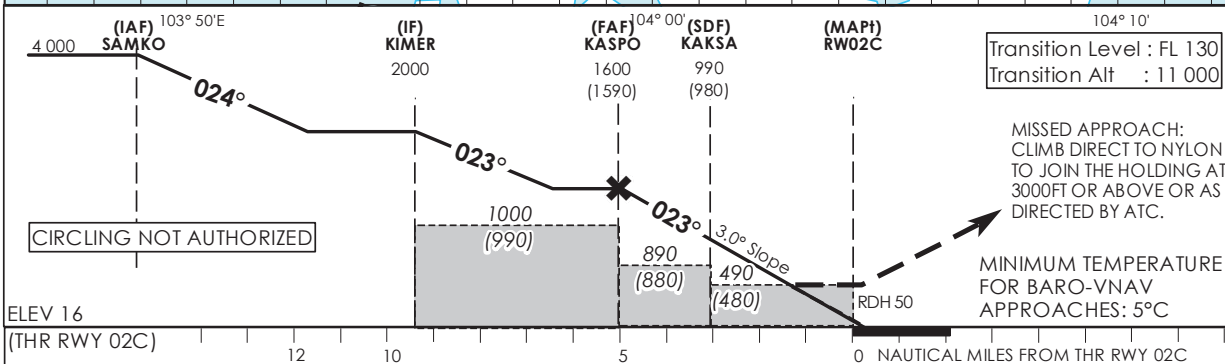
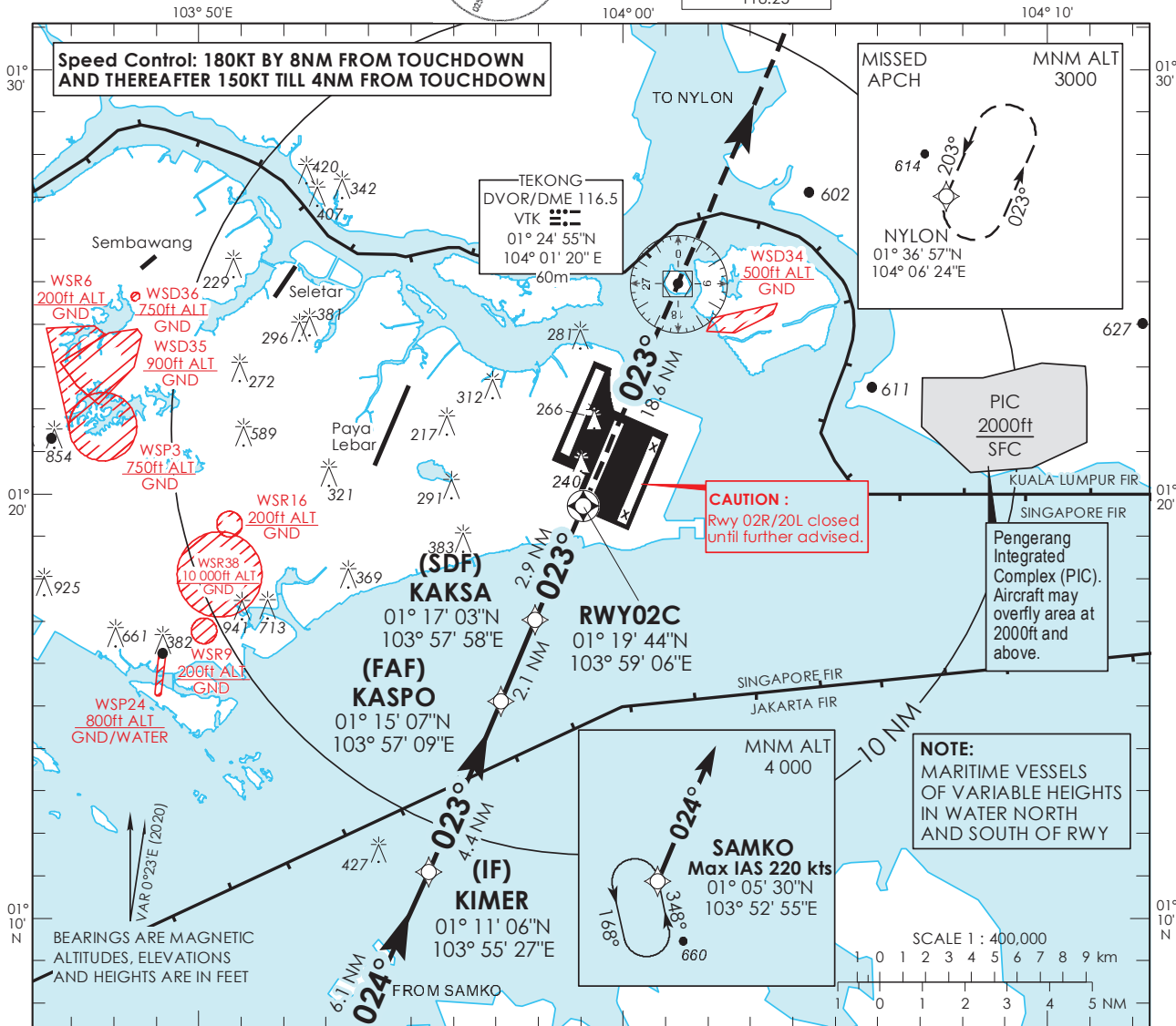
Name	Latitude	Longitude
SAMKO (IAF)	01° 05' 30" N	103° 52' 55" E
SANAT (IAF)	01° 07' 49" N	103° 59' 30" E
ERVOT (IF)	01° 11' 20" N	103° 54' 36" E
EMTAP (FAF)	01° 16' 56" N	103° 56' 57" E
RW02L	01° 20' 56" N	103° 58' 39" E
ENSUN	01° 26' 03" N	104° 00' 48" E
AKOMA	01° 45' 22" N	103° 54' 43" E

INSTRUMENT APPROACH CHART - ICAO AERODROME ELEV **22ft**
HEIGHT RELATED TO THR RWY 02C - ELEV **16ft**



D-ATIS AP ID WSSS	128.025
APP	124.05
TWR	118.6
	118.25

SINGAPORE/ SINGAPORE CHANGI RNP RWY 02C



		OCA (OCH)					
		A	B	C	D		
Category of Aircraft							
LNAV	2.5%		490 (480)				
LNAV without SDF	2.5%		890 (880)				
LNAV/VNAV	2.5%		360 (350)				
Fix		SAMKO	KIMER	KASPO	KAкса	RW02C	NYLON
Altitude (Height)		4000 (3986)	2000 (1986)	1600 (1586)	990 (976)	490 (476)	3000 (2986)
Speed	knots	80	100	120	140	160	180
FAF - MAPt 5nm	min : s	3 : 45	3 : 00	2 : 30	2 : 09	1 : 53	1 : 40
Rate of descent/GS	ft/min	425	531	637	743	849	955

SINGAPORE CHANGI RNP-APCH RWY 02C – Approach from SAMKO

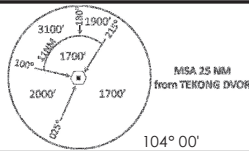
Path Terminator	Waypoint	Fly-Over	Course °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Altitude (FT)	Speed Limit (KT)	VPA/TCH(FT)	Navigation Specification
IF	SAMKO	-	-	-0.4	-	-	A040+	220	-	RNP APCH
TF	KIMER	-	024 (024.4)	-0.4	6.1	-	A020+	-	-	RNP APCH
TF	KASPO	-	023 (023.4)	-0.4	4.4	-	A016+	-	-	RNP APCH
TF	KAKSA	-	023 (023.4)	-0.4	2.1	-	990ft+	-	-	RNP APCH
TF	RW02C	Y	023 (023.4)	-0.4	2.9	-	-	-	-3.0° / 50	RNP APCH
DF	NYLON	-	-	-0.4	-	-	A030+	-	-	RNP APCH

Waypoint Coordinates

Name	Latitude	Longitude
SAMKO (IAF)	01° 05' 30" N	103° 52' 55" E
KIMER (IF)	01° 11' 06" N	103° 55' 27" E
KASPO (FAF)	01° 15' 07" N	103° 57' 09" E
KAKSA (SDF)	01° 17' 03" N	103° 57' 58" E
RW02C	01° 19' 44" N	103° 59' 06" E
NYLON	01° 36' 57" N	104° 06' 24" E

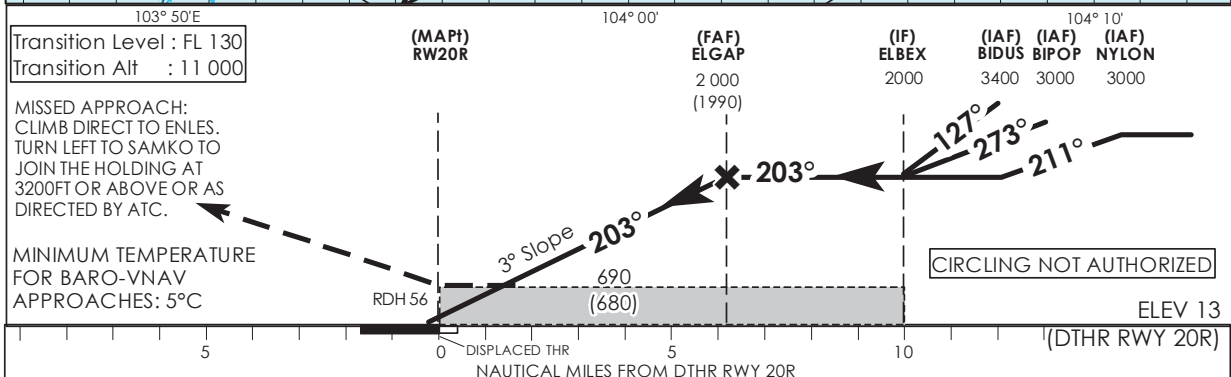
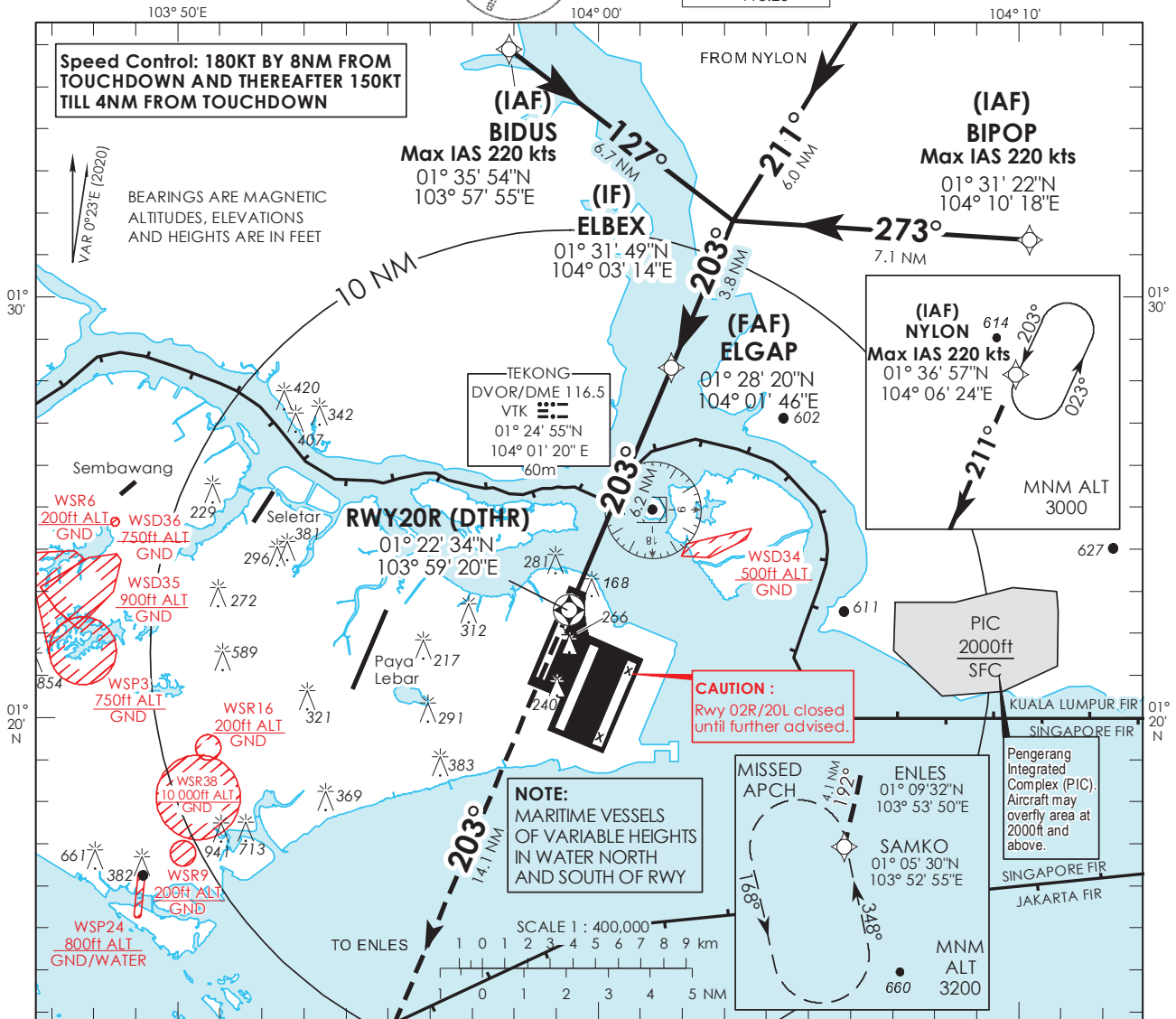
**INSTRUMENT
APPROACH
CHART - ICAO**

AERODROME ELEV 22ft
HEIGHT RELATED TO
DTHR RWY 20R - ELEV 13ft



D-ATIS	AP ID	WSSS
APP	124.05	
TWR	119.3	
	118.6	
	118.25	

**SINGAPORE/
SINGAPORE CHANGI
RNP RWY 20R**



		OCA (OCH)							
Category of Aircraft		A	B	C	D				
LNAV/VNAV	2.5%	690 (680)							
LNAV	2.5%	690 (680)							
Fix		BIDUS	NYLON	BIPOP	ELBEX	ELGAP	RW20R	ENLES	SAMKO
Altitude (Height)		3400 (3387)	3000 (2987)	3000 (2987)	2000 (1987)	2000 (1987)	690 (680)	2180 (2167)	3200 (3187)
Speed	knots	80	100	120	140	160	180		
FAF - MAPt 6.2 nm	min : s	4 : 39	3 : 44	3 : 06	2 : 40	2 : 20	2 : 04		
Rate of descent/GS	ft/min	425	531	637	743	849	955		

SINGAPORE CHANGI RNP-APCH RWY 20R – Approach from BIDUS

Path Terminator	Waypoint	Fly-Over	Course °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Altitude (FT)	Speed Limit (KT)	VPA/ TCH(FT)	Navigation Specification
IF	BIDUS	-	-	-0.4	-	-	A034+	220	-	RNP APCH
TF	ELBEX	-	127 (127.4)	-0.4	6.7	R	A020+	-	-	RNP APCH
TF	ELGAP	-	203 (203.4)	-0.4	3.8	-	A020+	-	-	RNP APCH
TF	RW20R	Y	203 (203.4)	-0.4	6.2	-	-	-	-3.0° / 50	RNP APCH
DF	ENLES	-	-	-0.4	-	L	-	-	-	RNP APCH
TF	SAMKO	-	192 (192.4)	-0.4	4.1	-	A032+	-	-	RNP APCH

SINGAPORE CHANGI RNP-APCH RWY 20R – Approach from NYLON

Path Terminator	Waypoint	Fly-Over	Course °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Altitude (FT)	Speed Limit (KT)	VPA/ TCH(FT)	Navigation Specification
IF	NYLON	-	-	-0.4	-	-	A030+	220	-	RNP APCH
TF	ELBEX	-	211 (211.4)	-0.4	6.0	L	A020+	-	-	RNP APCH
TF	ELGAP	-	203 (203.4)	-0.4	3.8	-	A020+	-	-	RNP APCH
TF	RW20R	Y	203 (203.4)	-0.4	6.2	-	-	-	-3.0° / 50	RNP APCH
DF	ENLES	-	-	-0.4	-	L	-	-	-	RNP APCH
TF	SAMKO	-	192 (192.4)	-0.4	4.1	-	A032+	-	-	RNP APCH

SINGAPORE CHANGI RNP-APCH RWY 20R – Approach from BIPOP

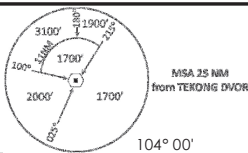
Path Terminator	Waypoint	Fly-Over	Course °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Altitude (FT)	Speed Limit (KT)	VPA/ TCH(FT)	Navigation Specification
IF	BIPOP	-	-	-0.4	-	-	A030+	220	-	RNP APCH
TF	ELBEX	-	273 (273.4)	-0.4	7.1	L	A020+	-	-	RNP APCH
TF	ELGAP	-	203 (203.4)	-0.4	3.8	-	A020+	-	-	RNP APCH
TF	RW20R	Y	203 (203.4)	-0.4	6.2	-	-	-	-3.0° / 50	RNP APCH
DF	ENLES	-	-	-0.4	-	L	-	-	-	RNP APCH
TF	SAMKO	-	192 (192.4)	-0.4	4.1	-	A032+	-	-	RNP APCH

Waypoint Coordinates

Name	Latitude	Longitude
BIDUS (IAF)	01° 35' 54" N	103° 57' 55" E
NYLON (IAF)	01° 36' 57" N	104° 06' 24" E
BIPOP (IAF)	01° 31' 22" N	104° 10' 18" E
ELBEX (IF)	01° 31' 49" N	104° 03' 14" E
ELGAP (FAF)	01° 28' 20" N	104° 01' 46" E
RW20R	01° 22' 34" N	103° 59' 20" E
ENLES	01° 09' 32" N	103° 53' 50" E
SAMKO	01° 05' 30" N	103° 52' 55" E

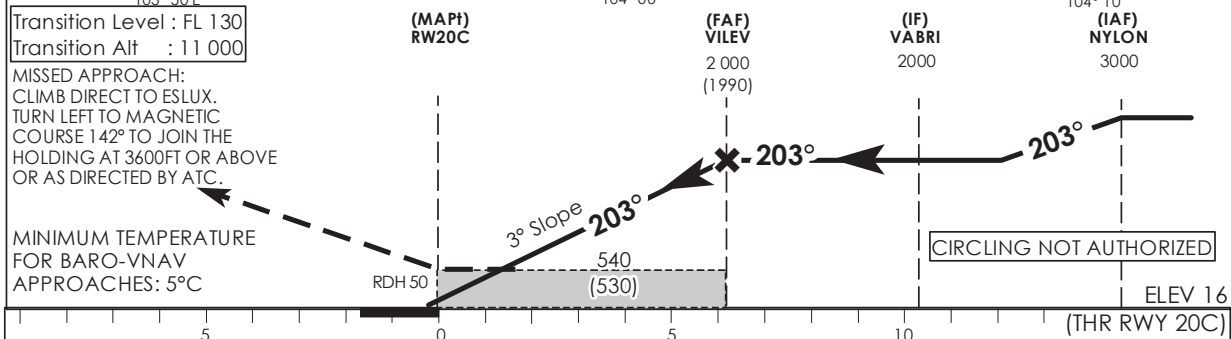
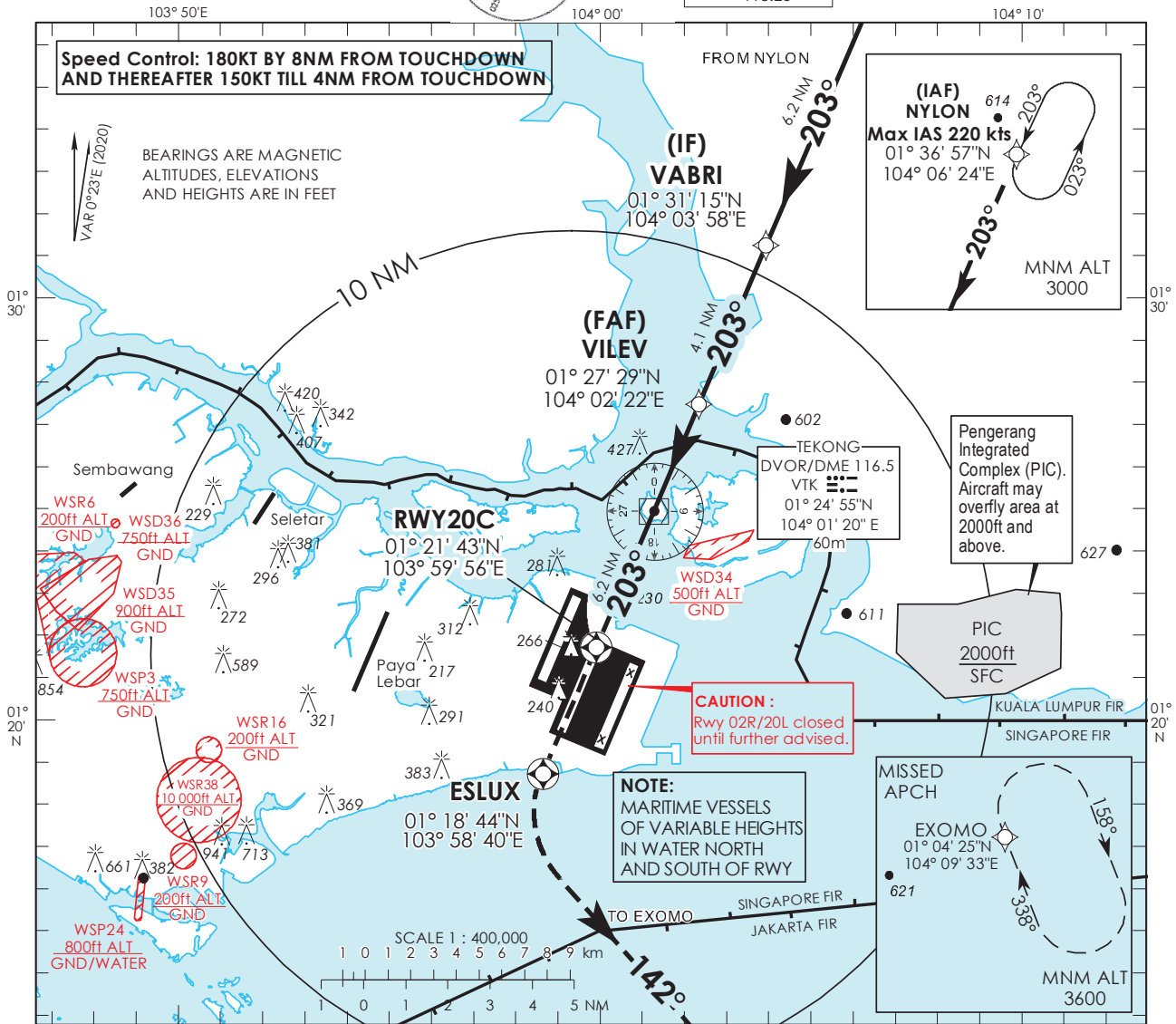
**INSTRUMENT
APPROACH
CHART - ICAO**

AERODROME ELEV **22ft**
HEIGHT RELATED TO
THR RWY 20C - ELEV **16ft**



D-ATIS	AP ID WSSS	128.025
APP		124.05
TWR		119.3
		118.6
		118.25

**SINGAPORE/
SINGAPORE CHANGI
RNP RWY 20C**



		OCA (OCH)					
Category of Aircraft		A	B	C	D		
LNAV/VNAV	2.5%				490 (480)		
LNAV	2.5%				540 (530)		
Fix		NYLON	VABRI	VILEV	RW20C	ESLUX	EXOMO
Altitude (Height)		3000 (2985)	2000 (1985)	2000 (1985)	540 (525)	540 (525)	3600 (3585)
Speed	knots	80	100	120	140	160	180
FAF - MAPt 6.2 nm	min : s	4 : 39	3 : 44	3 : 06	2 : 40	2 : 20	2 : 04
Rate of descent/GS	ft/min	425	531	637	743	849	955

SINGAPORE CHANGI RNP-APCH RWY 20C – Approach from NYLON

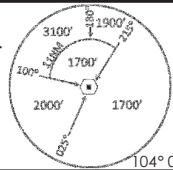
Path Terminator	Waypoint	Fly-Over	Course °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Altitude (FT)	Speed Limit (KT)	VPA/TCH(FT)	Navigation Specification
IF	NYLON	-	-	-0.4	-	-	A030+	220	-	RNP APCH
TF	VABRI	-	203 (203.4)	-0.4	6.2	-	A020+	-	-	RNP APCH
TF	VILEV	-	203 (203.4)	-0.4	4.1	-	A020+	-	-	RNP APCH
TF	RW20C	Y	203 (203.4)	-0.4	6.2	-	-	-	-3.0° / 50	RNP APCH
DF	ESLUX	Y	-	-0.4	-	L	-	-	-	RNP APCH
TF	EXOMO	-	142 (142.4)	-0.4	-	-	A036+	-	-	RNP APCH

Waypoint Coordinates

Name	Latitude	Longitude
NYLON (IAF)	01° 36' 57" N	104° 06' 24" E
VABRI (IF)	01° 31' 15" N	104° 03' 58" E
VILEV (FAF)	01° 27' 29" N	104° 02' 22" E
RW20C	01° 21' 43" N	103° 59' 56" E
ESLUX	01° 18' 44" N	103° 58' 40" E
EXOMO	01° 04' 25" N	104° 09' 33" E

INSTRUMENT APPROACH CHART

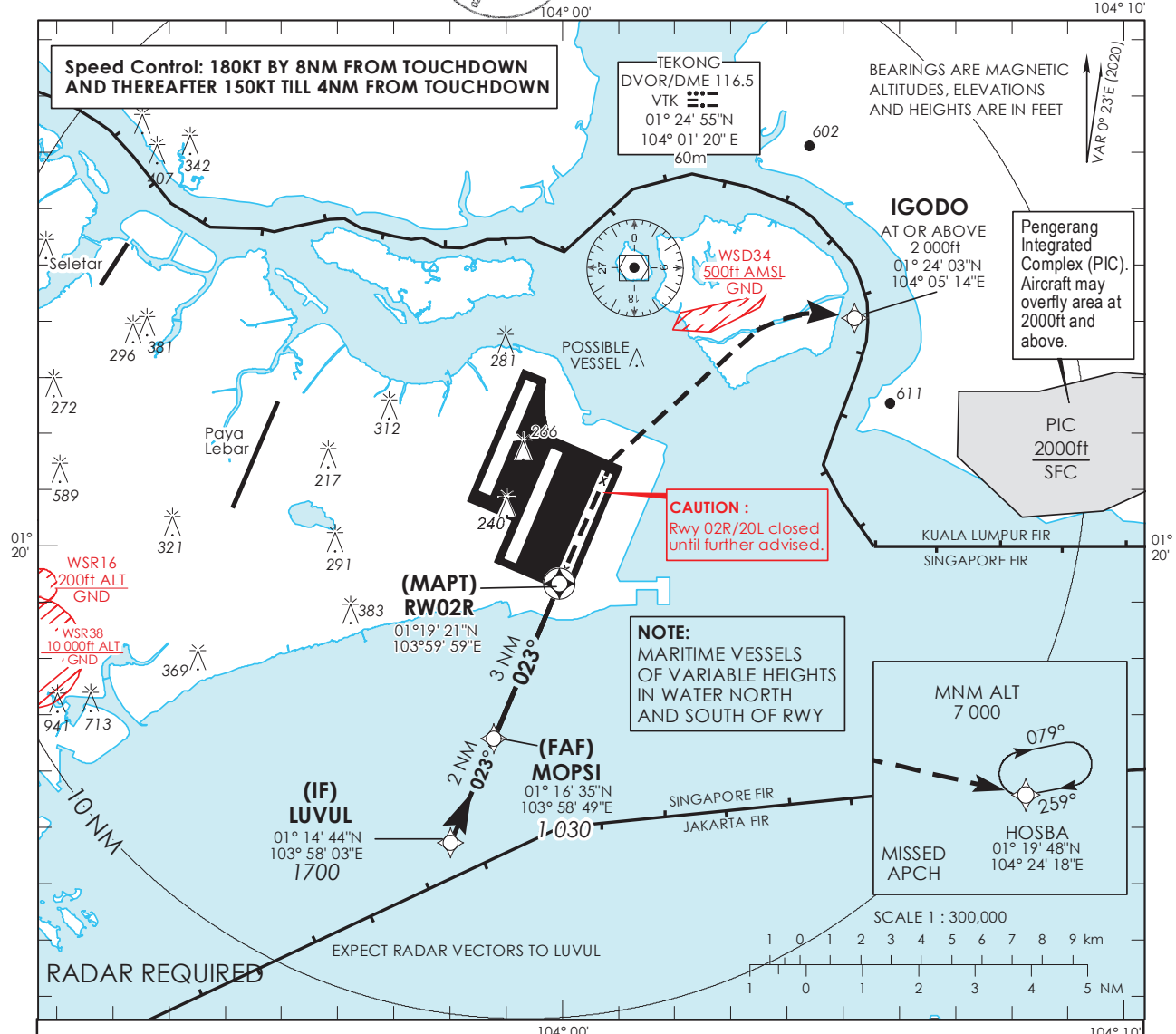
AERODROME ELEV **22ft**
HEIGHT RELATED TO
THR RWY 02R - ELEV **16ft**



MSA 25 NM from TERKONG DVOR

D-ATIS	AP ID WSSS
APP	128.025
TWR	124.05
	119.3
	131.4

SINGAPORE/ SINGAPORE CHANGI RNP RWY 02R

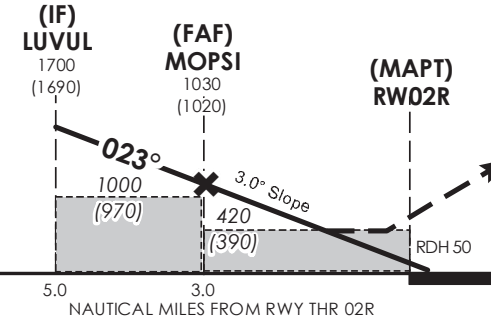


- This procedure requires a missed approach climb gradient of 5% (304 ft/NM) until passing 2,000ft. MAX IAS 185kts during turning missed approach.
- For aircraft which can only achieve a 2.5% (152 ft/NM) climb gradient, the OCA (OCH) is 820ft (800ft) and aircraft shall climb straight to 1200ft before commencing right turn climbing to 7000ft or above to HOSBA.

Transition Level : FL 130
Transition Alt : 11 000

MINIMUM TEMPERATURE FOR BARO-VNAV APPROACHES: 5°C

ELEV 16
(THR RWY 02R)



MISSED APPROACH
Climb direct to IGODO at 2 000ft or above. Thereafter, turn right climbing to 7 000ft or above to HOSBA.
Hold at HOSBA or AS DIRECTED BY ATC.
No turn before MAPt.

CIRCLING NOT AUTHORIZED

Category of Aircraft		OCA (OCH)			
		A	B	C	D
LNAV/VNAV	5%			330 (310)	
LNAV	5%			420 (390)	
Distance		LUVUL		MOPSI	
Altitude (Height)		1700 (1690)		1030 (1020)	
Speed	knots	70	120	150	185
FAF - MAPt 3.0nm	min : s *	2 : 34	1 : 30	1 : 12	0 : 58
Rate of descent/GS	ft/min	370	635	795	980

SINGAPORE CHANGI RNP-APCH RWY 02R – Approach from LUVUL

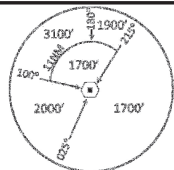
Path Terminator	Waypoint	Fly-Over	Course °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Altitude (FT)	Speed Limit (KT)	VPA/TCH(FT)	Navigation Specification
IF	LUVUL	-	023 (023.4)	-0.4	-	-	1700+	180	-	RNP APCH
TF	MOPSI	-	023 (023.4)	-0.4	2.0	-	1030+	150	-	RNP APCH
TF	RW02R	Y	023 (023.4)	-0.4	3.0	R	-	-	-3.0° / 50	RNP APCH
DF	IGODO	-	-	-0.4	-	R	2000+	185	-	RNP APCH
TF	HOSBA	-	103 (103.4)	-0.4	-	-	7000+	-	-	RNP APCH

Waypoint Coordinates

Name	Latitude	Longitude
LUVUL (IF)	01° 14' 44" N	103° 58' 03" E
MOPSI (FAF)	01° 16' 35" N	103° 58' 49" E
RW02R	01° 19' 21" N	103° 59' 59" E
IGODO	01° 24' 03" N	104° 05' 14" E
HOSBA	01° 19' 48" N	104° 24' 18" E

INSTRUMENT APPROACH CHART

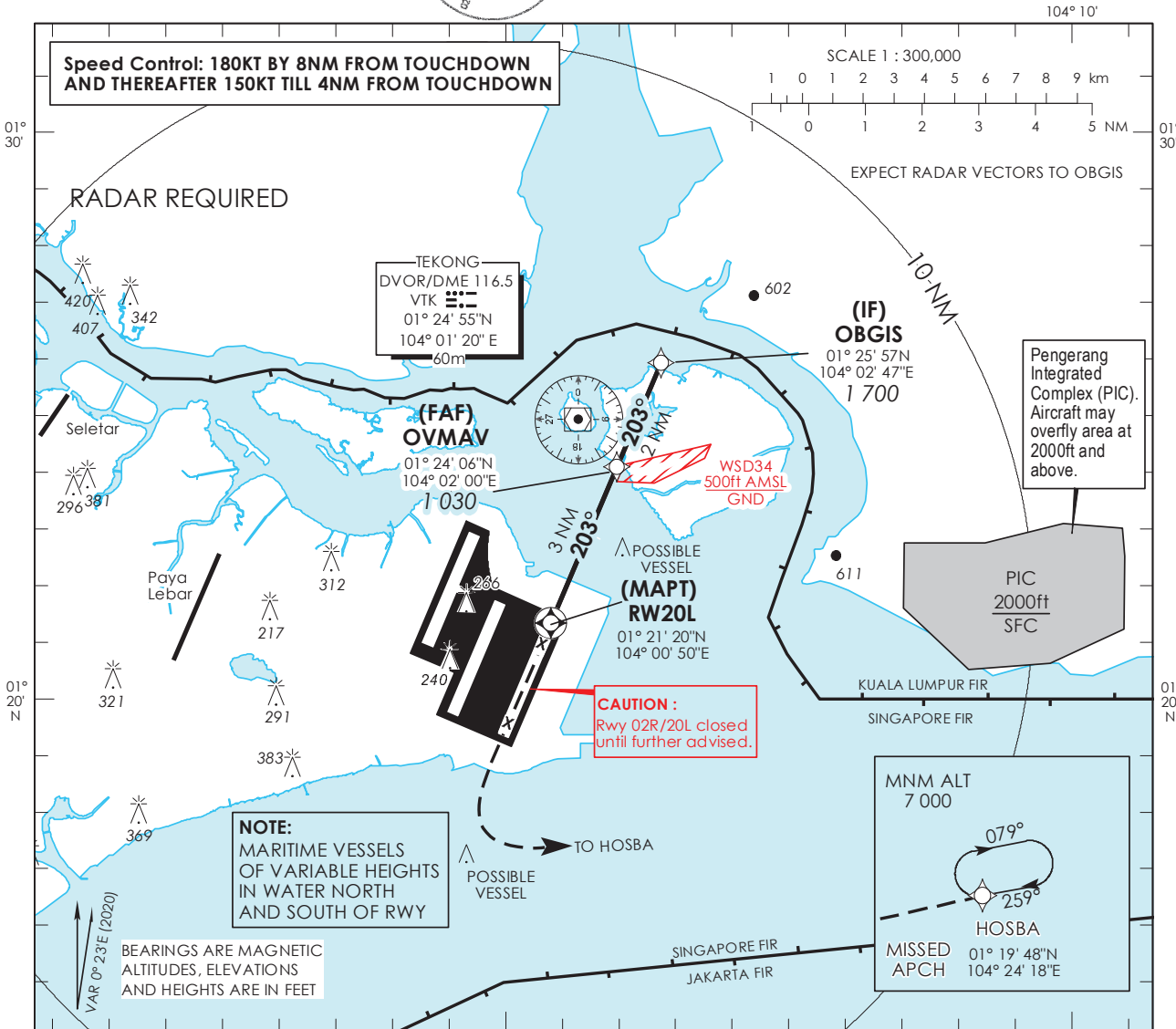
AERODROME ELEV **22ft**
HEIGHT RELATED TO
THR RWY 20L - ELEV 16ft



MISA 25 NM
from TEKONG DVOR

D-ATIS	AP ID	WSSS
	128.6	
APP	124.05	
	119.3	
TWR	131.4	

SINGAPORE/ SINGAPORE CHANGI RNP RWY 20L

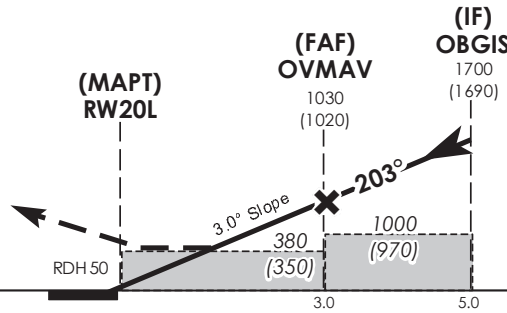


This procedure requires a missed approach climb gradient of 5% (304 ft/NM) until passing 3,000ft.
For aircraft which can only achieve a 2.5% (152 ft/NM) climb gradient, the OCA (OCH) is 1080ft (1050ft).

Transition Level : FL 130
Transition Alt : 11 000

MISSED APPROACH
Climb straight to 1 500ft, turn left climbing to 7 000ft or above to HOSBA.
Hold at HOSBA or AS DIRECTED BY ATC.
No turn before MAPT.

CIRCLING NOT AUTHORIZED



MINIMUM TEMPERATURE FOR BARO-VNAV APPROACHES: 5°C

		OCA (OCH)			
Category of Aircraft		A	B	C	D
LNAV/VNAV	5%				
LNAV	5%				
		OBGIS		OVMAV	
Distance		1700 (1690)		1030 (1020)	
Altitude (Height)					
Speed	knots	70	120	150	185
FAF - MAPT 3.0nm	min : s*	2 : 34	1 : 30	1 : 12	0 : 58
Rate of descent/GS	ft/min	370	635	795	980

SINGAPORE CHANGI RNP-APCH RWY 20L – Approach from OBGIS

Path Terminator	Waypoint	Fly-Over	Course °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Altitude (FT)	Speed Limit (KT)	VPA/TCH(FT)	Navigation Specification
IF	OBGIS	-	203 (203.4)	-0.4	-	-	1700+	180	-	RNP APCH
TF	OVMAY	-	203 (203.4)	-0.4	2.0	-	1030+	150	-	RNP APCH
TF	RW20L	Y	203 (203.4)	-0.4	3.0	-	-	-	-3.0° / 50	RNP APCH
CA	-	-	203 (203.4)	-0.4	-	L	1500+	-	-	RNP APCH
DF	HOSBA	-	-	-	-	-	7000+	-	-	RNP APCH

Waypoint Coordinates

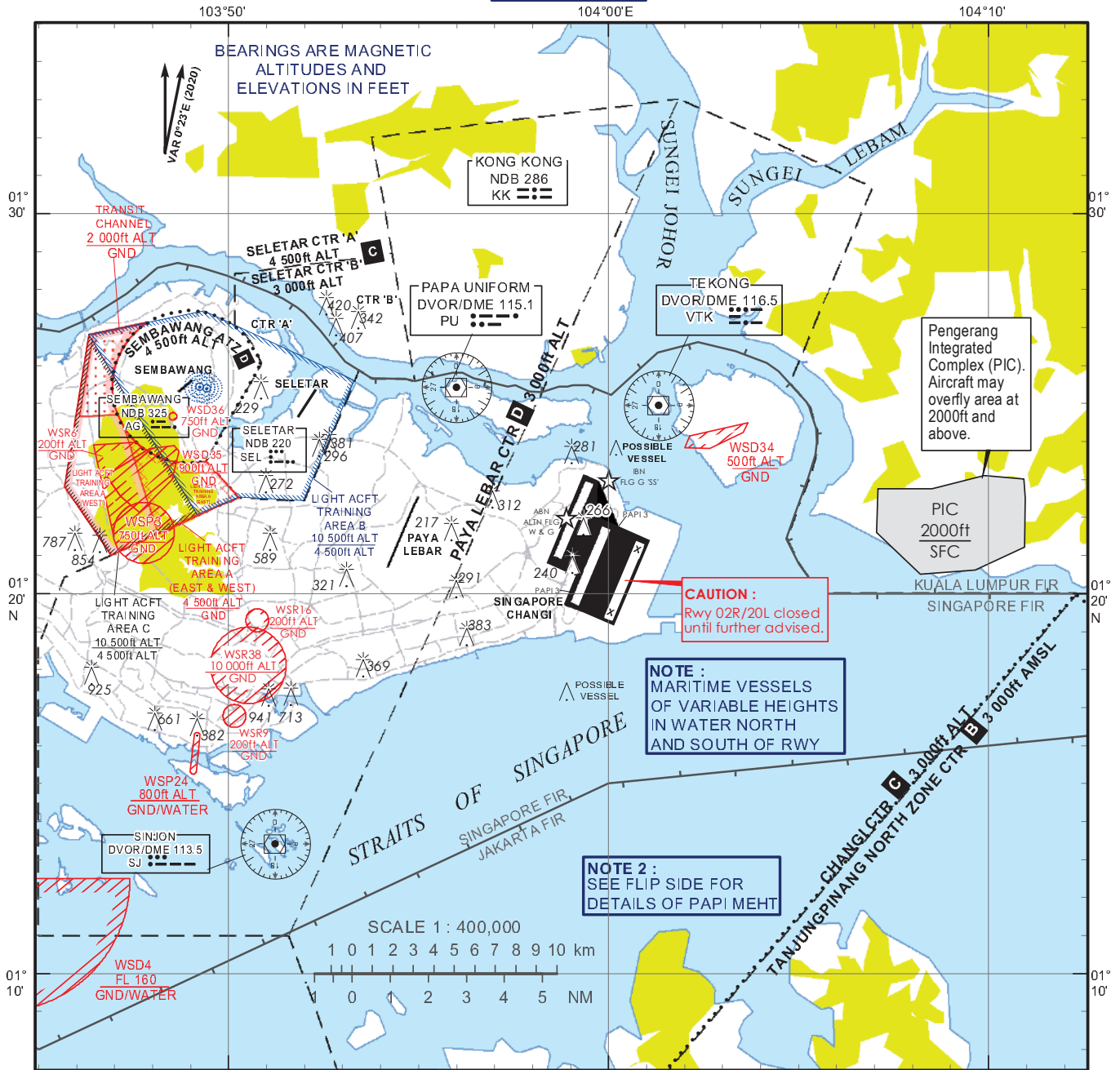
Name	Latitude	Longitude
OBGIS (IF)	01° 25' 57" N	104° 02' 47" E
OVMAY (FAF)	01° 24' 06" N	104° 02' 00" E
RW20L	01° 21' 20" N	104° 00' 50" E
HOSBA	01° 19' 48" N	104° 24' 18" E

**VISUAL
APPROACH
CHART - ICAO**

AERODROME ELEV 22 ft

D-ATIS	APID WSSS
APP	128.025
	124.05
	119.3
TWR	118.6
	118.25

SINGAPORE/SINGAPORE CHANGI



VISUAL APPROACH PROCEDURE

1. An IFR flight operating into Singapore Changi Airport may be cleared for a visual approach subject to the following conditions :-
 - a) The pilot has the aerodrome in sight and can conduct his approach with visual reference to terrain;
 - b) The flight will not cause delay to other traffic;
 - c) There is no conflicting tall vessel movement;
 - d) The cloud ceiling at the aerodrome is 4,000ft or more for landing on RWY 20C/R/L and 3,000ft or more for on RWY 02C/L/R ; and
 - e) The visibility at the aerodrome is 5km or more.
2. Notwithstanding para 1d) and 1e), if the pilot reports that he has the aerodrome in sight and can conduct his approach with visual reference to terrain, the flight may be cleared for a visual approach.
3. Pilots may expect radar vectoring for separation and sequencing with other traffic prior to being cleared for a visual approach.

PAPI 3° (MEHT)*						
Pilot's eye height over the threshold when the following PAPI lights come in view.	RUNWAY					
	02L	20R	02C	20C	02R	20L
2 White lights and 2 Red lights	20.0m	20.0m	19.8m	19.8m	19.7m	19.7m
3 White lights and 1 Red light	24.0m	22.6m	23.7m	23.7m	23.6m	23.6m
4 White lights	26.4m	25.0m	26.2m	26.2m	26.0m	26.0m
<p>*MEHT : Minimum Eye Height Over the Threshold.</p> <p>Note : Aircraft with eye-to-wheel height greater than 8 metres are advised to fly with 2 white lights and 2 red lights visible so as to achieve sufficient wheel clearance.</p>						

WSSL AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

Designations RWY NR	TRUE BRG	Dimensions of RWY (m)	Strength (PCN) and Surface of RWY and SWY	THR coordinates and RWY end coordinates (THR GEOID Undulation)	THR Elevation and highest elevation of TDZ of precision APCH RWY
1	2	3	4	5	6
03	033.33°	1836 x 46	44/F/C/X/T Grooved Bituminous Concrete	012430.846N 1035143.791E (9.78M)	14 M 13 M
21	213.33°	1836 x 46	44/F/C/X/T Grooved Bituminous Concrete	012520.791N 1035216.425E (9.78M)	5M 10 M

Slope of RWY – SWY Transverse / Longitudinal	SWY Dimensions (m)	CWY Dimensions (m)	STRIP Dimensions (m)	Dimensions of RESA (m)	Locations and description of ARST system
7	8	9	10	11	12
RWY 03 1.21 / 0.49% SWY: Not Applicable	Not Applicable	60 X 150	1956 X 150	RWY 03-240 X 92	Not Applicable
RWY 21 1.21 / 0.49% SWY: Not Applicable	Not Applicable			RWY 21-240 X 150	Not Applicable

OFZ	Remarks
13	14
Not Applicable	<p>i) Scheduled closure period for RWY 03/21</p> <p>a. BTN 1600-2300 on first and third FRI of every month or the following FRI if the first or third FRI is a public holiday. RWY CLSD to all TFC except medevac and EMERG flights. Advance notice of 30 minutes is required for EMERG reopening of RWY.</p> <p>b. BTN 0500-0630, 1030-1200, 1600-1730 and 2300-0030 daily for 15-minute RWY inspection. Aircraft to expect delay.</p> <p>ii) A lighted RWY turn pad with centreline marking is provided at the threshold of RWY 03 which is able to serve aircraft up to B757-200.</p> <p>iii) Orange frangible posts are positioned along the boundary 90m on either sides of the RWY centreline demarcating the boundary for grass cutting and other maintenance works.</p> <p>iv) Wind Direction Indicators (WDIs) are located at both northern and southern ends of the RWY.</p>

WSSL AD 2.13 DECLARED DISTANCES

RWY Designator	TORA (m)	TODA (m)	ASDA (m)	LDA (m)	Remarks
1	2	3	4	5	6
03	1836	1896	1836	1836	NIL
21	1836	1896	1836	1836	NIL

WSSL AD 2.14 APPROACH AND RUNWAY LIGHTING

RWY Designator	APCH LGT type LEN INTST	THR LGT Colour WBAR	VASIS (MEHT) PAPI	TDZ LGT LEN	RWY CL LGT,LEN, spacing, colour, INTST	RWY edge LGT LEN, spacing colour, INTST	RWY End LGT Colour WBAR	SWY LGT LEN Colour
1	2	3	4	5	6	7	8	9
03	Simple APCH LGT: 4 rows of barettes of 3 LGT each and 1 crossbar of 13 LGT. White, elevated, uni-directional APCH LGT and white, omni-directional CGL on top of elevated APCH LGT. Simple TDZ LGT: 2 pairs white, inset, uni-directional LGT.	Green with THR IDENT LGT	PAPI 3.2° (both sides of RWY) 2 white 2 red LGT (21.24m) 3 white 1 red LGT (22.27m) 4 white LGT (24.75m). ACFT with eye-to-wheel HGT greater than 6.3m are ADZ to fly with 2 white 2 red LGT visible so as to achieve sufficient wheel CLR.	NIL	NIL	White with yellow on last 600m of either end. Elevated, omni-directional and brilliancy controlled.	Red	NIL
21	APCH LGT: 1 row of inset APCH LGT of 4 LGT and 4 rows of barettes of 4 LGT each. White inset uni-directional APCH LGT and white omni-directional CGL on top of white, elevated uni-directional APCH LGT. Simple TDZ LGT: 2 pairs white, inset, uni-directional LGT.	Green with THR IDENT LGT	PAPI 3.5° (both sides of RWY) 2 white 2 red LGT (17.720m) 3 white 1 red LGT (19.286m) 4 white LGT (20.871m). ACFT with eye-to-wheel HGT greater than 6.3m are ADZ to fly with 2 white 2 red LGT visible so as to achieve sufficient wheel CLR.	NIL	NIL	White with yellow on last 600m of either end. Elevated, omni-directional and brilliancy controlled.	Red	NIL
RWY 21 THR and RWY END LGT symmetrically disposed in 2 groups with a gap between the groups. RWY 21 THR and RWY END LGT reinstated to inset fitting.								

WSSL AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

1	<i>ABN/IBN location, characteristics and hours of operation</i>	ABN: 012448.00N 1035207.96E (on top of Control Tower) ALTN FLG W G EV 2.5 SEC. HN and IMC IBN: 012509.94N 1035152.14E (on top of West Substation) FLG G 'SL' EV 7 SEC. HN and IMC
2	<i>LD and LGTI location Ultrasonic wind sensor location and LGT</i>	Ultrasonic wind sensors and windsocks at ends of RWY.
3	<i>TWY edge and centreline lighting</i>	TWY Edge LGT: Blue, elevated and omni-directional. TWY Centreline LGT: Green, fixed. Intermediate holding position LGT: Yellow, fixed, unidirectional.
4	<i>Secondary power supply/switch-over time</i>	Automatic standby generator power supply available for airfield lighting.
5	<i>Remarks</i>	Vehicles painted yellow or displaying checkered red/white or orange/white flag at highest point of vehicle. WDI lighted.

WSSL AD 2.16 HELICOPTER LANDING AREA

1	Coordinates of THR of FATO Geoid undulation	H03 012437.963N 1035152.072E	H21 012446.046N 1035157.344E
2	FATO elevation M/FT	H03- 10.45m/34.3ft; H21 - 9.36m/30.7ft	
3	FATO area dimensions, surface, strength, marking	Rectangle 297m x 21.5m, compacted turf, helicopter landing area designations, outline by concrete kerbs painted white.	
4	True BRG of FATO	033.33/213.33° Direction of TKOF zones: 034°GEO / 214°GEO	
5	Declared distance available	TODAH RTODAH LDAH H03 297m 297m 297m H21 297m 297m 297m	
6	Approach and FATO lighting	Nil	
7	Remarks	Slope of helicopter landing area (transverse/longitudinal) H03 - 1.19%/0.44% ; H21 - 0.96%/0.44%	

WSSL AD 2.17 ATS AIRSPACE

1	<i>Designation and Lateral Limits</i>	<p>SELETAR CTR 012703N 1035009E 012825N 1035009E 012900N 1035425E 012534N 1035454E thence along international boundary to 012556N 1035326E 012227N 1035158E 012232N 1035016E 012327N 1034922E 012607N 1035053E and thence an arc of 2NM radius (centred at position 012536.00N 1034858.02E) joining 012607N 1035053E and 012703N 1035009E</p> <p>SELETAR CONTROL ZONE A Portion of Seletar CTR within Singapore FIR is known as Seletar CTR 'A'.</p> <p>SELETAR CONTROL ZONE 'B' The part in the Kuala Lumpur FIR is known as Seletar CTR 'B' and is bounded by 012825N 1035009E, 012900N 1035425E, 012534N 1035454E thence along the Peninsular Malaysia/Singapore international boundary to 012808N 1035010E to 012825N 1035009E from GND/sea level to 3,000ft. It will be activated only with prior approval of Johor Bahru ATC. (see chart AD-2-WSSL-VFR-1).</p>
2	<i>Vertical Limits</i>	<p>SELETAR CONTROL ZONE A SFC to 4 500ft ALT Maximum Usable ALT 4 000ft</p> <p>SELETAR CONTROL ZONE B SFC to 3 000ft ALT</p>
3	<i>Airspace Classification</i>	C
4	<i>ATS Unit Call sign Language(s)</i>	SELETAR TOWER English
5	<i>Transition Altitude</i>	11000 FT (3,350m)
6	<i>Remarks</i>	NIL

WSSL AD 2.18 ATS COMMUNICATION FACILITIES

Service designation	Call sign	Frequency P-Pri S-Sec	Hours of operation	Remarks
TWR	Seletar Tower	P118.45 MHz S130.2 MHz 270.4 MHz	H24	NIL
	Seletar Ground	121.6 MHz * 122.9 MHz	H24	* for vehicular movements
APP	Singapore Approach	P124.05 MHz S124.6 MHz S126.3 MHz	H24	TAR – flow control service provided for ARR/DEP ACFT. Intermediate approach to Singapore Changi AP and other airports in Singapore. DEP from all airports in Singapore.
	Seletar Approach	126.025 MHz	0000-1500	TAR - Intermediate approach to Seletar Airport.
ATIS	Seletar Airport Information	128.425 MHz	H24	Combined ARR and DEP report (broadcasting with hourly updated MET INFO) Data Link Service available. AP IDENT WSSL Messages comply with ARINC 623 Standards. Updating of data: H+00 to H+10 and H+30 to H+40

←

WSSL AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of Aid and Variation	IDENT	Frequency	OPR Hour	Position of Transmitting Antenna Coordinates	DME Transmitting Antenna Elevation / Remarks
1	2	3	4	5	6 & 7
NIL	NIL	NIL	NIL	NIL	NIL

WSSL AD 2.20 LOCAL TRAFFIC REGULATIONS

1 LOCAL FLYING RESTRICTIONS:

- 1.1 Fixed-wing aircraft operations including circuit flying and training operations are restricted to the west of Seletar runway. Helicopter operations are confined to the west of Seletar runway between sunset and sunrise, subject to the restrictions in paragraph 1.3 below.
- 1.2 Circuit Heights:
 - Light aircraft 800ft (west of Seletar runway only);
 - Other aircraft 1,000ft - 1,500ft (west of Seletar runway only);
 - Helicopter-only area east of runway up to 600ft AGL
- 1.3 Circuit Flying and Training Operations are not permitted between 1400-2300 daily.
- 1.4 Pilots are required to keep clear of PAYA LEBAR CTR and SEMBAWANG ATZ.
- 1.5 During the designated hours for training flights, non-training flights will not be permitted to operate at Seletar Airport. Refer to GEN 1.2 paragraph 3.8 and WSSL AD 2.22 paragraph 2 for details.
- 1.6 All non-training flights, including functional check flights, are advised to plan to depart or arrive outside the designated hours for training flights.

← 2 **FILING OF FUNCTIONAL CHECK/TRAINING FLIGHTS**

← 2.1 Flight notification shall be given prior to departure. Flight notification by means of RTF should be avoided.

← 2.2 For training flights planned to be conducted in Seletar circuits or in Light Aircraft Training Areas A, B and C, locally based operators shall submit details of their flight by electronic mail using the Seletar Functional Check / Training Form which can be retrieved from webpage:

<https://aim-sg.caas.gov.sg>

← 2.3 Operators of functional check flights conducting circuits within Seletar shall contact Seletar Tower Manager to provide advance notice, at least 2 days before the date of flight. These flights shall not operate within the designated hours for training flights. Refer to GEN 1.2 paragraph 3.8 and WSSL AD 2.20 paragraph 1.5 for details.

Note: Functional Check flight shall not be operated in Light Aircraft Training Areas A, B and C.

2.4 Flight details should contain the following information:

- a. Aircraft identification;
- b. Name and contact number of pilot;
- c. Number of persons on board;
- d. ETD;
- e. Flight duration;
- f. Total endurance; and
- g. Area of flight.

2.5 For flights other than those classified in paragraphs 2.2 and 2.3 above, a flight plan shall be filed.

2.6 Light aircraft engaged in flying training shall maintain VHF communication.

2.7 Light aircraft flying on airways shall, in addition to radio communication apparatus, be equipped with a radio compass.

2.8 All fixed wing aircraft are to use the runway for take-off and landing. After landing, pilots are to vacate the runway via the first available exit taxiway to the left or right or as instructed by ATC.

2.9 Fixed-wing circuit patterns are left hand for RWY 03 and right hand for RWY 21 (arrival and departure).

2.10 All light aircraft training flights shall not descend below 200ft on Seletar QNH when on final approach to land or for a touch-and-go landing unless a landing/touch-and-go clearance has been obtained from ATC. If no such clearance has been obtained from ATC by 200ft the aircraft shall break-off its approach and carry out a go-around procedure.

3 WRONG APPROACHES AND LANDINGS OF AIRCRAFT BOUND FOR SELETAR AERODROME AND SEMBAWANG MILITARY AERODROME

3.1 INTRODUCTION

3.1.1 The attention of all pilots is drawn to the existence of RSAF Sembawang Aerodrome, 3NM to the west of Seletar Aerodrome. The runway at Sembawang is orientated in almost the same direction as the runway at Seletar Aerodrome i.e. 03/21 for Seletar Aerodrome and 05/23 for Sembawang. Due to the close proximity of these two runways, pilots are cautioned against mistaking Sembawang Aerodrome for Seletar Aerodrome and thus making an inadvertent visual landing or approach to land at Sembawang.

3.1.2 Erroneous approaches or landings usually occurred in marginal weather conditions. In almost every instance, the prevailing weather at the time of the incident contributed towards a hasty and erroneous identification of the correct aerodrome.

3.1.3 There is intensive local flying at both aerodromes during the day and night. As pilot training is the major activity at both aerodromes, the risk of collision is very great if a wrong approach or landing is made at either of the two aerodromes.

3.2 POINTS TO BEAR IN MIND WHEN APPROACHING SELETAR AD OR SEMBAWANG AD

3.2.1 The following points are highlighted to serve as a guide to assist pilots in identifying Seletar AD or Sembawang AD and should be remembered and followed:

- a. The runways at Seletar and Sembawang are almost identically aligned. Extra vigilance, therefore, is required when approaching either aerodrome, or when commencing an approach to land.
- b. Make full use of available navigational and landing aids, and positively identify each aid used.
- c. Adhere strictly to the joining instructions issued by ATC.
- d. To keep clear of Sembawang ATZ while approaching Seletar AD for landing and vice versa.

3.2.2 Pilots are required to take note of the proximity of Sembawang ATZ, Paya Lebar CTR and all Prohibited/Restricted/Danger Areas (e.g. WSR38 and WSD4). All arriving and departing aircraft will have to keep clear of these areas.

← **3.3 AERODROME CHARACTERISTICS OF SELETAR AND SEMBAWANG AERODROMES**

Aeronautical Service	Seletar AD	Sembawang AD	Significant Differences and Remarks
RWY Designation	03/21	05/23	Exercise caution due to almost similar RWY alignment
Location	Adjacent to the Straits of Johor on the eastern bank of Seletar River. Seletar AD is situated APRX 3NM NW of Paya Lebar AP.	APRX 3NM west of Seletar AD and 3NM inland from the Straits of Johor	Seletar RWY commences almost from the edge of the shore. Also note that Sembawang AD is inland and not next to the sea. Pilots operating in either AD are to keep clear of the other AD ATZ/CTR at all times.
RWY LGT	White/Amber RWY edge LGT	NIL	Sembawang AD has no RWY LGT
Approach LGT	Simple approach LGT available for RWY 03 approach, consisting of 4 rows of barettes and 1 crossbar (5th row). <u>RWY 03</u> - white, elevated, uni-directional approach LGT and white, omni-directional CGL on top of elevated approach LGT. Approach LGT available for RWY 21 approach, consisting of 1 row of inset approach LGT (1st row) and 4 rows of barettes. <u>RWY 21</u> - white, inset and elevated, uni-directional approach LGT and white, omni-directional CGL on top of elevated approach LGT. Simple touchdown zone LGT for both RWY 03 and RWY 21 approach consisting of 2 pairs of white, inset, uni-directional LGT	NIL	No visual approach slope indicator at Sembawang AD
IBN	FLG G 'SL' EV 7 SEC	FLG R 'AG' EV 20 SEC HN and IMC	NIL
ABN	ALTN FLG W G EV 2.5 SEC	NIL	Sembawang AD has no ABN
Parking Apron	Relatively large aircraft parking apron to the west of RWY, connected to the RWY by three taxiways	Small aircraft parking apron	Differences in size and location of the parking apron

WSSL AD 2.21 NOISE ABATEMENT PROCEDURES

- 1.1 To alleviate the problem of noise, no flights are permitted between 1400-2300, other than MEDEVAC and emergency flights.
- 1.2 All aircraft on AWY G579 between SINJON (SJ) and GUMPU shall operate at/above 5,000ft.
- 1.3 When overflying residential areas around Seletar Airport, aircraft are to adhere to the minimum altitudes specified within the Noise Abatement Areas.
- 1.4 Noise Abatement Area 1 is bounded by the following points, and aircraft are to maintain a minimum altitude of 1,500ft when overflying the area.

Lateral Limits of Noise Abatement Area 1	
POINT	COORDINATES
A	012551.0N 1035044.3E
B	012549.9N 1035059.2E
C	012522.3N 1035102.3E
D	012458.3N 1035044.4E
E	012443.4N 1035005.3E
A	012551.0N 1035044.3E

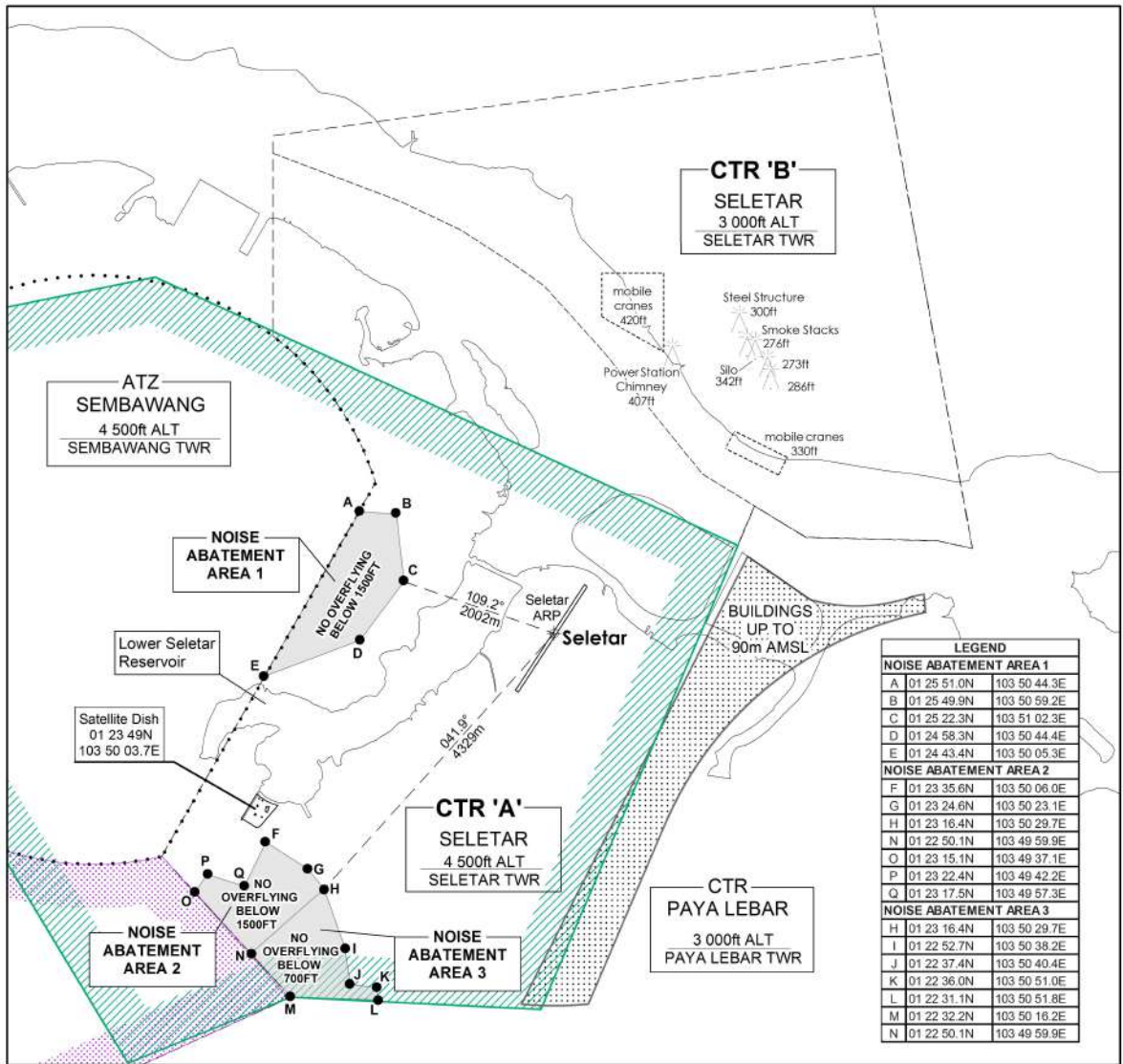
- 1.5 Noise Abatement Area 2 is bounded by the following points, and aircraft are to maintain a minimum altitude of 1,500ft when overflying the area.

Lateral Limits of Noise Abatement Area 2	
Point	Coordinates
F	012335.6N 1035006.0E
G	012324.6N 1035023.1E
H	012316.4N 1035029.7E
N	012250.1N 1034959.9E
O	012315.1N 1034937.1E
P	012322.4N 1034942.2E
Q	012317.5N 1034957.3E
F	012335.6N 1035006.0E

- 1.6 Noise Abatement Area 3 is bounded by the following points, and aircraft are to maintain a minimum altitude of 700ft when overflying the area.

Lateral Limits of Noise Abatement Area 3	
Point	Coordinates
H	012316.4N 1035029.7E
I	012252.7N 1035038.2E
J	012237.4N 1035040.4E
K	012236.0N 1035051.0E
L	012231.1N 1035051.8E
M	012232.2N 1035016.2E
N	012250.1N 1034959.9E
H	012316.4N 1035029.7E

1.7 The map below shows the locations of Noise Abatement Areas 1, 2 and 3 within Seletar Control Zone.



1.8 Aircraft which are unable to adhere to the minimum altitudes specified over the noise abatement areas are not allowed to operate at Seletar Airport.

1.9 No engine run up shall be permitted between 1400-2300.

WSSL AD 2.22 FLIGHT PROCEDURES

1 PROCEDURES FOR ARRIVALS INTO SELETAR AERODROME

1.1 Introduction

- 1.1.1 Aircraft on VFR flight plan, routing via Tebrau City Mall (013259N1034748E) to Seletar shall follow the joining procedures as described in paragraph 1.2 and illustrated in charts AD-2-WSSL-VAC-1, AD-2-WSSL-VAC-2 and AD-2-WSSL-VFR-1.
- 1.1.2 Aircraft returning from Light Aircraft Training Areas shall follow the joining procedures as described in paragraph 1.3 and illustrated in charts AD-2-WSSL-VAC-1 and AD-2-WSSL-VAC-2.
- 1.1.3 Aircraft on IFR flight plan, routing via GUMPU, OMKOM or SJ - PONJO - RECHI to Seletar shall be vectored under radar for a visual approach. Seletar Approach shall provide the radar service for aircraft routing via GUMPU and OMKOM, and Paya Lebar Approach shall provide the radar service for aircraft routing via SJ - PONJO - RECHI. When Seletar Approach and Paya Lebar Approach is closed, Singapore Approach shall provide the service. Unless authorised by ATC, pilots shall follow the joining procedures as described in paragraph 1.4 and 1.5. The joining procedures are illustrated in charts AD-2-WSSL-VAC-3, AD-2-WSSL-VAC-4, AD-2-WSSL-IFR-1 and AD-2-WSSL-IFR-2. All arrival clearances subject to ATC coordination.
- 1.1.4 When within 5km of the aerodrome reference point, aircraft are to fly at a manoeuvring speed of not more than 170kt unless otherwise authorised by ATC. All aircraft are required to keep well clear of Sembawang ATZ, Paya Lebar CTR and any Prohibited/Restricted/Danger Areas (e.g. WSR38 and WSD4) within the vicinity.
- 1.1.5 Circuit traffic already downwind shall have priority. Arriving aircraft shall position and sequence itself accordingly, unless directed otherwise by ATC.
- 1.1.6 Pilots shall not fly east of the runway. This is due to tall buildings up to 90m (296ft) AMSL to the east of Seletar CTR (the location is depicted in charts AD-2-WSSL-VAC-1 to AD-2-WSSL-VAC-4).

1.2 Joining Procedures for VFR flights from Tebrau City Mall (013259N1034748E)

- 1.2.1 Aircraft on VFR flight plan joining Seletar CTR from East of JB Town are to descend to altitude cleared by ATC. From Tebrau City Mall (013259N1034748E) descend in VMC to altitude cleared by ATC and proceed to POINT 'X' (located 012830N 1034954E or radial 297/7DME from PU DVOR/DME) keeping clear of WMP228 and then direct to overhead the airfield.
- 1.2.2 When overhead the airfield, the joining aircraft shall make a turn overflying the runway and after passing abeam the Control Tower, commence descent as cleared to cross the upwind end of the runway at 1,500ft. Passing over the end of the runway, descend to circuit altitude as cleared by ATC. Pilots shall ensure to keep clear of Sembawang ATZ and Paya Lebar CTR and not to fly east of the runway. This is to keep clear of tall buildings up to 90m AMSL to the east of Seletar CTR. The area where the tall buildings are located is indicated in the Seletar Visual Approach Charts AD-2-WSSL-VAC-1 to AD-2-WSSL-VAC-4. Procedures are illustrated in the following charts:
- i. AD-2-WSSL-VAC-1 : Visual Approach Chart - RWY 03
 - ii. AD-2-WSSL-VAC-2 : Visual Approach Chart - RWY 21
- 1.2.3 Traffic permitting and in good visibility, joining aircraft may be cleared to join directly for right base when landing on RWY 21 or turn downwind for RWY 03 from north-end of the runway (THR RWY 21).

1.3 Joining Procedures from Light Aircraft Training Areas

- 1.3.1 Unless otherwise authorised by ATC, aircraft are to join overhead the airfield at 2,000ft keeping clear of Sembawang ATZ and Paya Lebar CTR.
- 1.3.2 When overhead the airfield, the joining aircraft shall make a turn to the eastern side of the runway and after passing abeam the Control Tower, commence descent as cleared to cross the upwind end of the runway at 1,500ft. Passing over the end of the runway, descend to circuit altitude as cleared by ATC. Pilots shall ensure to keep clear of Sembawang ATZ and Paya Lebar CTR and not to fly east of the runway. This is to keep clear of tall buildings up to 90m AMSL to the east of Seletar CTR. The area where the tall buildings are located is indicated in the Seletar Approach Charts AD-2-WSSL-VAC-1 to AD-2-WSSL-VAC-4. Procedures are illustrated in the following charts:
- i. AD-2-WSSL-VAC-1: Visual Approach Chart - RWY 03
 - ii. AD-2-WSSL-VAC-2: Visual Approach Chart - RWY 21
- 1.3.3 Traffic permitting and in good visibility, joining aircraft may be cleared to join directly for right base when landing on RWY 21 or turn downwind for RWY 03 from north-end of the runway (THR RWY 21).

1.4 Joining Procedures for IFR flights from GUMPU, OMKOM or SJ - RWY 03

1.4.1 From OMKOM

Cross OMKOM at or above 3,000ft. On passing OMKOM descend in VMC to 2,000ft or altitude cleared by ATC and join downwind RWY 03.

- i. Straight-in-Approach
Join downwind RWY 03 at 2,000ft (keeping clear of Sembawang ATZ). When downwind descend from 2,000ft for visual approach RWY 03, or as cleared by ATC. Pilots should have the runway in sight.
- ii. Circling Approach
Join downwind RWY 03 at 2,000ft (keeping clear of Sembawang ATZ). At end of downwind turn left and overfly the runway. When passing over north end of the runway (THR RWY 21), descend from 2,000ft to 1,500ft and turn left for downwind RWY 03. At downwind descend for a visual approach RWY 03 or as cleared by ATC. Pilots should have the runway in sight.

← 1.4.2 From GUMPU

Cross GUMPU at or above 6,000ft enroute to Point ALFA. On passing Point ALFA, descend in VMC to 2,000ft or altitude cleared by ATC. (Point ALFA is located at 013033N 1034942E or Radial 296/7 DME VTK)

- i. Straight-in-Approach
On passing Point ALFA, turn right for downwind RWY 03 (keeping clear of Sembawang ATZ). At downwind descend from 2,000ft for a visual approach RWY 03, or as cleared by ATC. Pilots should have the runway in sight.
- ii. Circling Approach
On passing Point ALFA, turn right for downwind RWY 03 (keeping clear of Sembawang ATZ). At end of downwind, turn left and overfly the runway. Passing over north end of the runway (THR RWY 21), descend from 2,000ft to 1,500ft and turn left for downwind RWY 03. At downwind descend for a visual approach RWY 03 or as cleared by ATC. Pilots should have the runway in sight.

1.4.3 From SJ

Cross SJ at 4,000ft or as cleared by ATC. On passing SJ, descend to 3,000ft for PONJO. On passing PONJO, descend in VMC to 2,000ft or altitude cleared by ATC. (PONJO is located at 01 1629N 1034629E or Radial 303 SJ)

- i. Straight-in-Approach
Join direct for a straight-in visual approach RWY 03 descending from 2,000ft at a speed of not more than 170kt, or as cleared by ATC. Pilots should have the runway in sight.
- ii. Circling Approach
Overfly the runway at 2,000ft at a speed of not more than 160kt, or as cleared by ATC. When passing over the north-end of runway (THR RWY 21), descend from 2,000ft to 1,500ft and turn left for downwind RWY 03 (keeping clear of Sembawang ATZ and Light Aircraft Training Area A). At downwind, descend for visual approach or as cleared by ATC. Pilots should have the runway in sight.

1.4.4 Procedures are illustrated in the following charts:

- AD-2-WSSL-VAC-3 : Visual Approach Chart - RWY 03
- AD-2-WSSL-IFR-1 : Seletar Aerodrome Joining Procedures (IFR flights) from GUMPU, OMKOM and SJ - RWY 03

1.5 Joining Procedures for IFR flights from GUMPU, OMKOM or SJ - RWY 21

1.5.1 From OMKOM

Cross OMKOM at or above 3,000ft. On passing OMKOM descend in VMC to 2,000ft or altitude cleared by ATC.

- i. Straight-in-Approach
Join direct for a straight-in visual approach Rwy 21 descending from 2,000ft, or as cleared by ATC. Pilots should have the runway in sight.
- ii. Circling Approach
Overfly the runway at 2,000ft, or as cleared by ATC. Passing over the south-end of the runway (THR RWY 03), descend from 2,000ft to 1,500ft and turn right for downwind RWY 21 (keeping clear of Light Aircraft Training Area A and Sembawang ATZ). At downwind descend for a visual approach RWY 21 or as cleared by ATC. Pilots should have the runway in sight.

- 1.5.2 From GUMPU
Cross GUMPU at or above 6,000ft enroute to Point ALFA. On passing Point ALFA, descend in VMC to 2,000ft or altitude cleared by ATC. (Point ALFA is located at 013033N 1034942E or Radial 296 VTK)
- i. Straight-in-Approach
On passing Point ALFA, join direct for a straight-in visual approach RWY 21 descending from 2,000ft, or as cleared by ATC (keeping clear of Sembawang ATZ).
 - ii. Circling Approach
On passing Point ALFA, overfly the runway at 2,000ft. When passing over the south end of the runway (THR RWY 03), descend from 2,000ft to 1,500ft and turn right for downwind RWY 21 (keeping clear of Light Aircraft Training Area A and Sembawang ATZ). At downwind descend for a visual approach RWY 21 or as cleared by ATC. Pilots should have the runway in sight.

- ← 1.5.3 From SJ
Cross SJ at 4,000ft or as cleared by ATC. On passing SJ, descend to 3,000ft for PONJO. On passing PONJO, descend in VMC to 2,000ft or altitude cleared by ATC and join downwind RWY 21 via RECHI-SETHI. (RECHI is located at 012033N 1034908E or Radial 235 PU and SETHI is located at 012439N 1035006E or Radial 263 PU)
- i. Straight-in-Approach
Join downwind RWY 21 via SETHI at 2,000ft (keeping clear of Sembawang ATZ) at a speed of not more than 170kt. When downwind, descend from 2,000ft for visual approach, or as cleared by ATC. Pilots should have the runway in sight.
 - ii. Circling Approach
Join downwind RWY 21 via SETHI at 2,000ft (keeping clear of Sembawang ATZ) at a speed of not more than 160kt. At end of downwind, turn right and overfly the runway. When passing over south-end of the runway (THR RWY 03), descend from 2,000ft to 1,500ft and turn right for downwind RWY 21. At downwind, descend for visual approach or as cleared by ATC. Pilots should have the runway in sight.

1.5.4 Procedures are illustrated in the following charts:

- AD-2-WSSL-VAC-4 : Visual Approach Chart - RWY 21
- AD-2-WSSL-IFR-2 : Seletar Aerodrome Joining Procedures (IFR flights) from GUMPU, OMKOM and SJ - RWY 21

1.6 ***Holding Procedure***

1.6.1 A low level holding procedure is established at SJ DVOR/DME. Suitably equipped aircraft bound for Seletar which may wish to hold for weather improvement may use this procedure (ENR 3.6-3 refers)

1.7 ***Approaches to Seletar Aerodrome***

- 1.7.1 A deep-water shipping channel approximately 1525m from the northern threshold cuts across the extended centreline of Seletar RWY 21.
- 1.7.2 Information on the mast heights of tall vessels is relayed to ATC by Maritime and Port Authority of Singapore. ATC shall inform pilots of landing and departing aircraft of such information if the reported mast height of the vessel is above 30m.
- 1.7.3 At night ATC shall not permit landing on RWY 21 when vessels of mast height above 30m are reported.
- 1.7.4 Aircraft making approaches into Seletar are required to keep clear of Sembawang ATZ and any Prohibited/Restricted/Danger Areas (e.g. WSR38 and WSD4) within the vicinity.
- 1.7.5 Aircraft are restricted from overflying built-up residential areas around Seletar Airport (charts AD-2-WSSL-VAC-1 to AD-2-WSSL-VAC-4 refer) at an altitude of below 1,500ft. Aircraft types which are unable to safely manoeuvre clear of the built-up residential areas are not allowed to operate at Seletar Airport.

2 GROUND PROCEDURES FOR NON-TRAINING FLIGHTS

- 2.1 Pilots shall contact ATC (Seletar Ground on 121.6MHz) with the following details when the aircraft is ready to start up for departure within 5 minutes.
- a. Callsign;
 - b. Destination;
 - c. Proposed flight level and alternate level, if any; and
 - d. Parking position.
- 2.1.1 Pilots shall request ATC clearance no later than 15 minutes prior to the start of noise abatement procedures or designated training hours and to expect delay if unable to comply. Refer to GEN 1.2 paragraph 3.8 and WSSL AD 2.21 for details.
- 2.2 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.
- 2.3 Once flight level is accepted by the pilot and an ATC clearance issued, the aircraft must start up within 5 minutes from the time the ATC clearance is accepted unless other ATC restrictions are imposed. The ATC clearance will be cancelled on expiry of the 5 minutes grace period. This also applies to situations when aircraft develop technical issues and is unable to continue taxi for departure.
- 2.4 Pilots who are ready to depart following the cancellation of an ATC clearance shall adopt the procedures as if it is the first time they are ready to depart.

3 DEPARTURES FROM SELETAR AERODROME

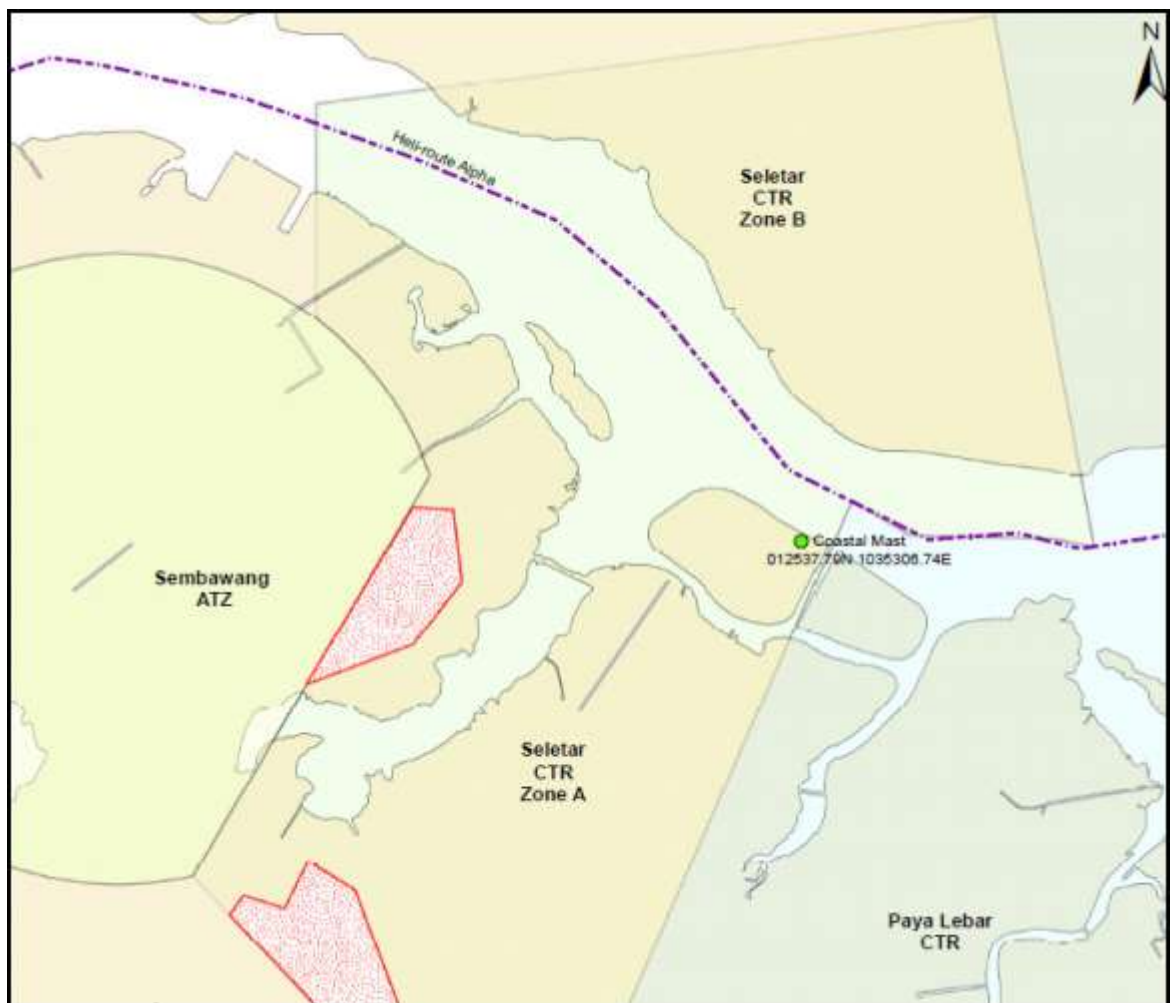
- 3.1 Aircraft departing Seletar are required to keep clear of Sembawang ATZ and any Prohibited/Restricted/Danger Areas (e.g. WSR38 and WSD4) within the vicinity.
- 3.2 The pilot-in-command or the operator of IFR flight operating out of Seletar is required to file via OMKOM or RECHI - PONJO - SJ under item 15 of the flight plan. All departure clearances subject to ATC coordination.
- 3.3 Aircraft departing Seletar are required to adhere to the speed restrictions (charts AD-2-WSSL-VDC-1 and AD-2-WSSL-VDC-2 refer).

WSSL AD 2.23 ADDITIONAL INFORMATION**1 BIRD CONCENTRATION IN THE VICINITY OF THE AIRPORT**

- 1.1 A number of varieties of birds are found in Singapore throughout the year. The larger birds commonly found in Seletar Airport includes the following:
- Cattle egrets (weighing approximately 300g each)
 - Brahminy kites (weighing approximately 600g each)
- 1.2 There could be an increase in bird activities during the usual migratory months of September to April. During this period, migratory birds may use the airport as their feeding ground.
- 1.3 Handheld laser device, long range acoustic device and alternating amplified bird cries of distress are used for bird dispersal within Seletar Airport.

2 HELICOPTER CROSSING SELETAR NORTHERN EXTENDED CENTRELINE

- 2.1 Due to flying activities in Seletar Control Zone, all helicopters flying on Heli-route Alpha and intending to cross the northern extended centreline of Seletar Aerodrome shall obtain a positive clearance from Seletar Tower on 118.45MHz prior to crossing (see chart below).
- 2.2 For eastbound crossing, all helicopters are to hold over the western tip of Seletar Island until a clearance has been issued by Seletar Tower.
- 2.3 For westbound crossing, all helicopters are to hold on Heli-route Alpha abeam the coastal mast until a clearance has been issued by Seletar Tower.
- 2.4 The holding altitude is 200 feet or otherwise instructed by ATC.



WSSL AD 2.24 CHARTS RELATED TO SELETAR AIRPORT

Aerodrome Chart - ICAO	AD-2-WSSL-ADC-1 to 1.1
Layout of Significant Aerodrome Buildings and Apron Facilities	AD-2-WSSL-ADC-2
Aerodrome Hotspots	AD-2-WSSL-ADC-3
Aerodrome Obstacle Chart (AOC) - ICAO - TYPE A - RWY 03/21	AD-2-WSSL-AOC-1
Aerodrome Obstacle Chart (AOC) - ICAO - TYPE B - RWY 03/21	AD-2-WSSL-AOC-2
Visual Approach Chart (VAC) - ICAO - RWY 03	AD-2-WSSL-VAC-1
Visual Approach Chart (VAC) - ICAO - RWY 21	AD-2-WSSL-VAC-2
Visual Approach Chart (VAC) - ICAO - Advisory Joining Procedures - RWY 03	AD-2-WSSL-VAC-3
Visual Approach Chart (VAC) - ICAO - Advisory Joining Procedures - RWY 21	AD-2-WSSL-VAC-4
Visual Departure Chart - RWY 03	AD-2-WSSL-VDC-1 to 1.1
Visual Departure Chart - RWY 21	AD-2-WSSL-VDC-2 to 2.1
Joining Procedures - VFR Flights from Johor Bahru	AD-2-WSSL-VFR-1
Joining procedures - IFR Flights from GUMPU, OMKOM and SJ - RWY 03	AD-2-WSSL-IFR-1
Joining procedures - IFR Flights from GUMPU, OMKOM and SJ - RWY 21	AD-2-WSSL-IFR-2

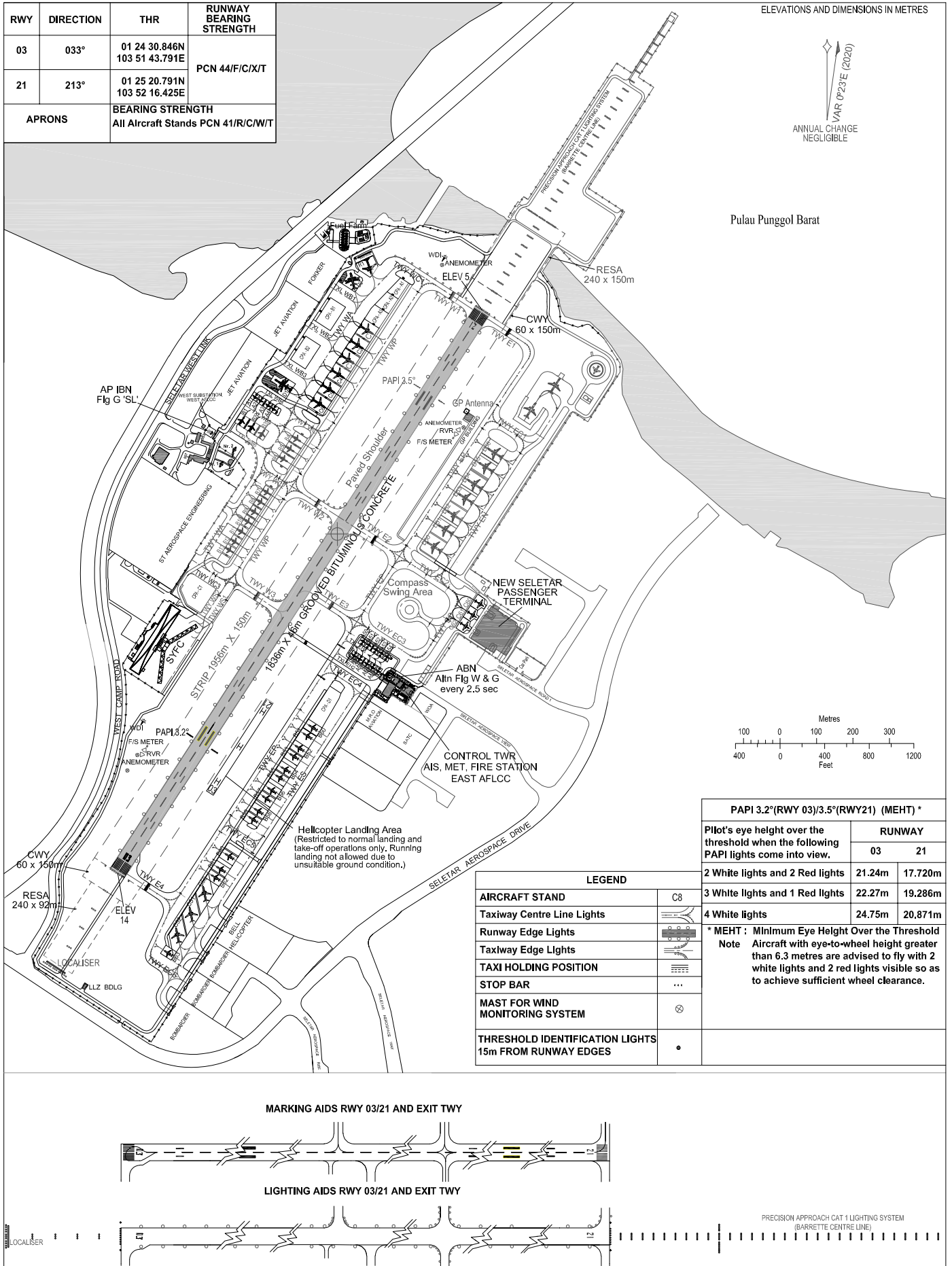
AERODROME CHART - ICAO

01° 25' 01.04"N
103° 52' 03.52"E

ELEV 14m

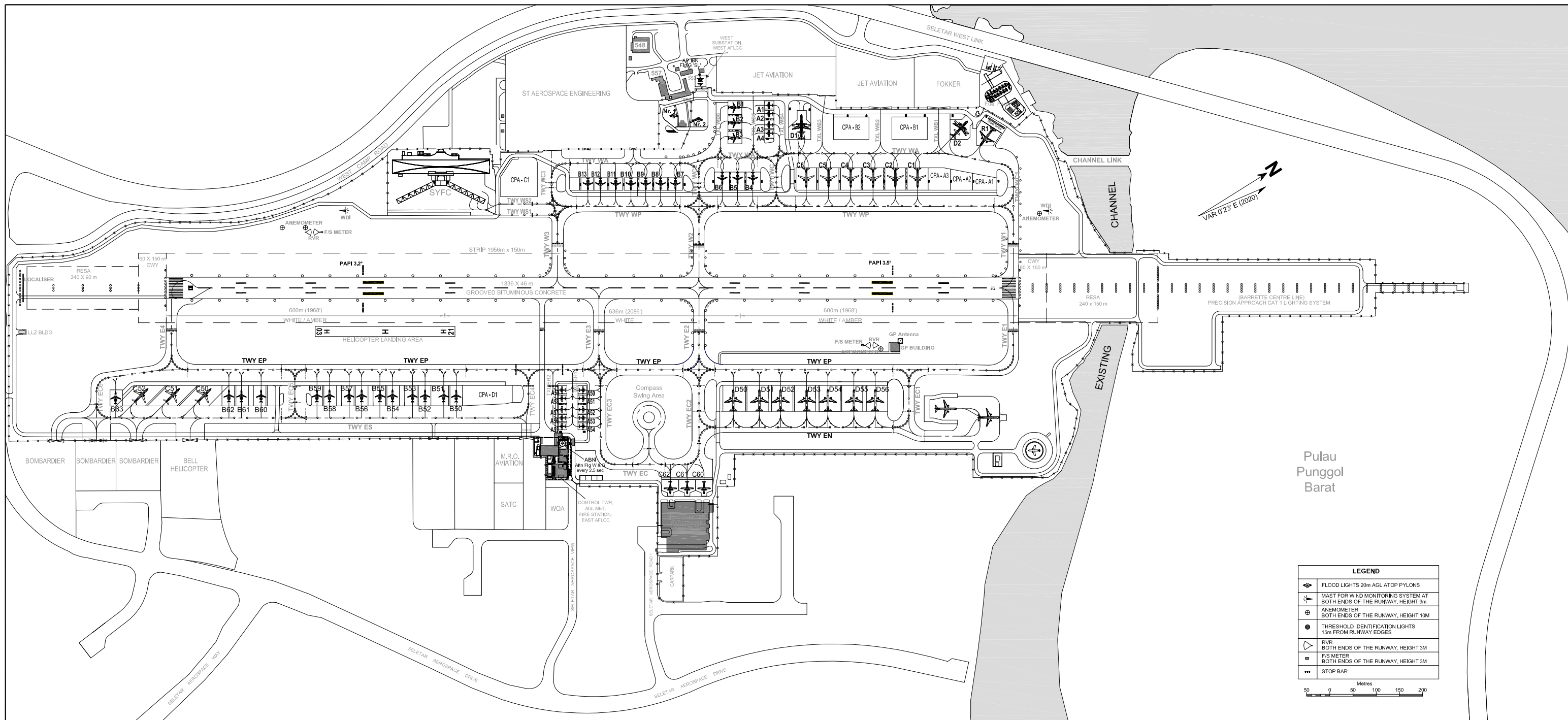
TWR 118.45
121.6

SINGAPORE/SELETAR

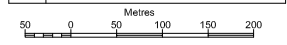


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SELETAR AERODROME LAYOUT OF SIGNIFICANT AERODROME BUILDINGS AND APRON FACILITIES

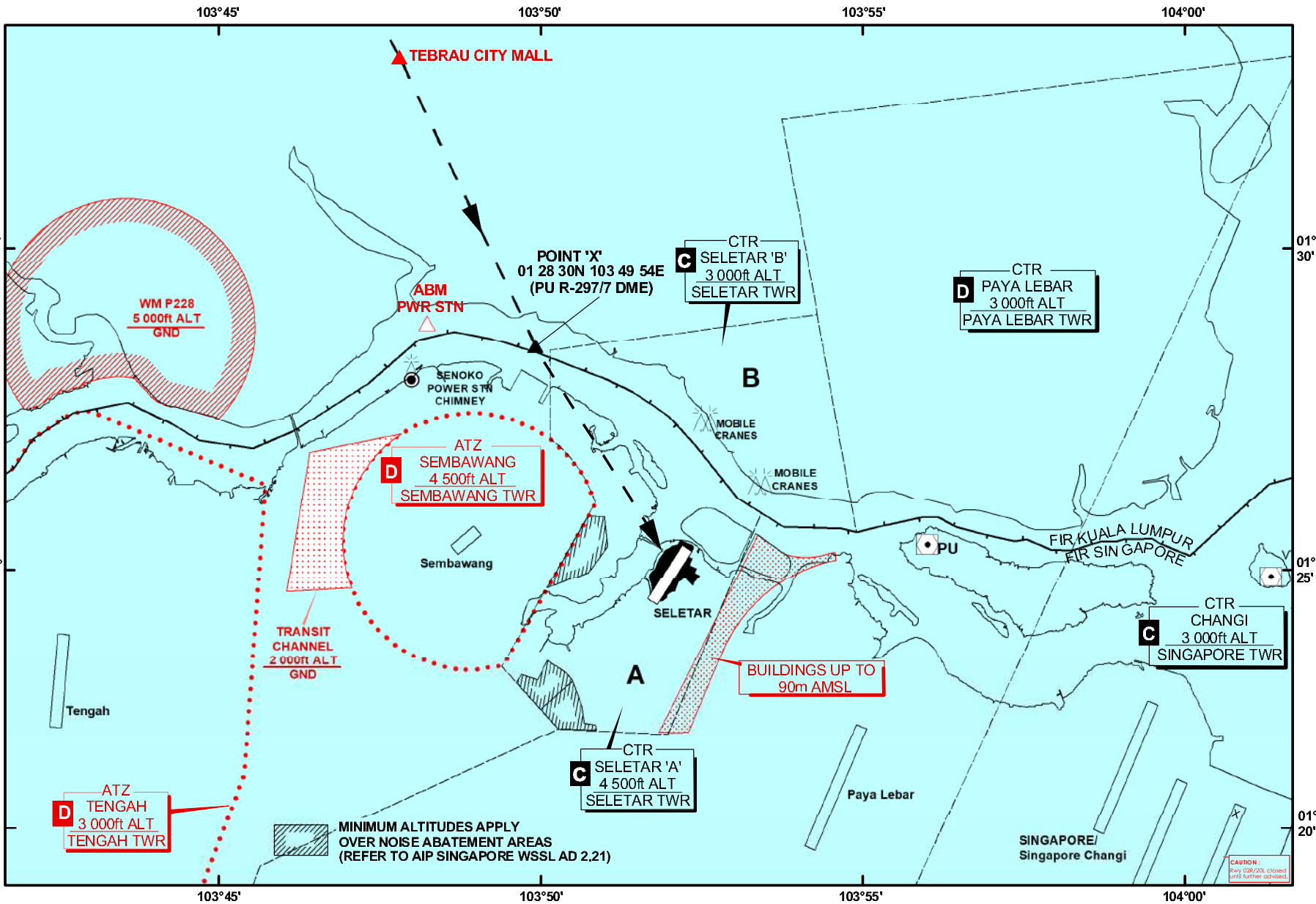


LEGEND	
	FLOOD LIGHTS 20m AGL ATOP PYLONS
	MAST FOR WIND MONITORING SYSTEM AT BOTH ENDS OF THE RUNWAY, HEIGHT 9m
	ANEMOMETER BOTH ENDS OF THE RUNWAY, HEIGHT 10M
	THRESHOLD IDENTIFICATION LIGHTS 15m FROM RUNWAY EDGES
	RVR BOTH ENDS OF THE RUNWAY, HEIGHT 3M
	F/S METER BOTH ENDS OF THE RUNWAY, HEIGHT 3M
	STOP BAR



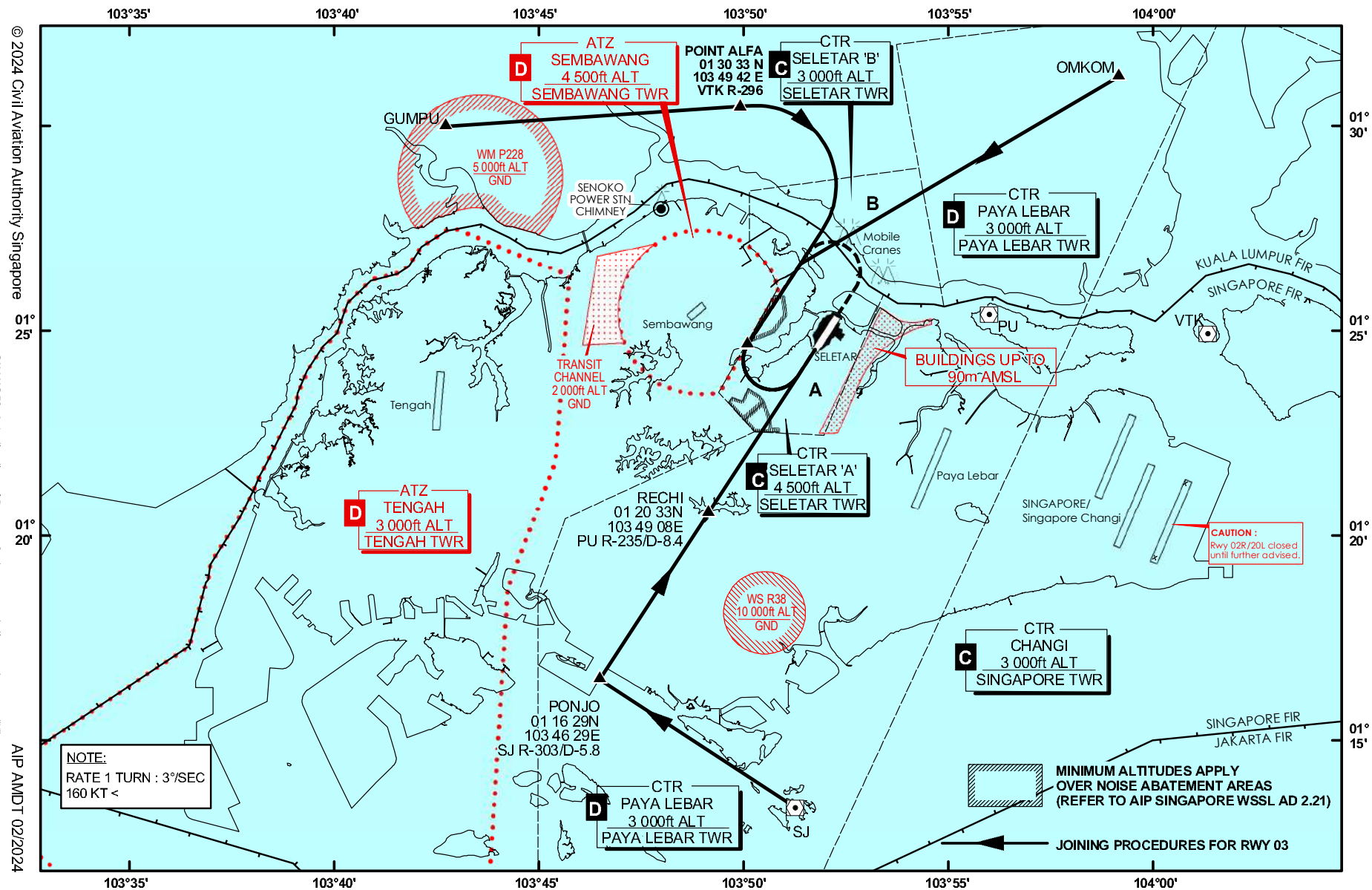
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SELETAR AERODROME JOINING PROCEDURE (VFR FLIGHTS) FROM JOHOR BAHRU



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SELETAR AERODROME JOINING PROCEDURE (IFR FLIGHTS) FROM GUMPU, OMKOM AND SJ - RUNWAY 03



© 2024 Civil Aviation Authority Singapore
 CHANGES : 1. Indication of Runway 3 closure abolition and crosses "X"
 2. Redignment of FIR
 AIP AMDT 02/2024

A I P Singapore
 AD-2-WSSL-IFR-1
 21 MAR 2024

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WSAP AD 2.14 APPROACH AND RUNWAY LIGHTING

<i>RWY Designator</i>	APCH LGT type LEN INTST	THR LGT colour WBAR	VASIS (MEHT) PAPI	TDZ LGT LEN	RWY Centre Line LGT LEN, spacing, colour, INTST	RWY edge LGT LEN, spacing colour, INTST	RWY END LGT colour WBAR	SWY LGT LEN colour
1	2	3	4	5	6	7	8	9
02/20	Sequenced FLG LGT. Modified Calvert High INTST White LGT with brilliancy control.	Green	PAPI on 3° glide slope	-	NIL	White with Amber	Red	Red

WSAP AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

<i>WDI/Taxiway/Stopway</i>	Lighted
IBN	012120.6N 1035410.0E; Flashing Red 'PL'; Operating hours HN and IMC

WSAP AD 2.17 ATS AIRSPACE

1	<i>Designation and Lateral Limits</i>	PAYA LEBAR CTR 011100N 1035134E 013300N 1040149E 013200N 1035344E 012534N 1035454E thence along international BDRY to 012544N 1035320E 012227N 1035158E 012232N 1035016E 012100N 1034654E 012025N 1034539E 011835N 1034459E thence southwards on 180° to 011100N 1034459E and eastwards to join up with 011100N 1035134E.
2	<i>Vertical Limits</i>	GND to 3000 FT ALT
3	<i>Airspace Classification</i>	D
4	<i>ATS Unit Call Sign, Language(s)</i>	PAYA LEBAR TOWER (Singapore APP outside the opr hours of PAYA LEBAR TOWER), English
5	<i>Transition Altitude</i>	11000 FT (3,350m)
6	<i>Remarks</i>	Northern Transit Corridor: RSAF military aircraft (with the exception of trainer aircraft) using the northern transit corridor will enter the airspace over Johor at or above 5,000ft. RSAF trainer aircraft using the northern corridor will enter the airspace over Johor at or above 2,000ft.

WSAP AD 2.18 ATS COMMUNICATION FACILITIES

Service designation	Call sign	Frequency	Hours of operation	Remarks
APP	SELETAR APPROACH	126.025 MHz	0000-1500	TAR – Intermediate approach to Seletar Airport
	SINGAPORE APPROACH	124.05 MHz 124.6 MHz 126.3 MHz	H24	TAR – flow control service provided for ARR/DEP ACFT. Intermediate approach to Singapore Changi AP and other airports in Singapore. DEP from all airports in Singapore.
	PAYA LEBAR APPROACH	119.9 MHz 298.0 MHz *255.8 MHz #127.7 MHz	BTN 2300-1100 SUN-MON to THU-FRI	* for monitoring aircraft operating in Light Aircraft Training Areas. # for monitoring aircraft operating in Light Aircraft Training Areas and Seletar outbound/inbound traffic.
TWR	PAYA LEBAR TOWER	118.05 MHz 263.1 MHz	On SAT-SUN, public holidays and outside the above times PPR from RSAF	NIL
GND	PAYA LEBAR GROUND	130.8 MHz 296.0 MHz		
PAR	PAYA LEBAR TALKDOWN	119.9 MHz †269.0 MHz ◆240.5 MHz	Headquarters via Paya Lebar Base Command Post.	† for Talkdown 1, ◆for Talkdown 2 Maint Period: BTN 0001-1100 First THU of EV month
SRE	PAYA LEBAR DIRECTOR	283.0 MHz		Maint Period: BTN 0001-1100 Second THU of EV month
Flight Information Service	SINGAPORE RADAR	119.1 MHz	H24	NIL

WSAP AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of Aid and MAG Variation	IDENT	FREQ	OPR Hour	Position of transmitting Antenna Coordinates	DME transmitting Antenna Elevation / Remarks
TACAN	PLA	CH110X	H24	012224.00N 1035451.00E	030° MAG 2.375km from ARP. Maint Period: BTN 0001-0900 Second SAT of EV month For homing purposes only.
PAPA UNIFORM DVOR/DME	PU	115.1 MHz CH98X	H24	012524.00N 1035600.00E	020° MAG 9km from THR RWY 02 Antenna Hgt: 190ft AMSL. Coverage 200NM. Maint Period: BTN 0200-0600 Third WED of EV month
SINJON DVOR/DME	SJ	113.5 MHz CH82X	H24	011321.34N 1035115.22E	201° MAG 14.5km from THR RWY 02 (Paya Lebar). Antenna HGT: 194ft AMSL Coverage 200NM Maint Period: BTN 0200-0600 Third THU of EV month
ILS LLZ RWY 02	IPN	109.3MHz	H24	012246.41N 1035503.64E	LOC 401m from THR RWY 20 along centreline of RWY. Course width 3 DEG. Maint Period: BTN 0001-0900 First SUN of EV month
ILS GP RWY 02	-	332.00MHz	H24	012050.42N 1035410.11E	GP angle 3 DEG.
ILS DME RWY 02	IPN	CH30X	H24	012050.42N 1035410.11E	DME co-located with GP

Type of Aid and MAG Variation	IDENT	FREQ	OPR Hour	Position of transmitting Antenna Coordinates	DME transmitting Antenna Elevation / Remarks
ILS LLZ RWY 20	IPS	111.5MHz	H24	012027.24N 1035404.48E	LOC 462m from THR RWY 02 along centreline of RWY. Course width 3 deg. Maint Period: BTN 0001-0900 Second SUN of EV month
ILS GP RWY 20	-	332.90MHz	H24	012227.29N 1035451.29E	GP angle 3 deg.
ILS DME RWY 20	IPS	CH52X	H24	012227.29N 1035451.29E	DME co-located with GP

WSAP AD 2.20 LOCAL TRAFFIC REGULATIONS - DESIGNATION OF PAYA LEBAR AIRPORT AS AN ALTERNATE AD FOR SINGAPORE CHANGI AIRPORT

1 INTRODUCTION

- 1.1 Paya Lebar Airport is designated as an alternate aerodrome to Singapore Changi Airport.
- 1.2 As Paya Lebar Airport is a joint civil/military aerodrome, its use as a planned alternate aerodrome for Singapore Changi Airport is subjected to certain restrictions and limitations. It also has limited ground, baggage and passenger handling facilities for civilian aircraft operations, such as passenger boarding bridges.

2 MANNING OF PAYA LEBAR AIRPORT

- 2.1 The airport is open from 2300-1100 on SUN-MON to THU-FRI. It is closed on Saturdays, Sundays and Public Holidays. Outside the stipulated operating hours and during airport closure, Paya Lebar Airport will be opened at 30 minutes' notice to accept diversion flights into the aerodrome.
- 2.2 Airline operators are requested to inform the Airport Manager and the Duty Tower Controller or SATCC Watch Manager at Singapore Changi Airport as soon as it is known that their service will require the use of Paya Lebar Airport. Revised ETAs and/or ETDs are to be notified as soon as known.
- ← 2.3 The airport will hold off all departures and arrivals when the aerodrome visibility falls below 3km, or when the aerodrome prevailing cloud base is lower than 500ft. This is a safety consideration to avoid aircraft from carrying out a missed approach under an adverse weather condition. For maintenance/functional check flights scheduled to depart and arrive back to the airport, such departures may be held off when the aerodrome visibility falls below 6km, or when the aerodrome prevailing cloud base is lower than 1,000ft.

3 OPERATIONAL SERVICES

- 3.1 Air-ground-air communications maintained by Paya Lebar Airport for aerodrome/approach control service are listed in page WSAP AD 2-7.

4 PASSENGER CLEARANCE

- 4.1 All Customs, Health and Immigration clearances will be carried out at Singapore Changi Airport.
- 4.2 The diverting aircraft Airline's Coordinator and its ground handling agency staff shall be present to provide assistance when an aircraft is required to land at Paya Lebar Airport.

5 SECURITY

- 5.1 All airline personnel, including ground handlers and support staff who have to proceed to Paya Lebar Airport must wear their Singapore Changi Airport passes at a prominent position for entry to the aircraft parking area. All personnel not in possession of the laminated Singapore Changi Airport pass will be denied entry into Paya Lebar Airport by the RSAF Security Guard. Entry into the airport by both the airline personnel and service equipment is via the main gate. The Airline Engineering Coordinator shall be responsible for the proper positioning of the ground servicing equipment and vehicles in the Apron Area where arriving aircraft are to be parked.
- 5.2 The security of civil aircraft parked in the Apron is the responsibility of the aircraft owner and any security service obtained shall first be cleared with the Paya Lebar Airport flight security.

6 AIRCRAFT STAND ALLOCATION

- 6.1 Nine aircraft parking positions in Apron C and on taxiway fillets are available for civil aircraft. A separation of 40 feet between wing-tips should be maintained.
- 6.2 Aircraft parking positions will be issued by the Paya Lebar Tower and the Airline Engineering Coordinator shall provide the marshalling services. Close coordination between the Airline Engineering Coordinator and the Tower Controller is essential in regard to aircraft parking and positioning of servicing equipment in and around the parking apron.

7 AIRCRAFT REFUELLING

- 7.1 ST Airport Services Pte Ltd (STARS) is the assigned aircraft fuelling agency. However, prior arrangement must be made between the airline and STARS for such services. The refuelling rate available is 350 imperial gallons per minute (IGPM).

8 GROUND OPERATIONS

- 8.1 Singapore Airport Terminal Services (SATS) and DNATA Singapore Pte Ltd (DNATA) will provide all ground services at one hour's prior notice except engineering services which will be provided by Singapore Airlines.

9 FULL EMERGENCY/CRASH PROCEDURE

- 9.1 In the event of a Full Emergency being declared on a civil aircraft diverted to Paya Lebar AP, Full Emergency/Crash Procedures applicable to Singapore Changi AP will equally apply to Paya Lebar AP.
- 9.2 Alerting of all outside organisations such as the Singapore Civil Defence Force, Police, MINDEF and ambulance services shall be carried out by the Singapore Changi AP Tower Controller.

10 METEOROLOGICAL AND AERONAUTICAL INFORMATION SERVICE

- 10.1 Meteorological service is available 24 hours at the 6th floor of the building where Paya Lebar Air Traffic Control Tower is located.
- 10.2 Aeronautical Information Service is available at Singapore Changi Airport.

11 ATC SERVICE OUTSIDE STIPULATED OPERATING HOURS

- 11.1 Radar service will not be available at Paya Lebar Airport outside its stipulated operating hours.

WSAP AD 2.22 FLIGHT AND GROUND PROCEDURES

1 DEPARTURE AND ARRIVAL PROCEDURES

- 1.1 The designated runway for departures is RWY 02 and for arrivals is RWY 20.
- 1.2 The airport will hold off all departures and arrivals when the aerodrome visibility falls below 3km, or when the aerodrome prevailing cloud base is lower than 500ft. This is a safety consideration to avoid aircraft from carrying out a missed approach and overflying the populace under an adverse weather condition.

2 STANDARD INSTRUMENT DEPARTURES

November 1 Departure - Climb to maintain 3,000ft on RWY heading for PU DVOR/DME. At PU DVOR/ DME, turn left heading 010. Contact Seletar APP on 126.025 MHz or as instructed by ATC.

November 2 Departure - Climb to maintain 3,000ft on RWY heading for PU DVOR/DME. At PU DVOR/ DME, maintain heading 020. Contact Seletar APP on 126.025 MHz or as instructed by ATC.

November 3 Departure - Climb to maintain 3,000ft on RWY heading for PU DVOR/DME. At PU DVOR/ DME, turn left heading 360. Contact Seletar APP on 126.025 MHz or as instructed by ATC.

3 STANDARD ARRIVALS

When Paya Lebar is VMC - Expect radar vector to RWY 20 for visual straight-in approach.

When Paya Lebar is IMC - Expect radar vector to RWY 20 for ILS or PU DVOR/DME approach.

WSAP AD 2.23 ADDITIONAL INFORMATION

1 OUTDOOR LIGHT AND WATER SHOW

- 1.1 An outdoor light and water show will take place between 1200-1215, 1300-1315, 1400-1415 Friday to Saturday and 1200-1215, 1300-1315 Sunday to Thursday at 011704N 1035130E (within Paya Lebar Control Zone).
GND - UNL.

WSAP AD 2.24 CHARTS RELATED TO PAYA LEBAR AIRPORT

Aerodrome Chart	AD-2-WSAP-ADC-1
Location of Aircraft Stands for Civil Aircraft	AD-2-WSAP-ADC-2
Aerodrome Obstacle Chart - ICAO - TYPE A	AD-2-WSAP-AOC-1
Instrument Approach Chart - ICAO - RWY 20 - PU DVOR/DME	AD-2-WSAP-IAC-1
Instrument Approach Chart - ICAO - RWY 02 - PU DVOR/DME	AD-2-WSAP-IAC-2
Instrument Approach Chart - ICAO - RWY 20 - IPS ILS/DME	AD-2-WSAP-IAC-3
Instrument Approach Chart - ICAO - RWY 02 - IPN ILS DME	AD-2-WSAP-IAC-4
Instrument Approach Chart - ICAO - RWY 02 - RNP	AD-2-WSAP-IAC-5
Instrument Approach Chart - ICAO - RWY 20 - RNP	AD-2-WSAP-IAC-6

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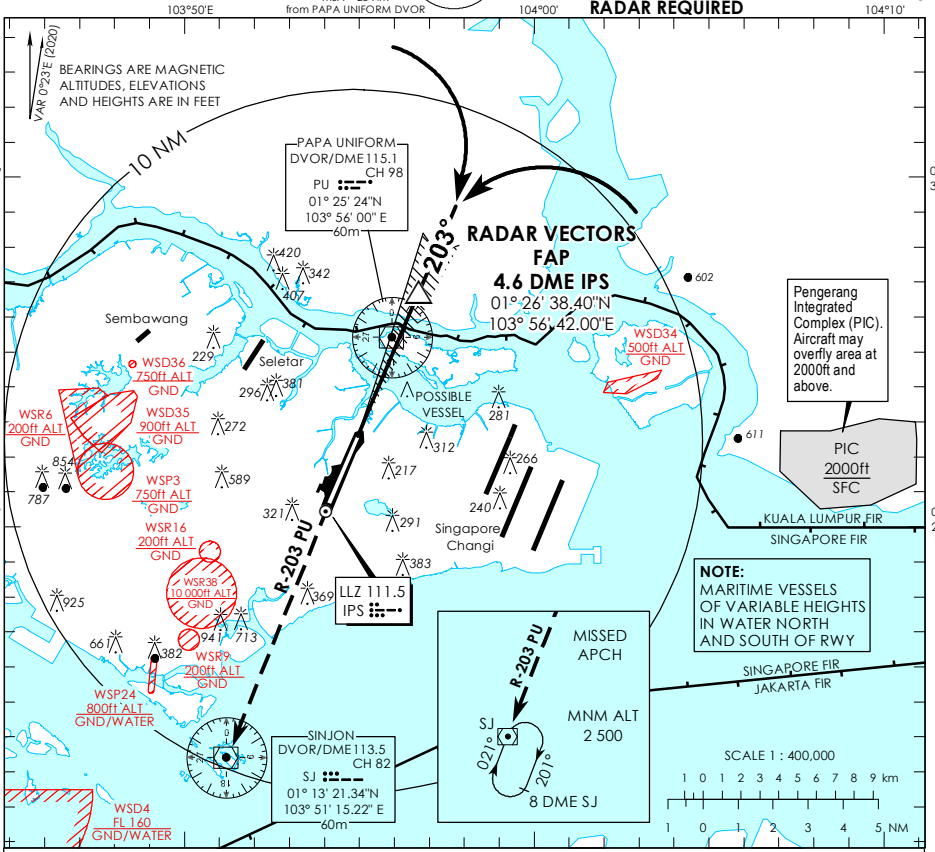
**INSTRUMENT
APPROACH
CHART - ICAO**

AERODROME ELEV 65ft
HEIGHT RELATED TO
THR RWY 20 - 65ft



ATIS Paya Lebar	148.9
Singapore APP	124.05
Paya Lebar APP	119.9 298.0
Seletar APP	126.025
Paya Lebar TWR	118.05 263.1
Ground Control	130.8 296.0

**SINGAPORE/
PAYA LEBAR
IPS ILS/DME
RWY 20**



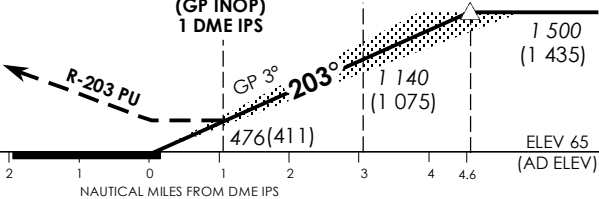
Transition Level : FL 130
Transition Alt : 11 000

ILS/DME co-located with GP

ILS RDH 55

MISSED APPROACH
Climb to 3 000ft on R-203 PU to SJ DVOR/DME and hold South right turn 021° inbound or AS DIRECTED BY ATC

Stepdown Fix (GP INOP) 3 DME IPS **FAP 4.6 DME IPS**

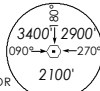


OCA (OCH)				
Category of Aircraft	A	B	C	D
Straight-in	CAT I ILS	194 (129)	204 (139)	214 (149)
	GP INOP	476 (411)		
Distance	4 DME	3 DME	2 DME	
Altitude (Height)	1300 (1235)	1140 (1075)	820 (755)	
Speed	knots	70	120	150
FAF - MAPT 3.6nm	min : s	3 : 06	1 : 48	1 : 27
Rate of descent/GS	ft/min	370	635	795
			980	

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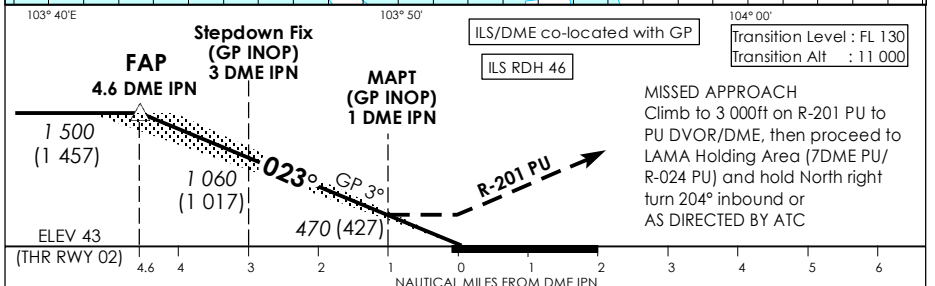
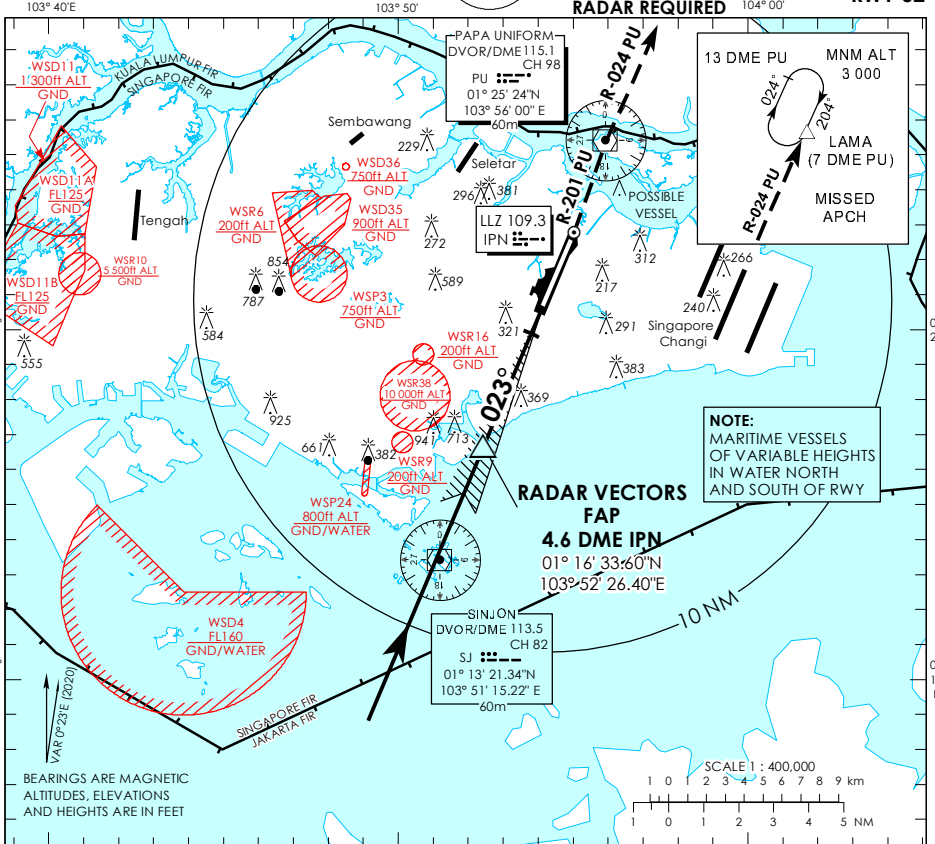
INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 65ft
HEIGHT RELATED TO
THR RWY 02 - ELEV 43ft
MSA 25 NM
from PAPA UNIFORM DVOR



ATIS Paya Lebar	148.9
Singapore APP	124.05
Paya Lebar APP	119.9 298.0
Seletar APP	126.025
Paya Lebar TWR	118.05 263.1
Ground Control	130.8 296.0

**SINGAPORE/PAYA LEBAR
IPN ILS/DME
RWY 02**



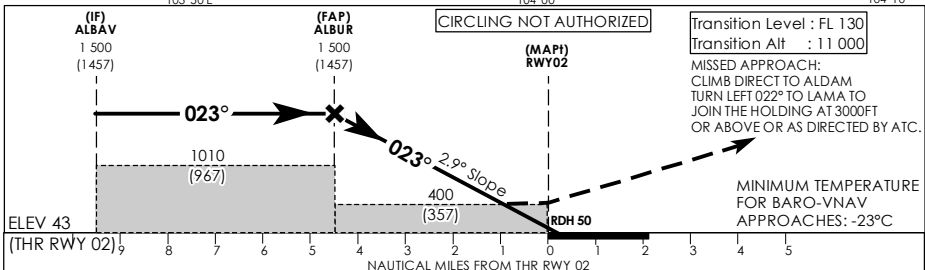
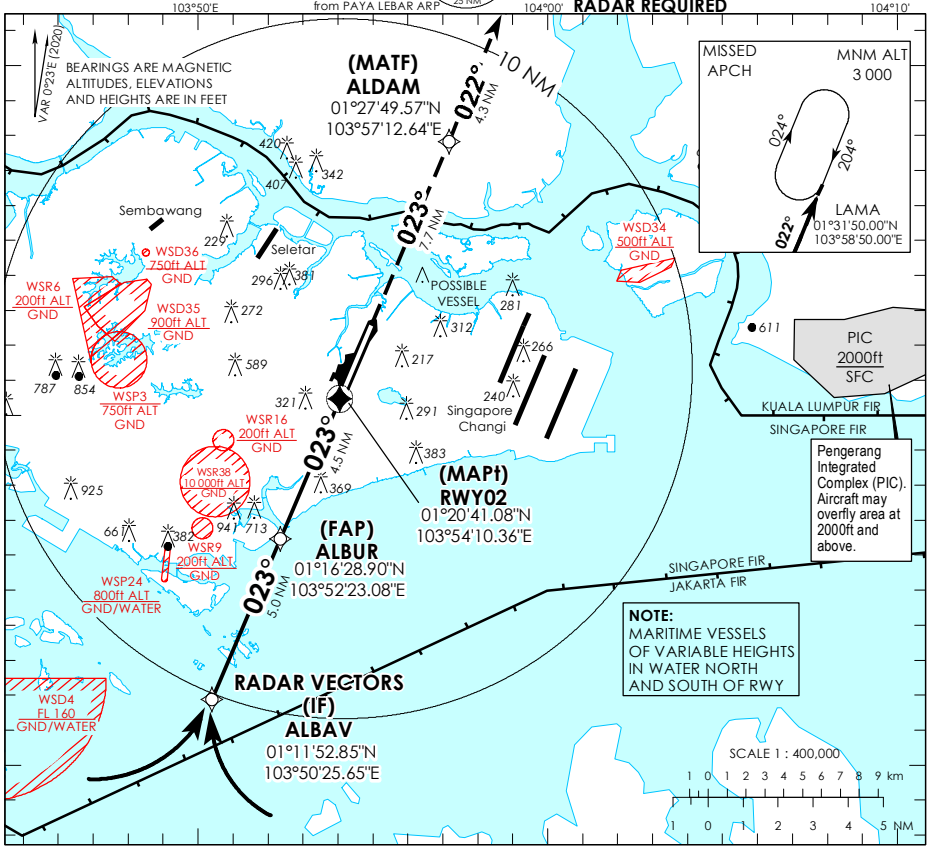
OCA (OCH)					
Category of Aircraft	A	B	C	D	
Straight-in	CAT I ILS	178 (135)	188 (145)	198 (155)	208 (165)
	GP INOP	470 (427)			
Distance	4 DME	3 DME	2 DME		
Altitude (Height)	1300 (1257)	1060 (1017)	740 (697)		
Speed	knots	70	120	150	185
FAF - MAPT 3.6nm	min : s	3 : 06	1 : 48	1 : 27	1 : 11
Rate of descent/GS	ft/min	370	635	795	980

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INSTRUMENT APPROACH CHART - ICAO
 AERODROME ELEV **65ft**
 HEIGHT RELATED TO THR RWY 02 - **43ft**

ATIS Paya Lebar 148.9
 Singapore APP 124.05
 Paya Lebar APP 119.9 298.0
 Seletar APP 126.025
 Paya Lebar TWR 118.05 263.1
 Ground Control 130.8 296.0

SINGAPORE/ PAYA LEBAR RNP RWY 02



		OCA (OCH)					
Category of Aircraft		A	B	C	D		
LNAV/VNAV	2.5%			400 (357)			
LNAV	2.5%			400 (357)			
Fix		ALBAV	ALBUR	RWY02	ALDAM	LAMA	
Altitude (Height)		1500 (1457)	1500 (1457)	400 (357)	1250 (1207)	1910 (1867)	
Speed	knots	80	100	120	140	160	180
FAP - MAPt 4.5 nm	min : s	3 : 23	2 : 42	2 : 15	1 : 56	1 : 41	1 : 30
Rate of descent/GS	ft/min	410	513	615	718	821	923

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INSTRUMENT APPROACH CHART - ICAO AERODROME ELEV 65ft
HEIGHT RELATED TO THR RWY 20 - 65ft

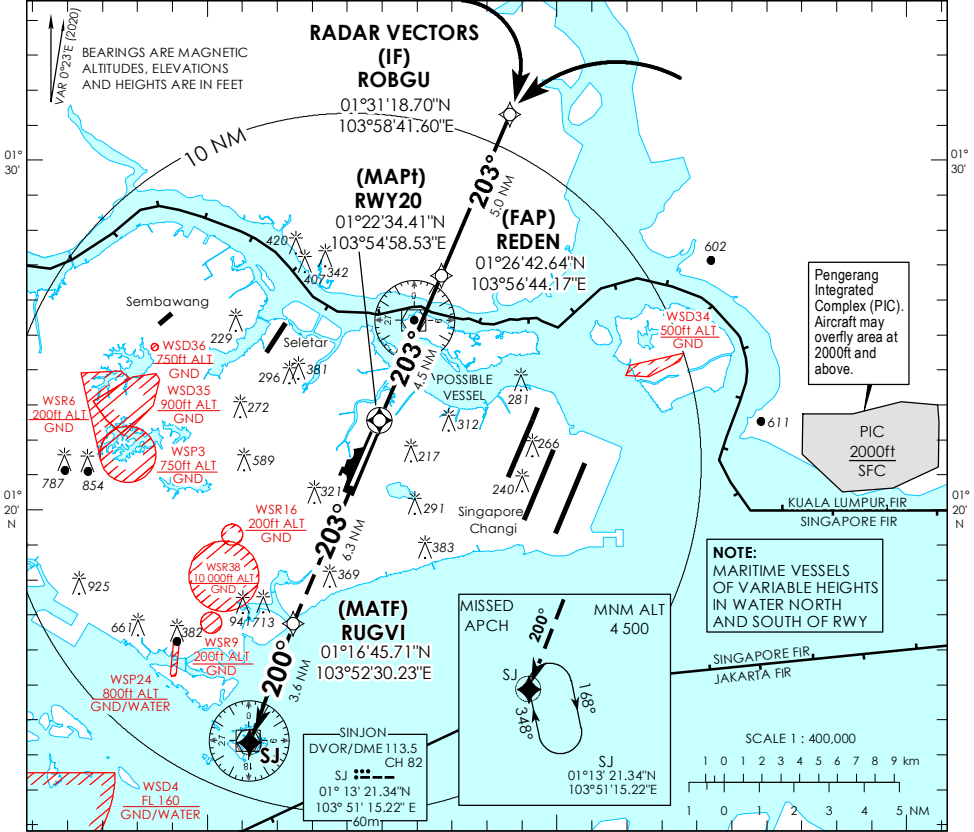
MSA 25 NM from PAYA LEBAR ARP

3500
+ ARP

ATIS Paya Lebar	148.9
Singapore APP	124.05
Paya Lebar APP	119.9 298.0
Seletar APP	126.025
Paya Lebar TWR	118.05 263.1
Ground Control	130.8 296.0

SINGAPORE/PAYA LEBAR
RNP RWY 20

RADAR REQUIRED



Transition Level : FL 130
Transition Alt : 11 000

MISSED APPROACH:
CLIMB DIRECT TO RUGVI.
TURN LEFT 200° TO SJ TO JOIN THE HOLDING AT 4500FT OR ABOVE OR AS DIRECTED BY ATC.

MINIMUM TEMPERATURE FOR BARO-VNAV APPROACHES: -23°C

(MAPt) RWY20
(FAP) REDEN
(IF) ROBGU

RDH 50
2.9° slope
420 (355)
1010 (945)

CIRCLING NOT AUTHORIZED

ELEV 65 (THR RWY 20)

NAUTICAL MILES FROM THR RWY 20

		OCA (OCH)					
Category of Aircraft		A	B	C	D		
LNAV/VNAV	2.5%			420 (355)			
LNAV	2.5%			420 (355)			
Fix		ROBGU	REDEN	RWY20	RUGVI	SINJON	
Altitude (Height)		1500 (1435)	1500 (1435)	420 (355)	1030 (965)	1580 (1515)	
Speed	knots	80	100	120	140	160	180
FAP - MAPt 4.5 nm	min : s	3 : 23	2 : 42	2 : 15	1 : 56	1 : 41	1 : 30
Rate of descent/GS	ft/min	410	513	615	718	821	923

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WSAT AD 2.18 ATS COMMUNICATION FACILITIES

<i>Service designation</i>	<i>Call sign</i>	<i>Frequency P - Primary S - Secondary</i>	<i>Hours of operation</i>	<i>Remarks</i>
APP	TENGAH APPROACH	P130.0 MHz P263.4 MHz S122.0 MHz	BTN 2300-1100 SUN/MON to THU/FRI; and	Nil
TWR	TENGAH TOWER	P122.0 MHz P282.5 MHz S263.4 MHz	On SUN, Public holidays and outside the above times, PPR from RSAF HQ via Tengah Ops.	
	TENGAH GROUND	122.0 MHz 337.8 MHz		
	TENGAH TALKDOWN	130.0 MHz 290.8 MHz 328.5 MHz		
Flight Information Service	SINGAPORE RADAR	119.1 MHz	H24	Nil
APP	SINGAPORE APPROACH	P124.05 MHz S124.6 MHz S126.3 MHz	H24	TAR – flow control service provided for ARR/DEP ACFT. Intermediate approach to Singapore Changi AP and other airports in Singapore. DEP from all airports in Singapore.

WSAT AD 2.19 RADIO NAVIGATION AND LANDING AIDS

RADIO NAVIGATION AND LANDING AIDS					
<i>Type of Aid</i>	<i>IDENT</i>	<i>FREQ</i>	<i>OPR Hour</i>	<i>Coordinates</i>	<i>Remarks</i>
TACAN	TNG	CH86X	2300-1100 from SUN/MON to THU/FRI; SUN, Public holidays and outside the above times prior permission required from RSAF HQ via Tengah Operations.	012336.00N 1034242.00E	043° MAG 0.55km from ARP Maint Period: 0001-0900 second SAT of EV month
SINJON DVOR/DME	SJ	113.5 MHz CH82X	H24	011321.34N 1035115.22E	201° MAG 14.5km from THR RWY 02 (Paya Lebar) Antenna HGT: 194ft AMSL. Coverage 200NM Maint Period: 0200-0600 third THU of EV month
ILS LLZ RWY 36	ITN	108.1 MHz	H24	012408.43N 1034234.34E	Located 260m from THR RWY 18 along centreline of RWY. Course width 3°
ILS GP RWY 36	-	334.7 MHz	H24	012240.84N 1034231.01E	GP antenna 3°
ILS DME RWY 36	ITN	CH18X	H24	012241.02N 1034226.67E	DME co-located with GP

WSAT AD 2.20 LOCAL TRAFFIC REGULATIONS - USE OF RSAF TENGAH AIR BASE AS AN EMERGENCY DIVERSION AERODROME FOR SINGAPORE CHANGI AIRPORT

1 INTRODUCTION

- 1.1 RSAF Tengah Air Base is nominated as the emergency diversionary aerodrome for Singapore Changi Airport. The arrangement outlined below is applicable for the handling of any civil aircraft movement that is diverted to RSAF Tengah Air Base.
- 1.2 It is emphasised that RSAF Tengah Air Base **is not an ICAO designated alternate aerodrome for Singapore Changi Airport** and therefore should not be flight planned as such. Its use by civil aircraft is permitted for emergency purposes only when Singapore Changi Airport runway is obstructed.

2 MANNING OF TENGAH AIR BASE

- 2.1 Tengah Air Base is open from 2300-1100 SUN/MON to THU/FRI. It is closed on SAT, SUN and public holidays. Outside the above stipulated operating hours, Tengah Air Base can be opened on 2 hours' prior notice. This arrangement, if necessary, will be undertaken by the Duty Tower Controller or SATCC Watch Manager of Singapore Changi Airport who will inform RSAF Headquarters via Tengah Ops.
- 2.2 Airline operators are requested to inform the Airport Manager and the Duty Tower Controller or SATCC Watch Manager at Singapore Changi Airport as soon as it is known that their service will require the use of Tengah Air Base. Revised ETAs/ETDs are to be notified as soon as known.

3 OPERATIONAL SERVICES

- 3.1 The layout of Tengah Airbase with the aircraft parking apron which is available for the use of civil aircraft (except B747 aircraft types) in the event of an emergency diversion from Singapore Changi Airport, is indicated in page WSAT AD 2-11. It is to be noted that only a limited number of civil aircraft can be accommodated at any one time.
- 3.2 Air-ground-air communication maintained by RSAF Tengah Tower/APP for AD Control Services is VHF 122.0MHz.

4 PASSENGER CLEARANCE

- 4.1 Once the aircraft has shutdown, only the Captain of the aircraft will be allowed out of the aircraft. All other passengers will remain in the aircraft due to space constraints and to avoid possible immigration problems.
- 4.2 Arrangements will be made to transport all the passengers back to Singapore Changi Airport for immigration processing.
- 4.3 The Airport Manager or his representative will be present at the Passenger Terminal to provide assistance when aircraft are required to land at Tengah Air Base.
- 4.4 No refreshment facilities are available.

5 SECURITY

- 5.1 All Airline personnel who are required to proceed to Tengah Air Base must wear their Singapore Changi Airport Passes at a prominent position and they will be escorted to the respective areas. All personnel not in possession of the laminated pass except Customs and Government Officers in uniform will be denied entry into Tengah Air Base by the RSAF Security Guard. Entry into the Air Base by both the airline personnel and service equipment is via the main gate. The Airline Engineering Coordinator shall be responsible for the proper positioning of the ground servicing equipment and vehicles in the Apron Area where arriving aircraft are to be parked.
- 5.2 No equipment, vehicles, stores, cargo or mail shall be left overnight at Tengah Air Base.
- 5.3 The security of civil aircraft parked in the Apron is the responsibility of the aircraft owner and any security service obtained shall first be cleared with the Tengah Air Base Security Authorities.

6 AIRCRAFT STAND ALLOCATION

- 6.1 Aircraft parking positions will be issued by the RSAF Tower Controller. A "follow-me" vehicle will be waiting at the accesses to guide the aircraft to the allocated parking stands.

7 COMMUNICATIONS

- 7.1 No VHF RTF surface movement frequency is available at Tengah Tower. Communication with the Tower will be by telephone, the nearest of which is in the Fire Station Building in front of the aircraft parking apron.

8 FUEL

8.1 Fuel available JET A1 F3X.

9 AIRCRAFT SERVICES

9.1 Airlines will have to provide their own services. Limited aircraft services can be obtained from the Aircraft Maintenance Unit by prior arrangement only.

9.2 Where essential facilities and services are not available at Tengah Air Base, such as the disposal of toilet waste or refuse, the resources available at Singapore Changi Airport shall be used.

10 RESCUE AND FIRE FIGHTING FACILITIES

10.1 The rescue and fire fighting facilities available at Tengah Airbase is up to ICAO CAT 8.

11 FULL EMERGENCY/CRASH PROCEDURE

11.1 In the event of a Full Emergency being declared on a civil aircraft diverted to Tengah Air Base, Full Emergency/Crash Procedures applicable to Singapore Changi Airport will equally apply to Tengah Air Base.

11.2 Alerting of all outside organisations such as the Singapore Civil Defence Force, Police, MINDEF and ambulance services shall be carried out by the Singapore Changi Airport Tower Controller.

11.3 The assembly point for all units attending to the Full Emergency incident will be at the Fire Station. No casualty clearance station is available at Tengah Air Base and in the event of an aircraft crash occurring, casualties if any, will be transported directly from the scene of crash to the Singapore General Hospital.

12 ATC SERVICE OUTSIDE OPERATING HOURS

12.1 Normal radar service will be provided by Singapore Radar (Civil). All aircraft diverting to Tengah will be vectored by Approach Control to SJ or to an agreed transfer control point before they are handed over to Tengah Tower. No radar service will be provided by Tengah.

WSAT AD 2.24 CHARTS RELATED TO AN AERODROME

AERODROME CHART - TENGAH [AD-2-WSAT-ADC-1](#)

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WSAG AD 2.18 COMMUNICATION FACILITIES

<i>Service designation</i>	<i>Call sign</i>	<i>Frequency</i>	<i>Hours of operation</i>	<i>Remarks</i>
1	2	3	4	5
APP	PAYA LEBAR APPROACH	127.7 MHz 255.8 MHz	BTN 2300-1100 SUN/MON to THU/FRI and BTN 2300-0500 FRI/SAT. Prior permission required on SUN and Public holidays	Nil
TWR	SEMBAWANG TOWER	239.0 MHz 129.7 MHz		Nil
GND	SEMBAWANG GROUND	277.1 MHz 118.8 MHz		Nil
Flight Information Service	SINGAPORE RADAR	119.1 MHz	H24	Nil
APP	SINGAPORE ARRIVAL	P119.3 MHz S119.4 MHz S119.55 MHz	H24	TAR - Intermediate and final approach to Singapore Changi AP.
	SINGAPORE APPROACH	P124.05 MHz S124.6 MHz S126.3 MHz		TAR – flow control service provided for ARR/DEP ACFT. Intermediate approach to Singapore Changi AP and other airports in Singapore. DEP from all airports in Singapore.

WSAG AD 2.19 RADIO NAVIGATION AND LANDING AIDS

<i>Type of Aid</i>	<i>IDENT</i>	<i>Frequency</i>	<i>OPR HR</i>	<i>Coordinates</i>	<i>Remarks</i>
1	2	3	4	5	6
SEMBAWANG NDB	AG	325 kHz	H24	012526.4N 1034913.0E	For training approaches in VMC only.

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WIDD — BATAM/HANG NADIM (INDONESIA)

*Note: The following sections in this chapter are intentionally left blank:
AD 2.2, AD 2.3, AD 2.4, AD 2.5, AD 2.6, AD 2.7, AD 2.8, AD 2.9, AD 2.10, AD 2.11, AD 2.12, AD 2.13, AD 2.14,
AD 2.15, AD 2.16, AD 2.19, AD 2.20, AD 2.21, AD 2.22, AD 2.23.*

WIDD AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WIDD — BATAM/HANG NADIM (INDONESIA)

WIDD AD 2.17 ATS AIRSPACE

1	<i>Designation and Lateral Limits</i>	Hang Nadim Vicinity of Aerodrome
2	<i>Vertical Limits</i>	Vicinity of Aerodrome
3	<i>Airspace Classification</i>	C
4	<i>ATS Unit Callsign</i>	HANG NADIM TOWER
5	<i>Language(s)</i>	English
6	<i>Transition Altitude</i>	11000 FT / FL 130
7	<i>Hours of applicability</i>	H24
8	<i>Remarks</i>	Nil

WIDD AD 2.18 ATS COMMUNICATION FACILITIES

Service designation	Callsign	Channel	SATVOICE number (s)	Logon Address	Hours of operation	Remarks
TWR	Hang Nadim Tower	118.7 MHz 118.3 MHz (SRY)	Nil	Nil	H24	Nil
	Hang Nadim Ground	121.95 MHz	Nil	Nil	H24	Nil
ATIS	Nil	126.25 MHz	Nil	Nil	H24	TWR Coordinates: 005524.59N 1043144.53E

WIDD AD 2.24 CHARTS RELATED TO AN AERODROME

See AIP Indonesia WIDD AD 2.24.

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WIDN — TANJUNGPINANG / RAJA HAJI FISABILILLAH (INDONESIA)

Note: The following sections in this chapter are intentionally left blank:

AD 2.2, AD 2.3, AD 2.4, AD 2.5, AD 2.6, AD 2.7, AD 2.8, AD 2.9, AD 2.10, AD 2.11, AD 2.12, AD 2.13, AD 2.14, AD 2.15, AD 2.16, AD 2.19, AD 2.20, AD 2.21, AD 2.22, AD 2.23.

WIDN AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WIDN — TANJUNGPINANG / RAJA HAJI FISABILILLAH (INDONESIA)

WIDN AD 2.17 ATS AIRSPACE

1	<i>Designation and Lateral Limits</i>	<p>Tanjungpinang North Control Zone (CTR): 011553N 1040852E - 011638N 1041620E - 011305N 1042029E - 010942N 1043500E Thence along the circle radius 27 NM from "BTM" VOR/DME clockwise until 004236N 1041654E - 005315N 1040335E - 010018N 1035530E - 011553N 1040852E.</p> <p>Tanjungpinang South Control Zone (CTR): 004236N 1041654E Follow the circle radius 27 NM from "BTM" VOR/DME anticlockwise until 010942N 1043500E - 010342N 1050018E Thence along the circle radius 30 NM from 005511N 1043134E clockwise until 002448N 1043700E - 004236N 1041654E.</p>
2	<i>Vertical Limits</i>	<p>Tanjungpinang North Control Zone (CTR): GND/WATER up to 3,000ft</p> <p>Tanjungpinang South Control Zone (CTR): GND/WATER up to 6,000ft</p>
3	<i>Airspace Classification</i>	C
4	<i>ATS Unit Callsign</i>	APP: Tanjungpinang Radar TWR: Raja Tower
5	<i>Language(s)</i>	English
6	<i>Transition Altitude</i>	11,000ft / FL 130
7	<i>Hours of applicability</i>	H24
8	<i>Remarks</i>	Aerodrome Control Service is provided within vicinity of Raja Haji Fisabilillah Aerodrome

WIDN AD 2.18 ATS COMMUNICATION FACILITIES

Service designation	Callsign	Channel	SATVOICE number (s)	Logon Address	Hours of operation	Remarks
APP	Tanjungpinang Radar	130.2 MHz 119.35 MHz (SRY)	Nil	Nil	H24	TWR Coordinates: 005524.59N 1043144.53E
TWR	Raja Tower	118.95 MHz	Nil	Nil	0000-1100	

WIDN AD 2.24 CHARTS RELATED TO AN AERODROME

See AIP Indonesia WIDN AD 2.24.

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WIDT — TANJUNG BALAI KARIMUN/ RAJA HAJI ABDULLAH (INDONESIA)

Note: The following sections in this chapter are intentionally left blank:

AD 2.2, AD 2.3, AD 2.4, AD 2.5, AD 2.6, AD 2.7, AD 2.8, AD 2.9, AD 2.10, AD 2.11, AD 2.12, AD 2.13, AD 2.14, AD 2.15, AD 2.16, AD 2.19, AD 2.20, AD 2.21, AD 2.22, AD 2.23.

WIDT AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WIDT — TANJUNG BALAI KARIMUN/ RAJA HAJI ABDULLAH (INDONESIA)

WIDT AD 2.17 ATS AIRSPACE

1	<i>Designation and Lateral Limits</i>	Vicinity of Aerodrome
2	<i>Vertical Limits</i>	Vicinity of Aerodrome
3	<i>Airspace Classification</i>	G
4	<i>ATS Unit Callsign</i>	Raja Haji Abdullah Aerodrome Information
5	<i>Language(s)</i>	English
6	<i>Transition Altitude</i>	11000 FT / FL 130
7	<i>Hours of applicability</i>	0000-0900
8	<i>Remarks</i>	Nil

WIDT AD 2.18 ATS COMMUNICATION FACILITIES

Service designation	Callsign	Channel	SATVOICE number (s)	Logon Address	Hours of operation	Remarks
AFIS	Raja Haji Abdullah Aerodrome Information	118.5 MHz	Nil	Nil	0000-0900	Nil

WIDT AD 2.24 CHARTS RELATED TO AN AERODROME

See AIP Indonesia WIDT AD 2.24.

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