GEN PART 1 – GENERAL (GEN)

GEN 0 PART 1 – GENERAL (GEN)

GEN 0.1 PREFACE

1 Name of the publishing authority

1.1 The Singapore Aeronautical Information Products are published by authority of the Civil Aviation Authority of Singapore.

2 Applicable ICAO documents

- ICAO Annex 15 - Aeronautical Information Service;
- ICAO Annex 4 - Aeronautical Charts;
- ICAO Doc 8126 - AIS Manual;
- ICAO Doc 8697 - Aeronautical Chart Manual.
- ICAO Doc 10066 - Procedures for Air Navigation Services - Aeronautical Information Management (PANS-AIM)

2.1 Differences to ICAO Standards, Recommended Practices and Procedures are listed under subsection GEN 1.7.

3 Publication Media

3.1 The Singapore Aeronautical Information Products comprising AIP Singapore, AIP Amendments, AIP Supplements, Aeronautical Information Circulars and NOTAM Lists, including NOTAMs and Pre-Flight Information Bulletins are available for retrieval from AIM-SG URL https://aim-sg.caas.gov.sg

4 The AIP structure and established regular amendment interval

4.1 *The AIP structure*

4.1.1 The AIP forms part of the Aeronautical Information Products, details of which are given in subsection GEN 3.1. The principal AIP structure is shown in graphic form on page GEN 0.1-3.

4.1.2 The AIP is made up of three Parts, General (GEN), En-route (ENR) and Aerodromes (AD), each divided into sections and subsections as applicable, containing various types of information.

4.1.3 *PART 1 — GENERAL (GEN)*

Part 1 consists of five sections containing information briefly described hereafter.

GEN 0 -	Preface; Record of AIP Amendments; Record of current AIP Supplements; Checklist of AIP pages; List of hand amendments to the AIP; and Table of Contents to Part 1.
GEN 1 -	*National regulations and requirements* - Designated authorities; Entry, transit and departure of aircraft; Entry, transit and departure of passengers and crew; Entry, transit and departure of cargo; Aircraft instruments, equipment and flight documents; Summary of national regulations and international agreements/conventions; and Differences from ICAO Standards, Recommended Practices and Procedures.
GEN 2 -	*Tables and codes* - Measuring system, aircraft markings, holidays; Abbreviations used in AIS publications; Chart symbols; Location indicators; List of radio navigation aids; Conversion tables; and Sunrise/Sunset tables.
GEN 3 -	*Services* - Aeronautical Information Services; Aeronautical Charts; Air Traffic Services; Communication Services; Meteorological Services; and Search and Rescue.
GEN 4 -	*Charges for aerodromes and air navigation services* - Aerodrome charges and Air navigation services charges.

4.1.4 *PART 2 — EN-ROUTE (ENR)*

Part 2 consists of seven sections containing information briefly described hereafter.

ENR 0 -	Table of Contents to Part 2.
ENR 1 -	*General rules and procedures* - General rules; Visual flight rules; Instrument flight rules; ATS airspace classification; Holding, approach and departure procedures; Radar services and procedures; Altimeter setting procedures; Regional supplementary procedures; Air traffic flow management; Flight planning; Addressing of flight plan messages; Interception of civil aircraft; Unlawful interference; and Air traffic incidents.
ENR 2 -	*Air traffic services airspace* - Detailed description of Flight Information Region (FIR); Terminal Control Areas (TMA); and other regulated airspace.
ENR 3 -	*ATS routes* - Detailed description of ATS routes; Area Navigation Routes; Helicopter Routes; other routes; and en-route holding. *Note - Other types of routes which are specified in connection with procedures for traffic to and from aerodromes are described in the relevant sections and subsections of Part 3 - Aerodromes.*
ENR 4 -	*Radio navigation aids/systems* - Radio navigation aids - en-route; special navigation systems; name-code designators for significant points; and aeronautical ground lights - en-route.

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ENR 5 - *Navigation warnings* - Prohibited, restricted and danger areas; military exercise and training areas; other activities of a dangerous nature; air navigation obstacles - en-route; aerial sporting and recreational activities; and bird migration and areas with sensitive fauna.

ENR 6 - *En-route charts* - En-route Chart - ICAO.

4.1.5 *PART 3 - AERODROMES (AD)*

Part 3 consists of three sections containing information briefly described hereafter.

AD 0 - Table of Contents to Part 3.

AD 1 - *Aerodromes* - Introduction - Aerodromes availability; Rescue and fire fighting services; Index to aerodromes; and Grouping of aerodromes.

AD 2 - *Aerodromes* - Detailed information about aerodromes listed under 24 sub-sections.

AD 3 - This section has been omitted as there are no heliports in Singapore.

4.2 *Regular Amendment Interval*

Regular amendments to AIP Singapore will be issued once every two months. The publication dates will be on alternate AIRAC effective dates as follows:

Amendment Number	Publication Date
07/2024	26 December 2024
01/2025	20 February 2025
02/2025	17 April 2025
03/2025	12 June 2025
04/2025	07 August 2025
05/2025	02 October 2025
06/2025	27 November 2025

5 Service to contact in case of detected AIP errors or omissions

In the compilation of the AIP, care has been taken to ensure that the information contained therein is accurate and complete. Any errors and omissions which may nevertheless be detected, as well as any enquiries or suggestions concerning the Aeronautical Information Products, should be referred to:

Post: AERONAUTICAL INFORMATION SERVICES
Civil Aviation Authority of Singapore,
60 Airport Boulevard, #04-01, Changi Airport
Terminal 2
Singapore 819643
Tel: (65) 69550400
Fax: (65) 64410221
E-mail: caas_singaporeais@caas.gov.sg

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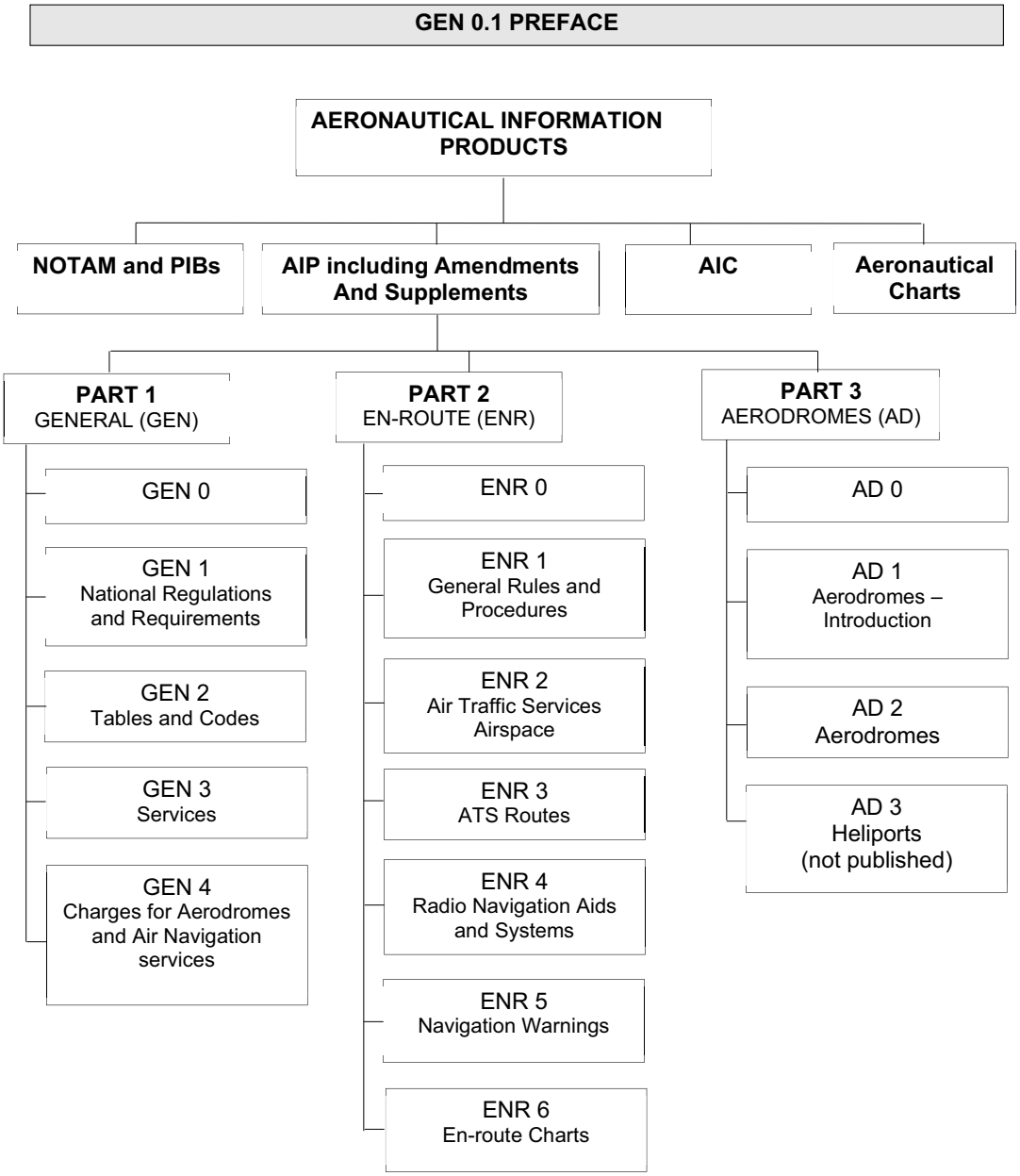

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GEN 0.2 RECORD OF AIP AMENDMENTS

AIP AMENDMENT

NR/Year	Publication Date	Effective date	Inserted by
03/2025	12 JUN 2025	12 JUN 2025	
04/2025	07 AUG 2025	07 AUG 2025	
05/2025	02 OCT 2025	02 OCT 2025	

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GEN 0.3 RECORD OF CURRENT AIP SUPPLEMENTS

NR/Year	Subject	AIP section(s) affected	Period of Validity	Cancellation record
059/2020	SINGAPORE CHANGI AIRPORT – LONG TERM CLOSURE OF AIRCRAFT STAND E20 AT TERMINAL 2, SINGAPORE CHANGI AIRPORT		2020/08/25 2026/12/30	
006/2024	PAYA LEBAR AIRPORT – CRANES		2024/01/11 2025/12/31	
007/2024	PAYA LEBAR AIRPORT – LUFFING CRANES		2024/01/11 2025/12/31	
017/2024	SINGAPORE CHANGI AIRPORT – CLOSURE OF AIRCRAFT STAND 504 AT WEST CARGO APRON		2024/02/22 2025/10/31	
020/2024	PAYA LEBAR AIRPORT – SADDLE CRANES		2024/02/08 2025/12/31	
047/2024	PAYA LEBAR AIRPORT – LUFFING CRANES		2024/02/08 2025/12/30	
048/2024	PAYA LEBAR AIRPORT – CRANES		2024/02/08 2025/12/31	
083/2024	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		2024/05/09 2028/01/03	
134/2024	SINGAPORE CHANGI AIRPORT – TEMPORARY CLOSURE OF TAXILANE N4 BEHIND AIRCRAFT STAND 604 AND DOWNGRADE OF AIRCRAFT STAND 603 TO CODE C		2024/08/30 2025/10/02	
161/2024	PAYA LEBAR AIRPORT – MOBILE CRANE		2024/10/17 2025/10/31	
171/2024	PAYA LEBAR AIRPORT – MOBILE CRANE		2024/10/17 2025/11/10	
174/2024	SINGAPORE CHANGI AIRPORT – CLOSURE OF TAXIWAYS ASSOCIATED WITH RUNWAY 02R/20L		2024/11/28 2027/12/22	
176/2024	SINGAPORE CHNAGI AIRPORT - USE OF CONSTRUCTION LASERS, LOCATIONS OF AUTOMATIC TOTAL STATIONS AND CONCRETE BLOCKS TO SUPPORT CONSTRUCTION ACTIVITIES AT TERMINAL 2		2024/10/28 2026/10/05	
177/2024	PAYA LEBAR AIRPORT – MOBILE CRANE		2024/11/14 2025/11/15	
178/2024	PAYA LEBAR AIRPORT – CRANES		2024/11/14 2025/12/31	
181/2024	PAYA LEBAR AIRPORT – MOBILE CRANE		2024/11/14 2025/11/30	
185/2024	PAYA LEBAR AIRPORT – MOBILE CRANE		2024/11/14 2025/12/31	
186/2024	PAYA LEBAR AIRPORT – MOBILE CRANE		2024/11/14 2025/12/31	
187/2024	PAYA LEBAR AIRPORT – LUFFER CRANES		2024/11/14 2025/12/31	
188/2024	PAYA LEBAR AIRPORT – CRANES		2024/11/14 2025/12/31	

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NR/Year	Subject	AIP section(s) affected	Period of Validity	Cancellation record
190/2024	PAYA LEBAR AIRPORT – CRAWLER CRANE		2024/11/14 2025/10/20	
192/2024	PAYA LEBAR AIRPORT – TOPLESS CRANES		2024/11/14 2025/11/30	
193/2024	PAYA LEBAR AIRPORT – CRAWLER TOWER CRANES		2024/11/14 2025/12/31	
194/2024	PAYA LEBAR AIRPORT – TOWER CRANES		2024/11/14 2025/12/31	
195/2024	PAYA LEBAR AIRPORT – FLAT-TOP CRANES		2024/11/14 2025/12/31	
196/2024	PAYA LEBAR AIRPORT – MOBILE CRANE		2024/11/14 2025/11/01	
197/2024	PAYA LEBAR AIRPORT – CRANES		2024/11/14 2025/12/15	
198/2024	PAYA LEBAR AIRPORT – TOWER CRANES		2024/11/14 2025/11/15	
199/2024	SINGAPORE CHANGI AIRPORT – LONG TERM CLOSURE OF AIRCRAFT STAND E5 AT TERMINAL 2, SINGAPORE CHANGI AIRPORT		2024/12/26 2025/10/30	
201/2024	PAYA LEBAR AIRPORT – MOBILE CRANES		2024/12/12 2025/10/31	
202/2024	PAYA LEBAR AIRPORT – MOBILE CRANES		2024/12/12 2025/10/31	
203/2024	PAYA LEBAR AIRPORT – MOBILE CRANES		2024/12/12 2025/10/31	
204/2024	PAYA LEBAR AIRPORT – CRAWLER CRANE		2024/12/12 2025/11/30	
205/2024	PAYA LEBAR AIRPORT – TOPLESS CRANES		2024/12/12 2025/11/30	
208/2024	PAYA LEBAR AIRPORT – CRANES		2024/12/12 2025/12/30	
209/2024	PAYA LEBAR AIRPORT – CRANES		2024/12/12 2025/12/30	
212/2024	PAYA LEBAR AIRPORT – MOBILE CRANE		2024/12/31 2025/10/31	
218/2024	SELETAR AIRPORT - CLOSURE OF HELICOPTER LANDING AREA		2024/12/30 2025/12/31	
002/2025	PAYA LEBAR AIRPORT – MOBILE CRANES		2025/01/24 2025/12/31	
003/2025	PAYA LEBAR AIRPORT – TRUCK CRANE		2025/01/24 2025/12/31	
004/2025	PAYA LEBAR AIRPORT – LUFFING TOWER CRANE		2025/01/24 2025/12/30	
005/2025	PAYA LEBAR AIRPORT – TOPLESS TOWER CRANES		2025/01/24 2025/12/31	
006/2025	PAYA LEBAR AIRPORT – TOWER CRANE		2025/01/24 2025/12/31	
009/2025	PAYA LEBAR AIRPORT – MOBILE CRANE		2025/01/24 2025/12/31	
010/2025	PAYA LEBAR AIRPORT – LUFFING CRANE		2025/01/24 2025/12/31	
013/2025	PAYA LEBAR AIRPORT – CRANES		2025/01/24 2025/12/14	

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014/2025	PAYA LEBAR AIRPORT – MOBILE CRANE		2025/01/24 2025/12/31	
015/2025	PAYA LEBAR AIRPORT – MOBILE CRANE		2025/01/24 2025/12/31	
016/2025	PAYA LEBAR AIRPORT – FLAT TOP CRANES		2025/01/24 2025/12/31	
017/2025	PAYA LEBAR AIRPORT – LUFFING CRANES		2025/01/24 2025/12/31	
018/2025	PAYA LEBAR AIRPORT – FLAT TOP CRANES		2025/01/24 2025/12/31	
019/2025	PAYA LEBAR AIRPORT – TOWER CRANES		2025/01/24 2025/12/31	
020/2025	PAYA LEBAR AIRPORT – TOWER CRANES		2025/01/24 2025/12/31	
021/2025	PAYA LEBAR AIRPORT – LUFFER CRANES		2025/01/24 2025/12/31	
022/2025	PAYA LEBAR AIRPORT – CRANES		2025/01/24 2025/12/31	
024/2025	PAYA LEBAR AIRPORT – LUFFING CRANES		2025/02/17 2025/12/01	
025/2025	PAYA LEBAR AIRPORT – LUFFER CRANE		2025/02/17 2025/12/31	
027/2025	PAYA LEBAR AIRPORT – CRAWLER CRANES		2025/02/17 2025/12/30	
028/2025	PAYA LEBAR AIRPORT – CRANES		2025/02/17 2025/12/31	
029/2025	PAYA LEBAR AIRPORT – CRANES		2025/02/17 2025/12/31	
030/2025	PAYA LEBAR AIRPORT – TOPLESS CRANES		2025/02/17 2025/12/31	
034/2025	PAYA LEBAR AIRPORT – FLAT TOP CRANES		2025/02/17 2026/01/31	
036/2025	SINGAPORE CHANGI AIRPORT - STEEL AND FRANGIBLE FRAMES AND FRANGIBLE POSTS		2025/02/28 2026/01/02	
038/2025	SINGAPORE CHANGI AIRPORT – CLOSURE OF AIRCRAFT STAND 604 AT EAST CARGO APRON		2025/04/17 2026/02/19	
040/2025	PAYA LEBAR AIRPORT – MOBILE CRANE		2025/03/11 2026/03/20	
041/2025	PAYA LEBAR AIRPORT – TOWER CRANES		2025/03/11 2025/12/31	
043/2025	PAYA LEBAR AIRPORT – CRANES		2025/03/11 2026/02/12	
044/2025	PAYA LEBAR AIRPORT – CRANES		2025/03/11 2026/01/31	
045/2025	PAYA LEBAR AIRPORT – LUFFING CRANES		2025/03/11 2025/12/31	
046/2025	PAYA LEBAR AIRPORT – MOBILE CRANE		2025/03/11 2026/01/15	
047/2025	PAYA LEBAR AIRPORT – CRANES		2025/03/11 2025/12/31	
048/2025	PAYA LEBAR AIRPORT – CRANES		2025/03/11 2025/12/31	

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049/2025	PAYA LEBAR AIRPORT – CRANES		2025/03/11 2026/12/31	
050/2025	PAYA LEBAR AIRPORT – CRANES		2025/04/10 2026/03/01	
051/2025	PAYA LEBAR AIRPORT – CRANES		2025/04/10 2026/03/05	
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054/2025	PAYA LEBAR AIRPORT – CRANES		2025/04/10 2026/03/05	
055/2025	PAYA LEBAR AIRPORT – CRANES		2025/04/10 2026/03/27	
057/2025	PAYA LEBAR AIRPORT – CRANE		2025/04/10 2025/12/31	
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063/2025	PAYA LEBAR AIRPORT – CRANES		2025/04/10 2025/12/31	
064/2025	SINGAPORE CHANGI AIRPORT – APPLY MINIMUM THRUST AT EAST CARGO APRON		2025/05/05 2026/02/28	
065/2025	SINGAPORE CHANGI AIRPORT – TEMPORARY FIXED OBJECTS AT AIRCRAFT STAND 504 AND STRIPS OF RUNWAY 02L/20R, TAXIWAYS N2, W, W3, M4, AND M, USE OF SURVEY LASERS, SOLAR PANELS AND CONCRETE SLABS		2025/05/26 2027/08/31	
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083/2025	PAYA LEBAR AIRPORT – CRANES		2025/05/29 2026/12/31	
084/2025	PAYA LEBAR AIRPORT – CRANE		2025/05/29 2026/12/31	
085/2025	PAYA LEBAR AIRPORT – CRANES		2025/07/31 2026/08/01	
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091/2025	SINGAPORE CHANGI AIRPORT – CHANGES TO PILOT DISPLAY INFORMATION ON THE AIRCRAFT DOCKING GUIDANCE SYSTEM(ADGS) - PILOT DISPLAY UNIT (PDU)		2025/08/07 PERM	
092/2025	PAYA LEBAR AIRPORT – CRANES		2025/07/10 2025/12/31	
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106/2025	PAYA LEBAR AIRPORT – CRANES		2025/07/10 2026/06/09	
107/2025	PAYA LEBAR AIRPORT – FRANGIBLE TOWERS		2025/07/10 2025/12/31	
108/2025	PAYA LEBAR AIRPORT – CRANE		2025/07/10 2026/12/31	

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109/2025	PAYA LEBAR AIRPORT – CRANES		2025/07/10 2026/06/13	
110/2025	PAYA LEBAR AIRPORT – CRANE		2025/07/10 2025/10/31	
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112/2025	PAYA LEBAR AIRPORT – CRANES		2025/07/10 2026/06/19	
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117/2025	PAYA LEBAR AIRPORT – CRANES		2025/07/10 2026/06/30	
119/2025	SINGAPORE CHANGI AIRPORT – UPDATED INFORMATION AND DATA FOR RUNWAY 02R/20L		2025/09/04 2026/02/18	
120/2025	SINGAPORE CHANGI AIRPORT – UPDATED CLOSURE SCHEDULES FOR RUNWAY 02L/ 20R AND RUNWAY 02C/20C		2025/09/04 2027/03/31	
121/2025	AIRSPACE CLOSURE KUALA LUMPUR AND SINGAPORE FIRS EXERCISE BERSAMA LIMA 2025 240001UTC SEPT 25 TO 051100UTC OCT 2025		2025/09/24 2025/10/05	
122/2025	PAYA LEBAR AIRPORT – CRANES		2025/08/14 2026/07/16	
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NR/Year	Subject	AIP section(s) affected	Period of Validity	Cancellation record
134/2025	SINGAPORE CHANGI AIRPORT – TEMPORARY CLOSURE OF TAXILANE N4 BEHIND AIRCRAFT STAND 604 AND DOWNGRADE OF AIRCRAFT STAND 603 TO CODE C		2025/10/02 2026/05/14	
135/2025	PAYA LEBAR AIRPORT – CRANE		2025/09/11 2026/08/26	
136/2025	PAYA LEBAR AIRPORT – CRANE		2025/09/11 2026/01/31	
137/2025	PAYA LEBAR AIRPORT – CRANE		2025/09/11 2026/08/31	
138/2025	PAYA LEBAR AIRPORT – CRANE		2025/09/11 2026/08/28	
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145/2025	PAYA LEBAR AIRPORT – CRANES		2025/09/11 2026/01/10	
146/2025	SINGAPORE CHANGI AIRPORT – CLOSURE OF AIRCRAFT STAND 504 AT WEST CARGO APRON		2025/10/30 2027/01/21	
147/2025	SINGAPORE CHANGI AIRPORT – LONG TERM CLOSURE OF AIRCRAFT STAND E5 AT TERMINAL 2, SINGAPORE CHANGI AIRPORT		2025/10/30 2026/05/29	
148/2025	SINGAPORE CHANGI AIRPORT – TEMPORARY CLOSURE AT THE JUNCTION OF TAXIWAY W1, TAXIWAY W AND TAXIWAY V1		2025/10/30 2026/03/31	

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GEN 0.4 CHECKLIST OF AIP PAGES

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AIP page(s) affected	*Amendment text*	*Introduced by AIP Amendment NR*
NIL	NIL	NIL

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GEN 1 NATIONAL REGULATIONS AND REQUIREMENTS

GEN 1.1 DESIGNATED AUTHORITIES

The authority responsible for civil aviation in Singapore is the Civil Aviation Authority of Singapore under the Ministry of Transport. The addresses of the designated authorities concerned with facilitation of international air navigation are as follows:

1 CIVIL AVIATION

Post:
CIVIL AVATION AUTHORITY OF SINGAPORE
60 Airport Boulevard, #04-01, Changi Airport Terminal 2
SINGAPORE 819643
Tel: (65) 65421122
Fax: (65) 65421231
AFS: WSSSYAYX
URL: www.caas.gov.sg

2 METEOROLOGY

Post:
DIRECTOR-GENERAL METEOROLOGICAL SERVICE SINGAPORE
60 Airport Boulevard, Changi Airport Terminal 2, #04-502-503
SINGAPORE 819643
Tel: (65) 65457190
Fax: (65) 65457192
AFS: WSSSYMYX
URL: www.weather.gov.sg

3 CUSTOMS

Post:
SINGAPORE CUSTOMS
55 Newton Road #07-01, Revenue House
SINGAPORE 307987
Tel: (65) 63552000
URL: www.customs.gov.sg

4 IMMIGRATION

Post:
IMMIGRATION & CHECKPOINTS AUTHORITY
10 Kallang Road, #08-00 ICA Building
SINGAPORE 208718
Tel: (65) 63916100
URL: www.ica.gov.sg

5 HEALTH

Post:
COMMUNICABLE DISEASES AGENCY
Acting Director Contact & Environmental Diseases, Border & Travel Health (CEBT)
238A Thomson Road, Novena Square Tower A #23-01 to 05
SINGAPORE 307684
URL: www.cda.gov.sg

Post:
MINISTRY OF HEALTH
Director Disease Response and Training Division (DTD)
1 Pasir Panjang Road, Labrador Tower
Level 21, #21-01
SINGAPORE 118479
Tel: (65) 63259220
URL: www.moh.gov.sg

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6 ENROUTE AND AERODROME CHARGES

Post:

CIVIL AVIATION AUTHORITY OF SINGAPORE
60 Airport Boulevard, #04-01, Changi Airport Terminal 2
SINGAPORE 819643

Tel: (65) 65421122
Fax: (65) 65421231
AFS: WSSSYAYX

Post:

CHANGI AIRPORT GROUP (S) PTE LTD
SELETAR AIRPORT (AIRSIDE OPERATIONS)
21 Seletar Aerospace Road 1 #02-01
SINGAPORE 797405

Tel: (65) 64815077
Fax (65) 64831754

7 AGRICULTURE QUARANTINE

Post:

Head Office: ANIMAL & VETERINARY SERVICE
Singapore Botanic Gardens, 1 Cluny Road
SINGAPORE 259569

URL: www.nparks.gov.sg/avs

Post:

CHANGI ANIMAL AND PLANT QUARANTINE STATION
113A Airport Cargo Road, Changi Airfreight Centre
SINGAPORE 819985

Tel: 1800 476 1600

8 TRANSPORT SAFETY INVESTIGATION BUREAU

Post:

Director (TSIB)
MINISTRY OF TRANSPORT
c/o Changi Airport Post Office P.O. Box 1005
SINGAPORE 918155

Tel: (65) 65412797
Fax: (65) 65422394
URL: www.mot.gov.sg

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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://iwish.kemenhub.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 (including ad hoc changes to scheduled flights) 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 changi.airside@changiairport.com or +65 8533 4558 / +65 6541 2151.

2.6 **EXEMPT FLIGHTS**

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

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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 Worldwide Airport Slot Guidelines (WASG). A copy of this document can be obtained from https://www.iata.org/en/programs/ops-infra/slots/slot-guidelines/

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.

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3.8 DESIGNATED HOURS FOR TRAINING FLIGHTS

3.8.1 To optimise the use of capacity, training and non-training flights will be segregated through designated hours for training flights. Non-training flights will not be permitted at Seletar Airport during the following periods from Tuesdays to Sundays:

- 0130 to 0230 UTC / 0930 to 1030 LT;
- 0400 to 0500 UTC / 1200 to 1300 LT;
- 0700 to 0800 UTC / 1500 to 1600 LT; and
- 0900 to 1000 UTC / 1700 to 1800 LT.

3.8.2 All operators or agents and pilots are to plan their flight schedules with sufficient buffers to avoid the designated hours for training flights.

3.8.3 Notwithstanding paragraph 3.8.1, the following types of flights may be permitted during the designated hours for training flights:

- Emergency landings, e.g. diversions or quick returns after takeoff, oil spill response operations;
- Flights operating under diplomatic cover; and
- Humanitarian flights including those responding to medical emergencies where the safety of human life is concerned or involved in search & rescue operations.

4 CIVIL SCHEDULED FLIGHTS

4.1 GENERAL

4.1.1 Before a scheduled service is permitted to operate into the Republic of Singapore, it must be appropriately covered by either an air services agreement, a licence issued in accordance with the Air Navigation (Licensing of Air Services) Regulations or other aeronautical arrangements. All scheduled flights are subject to prior approval.

4.2 APPLICATION FOR TRAFFIC LANDINGS AND UPLIFTS (SCHEDULED FLIGHTS)

4.2.1 Only the airline operator or authorised agency may apply for permission to operate scheduled flights.

4.2.2 All airline operators/authorised agencies are to submit their applications for scheduled flights for each IATA schedule season at least one month before the start of the season for approval by CAAS.

4.2.3 In addition, airline operators are also required to apply for CAAS' approval for any revisions to their schedule filings for the season, ad-hoc changes to flight schedules and flight cancellations. Such applications should be filed through the flightSG system at https://flightsg.caas.gov.sg 5 working days before flight changes take place.

4.2.4 If insufficient notice as specified in paragraphs 4.2.2 and 4.2.3 is given, the application may not be considered.

4.2.5 Airline operators are to ensure that a copy of the following documents, which are to remain valid during the period of operations, are lodged with CAAS:

a) Certificate(s) of Registration(s) for aircraft used;
b) Certificate(s) of Airworthiness for aircraft used; and
c) Air Operator's Certificate

4.2.6 All applications and required documents listed in paragraph 4.2.5 should be submitted via flightSG.

4.3 DOCUMENTARY REQUIREMENTS FOR CLEARANCE OF AIRCRAFT

4.3.1 It is necessary that the undermentioned aircraft documents be submitted by airline operators for clearance on entry and departure of their aircraft to and from Singapore. All documents listed below must follow the ICAO standard format as set forth in the relevant appendices to ICAO Annex 9. They are acceptable in English only and must be completed in legible handwriting. No visas are required in connection with such documents.

4.3.2 *Aircraft Documents Requirements (arrival/departure)*

Required by	General Declaration	Passenger Manifest	Cargo Manifest
Immigration	2	2	-
Customs	1	1	1
Health	1	1	-

a) *One copy of the General Declaration is endorsed and returned by Customs, signifying clearance.*
b) *If no passengers are embarking (disembarking) and no articles are laden (unladen), no aircraft documents except copies of the General Declaration need be submitted to the above authorities.*

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5 CIVIL NON-SCHEDULED FLIGHTS

5.1 PROCEDURES

5.1.1 *Overflights*

5.1.1.1 Prior notification is necessary. Subject to the observance of the terms of the Convention on International Civil Aviation, Singapore facilitates overflights by civil aircraft registered in any ICAO Contracting States with which Singapore has diplomatic relations provided adequate advance notification shall have been given.

5.1.1.2 Notification by flight plan addressed to the Singapore Air Traffic Control Centre (WSJCZQZX) if received at least 2 hours in advance of the aircraft's arrival into the Singapore Flight Information Region will normally be accepted as advance notification in this respect.

5.1.1.3 In all other cases, prior permission must be sought and obtained through diplomatic means from the Ministry of Foreign Affairs, Republic of Singapore.

5.1.2 *Non-Traffic or Technical Landings*

5.1.2.1 Prior notification is necessary. Subject to the observance of the terms of the Convention on International Civil Aviation, Singapore facilitates such non-traffic or technical landings by civil aircraft registered in any ICAO Contracting States with which Singapore has diplomatic relations provided adequate advance notification shall have been given.

5.1.2.2 Notification by flight plan addressed to the Singapore Air Traffic Control Centre (WSJCZQZX) if received at least 2 hours in advance of the aircraft's arrival at Singapore Changi Airport or Seletar Aerodrome or 2 hours prior to entering the Singapore Flight Information Region whichever is the earlier will normally be accepted as advance notification in this respect.

5.1.2.3 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. The aircraft must carry its own tow-bar. The aircraft operator may make arrangements with the ground handling agent to provide the tow-bar. The aircraft shall be required to be towed to another aircraft stand should the need arise.

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

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

5.1.2.6 In all other cases, prior permission must be sought and obtained through diplomatic means from the Ministry of Foreign Affairs, Republic of Singapore.

5.1.2.7 All non-traffic aircraft are to submit a copy of the Certificate of Airworthiness to CAAS, after each landing, by facsimile at 6545 6519 or by email to CAAS_FS_FOS@caas.gov.sg

5.1.3 *Application for Traffic Landings and Uplifts (Non-Scheduled Flights)*

5.1.3.1 All non-scheduled flights are subject to prior approval.

5.1.3.2 Only the operator or authorised agency may apply for permission to operate a non-scheduled flight. The following information should be submitted together with the application:

a) Name, address and nationality of operator;
b) Name, address and business of charterer;
c) Type, registration mark and carrying capacity of aircraft;
d) Aircraft documents listed in paragraph 4.2.5;
e) Nature of flight including details of whether the flight is to carry passengers or cargo or both;
   i. for passenger flights: points of origin and destination of passengers, purpose of flight e.g. special event charter, inclusive tours and own-use charter; and the names of passengers.
   ii. for cargo flights: the origin, destination, description, quantities and dimensions of cargo; outbound/inbound or transhipment, as well as whether any item is perishable or classified as dangerous, explosive or munitions of war. (Please see regulations concerning importation, transhipment and exportation of cargo in subsection GEN 1.4).
f) Details of route, points of landing and final destination;
g) Date and time of arrival at, and departure from Singapore (Please see paragraph 5.1.3.4 below);
h) Name, address and telephone number of operator's local agent and ground handling agent;
i) Name and address of consignees and consignors, where applicable;
j) Any other information that may be relevant to the proposed operations.

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

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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 aground 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:

v) S$252 for a single one-way or return flight.

Note 1: "Working Day" means:

vi) a period that begins at 8.30am and ends at 6pm on any Monday to Thursday that CAAS is open for business; and
vii) 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.

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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.

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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
E-mail: 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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GEN 1.3 ENTRY, TRANSIT AND DEPARTURE OF PASSENGERS AND CREW

1 CUSTOMS REQUIREMENTS

1.1 The Red and Green Channel system is operated at the Airport to expedite customs clearance of arriving air passengers. All arriving passengers and crew members shall present themselves personally with their baggage and make oral declarations at the Red Channel if they have any prohibited or controlled goods or goods exceeding their duty-free concession and Goods and Services Tax (GST) import relief. If they do not have any of such goods, they may leave the Arrival Hall through the Green Channel. However, as part of our multi-layered security checks, some travellers going through the Green Channel may be subjected to further checks. Departing passengers are not subject to Customs formalities unless required to do so. Baggage may be examined in such manner as deemed necessary and it shall be the duty of the person in charge of the baggage to produce, open, unpack and repack such baggage.

1.2 **Dutiable Goods**. All dutiable goods brought into Singapore are subject to customs duty and/or excise duty and GST. There are 4 categories of dutiable goods: Intoxicating liquors; tobacco products; motor vehicles; and motor fuel. Please refer to the Singapore Customs' website for the latest list of dutiable goods and their respective duty rates. There is no customs duty on goods exported from Singapore.

1.3 **Duty-Free Allowance**. Please note that each arriving traveller is allowed to bring in a maximum of 10 litres of liquor products, subject to the payment of duty and GST. A traveller arriving with more than 10 litres of liquor products must present a valid Customs import permit for clearance at our checkpoints. Travellers are entitled to duty-free concession for liquors if they meet all the following conditions:

– Is 18 years of age and above;
– Have spent 48 hours or more outside Singapore immediately before arrival;
– Not arriving from Malaysia;
– The liquor is for personal consumption; and
– The liquor is not prohibited from import into Singapore.

Travellers will be given duty-free concession for liquors on one of the following options:

Option	Spirits	Wine	Beer
A	1 Litre	1 Litre	-
B	1 Litre	-	1 Litre
C	-	1 Litre	1 Litre
D	-	2 Litres	-
E	-	-	2 Litres

Bona-fide crew members are granted duty-free concession on 0.25 litre of spirits and 1 litre of wine or 1 litre of beer.

1.4 **GST Taxable Goods**. All goods brought into Singapore are subject to GST, at the prevailing rate of 9 percent of the goods' Cost, Insurance and Freight (CIF) value and applicable duty (for dutiable goods only). This is inclusive of all other charges, costs and expenses incidental to the sale and delivery of the goods into Singapore.

1.5 **GST Import Relief**. Travellers (excluding crew members and holders of a work permit, employment pass, student pass, dependent pass or long-term pass issued by the Singapore Government), are granted GST import relief on new articles, souvenirs, gifts and food preparations brought into Singapore. These goods must be intended for traveller's personal use or consumption and not for sale. The GST import relief amount is based on the number of hours the traveller has spent outside Singapore, as specified in the table below:

Time spent outside Singapore	Value of goods granted GST relief
48 hours and above	Up to S$500
Less than 48 hours	Up to S$100

There is no GST import relief and duty-free concession on intoxicating liquor and tobacco products, as well as goods imported for commercial purposes.

For more information on duty-free concession and GST import relief, please visit Singapore Customs' website.

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1.6 **Declaration and Payment of Duty and/or GST**. Arriving travellers are required to declare and pay the duty and GST to bring in dutiable and taxable goods exceeding their duty-free concession and GST import relief. For convenience, you are encouraged to make an advance declaration and payment of duties and GST prior to your arrival through our Customs@SG web portal. Once tax payment is successful, the Customs@SG web portal will create an e-receipt in your mobile device and you may exit the Arrival Hall via the Green Channel. If you are stopped for checks, you can show the e-receipt stored in your mobile device as proof of payment to the officers. Please visit Singapore Customs' website for more information on the Customs@SG mobile app and web portal. Alternatively, you may proceed directly to the Customs Tax Payment Office or the Red Channel upon arrival to declare your goods. Please present supporting documents such as invoices or receipts indicating the value of your goods to facilitate declaration and payment (if necessary).

1.7 **Goods Requiring a Customs Import Permit**. A valid Customs import permit is required for clearance if travellers are carrying (but not limited to):

– More than 0.4 kilogrammes of cigarettes or other tobacco products;
– More than 10 litres of liquor products;
– More than 0.5 kilogrammes of investment precious metals for personal use;
– More than 10 litres of motor fuel;
– Goods for trade, commercial or business purposes in which the GST on which exceeds S$300; or
– Goods clearly marked as trade samples (excluding liquors and tobacco products) the value of which exceeds S$400

1.8 **Prohibited Goods**. The following items are NOT allowed to be imported into Singapore. Some examples of prohibited goods include (but not limited to):

– Chewing gum (except approved oral dental and medicated gum by Singapore's Health Sciences Authority)
– Chewing tobacco and imitation tobacco products (e.g. electronic cigarettes, etc)
– Nasal snuff
– Oral snuff (including snus and dipping tobacco)
– Gutkha, Khaini and Zarda
– Shisha
– Smokeless cigars, smokeless cigarillos or smokeless cigarettes
– Dissolvable tobacco or nicotine. Any product containing nicotine or tobacco that may be used topically for application, by implant or injected into any parts of the body
– Any solution or substance, of which tobacco or nicotine is a constituent, that is intended to be used with an electronic nicotine delivery system or vaporizers
– Concealed weapon, cigarette lighters of pistol or revolver shape
– Cross Bow
– Firecrackers, including tube sparklers and "pop-pop"
– Flick knife, Gravity Knife, Wasp Knife, Throwing knife
– Knuckleduster, Ninja Star, Catapult / Slingshot
– Controlled drugs and psychotropic substances
– Endangered species of wildlife and their by-products
– Firecrackers
– Obscene articles, publications, video tapes/discs and software
– Reproduction of copyright publications, video tapes, video compact discs, laser discs, records or cassettes
– Seditious and treasonable materials

It is an offence to attempt to bring prohibited goods into Singapore.

1.9 **Controlled Goods**. You are required to obtain an import permit or authorisation form from the relevant Competent Authorities before you can bring controlled goods into Singapore. Please produce the goods and the import permit or authorisation form to the checking officer at the Red Channel on your arrival. Some examples of controlled goods include (but not limited to):

– Animals and animal products (including veterinary biologics, pet food and fertilizers containing animal products), birds, ornamental fish, plants, CITES-listed animals and plants, including their parts and derivatives
– Endangered species of wildlife
– Ornamental fish
– Plants and propagatable plant parts including cuttings, seeds and bulbs with or without potting medium, organic fertilisers of plant origin, live insects and microorganisms
– Fish and seafood products
– Fruit and vegetables
– Meat and meat products
– CDs-roms and video games
– Films, videotapes, videodiscs, and laser discs

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– Newspapers, books and magazines
– Pre-recorded cartridges and cassettes
– Telecommunication and radio communication equipment
– Toy walkie-talkies
– 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 https://www.ica.gov.sg/enter-transit-depart.

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*
– Pakistan
– Somalia

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– 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**, Temporary Passport issued by United Arab Emirates, and PRC Travel Document will also require a visa to enter Singapore.

^ 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, Krygyzstan, Moldova, Russia, Tajikistan, and Uzbekistan.

** Refugee Travel Documents 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.

Nationals of India, as well as Nationals of the People's Republic of China (PRC) holding other travel documents issued by the PRC^ (excluding ordinary, diplomatic, public affairs and service passports) may qualify for the 96-hour VFTF provided that:

a) the person is in transit to or from a third country via Singapore by any mode of transport and will depart via air or sea;
b) the person holds a valid passport and confirmed onward air/ferry/cruise ticket for departure from Singapore within 96 hours;
c) the person has a valid visa*/long-term pass (with a validity of at least 1 month from the date of entry into Singapore under the VFTF) issued by any of the following countries:
   – Australia
   – Canada
   – Germany
   – Japan
   – New Zealand
   – Switzerland
   – United Kingdom
   – United States of America

^ These include the PRC Travel Document, Hong Kong Special Administrative Region (SAR) Document of Identity (DOI) and Macau SAR Travel Permit.

* A visa is considered valid so long as it is issued by/ good for entry into one of the eight countries listed above. Travellers with Single Journey Visas (SJV) may still be granted VFTF on the return leg of their journey (i.e. after the SJV is used and no longer valid), but:

– the person must travel directly from the country that issued the SJV, en route through Singapore, back to their home country
– the person must not have returned to their home country since they last used the SJV.

2.4 Visitors must satisfy the following basic entry requirements before they are allowed to enter Singapore:

a) They are in possession of passports with at least 6 months' validity with assurance of their re-entry into their countries of residence or origin;
b) They have sufficient funds to last for the intended period of stay in Singapore;

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c) They hold confirmed onward/return tickets and entry facilities (including visas) to their onward destinations;
d) Short-term travellers holding a passport of travel document from a visa-required country/ region must apply for a Visa; and
e) They must fulfil all prevailing public health requirements.

The granting of social visit passes to all visitors is determined by the Immigration & Checkpoints Authority (ICA) officers at the point of entry.

3 PUBLIC HEALTH REQUIREMENTS

3.1 Strict compliance with the provisions of the International Health Regulations, 2005, of the World Health Organisation, and Singapore's Infectious Diseases Act is required.

3.2 The pilot-in-command of an aircraft landing at Airports in Singapore shall furnish the Airport Health Officer with one copy of the General Declaration form (see ICAO Annex 9 Appendix 1) and one copy of the Passenger Manifest (see ICAO Annex 9 Appendix 2) signed by the pilot-in-command.

3.3 Vaccination Certificate Requirements for entry into Singapore are as follows:

A valid International Certificate of Vaccination for yellow fever is required from all travellers, including Singapore Residents, with travel history to countries with risk of yellow fever transmission (regardless of area, city or region) in the six days prior to arrival in Singapore. The certificate is valid for life, beginning from 10 days after the date of vaccination (this applies to existing and new certificates). Travellers without a valid International Certificate of Vaccination for yellow fever (e.g. unvaccinated individuals, including those who are ineligible to receive the vaccination, and travellers whose certificate has yet to become valid), are liable to be quarantined under the Infectious Diseases Act. For more details on public health requirements related to yellow fever, please refer to Singapore's Communicable Diseases Agency website (https://www.cda.gov.sg/public/diseases/yellow-fever) and Immigration & Checkpoints Authority website (https://www.ica.gov.sg/enter-transit-depart/entering-singapore/yellow-fever-vaccination-certificate).

3.4 For more details on public health requirements related to COVID-19, please refer to https://www.caas.gov.sg/legislation-regulations/covid-19-publications/.

4 FLYING LICENCES AND RATINGS

4.1 VISITING PILOTS - HOLDERS OF NON-SINGAPORE PILOT LICENCES

4.1.1 When a holder of a non-Singapore pilot's licence wishes to fly on a Singapore registered aircraft in a private capacity in Singapore, he will be required to apply for a Certificate of Validation for his foreign licence. The Certificate of Validation, if approved, will be issued for this purpose only and for a limited period. The applicant would also be required to fulfil certain conditions. Pilots who wish to apply for a Certificate of Validation should contact the Personnel Licensing Section of the Civil Aviation Authority of Singapore (see address in paragraph 4.2.2 below)

4.2 CONVERSION OF FOREIGN LICENCE TO SINGAPORE LICENCE

4.2.1 Pilots holding valid licences, including an instrument rating and/or flying instructor's rating issued by ICAO Contracting States, may be considered for the conversion of their licences under the following conditions:

a) The pilot must demonstrate formal prospective employment by a Singapore air operator, approved training organisation or flying club to operate on Singapore registered aircraft. (This requirement will not be applicable for the conversion of a foreign licence to a Singapore PPL.)
b) The pilot's foreign licence and its associated ratings must be valid from the time of application to the time of issue of a Singapore licence and its associated ratings.
c) The pilot must fulfil all conversion terms as specified by CAAS within a period of 6 months preceding the issue of a Singapore licence and its associated ratings.

Further details on the conversion of a foreign licence can be obtained from:

Safety Policy and Planning Division
Personnel Licensing Section
Civil Aviation Authority of Singapore
Singapore Changi Airport Terminal 2
South Finger Pier Level 3
Unit No. 038-039
Singapore 819643

TEL: (65) 65412482
FAX: (65) 65434941

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4.3 PILOTS WHO HAVE ATTAINED THE AGE OF 65

4.3.1 Any pilot who has attained his 65th birthday shall not be permitted to act as pilot-in-command or co-pilot of an aircraft engaged in scheduled or non-scheduled international commercial air transport operations within Singapore airspace.

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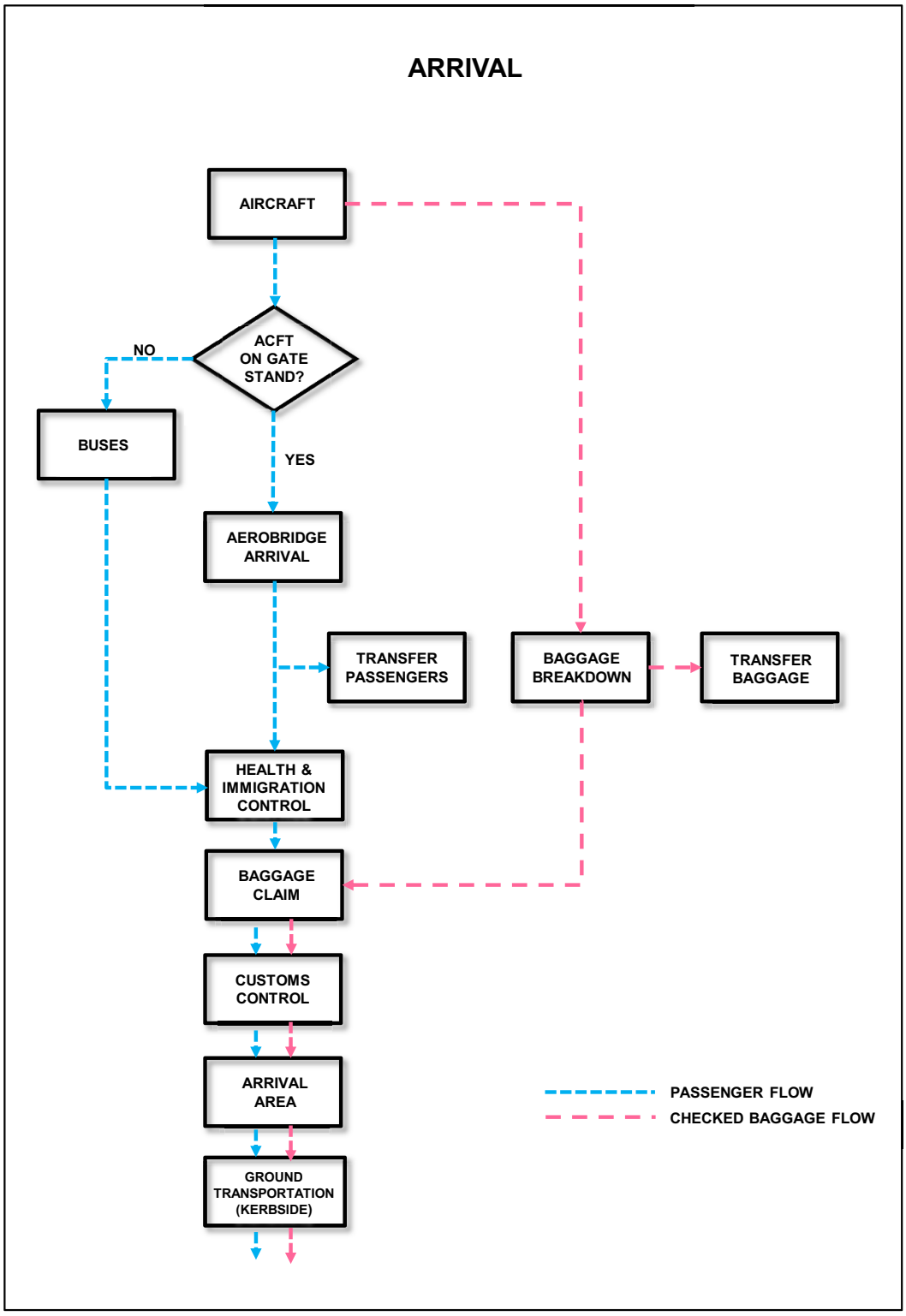
SINGAPORE CHANGI AIRPORT
PASSENGER FACILITATION FLOW



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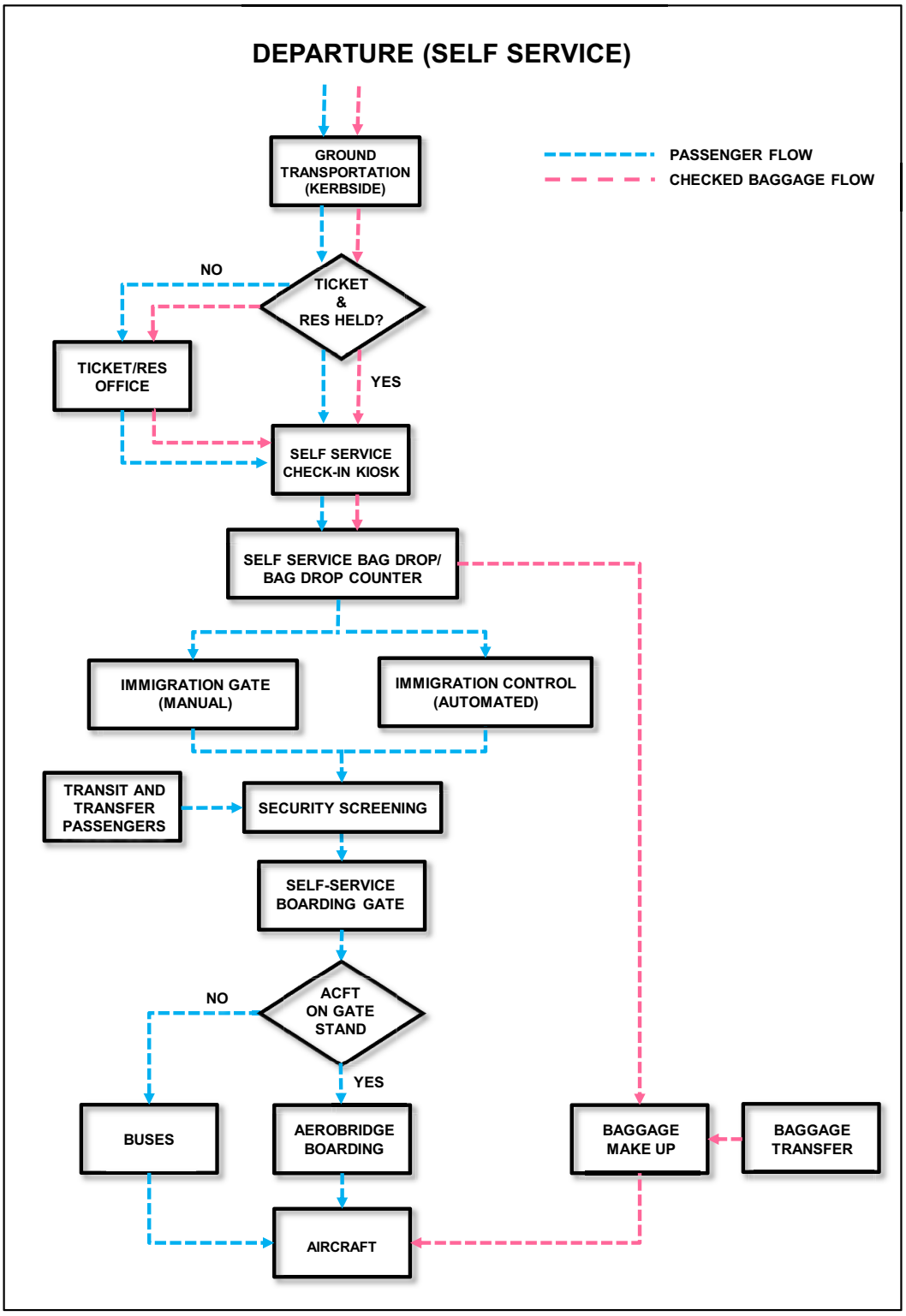
SINGAPORE CHANGI AIRPORT
PASSENGER FACILITATION FLOW



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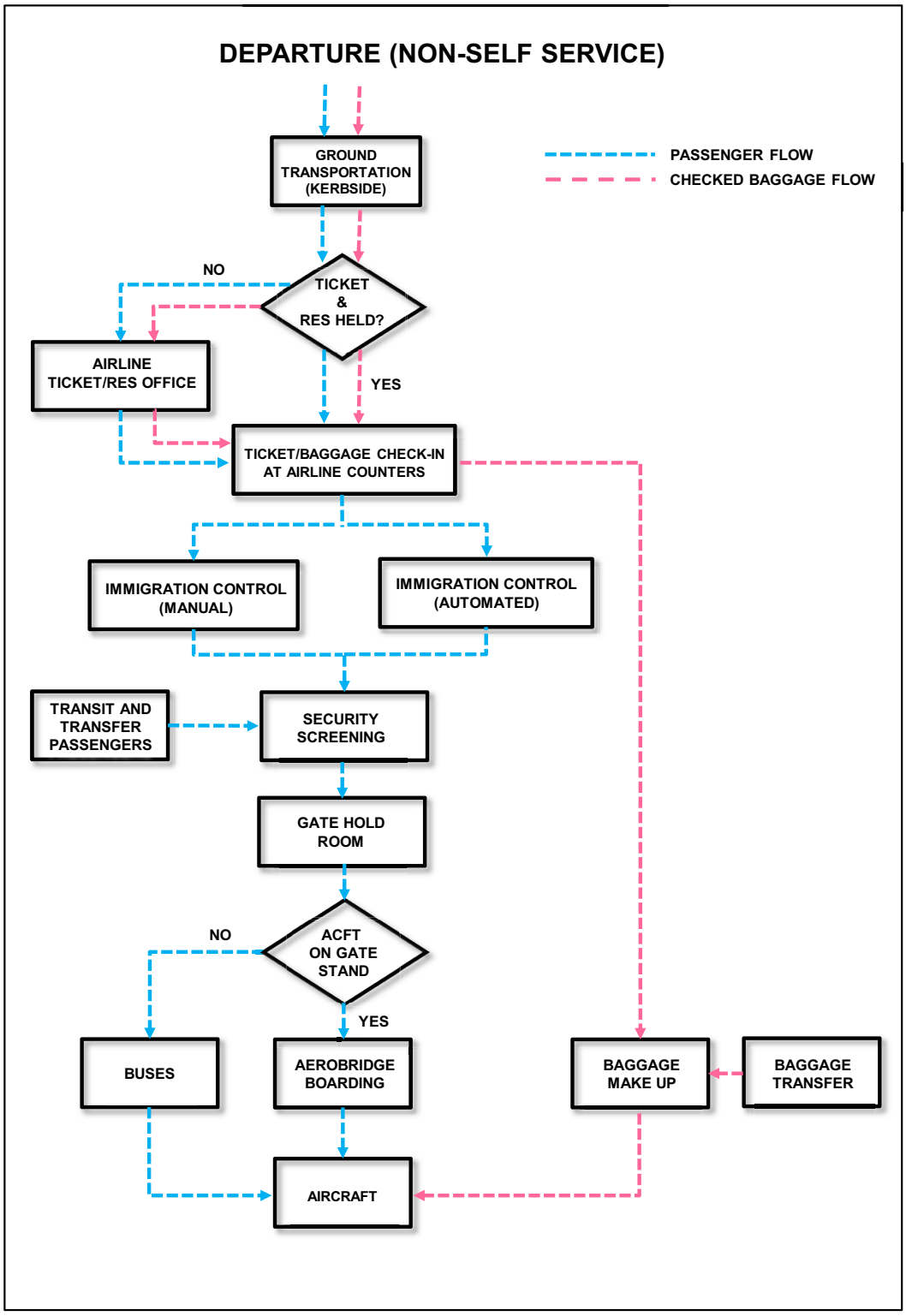
SINGAPORE CHANGI AIRPORT
PASSENGER FACILITATION FLOW



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GEN 1.4 ENTRY, TRANSIT AND DEPARTURE OF CARGO

1 CUSTOMS REQUIREMENTS CONCERNING CARGO AND OTHER ARTICLES

1.1 The following supporting documents: Airway Bill, Commercial Invoice, Packing List together with Customs Permits [for all goods including controlled goods, dutiable goods and goods subject to Goods and Services Tax (GST)] are to be produced if they are required for checks by Immigration and Checkpoints Authority officers at the checkpoint.

1.2 The following are applicable to the Free Trade Zone (FTZ):

a) Transhipment within the same FTZ (In Through Airway Bill cases), no Customs documentation is required if the items are not controlled by the Competent Authorities (CAs);
b) Transhipment of controlled goods within the same FTZ (In Through Airway Bill cases), a transshipment (Through transshipment within the same FTZ) permit is required; and
c) Import for re-export within the same FTZ (In Non-Through Airway Bill cases) without storage, an import for re-export permit is required for the importation and exportation of the goods; and
d) For the temporary storage of imported goods (excluding liquors and tobacco) in the Free Trade Zones, pending re-export to another destination or pending local release, an import permit is required. Subsequently for exportation, an export permit is required to be taken up.

1.3 Under the Strategic Goods (Control) Act (SGCA), goods in transhipment or transit are subject to controls under the full control list. No clearance documents are required for strategic goods in transhipment or transit which are taken into a FTZ immediately after they have been brought into Singapore and stay in the FTZ for not more than 45-days (for sea) / 21-days (for air) except for certain categories of goods. For transhipment and transit of certain sensitive strategic goods (listed under the Fourth and Fifth Schedule of the SGCR) and goods that are intended or likely to be used for nuclear, chemical or biological weapon purposes, or missiles capable of delivering such weapons (i.e. catch-all for WMD purposes), a strategic good permit is still required. Depending on the conditions stated in the permits, these goods may be required to be presented for Customs clearance at the checkpoint.

1.4 For the exportation of dutiable goods from a Licensed Warehouse, or non-dutiable goods from a Zero-GST Warehouse, Customs outward permits and goods are to be presented for checkpoint inspection and clearance.

1.5 For the importation and exportation of controlled goods, depending on the Competent Authorities'(CA) requirements, these goods may be required to be presented for Customs clearance at the checkpoint. For more information on the list of Controlled and Prohibited Goods for the importation and exportation of goods, please visit the respective pages on the Singapore Customs website. You may also refer to the Strategic Goods and the United Nations Security Council Sanctions webpages for more information on the relevant topics.

2 REQUIREMENTS FOR ANIMALS, BIRDS, PLANTS, VETERINARY BIOLOGICS, ORNAMENTAL FISH, CITES AND THEIR PRODUCTS

2.1 Prior permission of the Singapore Food Agency (SFA) is required for import, export or transshipment of:

a) Animals, birds for the purpose of rearing and slaughter for human consumption, animal feed for food producing animals, eggs and egg products, meat and meat products (including canned or processed meat).
b) Fish and aquatic animals (for rearing as food and for human consumption, fisheries products (in all forms).
c) Fruits and vegetables.
d) Processed food products and food contact articles.

More information can be obtained from the SFA website: https://www.sfa.gov.sg/food-import-export

2.2 Prior permission of the Animal & Veterinary Service (AVS) is required for import, export or transshipment of:

a) Animals and animal products (including veterinary biologics,pet food and fertilizers containing animal products), birds, plants ornamental fish.

2.3 Prior permission of the Animal & Veterinary Service (AVS) is also required for export of:

a) Animals and birds
b) Ornamental fish

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2.4 Prior permission of the National Parks Board (NParks) is required for the import of:

a) Plants and propagatable plant parts including cuttings, seeds and bulbs with or without potting medium, organic fertilisers of plant origin, live insects and microorganisms.

2.5 In the case of live animals, prior permission is also required for animals in transit. No prior permission required for transshipment of plants and plant products.

2.6 Prior permission of the Animal and Veterinary Service (AVS) is required for the import, export and re-export of all species of animals and plants, including their parts or derivatives protected under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

3 REQUIREMENTS RELATING TO ARMS AND EXPLOSIVES

3.1 Arms, explosives and explosives precursors are items regulated under the Arms & Explosives Act, Chapter 13. Under the said Act, any import or export of any of these items will require a licence from the Police Licensing & Regulatory Department (PLRD). For avoidance of any doubt, any transhipment (i.e. import of goods into Singapore on one conveyance and moved to another conveyance for the sole purpose of export to any place outside of Singapore) would similarly require an import and export licence respectively.

3.2 Application for the necessary licences can be submitted via Singapore Custom's TradeNet website (for traders) or GoBusiness website (https://www.gobusiness.gov.sg). More information can be obtained from PLRD's website at https://www.police.gov.sg/licence or email: spf_licensing_feedback@spf.gov.sg.

4 REQUIREMENTS FOR THE CARRIAGE OF DANGEROUS GOODS IN AIRCRAFT

4.1 DANGEROUS GOODS

4.1.1 Regulation 5(1) of Air Navigation (92-Carriage of Dangerous Goods) Regulations 2022 states that an operator of an aircraft must not load or carry any dangerous goods as cargo on its aircraft unless the operator of the aircraftt has been granted a dangerous goods permit by CAAS and in accordance with any conditions which CAAS may impose. This requirement applies to all aircraft operated for the purpose of commercial air transport flying to or from the Republic of Singapore, and without an authorisation granted under regulation 14 of Air Navigation (121-Commercial Air Transport by Large Aeroplanes) Regulations 2018 or regulation 14 of Air Navigation (135-Commercial Air Transport by Helicopters and Small Aeroplanes) Regulations 2018.

4.1.2 Where an operator of an aircraft has diplomatic clearance from the Government of Singapore to land the aircraft in Singapore, the operator is not required, for the period of time that the diplomatic clearance is valid, to obtain a dangerous goods permit.

4.1.3 A dangerous goods permit, if granted, is subject to compliance with Annex 18 to the Convention on International Civil Aviation and the latest edition of the ICAO Technical Instructions relating to the Safe Transport of Dangerous Goods by Air.

4.1.4 Operators of aircraft that wish to carry dangerous goods as cargo should submit their online application for a dangerous goods permit via the Enterprise Safety Oversight Management System (eSOMS) at https://esoms.caas.gov.sg/esoms/landingpage.html. Applications should be submitted at least 7 working days prior to the intended date of carriage of the dangerous goods cargo. New applicants may write to Dangerous Goods Section, Flight Standards Division, CAAS (email: CAAS_dangerous-goods@caas.gov.sg), to request for an eSOMS account.

5 REPORTING OF DANGEROUS GOODS ACCIDENT/INCIDENT

5.1 Regulation 24(1) of Air Navigation (92-Carriage of Dangerous Goods) Regulations 2022 requires the operator of an aircraft to report to the Director-General of Civil Aviation:

a) any dangerous goods accident or incident involving any aircraft that lands in or departs from Singapore; or

b) the finding of undeclared or misdeclared dangerous goods in cargo, mail or passenger's baggage that originate from or destined for Singapore, or are in transit in Singapore.

Operators are required to submit this report to CAAS in the quickest available means within 24 hours of the occurrence coming to the knowledge of the person making the report.

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5.2 All dangerous goods occurrence reports will be administered through the CAAS' reporting system known as the Singapore Aviation Accident / Incident Reporting System (SAIRS). Such reports are to be made using CAAS AW139 form, also known as the SAIRS Form. For the reporting of dangerous goods occurrences, only Part 4 of CAAS AW139 form needs to be completed. The form is available on the CAAS website and can be downloaded at the following link: https://www.caas.gov.sg/operations-safety/safety-reporting/singapore-aviation-accident-incident-reporting-system

5.3 All written reports using Part 4 of CAAS AW139 form should be made by the air operator or it's agent and submitted via email to caas_dfirs@caas.gov.sg.

5.4 For more information on the reporting of dangerous goods occurrences, air operators may refer to the CAAS Advisory Circular, ***AC 92-3-2 – Reporting of Dangerous Goods Occurrences***, in the following link: https://www.caas.gov.sg/docs/default-source/docs---srg/ac-92-3-2-(rev-0)---reporting-of-dangerous-goods-occurrences.pdf

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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 Next Pte. Ltd., No. 1 Kim Seng Promenade, #18-01, Great World City, East Lobby Singapore 237994.
Tel:	(65) 68269600
Fax:	(65) 68203341
URL:	www.toppannext.com

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1.1 CIVIL AVIATION LEGISLATION

No	Legislation	Citation
Civil Aviation Authority of Singapore Act & related legislation		
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 (Seletar Airport) By-laws 2009	S314/2009
8	Civil Aviation Authority of Singapore (Seletar Airport) Notification 2009	S294/2009
Air Navigation Act & related legislation		
9	Air Navigation Act 1966	
10	Air Navigation Order	O 2
11	Air Navigation (101 - Unmanned Aircraft Operations) Regulations 2019	S 833/2019
12	Air Navigation (119 – Air Operator Certification) Regulations 2018	S 443/2018
13	Air Navigation (121 – Commercial Air Transport by Large Aeroplanes) Regulations 2018	S 444/2018
14	Air Navigation (125 – Complex General Aviation) Regulations 2018	S 501/2018
15	Air Navigation (135 – Commercial Air Transport by Helicopters and Small Aeroplanes) Regulations 2018	S 445/2018
16	Air Navigation (137 – Aerial Work) Regulations 2018	S 502/2018
17	Air Navigation (139 – Aerodromes) Regulations 2023	S 10/2023
18	Air Navigation (91 – General Operating Rules) Regulations 2018	S441/2018
19	Air Navigation (92 – Carriage of Dangerous Goods) Regulations 2022	S998/2022
20	Air Navigation (98 – Special Operations) Regulations 2018	S442/2018
21	Air Navigation (99 - Breath Testing for Alcohol) Regulations 2019	S177/2019
22	Air Navigation (Aviation Security) Order	O 5
23	Air Navigation (Carbon Emissions and Reporting) Regulations 2022	S997/2022
24	Air Navigation (Composition of Offences) Rules 2017	S667/2017
25	Air Navigation (Licensing of Air Services) Regulations	RG 2
26	Air Navigation (Paya Lebar and Tengah Aerodrome Fees) Order	O 1
27	Air Navigation (Prohibited Flights) Order	O 6
28	Air Navigation (Protected Areas – Army Division Facilities) Order 2024	S341/2024
29	Air Navigation (Protected Areas – Army Headquarters and Formation Facilities) Order 2024	S340/2024
30	Air Navigation (Protected Areas – Catchment and Waterways Facilities) Order 2024	S124/2024
31	Air Navigation (Protected Areas – Military Offshore Facilities) Order 2024	S344/2024
32	Air Navigation (Protected Areas – Military Training-1 Facilities) Order 2024	S345/2024
33	Air Navigation (Protected Areas – Military Training-2 Facilities) Order 2024	S346/2024
34	Air Navigation (Protected Areas – Military Training-3 Facilities) Order 2024	S347/2024
35	Air Navigation (Protected Areas – Non-Military Places) Order 2024	S126/2024
36	Air Navigation (Protected Areas – Public Hospitals) Order 2024	S122/2024
37	Air Navigation (Telecommunication Facilities) Order 2024	S123/2024
38	Air Navigation (Protected Areas – Republic of Singapore Air Force Facilities) Order 2024	S342/2024

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No	Legislation	Citation
39	Air Navigation (Protected Areas – Republic of Singapore Navy Facilities) Order 2024	S343/2024
40	Air Navigation (Protected Areas – Water Supply and Water Reclamation Plants) Order 2024	S125/2024
41	Air Navigation (Protected Areas) Order 2015	S350/2015
42	Air Navigation (Regulated Air Cargo Agents and Known Consignors) Regulations 2017	S166/2017
43	Air Navigation (Voluntary Reporting) Rules 2020	S 592/2020
44	Air Navigation (Wreck and Salvage of Aircraft) Regulations	RG 1
45	Designation of Authorised Persons	N 2
46	Use of Seletar Aerodrome	N 1
Other Acts & related legislation		
47	Carriage by Air Act 1988	
48	Carriage by Air (Parties to Conventions) Order	O 1
49	Carriage by Air (Singapore Currency Equivalents) Order	O 2
50	Carriage by Air (Montreal Convention, 1999) Act 2007	
51	Carriage by Air (Montreal Convention, 1999) (Exclusion from Convention) Order	O 1
52	Tokyo Convention Act 1971	
53	Tokyo Convention (Convention Countries) Notification	N 1
54	Tokyo Convention (Protocol Countries) Notification 2019	S 893/2019
55	Hijacking of Aircraft and Protection of Aircraft and International Airports Act 1978	
56	Infrastructure Protection Act 2017	
57	Infrastructure Protection (Protected Areas) Order 2020	S 291/2020
58	Infrastructure Protection (Protected Areas) Order 2025	S 27/2025
59	Infrastructure Protection (Protected Places) (No. 10) Order 2020	S 293/2020
60	Infrastructure Protection (Protected Places) (No. 9) Order 2021	S 519/2021
61	Infrastructure Protection (Protected Places) (No. 20) Order 2024	S 790/2024
62	Infrastructure Protection (Protected Places) (No. 2) Order 2025	S 28/2025
63	International Interests in Aircraft Equipment Act 2009	
64	Immigration Act 1959	
65	Immigration (Authorised Places of Entry and Departure, and Rates) Notification 2012	S 627/2012
66	Immigration Regulations	RG 1
67	Arms and Explosives Act 1913	
68	Arms and Explosives (Aircraft Exemption) Rules	R 3
69	Arms and Explosives (Explosives) Rules	R 2
70	Arms and Explosives (Movement Control) Rules	R 4
71	International Organisations (Immunities and Privileges) Act 1948	
72	International Organisations (Immunities and Privileges) (International Civil Aviation Organisation) Order	O 4
73	Transport Safety Investigations Act 2018	
74	Transport Safety Investigations (Aviation Occurrences) Regulations 2023	S 870/2023
75	Transport Safety Investigations (Responsible Persons – Exemption) Order 2023	S 874/2023

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1.2 OTHER RELEVANT LEGISLATION

No	Legislation	Citation
1	Infectious Diseases Act 1976	
2	Infectious Diseases (Certificates of Vaccination or Other Prophylaxis) Regulations 2008	S 611/2008
3	Infectious Diseases (Quarantine) Regulations	RG 1
4	Arms and Explosives (Arms) Rules	R 1
5	Inspector of Explosives	CN 1
6	Arms Offences Act 1973	

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 (O 3).
b) The matter of income tax on air transport is contained within Section 12(2) and 12(2A) of the Income Tax Act 1947.

(2) Where a non-resident person carries on:
iii) the business of shipowner or charterer, or
iv) the business of air transport,

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and any ship or aircraft owned or chartered by the non-resident person calls at a port, an aerodrome or an airport in Singapore, the non-resident person's full profits arising from the carriage of passengers, mail, livestock or goods shipped, or loaded into an aircraft, in Singapore are deemed to accrue in Singapore.

(2A) Subsection 2 shall not apply to passengers, mail, livestock or goods which are brought to Singapore solely for transhipment, 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.

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GEN 1.7 DIFFERENCES FROM ICAO STANDARDS, RECOMMENDED PRACTICES AND PROCEDURES

ANNEX 1 **Personnel Licensing**, 13th Edition

Chapter 2

2.3.3.1.2 Due to local geographical constraints and boundary, it is not possible to complete one cross-country flight totalling not less than 270km (150NM) in the course of which full- stop landings at two different aerodromes are made. In such cases, a Private Pilot Licence with restriction to fly within Singapore only will be issued.

2.8.2.1 Singapore issues two types of ratings for flying instructors: Flying Instructor Rating and Assistant Flying Instructor Rating. Both ratings meet the ICAO standards for flying instructors. Newly qualified instructors are issued with an Assistant Flying Instructor Rating, and may qualify for a Flying Instructor Rating after acquiring additional flying and instructional experience.

An Assistant Flying Instructor Rating does not entitle the holder to:

a) give flying instructions unless under the supervision of a person holding a Flying Instructor Rating; or
b) give directions in respect of the student pilot's first solo day/night flight and first solo cross-country day/night flight.

2.9.1.1 The applicant for a Commercial Pilot Licence (Gliders) shall not be less than 18 years of age.

2.10.1.1 The applicant for a Private Pilot Licence (Balloons and Airships) shall not be less than 17 years of age. The applicant for a Commercial Pilot Licence (Balloons and Airships) shall not be less than 18 years of age.

ANNEX 2 **Rules of the Air**, 10th Edition

Appendix 3

VFR or IFR flights when operating in uncontrolled airspace within certain parts of the Singapore FIR at or above 3,000ft and below FL250 are required to use the cruising levels specified in the quadrantal table of cruising levels (quadrantal rule) as shown in section ENR 1.7 para 4.4.

DOC 4444 **Procedures for Air Navigation Services - Air Traffic Management,** 15th Edition (PANS-ATM)

- NIL Difference

DOC 7030 **Regional Supplementary Procedures,** 5th Edition

MID/ASIA REGIONAL SUPPLEMENTARY PROCEDURES

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

a) Above FL200.

ANNEX 3 **Meteorological Service for International Air Navigation,** 20th Edition

- NIL Difference

ANNEX 4 **Aeronautical Charts,** 11th Edition

- NIL Difference

ANNEX 5 **Units of Measurement to be used in Air and Ground Operations**, 5th Edition

- NIL Difference

ANNEX 6 **Operation of Aircraft**

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Part I (International Commercial Air Transport - Aeroplanes) - 11th Edition

Chapter 12

12.4(b) Singapore regulations do not require all cabin crew to be trained on the use of automated external defibrillator (AED). However, the regulations require that at least one senior cabin crew on board every aircraft carrying AED to be trained on the use of AED.

Part II (International General Aviation - Aeroplanes) - 10th Edition

- NIL Difference

Part III (International Operations - Helicopters) - 10th Edition

- NIL Difference

ANNEX 7 **Aircraft Nationality and Registration Marks,** 6th Edition

- NIL Difference.

ANNEX 8 **Airworthiness of Aircraft,** 12th Edition

- NIL Difference

ANNEX 9 **Facilitation**, 17th Edition

Chapter 3

3.16.1 Singapore adopts an electronic visa system (e-Visa) to retrieve information to verify the identity of the visa holder.

3.29 Singapore requires all travellers, including Singapore Citizens, Permanent Residents, Long-Term Pass holders and foreign visitors, to complete an electronic SG Arrival Card (SGAC) before/upon arrival in Singapore.

3.51 Singapore may allow the entry of an inadmissible person under special circumstances; for instance, to seek emergency medical treatment. In such cases, the airlines shall continue to be responsible for the custody and care of the passenger and eventual repatriation.

3.71 With effect from 27 Aug 2007, air crew who arrive in Singapore on crew duty and seeking temporary entry into Singapore are required to produce their passports for immigration clearance. However, their passports will not be endorsed. Crew who are nationals of countries that require visa to enter Singapore will continue to be exempted from the visa requirements if they arrive in Singapore as part of their crew duty or to join their assigned flights for the purpose of performing their crew duty.

Chapter 5

5.9.1 Under Singapore's regulations, the cost of custody and care of inadmissible persons pending their removal shall be borne by the aircraft operator.

5.18 The obligations, responsibilities, and costs associated with the removal of deportees are a shared responsibility. Singapore works closely with foreign diplomatic missions to facilitate the removal of deportees.

5.23 A valid travel document is required before any special consideration can be given to the admission of such persons. For Permanent Residents, entry permit and valid Travelling documents are required before entry is granted.

5.29 The required travel document to facilitate the return of the national will be issued upon confirmation of the person's Singapore Citizenship status.

ANNEX 10 **Aeronautical Telecommunications**

Volume I (Radio Navigation Aids) - 7th Edition

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Volume II (Communication Procedures including those with PANS status) - 7th Edition

Volume III (Communication Systems) - 2nd Edition
Part I - Digital Data Communication Systems
Part II - Voice Communication Systems

Volume IV (Surveillance and Collision Avoidance Systems) - 5th Edition

Volume V (Aeronautical Radio Frequency Spectrum Utilization) - 3rd Edition

- NIL Difference

ANNEX 11 **Air Traffic Services**,15th Edition
- NIL Difference

ANNEX 12 **Search and Rescue**, 8th Edition
- NIL Difference

ANNEX 13 **Aircraft Accident and Incident Investigation**, 13th Edition
- NIL Difference

ANNEX 14 **Aerodromes**

Volume I (Aerodrome Design and Operations) - 8th Edition

Chapter 3

3.4.3 The words “wherever practicable” in Annex 14 paragraph 3.4.3 have been removed in our national regulations. Without exception, the width of the runway strip shall be 140m where the code number is 3 or 4; and 70m where the code number is 1 or 2.

Chapter 4

4.2.14 For a precision approach runway category I, the inner approach surface; inner transitional surfaces; and balked landing surface shall be established, in addition to the conical surface; inner horizontal surface; approach surface and transitional surfaces.

Chapter 6

6.1.1.6 Annex 14 paragraph 6.1.1.6(c) which states that the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day has been removed from our national regulations.

Chapter 7

7.4.1 Relating to the display of unserviceability markers, our national regulations require additionally that “unserviceability markers shall also be displayed at the entrances to a permanently or temporarily closed runway or taxiway, or part thereof”.

Chapter 9

9.2.3 Relating to the level of rescue and fire fighting protection to be provided, the remission factor has been removed from our national regulations.

Volume II (Heliports) - 5th Edition
- Not applicable

ANNEX 15 **Aeronautical Information Services**, 16th Edition
- NIL Difference

ANNEX 16 **Environmental Protection**

Volume I (Aircraft Noise) - 8th Edition

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Volume II (Aircraft Engine Emissions) - 4th Edition

Volume III (Aeroplane CO? Emissions) - 1st Edition
- NIL Difference

ANNEX 17 **Aviation Security - Safeguarding International Civil Aviation Against Acts of Unlawful Interference**, 12th Edition
- NIL Difference

ANNEX 18 **The Safe Transport of Dangerous Goods by Air,** 4th Edition
- NIL Difference

ANNEX 19 **Safety Management**, 2nd Edition
- NIL Difference

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GEN 2 TABLES AND CODES

GEN 2.1 MEASURING SYSTEM, AIRCRAFT MARKING, HOLIDAYS

2.1.1 UNITS OF MEASUREMENT

The table of units of measurement shown in paragraph 3.2 is used for the dissemination of information and in messages transmitted to aircraft.

2.1.2 TEMPORAL REFERENCE SYSTEM

Co-ordinated Universal Time (UTC) is used in the air traffic and communication services and in documents published for international distribution by the Aeronautical Information Service. Reporting of time is expressed to the nearest minute, e.g. 12:40:35 is reported as 1241. Local time is 8 hours ahead of UTC. Time checks to aircraft are accurate to within 30 seconds.

2.1.3 HORIZONTAL REFERENCE SYSTEM

2.1.3.1 Name/designation of system

All published geographical coordinates in the Singapore FIR indicating latitude and longitude are expressed in terms of the World Geodetic System – 1984 (WGS-84) geodetic reference datum.

2.1.3.2 Parameters of the Projection

Projection is expressed in terms of Conical Conformal Projection.

Measurement of	*Units*
Distance used in navigation, position report, etc. - generally in excess of 4000m	* Kilometres (km) or Nautical miles (NM)
Relatively short distances such as those relating to aerodromes (e.g. runway lengths)	Metres (m)
Altitudes, elevations and heights	Metres (m) or Feet (ft)
Horizontal speed including wind speed	Knots (kt)
Vertical speed	Feet per minute (ft/min)
Wind direction for landing and taking-off	Degrees Magnetic (°M)
Wind direction except for landing and taking-off	Degrees True (°T)
Visibility, including runway visual range	Metres (m) or Kilometres (km)
Altimeter Setting	Hectopascals (hPa)
Temperature	Degrees Celsius (Centigrade) (°C)
Weight	Metric tonnes (t) or kilogrammes (kg)
Time	Hours and minutes, the day of 24 hours beginning at midnight UTC (hhmm)
* International nautical miles, for which conversion into metres is given by: 1 international NM = 1852 metres	

2.1.3.3 Ellipsoid

Ellipsoid is expressed in terms of the World Geodetic System – 1984 (WGS-84) ellipsoid.

2.1.3.4 Datum

The World Geodetic System – 1984 (WGS-84) is used.

2.1.3.5 Area of application

The area of application for the published geographical coordinates coincides with the area of responsibility of the Aeronautical Information Service, i.e. the entire territory of Singapore as well as the airspace over the high seas encompassed by the Singapore Flight Information Region.

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2.1.3.6 Use of an asterisk to identify published geographical coordinates

An asterisk (*) will be used to identify those published geographical coordinates which have been transformed into WGS-84 coordinates but whose accuracy of original field work does not meet the requirements in ICAO Annex 11, Chapter 2 and ICAO Annex 14, Volume I, Chapter 2. Specifications for determination and reporting of WGS-84 coordinates are given in ICAO Annex 11, Chapter 2 and ICAO Annex 14, Volume I, Chapter 2.

2.1.4 VERTICAL REFERENCE SYSTEM

2.1.4.1 Name/designation of system

The vertical reference system corresponds to mean sea level (MSL).

2.1.4.2 Geoid model

The geoid model used is the Earth Gravitational Model 1996 — (EGM-96).

2.1.5 AIRCRAFT NATIONALITY AND REGISTRATION MARKS

The nationality mark for aircraft registered in Singapore is the figure 9, followed by the letter V, i.e., 9V. The nationality mark is followed by a hyphen and a registration mark consisting of a three-letter group, e.g., 9V-BAA.

2.1.6 PUBLIC HOLIDAYS IN SINGAPORE

The following dates are notified as public holidays:

Name of Holiday	Date	Day
Christmas Day	25 December 2024	Wednesday
New Year's Day	01 January 2025	Wednesday
Chinese New Year	29 January 2025	Wednesday
	30 January 2025	Thursday
Hari Raya Puasa	31 March 2025	Monday
Good Friday	18 April 2025	Friday
Labour Day	01 May 2025	Thursday
Vesak Day	12 May 2025	Monday
Hari Raya Haji	07 June 2025	Saturday
National Day	09 August 2025	Saturday
Deepavali	20 October 2025	Monday
Christmas Day	25 December 2025	Thursday

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GEN 2.2 ABBREVIATIONS USED IN AIS PUBLICATIONS

Abbreviations marked by asterisks (*) are either different from or not contained in ICAO DOC 8400.

.	
... C	Centre (preceded by runway designation number to identify a parallel runway)
... L	Left (preceded by runway designation number to identify a parallel runway)
... R	Right (preceded by runway designation number to identify a parallel runway)
4	
4D/15 *	Four dimensional (latitude, longitude, altitude, time) position information at 15 minutes interval
A	
A/A	Air-to-air
A/G	Air-to-ground
AAIM	Aircraft autonomous integrity monitoring
AAL	Above aerodrome level
AAR	Air to air refuelling
ABM	Abeam
ABN	Aerodrome beacon
ABV	Above
ACAS	Airborne collision avoidance system
ACC	Area control centre or area control
ACCID	Notification of an aircraft accident
ACFT	Aircraft
ACK	Acknowledge
ACL	Altimeter check location
ACPT	Accept or accepted
ACT	Active or activated or activity
AD	Aerodrome
ADA	Advisory area
ADC	Aerodrome Chart
ADDN	Addition or additional
ADF	Automatic direction finding equipment
ADIZ	Air defence identification zone
ADJ	Adjacent
ADR	Advisory route
ADS-B	Automatic dependent surveillance-broadcast
ADS-C	Automatic dependent surveillance-contract
ADZ	Advise
AFIS	Aerodrome flight information service
AFS	Aeronautical fixed service
AFT	After...(time or place)
AFTN	Aeronautical fixed telecommunication network
AGL	Above ground level
AIC	Aeronautical information circular
AIDC	Air traffic services interfacility data communications
AIM	Aeronautical information management
AIP	Aeronautical information publication
AIRAC	Aeronautical information regulation and control
AIREP	Air-report
AIS	Aeronautical information services
ALERFA	Alert phase
ALRS	Alerting service
ALS	Approach lighting system
ALT	Altitude
AMA	Area minimum altitude
AMDT	Amendment (AIP amendment)
AMSL	Above mean sea level
ANSP *	Air Navigation Service Provider
AO	Aircraft operator
AOC	Aerodrome obstacle chart (followed by type and name/title)
AP	Airport
APCH	Approach
APN	Apron
APP	Approach control office or approach control or approach control service
APR	April
APRX	Approximate or approximately
APU	Auxiliary power unit
APV	Approach procedure with vertical guidance
ARC	Area Chart
ARO	Air traffic services reporting office
ARP	Aerodrome reference point
ARR	Arrive or arrival or Arrival (message type designator)
ASC	Ascend to or ascending to
ASDA	Accelerate-stop distance available
ASPH	Asphalt
ASTO *	Aeroshell turbine oil
ATA	Actual time of arrival
ATC	Air traffic control (in general)
ATD	Actual time of departure
ATFM	Air traffic flow management
ATIS	Automatic terminal information service
ATM	Air Traffic Management
ATN	Aeronautical telecommunication network
ATS	Air traffic services
ATTN	Attention
ATZ	Aerodrome traffic zone
AUG	August
AUTO	Automatic
AUW	All up weight
AUX	Auxiliary
AVBL	Available or availability
AVGAS	Aviation gasoline
AWOS	Automated Weather Observation System
AWY	Airway
AZM	Azimuth
B	
BA	Braking action
BAROVNAV	Barometric vertical navigation
BCN	Beacon (Aeronautical ground light)
BCST	Broadcast
BDRY	Boundary
BLDG	Building
BLW	Below ...
BOBCAT *	Bay of Bengal Cooperative Air Traffic Flow Management Advisory System
BRG	Bearing
BRKG	Braking
BTN	Between
C	
C	Degrees Celsius (Centigrade)
CAAS *	Civil Aviation Authority of Singapore
CAFHI *	Changi Airport Fuel Hydrant Installation
CAT	Clear air turbulence
CAVOK	(to be pronounced "KAV-OH-KAY") visibility, cloud and present weather better than prescribed values or conditions
CCO	Continuous climb operations
CDO	Continuous descent operations
CDR	Conditional route
CH	Channel
CHG	Modification (message type designator)
CIV	Civil

CL	Centre line
CLBR	Calibration
CLSD	Close or closed or closing
CMB	Climb to or climbing to
CMPL	Completion or completed or complete
CNL	Cancel or cancelled or flight plan cancellation (message type designator)
CNS	Communications, Navigation and Surveillance
COM	Communications
CONC	Concrete
COND	Condition
CONST	Construction or constructed
CONT	Continue(s) or continued
COOR	Coordinate or coordination
COORD	Coordinates
COP	Change-over point
CPDLC	Controller-pilot data link communications
CPL	Current flight plan (message type designator)
CRC	Cyclic redundancy check
CRP	Compulsory reporting point
CS	Call sign
CTA	Control area
CTC	Contact
CTL	Control
CTN	Caution
CTO *	Calculated Time-Over
CTOT *	Calculated Take-off Time
CTR	Control zone
CUST	Customs
CWY	Clearway
D	
D ...	Danger area (followed by identification)
DA	Decision altitude
DCKG	Docking
DCPC	Direct controller-pilot communications
DCT	Direct (in relation to flight plan clearances and type of approach)
DEC	December
DEG	Degrees
DEP	Depart or departure or Departure (message type designator)
DER	Departure end of the runway
DES	Descend to or descending to
DEST	Destination
DETRESFA	Distress phase
DEV	Deviation or deviating
DFTI	Distances from touch down indicator
DH	Decision height
DIST	Distance
DLA	Delay or delayed or Delay (message type designator)
DLY	Daily
DME	Distance measuring equipment
DNG	Danger or dangerous
DOF	Date of flight
DPT	Depth
DR	Dead reckoning
DRG	During
DTG	Date-time group
DTHR	Displaced runway threshold
DUR	Duration
DVOR	Doppler VOR
E	
E ...	East or eastern longitude
EAT	Expected approach time
EET	Estimated elapsed time
ELBA	Emergency location beacon-aircraft
ELEV	Elevation
ELT	Emergency locator transmitter
EM	Emission
EMERG	Emergency
ENG	Engine
ENR	Enroute
ENRC	Enroute Chart (followed by name/title)
EOBT	Estimated off-block time
EQPT	Equipment
EST	Estimate or estimated or estimate (as message type designator)
ETA	Estimated time of arrival or estimating arrival
ETD	Estimated time of departure or estimating departure
ETO	Estimated time over significant point
EV	Every
EXC	Except
EXER	Exercises or exercising or to exercise
EXP	Expect or expected or expecting
EXTD	Extend or extending or Extended
F	
FAC	Facilities
FAF	Final approach fix
FAP	Final approach point
FATO	Final approach and take-off area
FAX	Facsimile transmission
FCST	Forecast
FCT	Friction coefficient
FDPS	Flight data processing system
FEB	February
FIC	Flight information centre
FIR	Flight information region
FIS	Flight information service
FL	Flight level
FLG	Flashing
FLR	Flares
FLT	Flight
FLTCK	Flight check
FLUC	Fluctuating or fluctuation or fluctuated
FLW	Follow(s) or following
FLY	Fly or flying
FM	Course from a fix to manual termination (used in navigation database coding)
FMS	Flight management system
FMU	Flow management unit
FNA	Final approach
FOD *	Foreign object damage
FPL	Flight Plan
FREQ	Frequency
FRI	Friday
FRNG	Firing
FSL	Full stop landing
FST	First
FT	Feet (dimensional unit)
G	
G/A	Ground-to-air
GA	General Aviation
GCA	Ground controlled approach system or ground controlled approach
GEN	General
GEO	Geographic or true
GLD	Glider
GLONASS	Global orbiting navigation satellite system
GND	Ground
GNDCK	Ground check

GNSS	Global navigation satellite system
GOV	Government
GP	Glide path
GPA	Glide path angle
GPS	Global positioning system
GRASS	Grass landing area
GS	Ground speed
GUND	Geoid undulation
H	
H+ *	Hours plus.....minutes past the hour
H24	Continuous day and night service
HBN	Hazard beacon
HDG	Heading
HEL	Helicopter
HEL-H *	Heavy helicopter (radius of action, for rescue purposes, more than 370km (200NM) and capacity of evacuating more than 15 persons)
HEL-L *	Light helicopter (radius of action, for rescue purposes, up to 185km (100NM) and capacity of evacuating 1-5 persons)
HEL-M *	Medium helicopter (radius of action, for rescue purposes, 185-370km (100- 200NM) and capacity of evacuating 6-15 persons)
HF	High frequency (3 000 to 30 000kHz)
HGT	Height or height above
HJ	Sunrise to sunset
HLDG	Holding
HN	Sunset to sunrise
HO	Service available to meet operational requirements
HOL	Holiday
HOSP	Hospital aircraft
HPA	Hectopascal
HQ *	Headquarters
HR	Hours
HS	Service available during hours of scheduled operations
HUM	Humanitarian
HX	No specific working hours
HZ	Haze or Hertz (cycle per second)
I	
IAC	Instrument approach chart (followed by name/title)
IAF	Initial approach fix
IAP	Instrument approach procedure
IAR	Intersection of air routes
IAS	Indicated airspeed
IBN	Identification beacon
ICAO	International Civil Aviation Organisation
ID	Identifier or identify
IDENT	Identification
IF	Intermediate approach fix
IFR	Instrument flight rules
ILS	Instrument landing system
IM	Inner marker
IMC	Instrument meteorological conditions
INA	Initial approach
INBD	Inbound
INCERFA	Uncertainty phase
INCORP	Incorporated
INFO	Information
INOP	Inoperative
INPR	In progress
INS	Inertial navigation system
INSTL	Install or installed or installation
INSTR	Instrument
INT	Intersection
INTL	International
INTRG	Interrogator
INTRP	Interrupt or interruption or interrupted
INTST	Intensity
IRS	Inertial reference system
ISA	International standard atmosphere
J	
JAN	January
JUL	July
JUN	June
K	
KG	Kilograms
KHZ	Kilohertz
KM	Kilometres
KMH	Kilometres per hour
KPA	Kilopascal
KT	Knots
KW	Kilowatts
L	
L	Locator (see LM, LO)
LAT	Latitude
LDA	Landing distance available
LDAH	Landing distance available, helicopter
LDG	Landing
LDI	Landing direction indicator
LEN	Length
LGT	Light or lighting
LGTD	Lighted
LIH	Light intensity high
LIL	Light intensity low
LIM	Light intensity medium
LLZ	Localizer
LM	Locator middle
LNAV	Lateral navigation
LO	Locator, outer
LONG	Longitude
LORAN	LORAN (Long range air navigation system)
LRG	Long range
LT *	Local time
LTD	Limited
LVL	Level
LVP	Low visibility procedures
M	
M	Mach number (followed by figures) or Metres (preceded by figures)
MAD *	Maximum Acceptable Delay
MAG	Magnetic
MAINT	Maintenance
MAP	Aeronautical maps and charts
MAPT	Missed approach point
MAR	March
MAX	Maximum
MAY	May
MCA	Minimum crossing altitude
MDA	Minimum descent altitude
MDH	Minimum descent height
MEA	Minimum en-route altitude
MEDEVAC	Medical evacuation flight
MEHT	Minimum eye height over threshold (for visual approach slope indicator systems)
MET	Meteorological or meteorology
METAR	Aerodrome routine meteorological report (in meteorological code)
MHA	Minimum holding altitude
MHZ	Megahertz
MID	Mid-point (related to RVR)

MIL	Military
MIN	Minutes
MINDEF *	Ministry of Defence
MLS	Microwave landing system
MM	Middle marker
MNM	Minimum
MNPS	Minimum navigation performance specifications
MNT	Monitor or monitoring or monitored
MNTN	Maintain
MOA	Military operating area
MOC	Minimum obstacle clearance (required)
MOCA	Minimum obstacle clearance altitude
MON	Monday
MOPS	Minimum operational performance standards
MOV	Move or moving or movement
MPS	Metres per second
MSA	Minimum sector altitude
MSAW	Minimum safe altitude warning
MSG	Message
MSL	Mean sea level
MWO	Meteorological watch office
N	
N	North or northern latitude
NAV	Navigation
NAVAID	Navigation aid
NC	No change
NDB	Non-directional radio beacon
NGT	Night
NM	Nautical miles
NML	Normal
NOF	International NOTAM Office
NONSTD	Non-standard
NOSIG	No significant change (used in trend-type landing forecasts)
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
NOV	November
NR	Number
O	
O/R	On request
OAC	Oceanic area control centre
OAS	Obstacle assessment surface
OBS	Observe or observed or observation
OBST	Obstacle
OCA	Obstacle clearance altitude
OCC	Occulting (light)
OCH	Obstacle clearance height
OCNL	Occasional or occasionally
OCS	Obstacle clearance surface
OCT	October
OFZ	Obstacle free zone
OHD	Overhead
OM	Out marker
OPMET	Operational meteorological (information)
OPR	Operator or operate or operative or operating or operational
OPS	Operations
OTP	On top
OTS	Organized track system
OUBD	Outbound
P	
P ...	Prohibited area (followed by identification)
PA	Precision approach
PALS	Precision approach lighting system (specify category)
PANS	Procedures for air navigation services
PAPI	Precision approach path indicator
PAR	Precision approach radar
PARA *	Paragraph
PARL	Parallel
PAX	Passenger(s)
PBC	Performance-based communication
PBN	Performance-based navigation
PBS	Performance-based surveillance
PCD	Proceed or proceeding
PCL	Pilot-controlled lighting
PCN	Pavement classification number
PDC	Pre-departure clearance
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)
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
RVSM	Reduced vertical separation minimum (300m(1000ft)) between FL290 and FL410
RWY	Runway
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
SRY	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	
U/S	Unserviceable
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
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	
YCZ	Yellow caution zone (runway lighting)

GEN 2.3 CHART SYMBOLS

The aeronautical symbols used on charts contained in the AIP and other aeronautical charts series listed in GEN 3.2 are shown below. They correspond in every respect to the internationally agreed symbols contained in ICAO Annex 4 - Aeronautical Charts, Tenth Edition and the Aeronautical Chart Manual Doc 8697-AN/889. A number of symbols, not yet internationally recognised, are also included.

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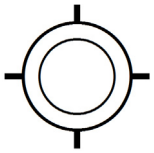
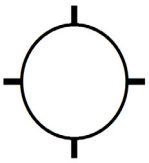
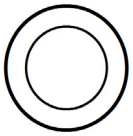
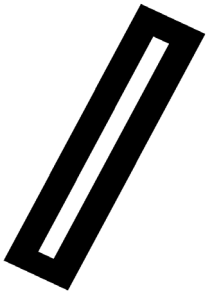
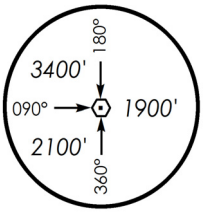
1 AERODROMES

1.1 Charts other than approach charts

Civil (land)	
Joint civil and military (land)	
Military (land)	

1.2 Approach charts

The aerodrome on which the procedure is based	
Aerodromes affecting the traffic pattern on the aerodrome on which the procedure is based	
MINIMUM SECTOR ALTITUDE (MSA) MSA provides 300m (984ft) obstacle clearance and rounding the resulting value up to next higher 30m (100ft) increment, within a radius of 46km (25NM) of the homing facility on which the instrument approach is based.	
DME distance Distance in nautical miles to DME Identification of radio navigation aid	

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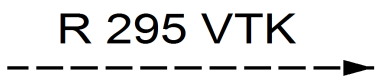
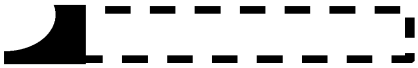
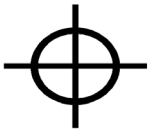
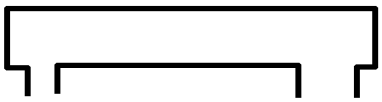
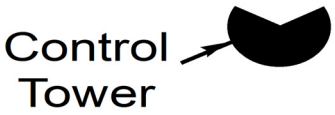
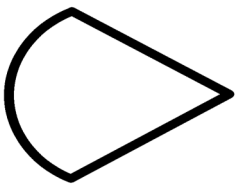
VOR radial Radial bearing from, and identification of, VOR	
Radio Marker Beacon Elliptical	
Instrument landing system ILS - PLAN VIEW	
Instrument landing system ILS -PROFILE	

1.3 Aerodrome Charts

Hard surface runway	
Stopway	
Clearway	

2 AERODROME INSTALLATIONS AND LIGHTS

Aerodrome reference point (ARP)	
Taxiways and parking areas	
Control tower	
Barrette	
Runway visual range (RVR) observation site	

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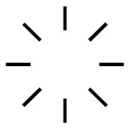
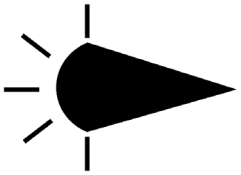
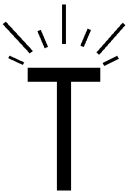
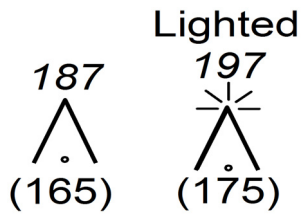
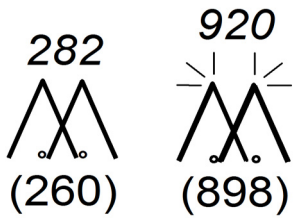
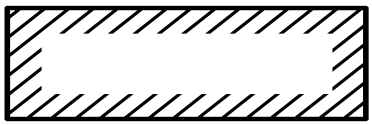
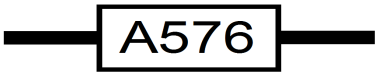
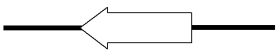
Obstacle light	
Aeronautical ground light	
Wind direction indicator (lighted)	
Landing direction indicator (lighted)	

3 MISCELLANEOUS

Spot elevation	
Obstacles	

Group obstacles Note: Numerals in italics indicate elevation of top of obstacle above sea level. Upright numerals in parentheses indicate height above specified datum.	
Restricted airspace (prohibited, restricted or danger areas)	
Common boundary of two areas	
ATS route - ATS route designator	
ATS route - Two ways airway	
ATS route - One way airway	
Scale-break (on ATS route)	
ATS route reporting point by-pass (No report is required on this route)	

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

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

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GEN 2.5 LIST OF RADIO NAVIGATION AIDS

ID	Station Name	Aid	Purpose
AG	SEMBAWANG	NDB	AE
BP	BATU PAHAT (Malaysian facility)	NDB	E
BTM	BATAM/HANG NADIM (Indonesian facility)	VOR/DME	A
ICC	SINGAPORE CHANGI	ILS/LLZ/DME	A
ICE	SINGAPORE CHANGI	ILS/LLZ/DME	A
ICH	SINGAPORE CHANGI	ILS/LLZ/DME	A
ICW	SINGAPORE CHANGI	ILS/LLZ/DME	A
PU	PAPA UNIFORM	DVOR/DME	AE
SJ	SINJON	DVOR/DME	E
TPG	TANJUNGPINANG/ RAJA HAJI FISABILILAH (Indonesian facility)	VOR/DME	A
VJB	JOHOR BAHRU (Malaysian Facility)	DVOR/DME	E
VMR	MERSING (Malaysian Facility)	DVOR/DME	E
VTK	TEKONG	DVOR/DME	AE

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Station Name	Aid	ID	Purpose
BATAM/HANG NADIM (Indonesian facility)	VOR/DME	BTM	A
BATU PAHAT (Malaysian facility)	NDB	BP	E
JOHOR BAHRU (Malaysian Facility)	DVOR/DME	VJB	E
MERSING (Malaysian Facility)	DVOR/DME	VMR	E
PAPA UNIFORM	DVOR/DME	PU	AE
SEMBAWANG	NDB	AG	AE
SINGAPORE CHANGI	ILS/LLZ/DME	ICC	A
SINGAPORE CHANGI	ILS/LLZ/DME	ICE	A
SINGAPORE CHANGI	ILS/LLZ/DME	ICH	A
SINGAPORE CHANGI	ILS/LLZ/DME	ICW	A
SINJON	DVOR/DME	SJ	E
TANJUNGPINANG/RAJA HAJI FISABILILLAH (Indonesian facility)	VOR/DME	TPG	A
TEKONG	DVOR/DME	VTK	AE

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

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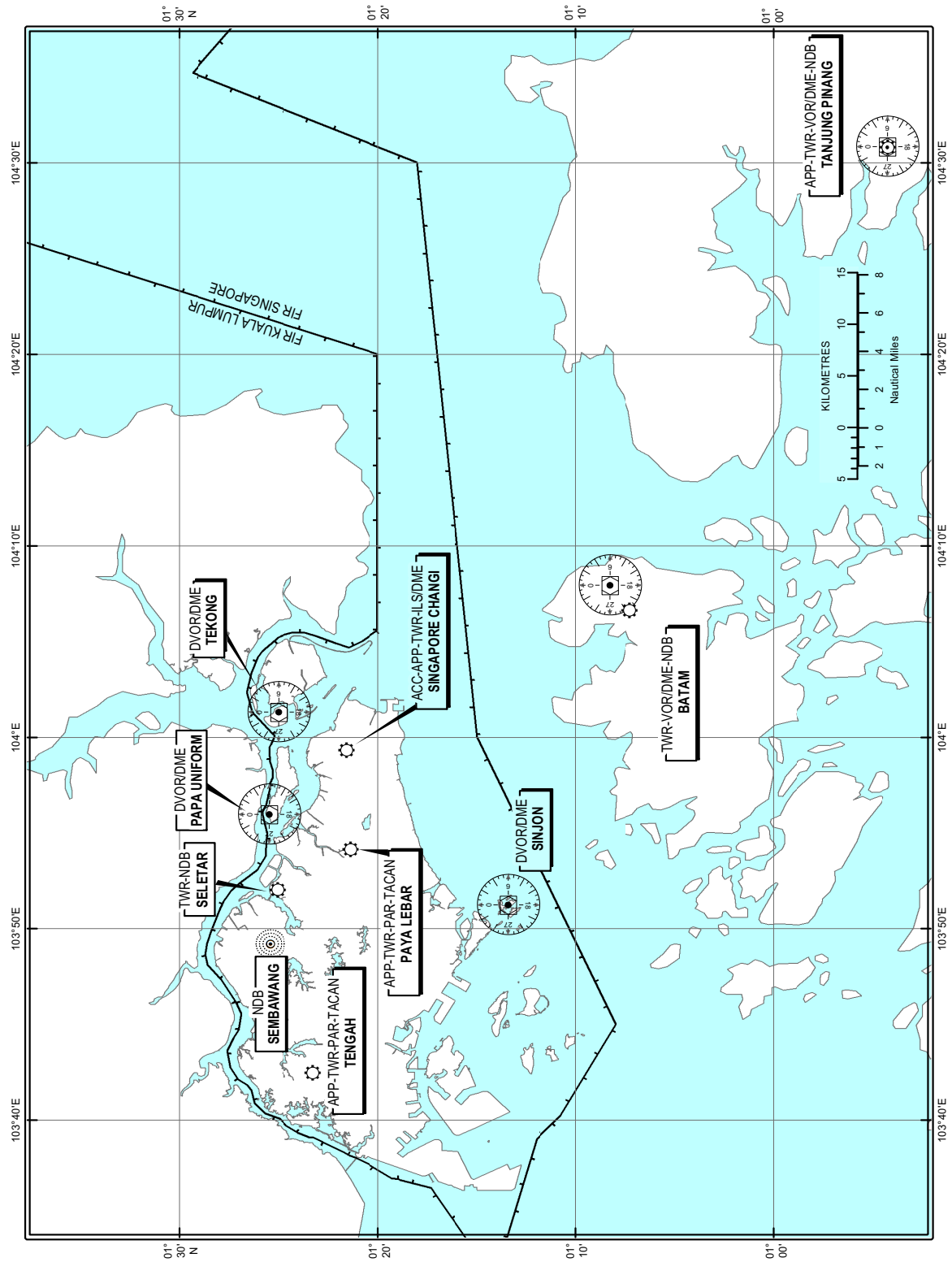
SINGAPORE
RADIO FACILITY INDEX CHART



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GEN 2.6 CONVERSIONS TABLES

NM to KM 1NM = 1.852 KM		**KM to NM** 1KM = 0.54 NM		**FT to M** 1 FT = 0.3048 M		**M to FT** 1 M = 3.281 FT	
NM	*KM*	*KM*	*NM*	*FT*	*M*	*M*	*FT*
0.1	0.185	0.1	0.05	1	0.305	1	3.28
0.2	0.370	0.2	0.11	2	0.610	2	6.56
0.3	0.556	0.3	0.16	3	0.914	3	9.84
0.4	0.741	0.4	0.22	4	1.219	4	13.12
0.5	0.926	0.5	0.27	5	1.524	5	16.40
0.6	1.111	0.6	0.32	6	1.829	6	19.69
0.7	1.296	0.7	0.38	7	2.134	7	22.97
0.8	1.482	0.8	0.43	8	2.438	8	26.25
0.9	1.667	0.9	0.49	9	2.743	9	29.53
1	1.852	1	0.54	10	3.048	10	32.81
2	3.704	2	1.08	20	6.096	20	65.62
3	5.556	3	1.62	30	9.144	30	98.43
4	7.408	4	2.16	40	12.192	40	131.23
5	9.260	5	2.70	50	15.240	50	164.04
6	11.112	6	3.24	60	18.288	60	196.85
7	12.964	7	3.78	70	21.336	70	229.66
8	14.816	8	4.32	80	24.384	80	262.47
9	16.668	9	4.86	90	27.432	90	295.28
10	18.520	10	5.40	100	30.480	100	328.08
20	37.040	20	10.80	200	60.960	200	656.17
30	55.560	30	16.20	300	91.440	300	984.25
40	74.080	40	21.60	400	121.920	400	1 312.34
50	92.600	50	27.00	500	152.400	500	1 640.42
60	111.120	60	32.40	600	182.880	600	1 968.50
70	129.640	70	37.80	700	213.360	700	2 296.59
80	148.160	80	43.20	800	243.840	800	2 624.67
90	166.680	90	48.60	900	274.320	900	2 952.76
100	185.200	100	54.00	1 000	304.800	1 000	3 280.84
200	370.400	200	107.99	2 000	609.600	2 000	6 561.68
300	555.600	300	161.99	3 000	914.400	3 000	9 842.52
400	740.800	400	215.98	4 000	1 219.200	4 000	13 123.36
500	926.000	500	269.98	5 000	1 524.000	5 000	16 404.20
				6 000	1 828.800		
				7 000	2 133.600		
				8 000	2 438.400		
				9 000	2 743.200		
				10 000	3 048.000		

From decimal minutes of an arc to seconds of an arc							
MIN	*SEC*	*MIN*	*SEC*	*MIN*	*SEC*	*MIN*	*SEC*
0.01	0.6	0.26	15.6	0.51	30.6	0.76	45.6
0.02	1.2	0.27	16.2	0.52	31.2	0.77	46.2

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From decimal minutes of an arc to seconds of an arc							
MIN	*SEC*	*MIN*	*SEC*	*MIN*	*SEC*	*MIN*	*SEC*
0.03	1.8	0.28	16.8	0.53	31.8	0.78	46.8
0.04	2.4	0.29	17.4	0.54	32.4	0.79	47.4
0.05	3.0	0.30	18.0	0.55	33.0	0.80	48.0
0.06	3.6	0.31	18.6	0.56	33.6	0.81	48.6
0.07	4.2	0.32	19.2	0.57	34.2	0.82	49.2
0.08	4.8	0.33	19.8	0.58	34.8	0.83	49.8
0.09	5.4	0.34	20.4	0.59	35.4	0.84	50.4
0.10	6.0	0.35	21.0	0.60	36.0	0.85	51.0
0.11	6.6	0.36	21.6	0.61	36.6	0.86	51.6
0.12	7.2	0.37	22.2	0.62	37.2	0.87	52.2
0.13	7.8	0.38	22.8	0.63	37.8	0.88	52.8
0.14	8.4	0.39	23.4	0.64	38.4	0.89	53.4
0.15	9.0	0.40	24.0	0.65	39.0	0.90	54.0
0.16	9.6	0.41	24.6	0.66	39.6	0.91	54.6
0.17	10.2	0.42	25.2	0.67	40.2	0.92	55.2
0.18	10.8	0.43	25.8	0.68	40.8	0.93	55.8
0.19	11.4	0.44	26.4	0.69	41.4	0.94	56.4
0.20	12.0	0.45	27.0	0.70	42.0	0.95	57.0
0.21	12.6	0.46	27.6	0.71	42.6	0.96	57.6
0.22	13.2	0.47	28.2	0.72	43.2	0.97	58.2
0.23	13.8	0.48	28.8	0.73	43.8	0.98	58.8
0.24	14.4	0.49	29.4	0.74	44.4	0.99	59.4
0.25	15.0	0.50	30.0	0.75	45.0		

From seconds of an arc to decimal minutes of an arc							
MIN	*SEC*	*MIN*	*SEC*	*MIN*	*SEC*	*MIN*	*SEC*
1	0.02	16	0.27	31	0.52	46	0.77
2	0.03	17	0.28	32	0.53	47	0.78
3	0.05	18	0.30	33	0.55	48	0.80
4	0.07	19	0.32	34	0.57	49	0.82
5	0.08	20	0.33	35	0.58	50	0.83
6	0.10	21	0.35	36	0.60	51	0.85
7	0.12	22	0.37	37	0.62	52	0.87
8	0.13	23	0.38	38	0.63	53	0.88
9	0.15	24	0.40	39	0.65	54	0.90
10	0.17	25	0.42	40	0.67	55	0.92
11	0.18	26	0.43	41	0.68	56	0.93
12	0.20	27	0.45	42	0.70	57	0.95
13	0.22	28	0.47	43	0.72	58	0.97
14	0.23	29	0.48	44	0.73	59	0.98
15	0.25	30	0.50	45	0.75		

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GEN 2.7 SUNRISE/SUNSET TABLES

1. The sunrise/sunset table is prepared by the Meteorological Service Singapore of the National Environment Agency and is reproduced here with their permission. The table includes all the airports and aerodromes being served by the Singapore air traffic services.

1.1 The times in the Sunrise-Sunset table is in UTC for sunrise (SR) and sunset (SS) for Year 2024 to Year 2029.

1.2 The times shown in the Sunrise-Sunset table, calculated for the year 2027, is an “average year” for the years from 2025 to 2029. In this period, the times on an arbitrary date and place will deviate less than 2 minutes from the times on the same date and place in the “average year”.

2 SUNRISE-SUNSET TABLES

Latitude : (012200N) Longitude: (1035900E)											
MONTH/DAY		SR	SS	MONTH/DAY		SR	SS	MONTH/DAY		SR	SS
JAN	01 – 05	2308	1110	MAY	01 - 06	2256	1106	SEP	01 - 05	2259	1107
	06 – 11	2310	1112		07 - 23	2255	1106		06 - 11	2258	1105
	12 – 16	2312	1114		24 - 31	2256	1107		12 - 14	2256	1104
	17 – 22	2314	1116						15 - 20	2255	1102
	23 - 31	2315	1118						21 - 26	2253	1100
									27 - 30	2251	1058
FEB	01 - 18	2316	1120	JUN	01 - 09	2257	1108	OCT	01 – 04	2250	1056
	19 - 28	2315	1120		10 - 14	2258	1110		05 – 10	2249	1054
					15 - 19	2259	1111		11 – 14	2248	1053
					20 - 23	2300	1112		15 – 24	2246	1051
					24 - 30	2301	1113		25 - 31	2246	1050
MAR	01 - 05	2313	1119	JUL	01 - 08	2303	1114	NOV	01 - 15	2246	1050
	06 - 12	2311	1117		09 - 15	2304	1115		12 – 15	2247	1050
	13 - 18	2309	1116		16 - 31	2305	1116		16 – 20	2248	1051
	19 - 24	2307	1114						21 – 24	2249	1052
	25 - 31	2305	1112						25 – 27	2250	1053
									28 – 30	2251	1054
APR	01 - 05	2303	1111	AUG	01 - 09	2305	1115	DEC	01 - 04	2253	1055
	06 - 14	2301	1109		10 - 16	2304	1114		05 - 07	2254	1057
	15 - 23	2259	1108		17 - 21	2303	1112		08 - 11	2256	1058
	24 - 30	2257	1106		22 - 25	2302	1111		12 - 15	2258	1100
					26 - 31	2301	1109		16 - 19	2300	1102
									20 - 23	2302	1104
									24 - 27	2304	1106
									28 - 31	2305	1108

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GEN 3 SERVICES

GEN 3.1 AERONAUTICAL INFORMATION SERVICES

3.1.1 RESPONSIBLE SERVICE

3.1.1.1 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.

3.1.1.2 AIS Headquarters

Post:	Aeronautical Information Services Civil Aviation Authority of Singapore 60 Airport Boulevard, #04-01, Changi Airport Terminal 2 Singapore 918141
Tel:	(65) 64227036
Fax:	(65) 64410221
E-mail:	caas_singaporeais@caas.gov.sg

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

Post:	Singapore Air Traffic Control Centre (SATCC) 60 Biggin Hill Road Singapore 509950
Tel:	(65) 65956056 (Duty Supervisor)
Tel:	(65) 65956053 (NOF)
AFS:	WSSSYNYX (NOF)
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 excluding the Tanjungpinang Terminal Control Area (TMA) and Control Zone (CTR).

Vertical limit: SFC to FL370

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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

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NOTAM are exchanged with other International NOTAM Offices (NOF) as follows:

NOTAM exchanged with other NOF (R=Received only, S=Sent only, EAD=Received from/Sent to European AIS Database)		
Abu Dhabi	Jakarta	Paro (R)
Addis Ababa	Jeddah	Phnom Penh (R)
Almaty (EAD)	Johannesburg	Plaisance
Amman (EAD)	Kabul	Port Moresby
Amsterdam (EAD)	Karachi	Praha (S)
Ankara (EAD)	Kathmandu	Pyongyang
Antananarivo	Khartoum (R)	Riga (EAD)
Athinai	Kobenhavn (EAD)	Roma
Baghdad	Kolkata	Sanaa
Bahrain	Kuala Lumpur	Sarajevo (S)
Baku (EAD)	Kuwait	Seoul
Bangkok	Kyiv (EAD)	Shannon (EAD)
Beijing	Lisboa (EAD)	Sofia
Beograd (EAD)	Ljubljana (EAD)	Stockholm (EAD)
Brasilia (S)	Lobamba (R)	Taipei
Brazzaville (R)	London (EAD)	Tallinn (EAD)
Brunei	Luqa (EAD)	Tbilisi (EAD)
Bruxelles (EAD)	Macao	Tehran
Bucuresti (EAD)	Madrid (EAD)	Tel Aviv
Budapest (EAD)	Mahé	Tirana (EAD)
Cairo (S)	Male	Tokyo
Canberra	Manila (EAD)	Tripoli
Chennai	Maseru (R)	Vientiane
Christchurch	Minsk (EAD)	Vilnius (EAD)
Colombo	Moskva	Warsaw (S) (EAD)
Damascus (R)	Mumbai	Washington
Dar es-Salaam (R)	Muscat	Wien (EAD)
Dhaka	Nadi	Windhoek (R)
Frankfurt (EAD)	Nairobi	Yangon
Hanoi	New Delhi	Yerevan (S) (EAD)
Harare	Nicosia (EAD)	Zagreb (EAD)
Helsinki (EAD)	Ottawa	Zurich
Hong Kong	Paris (EAD)	

SNOWTAM

Series S (SNOWTAM) comprises information concerning the presence or cessation of hazardous conditions due to snow, ice, slush, frost, standing water or water associated with snow, slush, ice or frost on the movement area.

SNOWTAM is issued for Singapore Changi Airport and Seletar Airport in accordance with ICAO PANS-AIM (Doc 10066), Appendix 4 by the International NOTAM Office (NOF).

Pre-flight Information Bulletin (PIB), a recapitulation of valid NOTAM in plain language, can be retrieved from AIM-SG URL: https://aim-sg.caas.gov.sg

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3.6 Aeronautical Information Circular (AIC)

Aeronautical Information Circular (AIC) contains information on the long-term forecast of major change in legislation, regulations, procedures or facilities; information of a purely explanatory or advisory nature liable to affect flight safety; and information or notification of an explanatory or advisory nature concerning technical, legislative or purely administrative matters which is inappropriate to the AIP or NOTAM, and is published as required.

Each AIC is numbered consecutively on a calendar year basis. The year, indicated by 2 digits, is a part of the serial number of the AIC. A checklist of current AIC is issued in the form of an AIC once a year.

3.7 Aeronautical Charts

Aeronautical charts are a visual representation of a portion of the Earth specifically designated to meet the needs of air navigation.

3.8 Sale of publications

The Aeronautical Information Products can be accessed freely via AIM-SG URL: https://aim-sg.caas.gov.sg.

3.8.1 AIRAC SYSTEM

3.8.1.1 In order to control and regulate operationally significant changes requiring amendments to charts, route manuals, etc., such changes, whenever possible, will be issued on predetermined dates according to the AIRAC SYSTEM. This type of information will be published in an AIRAC AIP Supplement.

3.8.1.2 AIRAC information will be issued so that the information will be received by the user not later than 28 days, and for major changes not later than 56 days, before the effective date. The table below indicates AIRAC effective dates for Years 2022 to 2026:

AIRAC Effective Dates				
Year 2022	Year 2023	Year 2024	Year 2025	Year 2026
27 January	26 January	25 January	23 January	22 January
24 February	23 February	22 February	20 February	19 February
24 March	23 March	21 March	20 March	19 March
21 April	20 April	18 April	17 April	16 April
19 May	18 May	16 May	15 May	14 May
16 June	15 June	13 June	12 June	11 June
14 July	13 July	11 July	10 July	09 July
11 August	10 August	08 August	07 August	06 August
08 September	07 September	05 September	04 September	03 September
06 October	05 October	03 October	02 October	01 October
03 November	02 November	31 October	30 October	29 October
01 December	30 November	28 November	27 November	26 November
29 December	28 December	26 December	25 December	24 December

3.8.1.3 A TRIGGER NOTAM will be originated giving a brief description of the contents of the AIRAC AIP Supplement, the effective date and time, and the reference number of the AIRAC AIP Supplement. This trigger NOTAM will come into force on the same effective date and time as the AIRAC AIP Supplement and will remain in force until 14 days after the effective date.

3.8.1.4 A NIL AIRAC NOTAM will be issued one cycle before the AIRAC effective date if no information is submitted for publication of an AIRAC AIP Supplement for an AIRAC effective date. The NIL AIRAC NOTAM will remain current for a duration of 14 days.

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3.8.2 PRE-FLIGHT INFORMATION SERVICE AT AERODROMES

Aerodrome	*Briefing Coverage*	*Availability of Bulletins*
SINGAPORE CHANGI	All route stages emanating from Singapore.	Pre-flight Information Bulletin (PIB) can be retrieved from AIM-SG URL - https://aim-sg.caas.gov.sg
SELETAR		

3.8.3 DIGITAL DATA SETS

To be developed.

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GEN 3.2 AERONAUTICAL CHARTS

3.2.1 Responsible Services

3.2.1.1 The Civil Aviation Authority of Singapore publishes a range of aeronautical charts for use by all types of civil aviation. The Aeronautical Information Services produces some of these charts which are part of the AIP. The charts published in the AIP are produced in accordance with the provisions contained in the ICAO documents listed in para 1.2. Differences to the provisions contained in ICAO Annex 4 - Aeronautical Charts are detailed in subsection GEN 1.7

3.2.1.2 Applicable ICAO Documents

Annex 4	-	Aeronautical Charts, Eleventh Edition 2009.
Doc 8168-OPS/611	-	Aircraft Operations, Volume II - Construction of Visual and Instrument Flight Procedures, Fifth Edition 2006.

3.2.2 MAINTENANCE OF CHARTS

3.2.2.1 Aeronautical charts published in the AIP are updated regularly. Significant changes or revisions in aeronautical information for other aeronautical charts are also included in the amendment.

3.2.2.2 Information found to be incorrect after publication will be corrected by an AIC or NOTAM if they are of operational significance.

3.2.3 PURCHASE ARRANGEMENTS

3.2.3.1 The charts listed in paragraph 4.1 can be accessed freely via AIM-SG URL: https://aim-sg.caas.gov.sg

3.2.4 AERONAUTICAL CHART SERIES AVAILABLE

3.2.4.1 The following series of aeronautical charts are produced:

a) World Aeronautical Chart - ICAO;
b) Aerodrome Chart - ICAO;
c) Aerodrome Obstacle Chart - ICAO Type A (for each runway);
d) Aerodrome Obstacle Chart - ICAO Type B;
e) Precision Approach Terrain Chart - ICAO
f) Enroute Chart - ICAO;
g) Area Chart - ICAO;
h) Standard Departure Chart - Instrument (SID) - ICAO;
i) Standard Arrival Chart - Instrument (STAR) - ICAO;
j) Instrument Approach Chart - ICAO (for each runway and procedure type);
k) Visual Approach Chart - ICAO

3.2.4.2 General description of each series

a) **World Aeronautical Chart - ICAO 1: 1 000 000**

This series is constructed on Lambert Conformal Conic Projection with two standard parallels at 0 deg 40 min and 3 deg 20 min. This spheroid is World Geodetic System 1984 (WGS84). The aeronautical data shown have been kept to a minimum, consistent with the use of the chart for visual air navigation.It includes a selection of aerodromes, significant obstacles, elements of the ATS system, prohibited, restricted and danger areas, and radio navigation aids. The chart provides information to satisfy visual air navigation and is also used as a pre-flight planning chart.

b) **Aerodrome Chart - ICAO**

This chart contains detailed aerodrome data to provide flight crews with information that will facilitate the ground movement of aircraft:

– from the aircraft stand to the runway; and
– from the runway to the aircraft stand;

It also provides essential operational information at Singapore Changi Airport and Seletar Aerodrome.

c) **Aerodrome Obstacle Chart - ICAO Type A (operating limitations)**

This chart contains detailed information on obstacles in the take-off flight path areas of Singapore Changi Airport, Seletar Aerodrome and Paya Lebar Airport. It is shown in plan and profile view. This obstacle information provides the data necessary to enable an operator to comply with the operating limitations of ICAO Annex 6, Parts I and II, Chapter 5.

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d) **Aerodrome Obstacle Chart - ICAO Type B**

This chart is produced to assist in the determination of critical heights for Singapore Changi Airport and Seletar Aerodrome.

e) **Precision Approach Terrain Chart - ICAO**

This chart provides detailed terrain profile information within a defined portion of the final approach so as to enable aircraft operating agencies to assess the effects of the terrain on decision height determination by the use of radio altimeters. This chart is produced for the precision approach Cat II runways at Singapore Changi Airport.

f) **Enroute Chart - ICAO**

This chart is produced for the entire Singapore FIR. The aeronautical data include all aerodromes, prohibited, restricted and danger areas and the air traffic services system in detail. This chart provides the flight crew with information to facilitate navigation along ATS routes in compliance with air traffic services procedures.

g) **Area Chart - ICAO**

This chart is produced when the air traffic services routes or position reporting requirements are complex and cannot be shown on the En-route Chart - ICAO. It shows, in more detail, those aerodromes that affect terminal routings, prohibited, restricted and danger areas and the air traffic services system. This chart provides the flight crew with information to facilitate the various phases of instrument flight:

– the transition between the en-route phase and the approach to an aerodrome;
– the transition between the take-off/missed approach and the en-route phase of flight; and
– flights through areas of complex ATS routes or airspace structure.

h) **Standard Departure Chart - Instrument (SID) - ICAO**

This chart is produced whenever a standard departure route - instrument has been established and cannot be shown with sufficient clarity on the Area Chart - ICAO.

The aeronautical data shown include the aerodrome of departure, aerodrome(s) which affect the designated standard departure route-instrument, prohibited, restricted and danger areas and the air traffic services system. This chart provides the flight crew with information that will enable them to comply with the designated standard departure route-instrument from the take-off phase to the en-route phase.

i) **Standard Arrival Chart - Instrument (STAR) - ICAO**

This chart is produced whenever a standard arrival route - instrument has been established and cannot be shown with sufficient clarity on the Area Chart - ICAO.

The aeronautical data shown include the aerodrome of landing, aerodrome(s) which affect the designated standard arrival route-instrument, prohibited, restricted and danger areas and the air traffic services system. This chart provides the flight crew with information that will enable them to comply with the designated arrival route-instrument from the en-route phase to the approach phase.

j) **Instrument Approach Chart - ICAO**

This chart is produced for all aerodromes used by civil aviation where instrument approach procedures have been established. A separate Instrument Approach Chart - ICAO has been provided for each approach procedure.

The aeronautical data shown include information on aerodromes, prohibited, restricted and danger areas, radio communication facilities and navigation aids, minimum sector altitude, procedure track portrayed in plan and profile view, aerodrome operating minima, etc.

This chart provides the flight crew with information that will enable them to perform an approved instrument approach procedure to the runway of intended landing including the missed approach procedure and where applicable, associated holding patterns.

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.

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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	05 SEP 24
Instrument Approach Chart ICAO (IAC)		**Singapore Changi**			
	1:400 000	RWY 02L - ICW ILS/DME	AD-2-WSSS-IAC-1	In AIP	20 FEB 25
	1:400 000	RWY 02C - ICE ILS/DME	AD-2-WSSS-IAC-2	In AIP	20 FEB 25
	1:400 000	RWY 02R - ICX ILS/DME	AD-2-WSSS-IAC-3	In AIP	20 FEB 25
	1:400 000	RWY 20R - ICH ILS/DME	AD-2-WSSS-IAC-5	In AIP	20 FEB 25
	1:400 000	RWY 20C - ICC ILS/DME	AD-2-WSSS-IAC-6	In AIP	20 FEB 25
	1:400 000	RWY 20C - VTK DVOR/DME	AD-2-WSSS-IAC-7	In AIP	20 FEB 25
	1:400 000	RWY 02L - RNP	AD-2-WSSS-IAC-9	In AIP	20 FEB 25
	1:400 000	RWY 02C - RNP	AD-2-WSSS-IAC-10	In AIP	20 FEB 25
	1:400 000	RWY 20R - RNP	AD-2-WSSS-IAC-11	In AIP	20 FEB 25
	1:400 000	RWY 20C - RNP	AD-2-WSSS-IAC-12	In AIP	20 FEB 25
	1:400 000	RWY 02R - RNP	AD-2-WSSS-IAC-13	In AIP	20 FEB 25
	1:400 000	RWY 20L - RNP	AD-2-WSSS-IAC-14	In AIP	31 OCT 24
		Paya Lebar			
	1:400 000	RWY 20 - PU DVOR/DME	In AIP	In AIP	20 FEB 25
	1:400 000	RWY 02 - PU DVOR/DME	In AIP	In AIP	20 FEB 25
	1:400 000	RWY 20 - IPS ILS/DME	In AIP	In AIP	20 FEB 25
	1:400 000	RWY 02 - IPN ILS/DME	In AIP	In AIP	20 FEB 25
	1:400 000	RWY 02 - RNP	In AIP	In AIP	20 FEB 25
	1:400 000	RWY 20 - RNP	In AIP	In AIP	20 FEB 25
Visual Approach Chart ICAO (VAC)	1:400 000	**Singapore Changi**	AD-2-WSSS-VAC-1	In AIP	20 FEB 25
		Seletar			
	1:100 000	RWY 03	AD-2-WSSL-VAC-1	In AIP	05 SEP 24
	1:100 000	RWY 21	AD-2-WSSL-VAC-2	In AIP	05 SEP 24
	1:100 000	RWY 03	AD-2-WSSL-VAC-3	In AIP	05 SEP 24
	1:100 000	RWY 21	AD-2-WSSL-VAC-4	In AIP	05 SEP 24
Visual Departure Chart		**Seletar**			
	1:100 000	RWY 03	AD-2-WSSL-VDC-1	In AIP	20 FEB 25
	1:100 000	RWY 21	AD-2-WSSL-VDC-2	In AIP	20 FEB 25
Aerodrome Chart ICAO (AC)		**Singapore Changi**	AD-2-WSSS-ADC-2	In AIP	02 OCT 25
		Seletar	AD-2-WSSL-ADC-1	In AIP	26 DEC 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	12 JUN 25
	1:10 000	RWY 20C/02C	AD-2-WSSS-AOC-2	In AIP	05 SEP 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)		**Singapore Changi**			
	1:20 000	RWY 02L/20R, 02C/20C and RWY 02R/20L	AD-2-WSSS-AOC-3	In AIP	02 OCT 25
		Seletar			
	1:20 000	RWY 03/21	AD-2-WSSL-AOC-2	In AIP	16 JUL 20
Precision Approach Terrain Chart ICAO (PATC)		**Singapore Changi**			
	1:2 500	RWY 02L	AD-2-WSSS-PATC-1	In AIP	10 OCT 19
	1:2 500	RWY 20C	AD-2-WSSS-PATC-2	In AIP	11 JUL 24
	1:2 500	RWY 02R	AD-2-WSSS-PATC-3	In AIP	31 OCT 24
	1:2 500	RWY 20L	AD-2-WSSS-PATC-4	In AIP	31 OCT 24
	1:2 500	RWY 02C	AD-2-WSSS-PATC-5	In AIP	11 JUL 24

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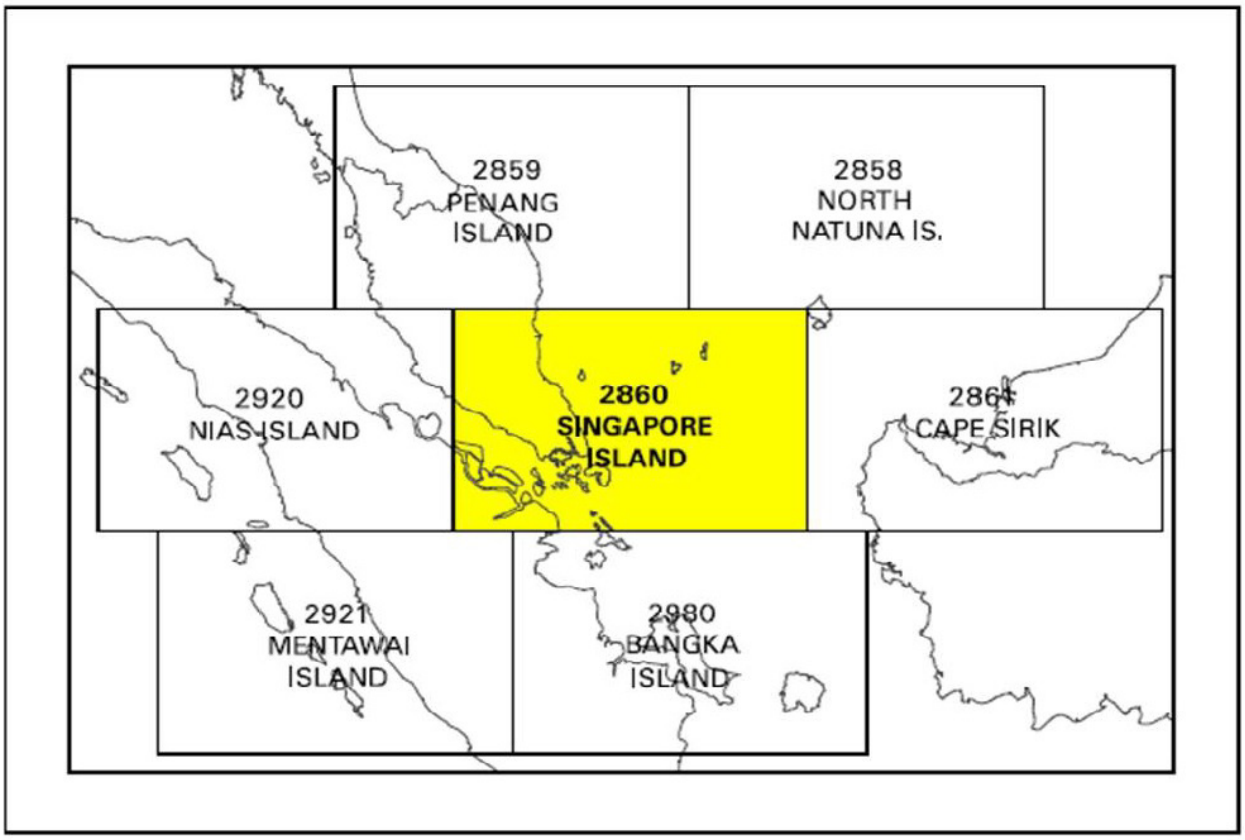
3.2.6 INDEX TO THE WORLD AERONAUTICAL CHART (WAC) - ICAO 1:1 000 000



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

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GEN 3.3 AIR TRAFFIC SERVICES

3.3.1 RESPONSIBLE SERVICE

3.3.1.1 The Director of the Air Traffic Services Division of the Civil Aviation Authority of Singapore (CAAS) acting under the authority of the Director-General of Civil Aviation is the authority responsible for the overall administration of air traffic services within the Singapore FIR.

Post: Director (Air Traffic Services)
Air Traffic Services Division
Civil Aviation Authority of Singapore
60 Airport Boulevard, #04-01, Changi Airport Terminal 2
Singapore 819643

Tel: (65) 65412669
Fax: (65) 6441 0221
AFS: WSJCZQZX

3.3.1.2 The services are provided in accordance with the provisions contained in the following ICAO documents:

Annex 2 – *Rules of the Air*

Annex 11 – *Air Traffic Services*

Doc 4444 – *Procedures for Air Navigation Services - Air Traffic Management (PANS-ATM)*

Doc 8168 – *Procedures for Air Navigation Services - Aircraft Operations (PANS-OPS)*

Doc 7030 – *Regional Supplementary Procedures*

3.3.1.3 Differences to these provisions are detailed in subsection GEN 1.7.

3.3.2 AREA OF RESPONSIBILITY

3.3.2.1 Air traffic services are provided for the entire territory of Singapore, including its territorial waters as well as the airspace over the high seas within the Singapore FIR.

3.3.2.2 In some cases, in accordance with the regional air navigation agreement, air traffic services are provided, under the delegated authority, in the airspace within another bordering FIR. Details of such services are provided in section ENR 2.

3.3.3 TYPES OF SERVICES

3.3.3.1 The following types of services are provided:

- Flight Information Service (FIS) and Alerting Service (ALRS);
- Area Control (ACC); and
- Radar

3.3.3.2 With the exception of services provided at military air bases, the following types of services are provided at aerodromes:

- Aerodrome Control (TWR);
- Aerodrome Flight Information Service (AFIS); and
- Automatic Terminal Information Service (ATIS) at certain aerodromes

3.3.3.3 Air Traffic Control is exercised:

a) on airways covering the main ATS routes;
b) within the Singapore/Johor Airspace Complex and in control zones at controlled aerodromes equipped with approach and/or landing aids.

3.3.3.4 Flight information service and alerting service within the Singapore FIR and air traffic control services in control areas are provided by one centre (ACC Singapore). There is no distinction between upper and lower controlled airspace. The axis of each airway is constituted by a line connecting reference points identified normally by radio navigational facilities.

3.3.3.5 Air traffic control, flight information and alerting services are provided by:

a) ACC Singapore along the airways including those parts of the airways traversing the Singapore/Johor Airspace Complex;
b) the relevant aerodrome control tower in coordination with ACC Singapore as necessary, for arriving and departing aircraft.

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3.3.3.6 Radar service is an integral part of the ATS system. A description of radar services and procedures is provided in subsection ENR 1.6. Additional procedures applicable within the Singapore/Johor Airspace Complex are contained in subsection ENR 1.1.

3.3.3.7 The description of the airspace designated for air traffic services purpose is found in several tables, all forming part of sub-section ENR 2.1.

3.3.3.8 In general, the air traffic rules and procedures in force and the organisation of air traffic services are in conformity with ICAO Standards, Recommended Practices and Procedures. The regional supplementary procedures and altimeter setting procedures are set out in full. Differences between the national and international rules and procedures are given in sub-section GEN 1.7.

3.3.3.9 A few prohibited areas, restricted areas and danger areas are established within the Singapore/Johor Airspace Complex. These areas are shown in sub-section ENR 5.1. Activation of areas subject to intermittent activity is notified well in advance by NOTAM, giving reference to the area only by its identification.

3.3.3.10 4D/15 service is provided to the following category of aircraft:

a) Aircraft operating within areas of Singapore FIR where radar services is provided by ATC;
b) ADS-B equipped aircraft operating in ADS-B airspace; and
c) ADS-C equipped aircraft logged on to WSJC on routes providing ADS/CPDLC service.

3.3.4 COORDINATION BETWEEN THE OPERATOR AND ATS

3.3.4.1 Coordination between the operator and air traffic services is effected in accordance with Chapter 2, paragraph 2.17 of ICAO Annex 11 - Air Traffic Services and Chapter 11, paragraphs 11.2.1.1.2,11.2.1.1.4 and 11.2.1.1.5 ICAO Doc 4444 - Procedures for Air Navigation Services - Air Traffic Management (PANS-ATM).

3.3.5 MINIMUM FLIGHT ALTITUDE

3.3.5.1 The minimum flight altitudes on the ATS routes listed in section ENR 3, have been determined to ensure at least 1,000ft (300m) vertical clearance above the highest known obstacle within the lateral limits of the route within Singapore FIR and the adjacent areas of adjoining FIRs.

3.3.6 ATS UNITS ADDRESS LIST

Unit Name	*Postal Address*	*Telephone Nr*	*Telefax Nr*	*Telex Nr*	*AFS Address*
1	2	3	4	5	6
SINGAPORE ACC / APP	Singapore Air Traffic Control Centre (SATCC) 60, Biggin Hill Road Singapore 509950	(65) 65412668 (ACC) (65) 65227002 (APP)	(65) 65457526 (ACC) (65) 65461790 (APP)	-	WSJCZQZX
SINGAPORE TOWER	Singapore Changi Control Tower Civil Aviation Authority of Singapore 60 Airport Boulevard, #04-01, Changi Airport Terminal 2 Singapore 819643	(65) 65956057 (65) 64227633	(65) 65459568 (65) 65456224	-	Nil
SELETAR TOWER	Seletar Control Tower Civil Aviation Authority of Singapore 60 Seletar Aerospace View Singapore 797561	(65) 64812893	(65) 64813510	-	WSSLZTZX

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GEN 3.4 COMMUNICATION SERVICES

3.4.1 RESPONSIBLE SERVICE

3.4.1.1 The Civil Aviation Authority of Singapore (CAAS) is responsible for the provision of telecommunication and navigation facility services in Singapore.

3.4.1.2 Enquiries, suggestions or complaints regarding any telecommunication and navigation facility services should be referred to the Director-General of Civil Aviation.

Post:
Director-General of Civil Aviation
Civil Aviation Authority of Singapore
60 Airport Boulevard, #04-01, Changi Airport Terminal 2
Singapore 819643
Tel: (65) 65421122
Fax: (65) 65421231
AFS: WSSSYAYX

3.4.1.3 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

3.4.1.4 Differences to these provisions are detailed in subsection GEN 1.7.

3.4.2 AREA OF RESPONSIBILITY

3.4.2.1 Communication services are provided for the entire SINGAPORE FIR.

3.4.2.2 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 excluding the Tanjungpinang Terminal Control Area (TMA) and Control Zone (CTR).

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*

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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 9.1 to 9.6.

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)

COMPUTERISED ATIS BROADCASTS

Station	*Callsign Identification*	*Frequency MHz*	*Hours UTC*
1	2	3	4
SINGAPORE / Singapore Changi	Changi Airport Departure Information	128.6	H24 (broadcasting with half hourly updated MET INFO)
	Changi Airport Arrival Information	128.025	
SINGAPORE/ Seletar	Seletar Airport Information	128.425	H24 (broadcasting with hourly updated MET INFO)

Remarks

Alphabetical Reference
All ATIS broadcasts will include Alphabetical Reference for identification in the ATIS message.

Updating of Data
H + 00 to H + 10 and H + 30 to H + 40.

Range 100NM

Height A110

Power 50W

Note to D-ATIS users
Pilots are advised to use AEEC 623 format with Cyclic Redundancy Check (CRC) for D-ATIS service to ensure data integrity. For aircraft formats without CRC (e.g. AEEC 620 format or AEEC 623 format without CRC), pilots are advised to verify the D-ATIS message received with the voice broadcasted ATIS message or to use only voice broadcasted ATIS service.

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ATIS BROADCASTS			
Station	*Callsign Identification*	*Freq MHz*	*Hours UTC*
SINGAPORE/ Paya Lebar	Paya Lebar Information	148.90	Sun-Mon to Thu-Fri between 2300-1100; Fri-Sat between 2300-0500. During public holidays and outside the above times prior permission required from RSAF HQ via Paya Lebar Ops.
SINGAPORE/ Tengah	Tengah Information	142.55	Sun-Mon to Thu-Fri between 2300-1100; Fri-Sat between 2300-0500. During public holidays and outside the above times prior permission required from RSAF HQ via Tengah Ops.
SINGAPORE/ Sembawang	Sembawang Information	149.25	Sun-Mon to Thu-Fri between 2300-1100; Fri-Sat between 2300-0500. During public holidays and outside the above times prior permission required from RSAF HQ via Sembawang Ops.

3.4 Language Used

The language used is English.

3.5 Obtaining Detailed Information

3.5.1 Details of the various facilities available for the en-route traffic can be found in section ENR 4.

3.5.2 Details of the facilities available at the individual aerodromes can be found in the relevant sections of AD. In cases where a facility is serving both the en-route traffic and the aerodromes, details are given in the relevant sections of ENR and AD.

3.6 REQUIREMENTS AND CONDITIONS

3.6.1 The requirements of the Civil Aviation Authority of Singapore and the general conditions under which the communication services are available for international use, as well as the requirements for the carriage of radio equipment, are contained in the Air Navigation Order of Singapore.

4 MISCELLANEOUS

NIL

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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		TRANS KHZ	REC KHZ			
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
			KUCHING		LTTdx			ATS	During aerodrome hours of operation	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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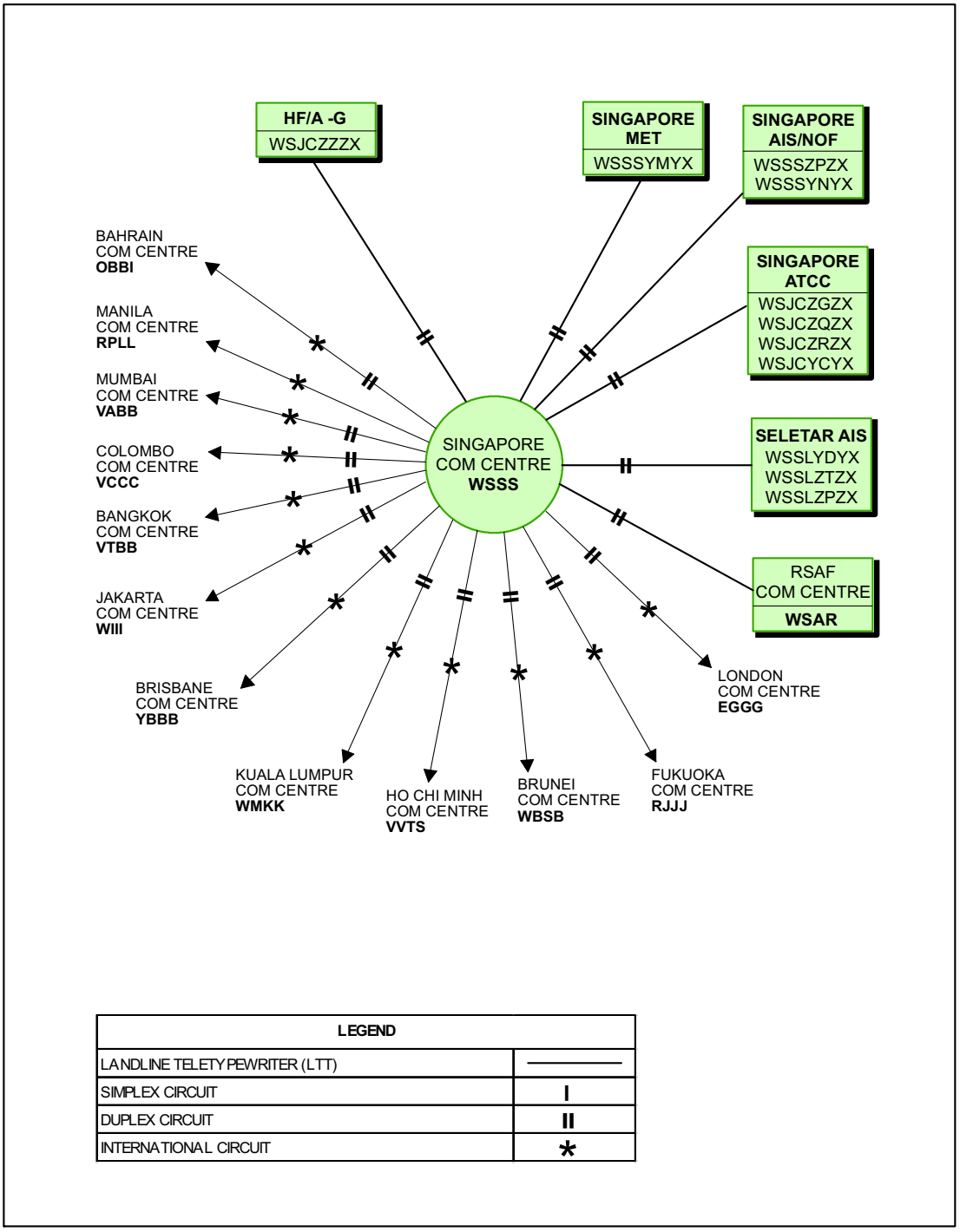
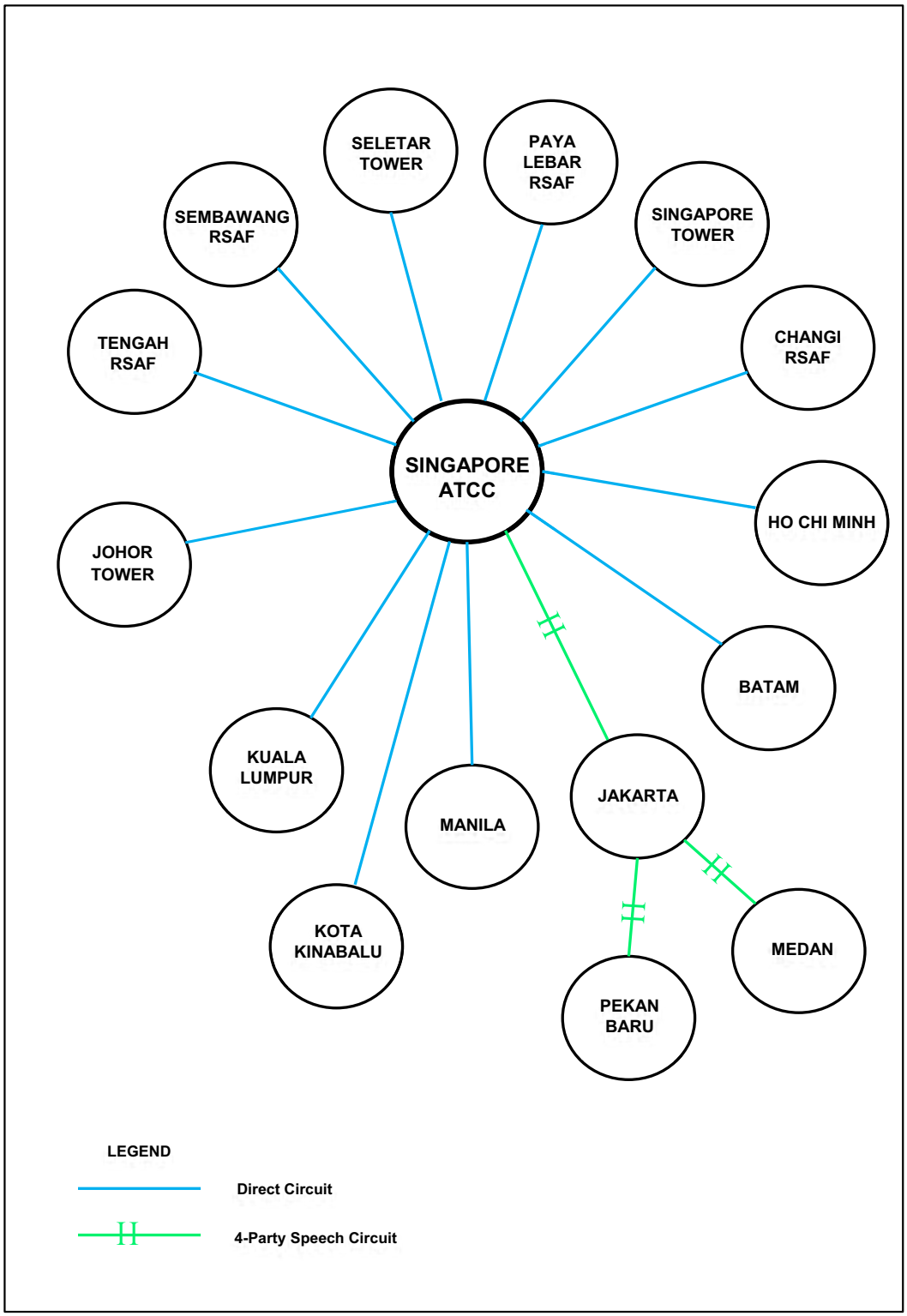
AERONAUTICAL FIXED SERVICES -
AERONAUTICAL FIXED TELECOMMUNICATIONS NETWORK (AFTN)
AIR TRAFFIC SERVICES (ATS) MESSAGE HANDLING SERVICES (AMHS)



LEGEND	
LANDLINE TELETYPEWRITER (LTT)	———
SIMPLEX CIRCUIT	I
DUPLEX CIRCUIT	II
INTERNATIONAL CIRCUIT	*

AERONAUTICAL FIXED SERVICES - TELEPHONE



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GEN 3.5 METEOROLOGICAL SERVICES

3.5.1 RESPONSIBLE SERVICE

3.5.1.1 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
SINGAPORE819643
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

3.5.1.2 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*

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

3.5.2 AREA OF RESPONSIBILITY

3.5.2.1 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

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3.5.3 METEOROLOGICAL OBSERVATIONS AND REPORTS

Meteorological Observations and Reports					
Name of Station/ Location Indicator	*Type & Frequency of Observation/ Automatic Observing Equipment*	*Types of MET Reports & Supplementa-ry Information included*	*Observation System & Sites (s)*	*Hours of Operation*	*Climatological Information*
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

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3.5.4 TYPES OF SERVICES

3.5.4.1 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.

3.5.4.2 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).

3.5.4.3 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.

3.5.4.4 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.

3.5.4.5 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.

3.5.4.6 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.

3.5.4.7 Climatological Summaries for Singapore Changi (WSSS-48698) are available from the Meteorological Service Singapore.

3.5.5 OBSERVING SYSTEMS AND OPERATING PROCEDURES AT SINGAPORE CHANGI AIRPORT AND SELETAR AERODROME

3.5.5.1 SINGAPORE CHANGI AIRPORT

3.5.5.2 RWY 02L/20R (Runway 1)

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

	DIST FROM END OF RWY	DIST FROM RWY CENTRELINE
(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

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

	DIST FROM END OF RWY	DIST FROM RWY CENTRELINE
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

3.5.5.2.2 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.

3.5.5.2.3 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).

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3.5.5.3RWY 02C/20C (Runway 2)

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

	DIST FROM THRESHOLD	DIST FROM RWY CENTRELINE
(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

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

	DIST FROM THRESHOLD	DIST FROM RWY CENTRELINE
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

3.5.5.3.3 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 1,500 metres.

3.5.5.4 RWY 02R/20L (Runway 3)

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

	DIST FROM THRESHOLD	DIST FROM RWY CENTRELINE
(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

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

	DIST FROM THRESHOLD	DIST FROM RWY CENTRELINE
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

3.5.5.4.2 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.

3.5.5.5 Wind Shear Observations (Singapore Changi Airport)

3.5.5.5.1 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.

3.5.5.5.2 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.

3.5.5.5.3 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)"

3.5.5.5.4 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)"

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

3.5.6 SELETAR AERODROME

3.5.6.1 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.

3.5.6.2 Wind Shear Observations (Seletar Aerodrome)

3.5.6.2.1 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.

3.5.6.2.2 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)"

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3.5.6.2.3 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)"

3.5.7 NOTIFICATION REQUIRED FROM OPERATORS

3.5.7.1 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.

3.5.8 AIRCRAFT REPORTS

3.6 AIREP

3.6.1 Special aircraft observations shall be made and the reports transmitted as necessary to ATC.

3.6.2 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.

3.7 REPORTING OF LOW LEVEL WIND SHEAR

3.7.1 Pilots encountering wind shear shall report to ATC as soon as possible.

3.7.2 When reporting wind shear on radiotelephony, the information should be transmitted in this order:

a) Aircraft callsign;
b) WIND SHEAR report;
c) Time (of wind shear occurrence);
d) Position (of wind shear);
e) Intensity (moderate, strong or severe);
f) Average height of wind shear layer.

3.7.3 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)"

3.7.4 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.

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3.7.5 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	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)	SIGMET METAR METAR METAR METAR METAR METAR METAR METAR METAR TAF TAF
			H + 50 to H + 55		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 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.					
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 TAF TAF TAF
	Data Link VOLMET (D-VOLMET) service available H24. AP Ident WSSS. Messages comply with ARINC 623 standards.					

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3.5.6 SIGMET SERVICE

3.6 General

3.6.1 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.

3.7 Area Meteorological Watch Service

3.7.1 The area meteorological watch service is performed by the Meteorological Service Singapore.

3.7.2 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.

3.7.3 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.

3.7.4 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 .

3.8 Warning Service

3.8.1 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

3.8.2 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.

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3.8.3 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.

3.8.4 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).

3.8.5 OTHER AUTOMATED METEOROLOGICAL SERVICES

3.9 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.

3.10 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			
Service Name	*Information Available*	*Area, Route and Aerodrome Coverage*	*Telephone and Telefax numbers Remarks*
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 and480km range rain intensity radar plots.	
	WAFC 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

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

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 excluding the Tanjungpinang Terminal Control Area (TMA) and Control Zone (CTR).

Vertical limit: SFC to FL370

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.

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

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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.

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.

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)’

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

6.4 Rescue Units and Facilities

RESCUE UNITS AND FACILITIES				
NAME	**AIRCRAFT**	**MARINE CRAFT**	**OTHER UNITS**	**REMARKS**
Singapore / MINDEF	LRG VLR HEL-M HEL-H	RV		
Singapore / Police Coast Guard		RV RV RV		
Singapore / Changi AES		RB		
Singapore in coordination with USA (Pacific Region RCC, PAC RCC Honolulu)	LRG			USAF LRG available at opportunity basis
Singapore Civil Defence Force		Basic Task Force (BTF) - RB - RV		
Pacific Flight Services	LRG VLR VLR VLR ELR			No ADS-B for King Air C90

SEARCH AND RESCUE UNITS			
Name	*Location*	*Facilities*	*Remarks*
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.

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SEARCH AND RESCUE UNITS			
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			
Purpose	*Frequency*	*Period*	*Watch Kept By*
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.

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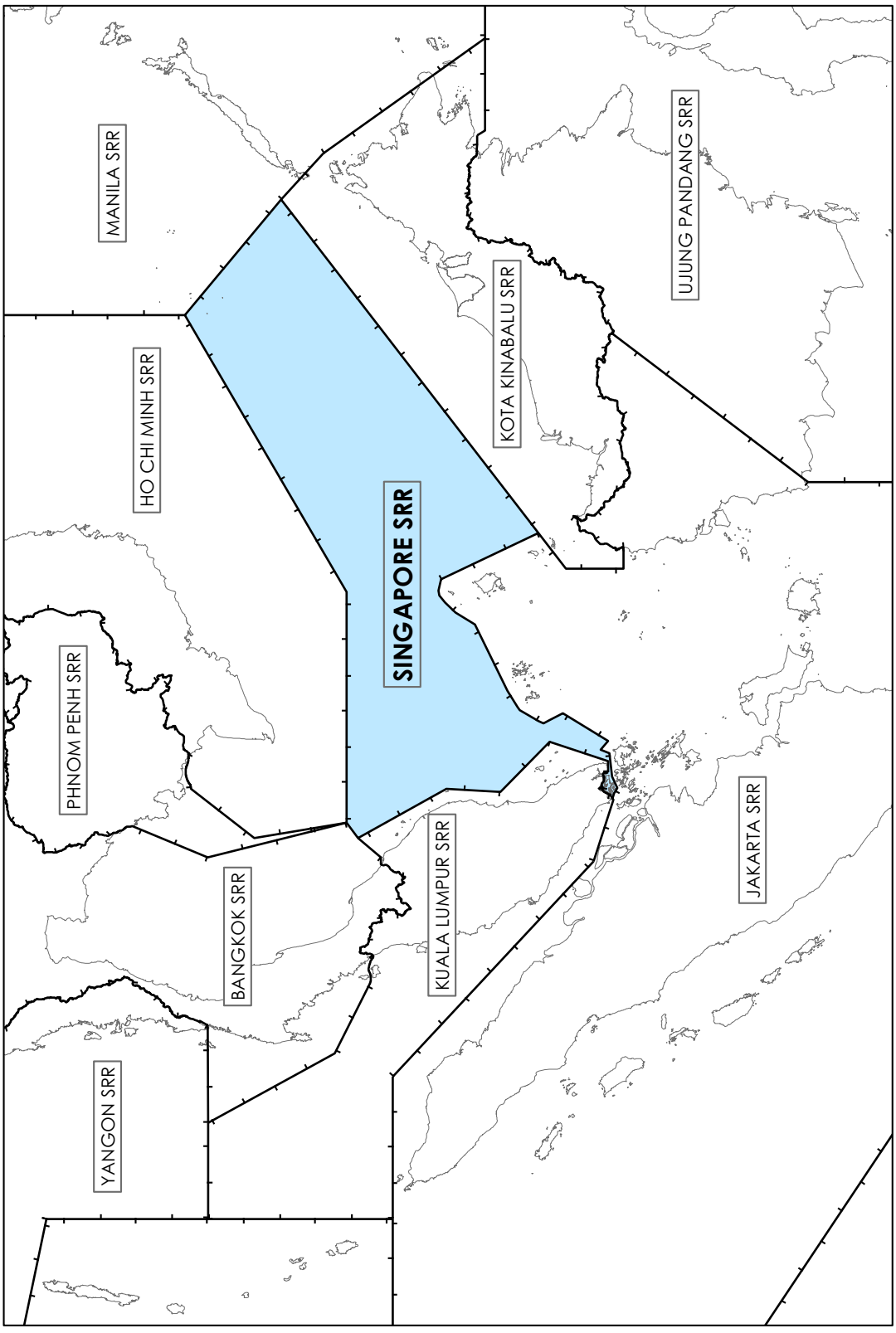
SINGAPORE SEARCH AND RESCUE REGION (SRR)



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GEN 4 CHARGES FOR AERODROMES/HELIPORT AND AIR NAVIGATION SERVICES

GEN 4.1 AERODROME CHARGES

1 AIRPORT FEES AND CHARGES APPLICABLE AT SINGAPORE CHANGI AIRPORT

1.1 These charges are set out in the website of the airport operator, Changi Airport Group (Singapore) Pte Ltd: https://www.changiairport.com/content/dam/cacorp/documents/changiairportgroup/List of Fees and Charges.pdf

1.2 Exemption from payment of any Singapore Changi Airport charges are set out in the CAAS (Licensing of Airport Operators) Regulations 2009, accessible from the link below: https://www.caas.gov.sg/docs/default-source/docs---legal/civil-aviation-authority-of-singapore-(licensing-o.pdf

2 AIRPORT FEES AND CHARGES APPLICABLE AT SELETAR AIRPORT

2.1 These charges are set out in the website of the airport operator, Changi Airport Group (Singapore) Pte Ltd: https://www.seletarairport.com/fees-charges.html

2.2 Exemption from payment of any Seletar Airport charges are set out in the CAAS (Licensing of Airport Operators) Regulations 2009, accessible from the link below: https://www.caas.gov.sg/docs/default-source/docs---legal/civil-aviation-authority-of-singapore-(licensing-o.pdf

3 HANGAR FEES

3.1 Hangar facilities at Singapore Changi Airport are managed by Singapore Airlines Ltd. Information on hangar fees may be obtained from Singapore Airlines (SIA).

3.2 Hangar facilities at Seletar Airport are managed by JTC's tenants. Information on hangar fees may be obtained directly from the tenants.

4 NOISE RELATED ITEMS

4.1 Please refer to AIP Singapore, Aerodrome sections of the respective airports.

5 GROUND HANDLING SERVICE CHARGES

5.1 The ground handling services at Singapore Changi Airport have been out-sourced by the airport operator, Changi Airport Group (Singapore) Pte Ltd to the licensed ground handlers. Unlike the other 2 licensed ground handlers, SIA Engineering Company Limited is licenced to provide only a subset of the apron handling services. Please contact the following licensed ground handlers for information on ground handling services and related charges:

DNATA Singapore Pte Ltd https://www.dnata.com/en/contact-us
SATS Ltd https://www.sats.com.sg/about-sats/contact-us
SIA Engineering Company Limited https://www.siaec.com.sg/contact_us.html

5.2 The ground handling services at Seletar Airport have been out-sourced by the airport operator, Changi Airport Group (Singapore) Pte Ltd to the licensed ground handlers. Please contact the licensed ground handlers for information on ground handling services and related charges. The licensed ground handlers' contact details are set out in the website of the airport operator, Changi Airport Group (Singapore) Pte Ltd: https://www.seletarairport.com/groundhandling.html

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GEN 4.2 AIR NAVIGATION SERVICES CHARGES

ROUTE AIR NAVIGATION SERVICES (RANS) CHARGES

1 GENERAL

1.1 All civil aircraft operating in the following areas of the Jakarta FIR ("airspace concerned") will be levied a RANS charge, collected by the Government of the Republic of Singapore on behalf of and for the Government of the Republic of Indonesia:

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 (refer to Chart A at page GEN 4.2–7), excluding the Tanjungpinang Terminal Control Area and Control Zone.

2 RANS CHARGES

2.1 The formula for computing RANS charges in the airspace concerned is as follows:

RANS Charge = Unit Rate X Route Unit

(a) The Unit Rate is: US$0.65

(b) The computation of the Route Unit is as follows:

Route Unit = Distance Factor (DF) X Weight Factor
where
Distance Factor = Great Circle Distance / 100 KM
Great Circle Distance below 100KM is computed as 1 Distance Factor

Weight Factor is based on the Weight Factor Table (refer to GEN 4.2–3).

3 EXEMPTION FROM RANS CHARGES

3.1 No charge will be levied for the following types of flights in Table 1 below. Operators should insert "STS/" with the reason for special handling in Item 18 of the ICAO flight plan per Table 1 below.

Table 1: Exemptions from RANS charges

	Types of flights exempted from RANS charges	**Indicator of reason for special handling by ATS in Item 18 of ICAO Flight Plan**
a.	All non-civil flights	STS/STATE
b.	State aircraft belonging to Republic of Indonesia and Republic of Singapore	STS/STATE
c.	VVIP flights such as aircraft used by a Head of State/ Government and his group	STS/HEAD
d.	Aircraft used for search and rescue purposes	STS/SAR
e.	Aircraft which have obtained exemption from the Directorate General of Civil Aviation, Indonesia	STS/DGCA EXR
f.	Aircraft which CAAS exempts from landing charges	STS/CAAS EXR
g.	Aircraft used for natural disaster management	STS/HUM

3.2 CAAS will not collect RANS charges for all flights between Indonesian airports.

4 COLLECTION OF RANS CHARGES

4.1 CAAS will collect the RANS charges and remit them to the Directorate General of Civil Aviation, Indonesia.

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4.2 Operators will be billed by CAAS on a monthly basis. Payment must be made to CAAS within 14 days of the date of issuance of the invoice. Payment is to be made in United States Dollars and shall include all bank charges such as agent banks' charges.

5 PERSON LIABLE TO PAY RANS CHARGES

5.1 The person liable to pay the charges is the operator of the aircraft at the time of the flight concerned. If the operator of the aircraft is not known, the owner of the aircraft shall be liable.

6 QUERIES ON LEVYING/BILLING OF RANS CHARGES

6.1 Please direct any questions regarding the levying and billing of RANS charges to:

Civil Aviation Authority of Singapore
Finance Division (Revenue)
60 Airport Boulevard, #04-01, Changi Airport Terminal 2
Singapore 819643

TEL : (65) 65412069 or 65412042
FAX : (65) 65423952
EMAIL : caas_collection_office@caas.gov.sg

Chart A - Airspace in the Jakarta FIR where Singapore collects RANS charges on behalf of and for Indonesia - GEN 4.2-7

Appendix A: Weight factor table

No.	MTOW x 1,000 Kg			Weight Factor
1.	0	-	17.77	10
2.	17.78	-	20.02	11
3.	20.03	-	22.32	12
4.	22.33	-	24.67	13
5.	24.68	-	27.07	14
6.	27.08	-	29.51	15
7.	29.52	-	31.99	16
8.	32.00	-	34.51	17
9.	34.52	-	37.07	18
10.	37.08	-	39.66	19
11.	39.67	-	42.28	20
12.	42.29	-	44.94	21
13.	44.95	-	47.64	22
14.	47.65	-	50.36	23
15.	50.37	-	53.11	24
16.	53.12	-	55.89	25
17.	55.90	-	58.70	26
18.	58.71	-	61.54	27
19.	61.55	-	64.40	28
20.	64.41	-	67.29	29
21.	67.30	-	70.20	30
22.	70.21	-	73.14	31
23.	73.15	-	76.10	32
24.	76.11	-	79.08	33
25.	79.09	-	82.09	34
26.	82.10	-	85.12	35
27.	85.13	-	88.14	36
28.	88.15	-	91.24	37

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No.	MTOW x 1,000 Kg			Weight Factor
29.	91.25	-	94.34	38
30.	94.35	-	97.45	39
31.	97.46	-	100.58	40
32.	100.59	-	103.74	41
33.	103.75	-	106.91	42
34.	106.92	-	110.10	43
35.	110.11	-	113.31	44
36.	113.32	-	116.54	45
37.	116.55	-	119.79	46
38.	119.80	-	123.05	47
39.	123.06	-	126.33	48
40.	126.34	-	129.63	49
41.	129.64	-	132.95	50
42.	132.96	-	136.28	51
43.	136.29	-	139.63	52
44.	139.64	-	142.99	53
45.	143.00	-	146.37	54
46.	146.38	-	149.77	55
47.	149.78	-	153.18	56
48.	153.19	-	156.61	57
49.	156.62	-	160.05	58
50.	160.06	-	163.51	59
51.	163.52	-	166.98	60
52.	166.99	-	170.47	61
53.	170.48	-	173.97	62
54.	173.98	-	177.48	63
55.	177.49	-	181.01	64
56.	181.02	-	184.55	65
57.	184.56	-	188.11	66
58.	188.12	-	191.68	67
59.	191.69	-	195.26	68
60.	195.27	-	198.86	69
61.	198.87	-	202.47	70
62.	202.48	-	206.09	71
63.	206.10	-	209.72	72
64.	209.73	-	213.37	73
65.	213.38	-	217.03	74
66.	217.04	-	220.70	75
67.	220.71	-	224.39	76
68.	224.40	-	228.08	77
69.	228.09	-	231.79	78
70.	231.80	-	235.51	79
71.	235.52	-	239.25	80
72.	239.26	-	243.99	81
73.	243.00	-	246.75	82

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No.	MTOW x 1,000 Kg			Weight Factor
74.	246.76	-	250.51	83
75.	250.52	-	254.29	84
76.	254.30	-	258.08	85
77.	258.09	-	261.88	86
78.	261.89	-	265.69	87
79.	265.70	-	269.52	88
80.	269.53	-	273.35	89
81.	273.36	-	277.20	90
82.	277.21	-	281.05	91
83.	281.06	-	284.92	92
84.	284.93	-	288.79	93
85.	288.80	-	292.68	94
86.	292.69	-	296.58	95
87.	296.59	-	300.49	96
88.	300.50	-	304.40	97
89.	304.41	-	308.33	98
90.	308.34	-	312.27	99
91.	312.28	-	316.22	100
92.	316.23	-	320.18	101
93.	320.19	-	324.14	102
94.	324.15	-	328.12	103
95.	328.13	-	332.11	104
96.	332.12	-	336.10	105
97.	336.11	-	340.11	106
98.	340.12	-	344.13	107
99.	344.14	-	348.15	108
100.	348.16	-	352.18	109
101.	352.19	-	356.23	110
102.	356.24	-	360.28	111
103.	360.29	-	364.34	112
104.	364.35	-	368.41	113
105.	368.42	-	372.49	114
106.	372.50	-	376.58	115
107.	376.59	-	380.68	116
108.	380.69	-	384.79	117
109.	384.80	-	388.90	118
110.	388.91	-	393.03	119
111.	393.04	-	397.16	120
112.	397.17	-	401.30	121
113.	401.31	-	405.45	122
114.	405.46	-	409.61	123
115.	409.62	-	413.78	124
116.	413.79	-	417.95	125
117.	417.96	-	422.14	126
118.	422.15	-	426.33	127

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No.	MTOW x 1,000 Kg			Weight Factor
119.	426.34	-	430.53	128
120.	430.54	-	434.74	129
121.	434.75	-	438.95	130
122.	438.96	-	44318	131
123.	443.19	-	447.41	132
124.	447.42	-	451.65	133
125.	451.66	-	455.90	134
126.	455.91	-	460.16	135
127.	460.17	-	464.42	136
128.	464.43	-	468.70	137
129.	468.71	-	472.98	138
130.	472.99	-	477.26	139
131.	477.27	-	481.56	140
132.	481.57	-	485.86	141
133.	485.87	-	490.18	142
134.	490.19	-	494.49	143
135.	494.50	-	498.82	144
136.	498.83	-	503.15	145
137.	503.16	-	507.50	146
138.	507..51	-	511.84	147
139.	511.85	-	516.20	148
140.	516.21	-	520.56	149
141.	520.57	-	524.94	150
142.	524.95	-	529.31	151
143.	529.32	-	533.70	152
144.	533.71	-	538.09	153
145.	538.10	-	542.49	154
146.	542.50	-	546.90	155
147.	546.91	-	551.31	156
148.	551.32	-	555.73	157
149.	555.74	-	560.16	158
150.	560.17	-	564.60	159
151.	564.61	-	569.04	160
152.	569.05	-	573.49	161
153.	573.50	-	577.94	162
154.	577.95	-	528.41	163
155.	582.42	-	586.88	164
156.	586.89	-	591.35	165
157.	591.36	-	595.84	166
158.	595.85	-	600.33	167
159.	600.34	-	604.85	168
160.	604.83	-	609.33	169
161.	609.34	-	613.84	170
162.	613.85	-	618.36	171
163.	618.37	-	622.88	172

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No.	MTOW x 1,000 Kg			Weight Factor
164.	622.89	-	627.41	173
165.	627.42	-	631.95	174
166.	631.96	-	636.49	175
167.	636.50	-	641.04	176
168.	641.05	-	645.59	177
169.	645.60	-	650.16	178
170.	650.17	-	654.73	179
171.	654.74	-	659.30	180
172.	659.31	-	663.88	181
173.	663.89	-	668.47	182
174.	668.48	-	673.07	183
175.	673.08	-	677.67	184
176.	677.68	-	682.27	185
177.	682.28	-	686.89	186
178.	686.90	-	691.51	187
179.	691.52	-	696.13	188
180.	696.14	-	700.76	189
181.	700.77	-	and so forth	190

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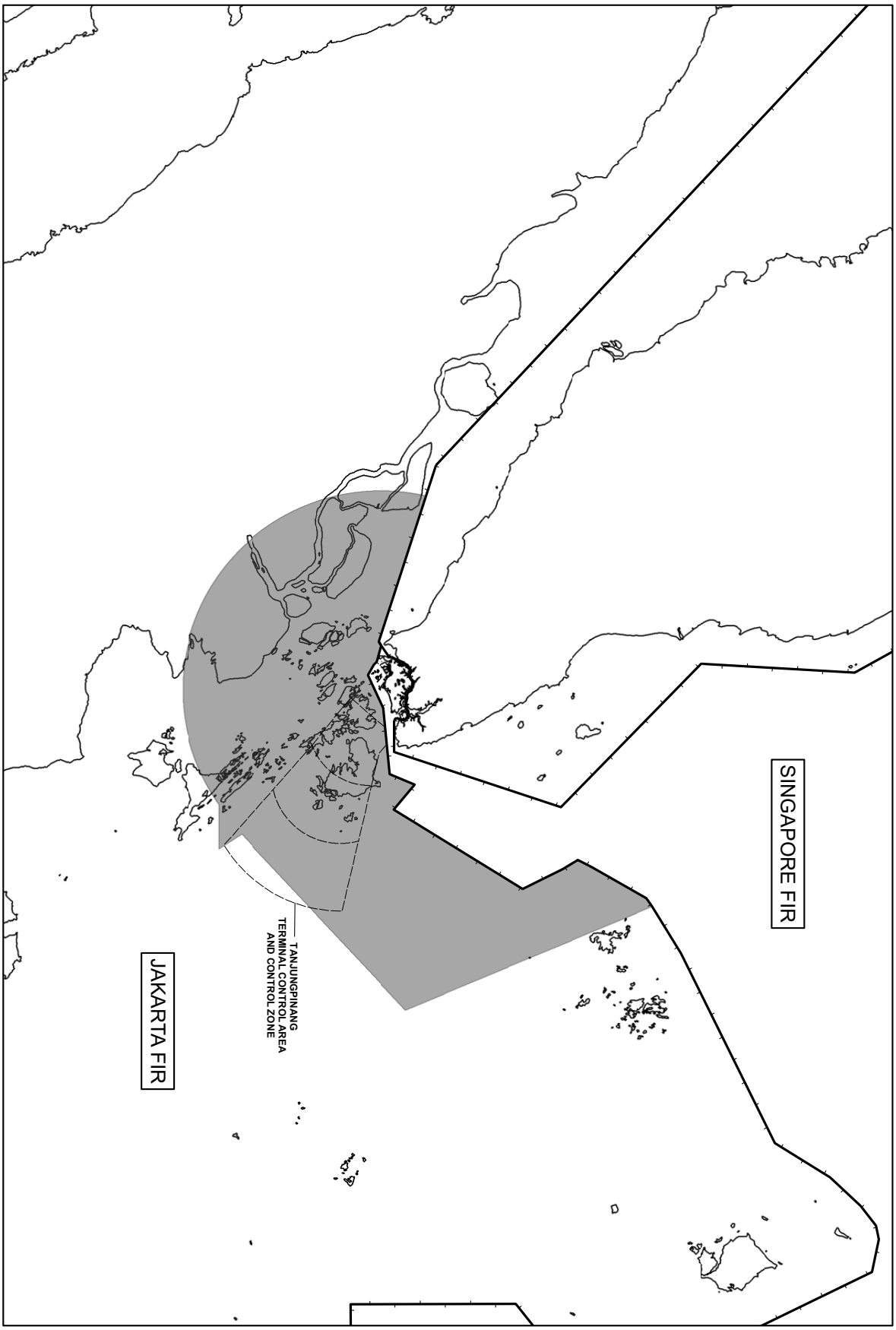
Chart A - Airspace in the Jakarta FIR where Singapore collects RANS charges on behalf of and for Indonesia



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ENR PART 2 - EN-ROUTE (ENR)

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NIL (not applicable).

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NIL (not applicable).

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ENR 0.3 RECORD OF AIP SUPPLEMENTS

NIL (not applicable).

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ENR 0.4 CHECKLIST OF AIP PAGES

NIL (not applicable).

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ENR 0.5 LIST OF HAND AMENDMENTS TO THE AIP

NIL (not applicable).

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ENR 01, ENR 0.2, ENR 0.3, ENR 0.4 and ENR 0.5.

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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.

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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

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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:

a) Direction of flight of aircraft concerned;
b) Type of aircraft concerned;
c) 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:

a) Turn after take-off;
b) Track to make good before turning on desired route;
c) Initial level to maintain;
d) 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.

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2.8.2 The term CAVOK will be used in place of visibility, weather and cloud when the following conditions apply simultaneously:

a) Visibility 10km or more;
b) No precipitations or thunderstorms;
c) 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:

a) When flying under VFR outside the Singapore/Johor Airspace Complex and CTRs notify the appropriate authority; or
b) 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.

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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 GENERAL FLIGHT PROCEDURES

3.1 RATE OF CLIMB AND DESCENT

3.1.1 Upon receipt of climb or descent instructions from ATC, the Pilot-in-Command shall carry out the climb or descent manoeuvre promptly on acknowledgement of clearance

3.1.2 The Pilot-in-Command of an aircraft commencing a climb or descent shall inform ATC if the anticipated ROC or ROD of aircraft will be lesser than 500ft per minute, or if it is necessary to level off at an intermediate Flight Level or altitude.

Note: This is not a restriction on ROC or ROD that is lesser than 500ft per minute for flight operations. ATC will require the information to better predict flight trajectory for separation purposes.

3.1.3 When ACAS produces a resolution advisory (RA), pilots shall take immediate actions to ensure separation from conflicting aircraft. This may involve following instructions to climb, descend, or as directed by the ACAS, even if the action conflicts with an instruction from the appropriate air traffic control unit.

3.1.4 Pilot-in-Command shall use appropriate procedures to ensure that the ROC or ROD of not exceeding 1500ft per minute is achieved throughout last 1000ft of climb or descent to assigned altitude or Flight Level unless the appropriate ATC unit instructs otherwise.

4 AIR TRAFFIC ADVISORY SERVICE

Not Provided

5 FLIGHT INFORMATION SERVICE

5.1 INTRODUCTION

5.1.1 Flight Information Service is provided to all flights.

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

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5.2 PROVISION OF FLIGHT INFORMATION SERVICE

5.2.1 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.

5.2.2 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.

5.2.3 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.

6 AERODROME/APPROACH CONTROL SERVICE

6.1 INTRODUCTION

6.1.1 Aerodrome/Approach Control issue air traffic control clearances, instructions and information to aircraft to ensure the safe, orderly and expeditious flow of air traffic.

6.1.2 In VMC all aircraft flying in a control zone (CTR) or aerodrome traffic zone (ATZ) come under Aerodrome Control. This does not, however, relieve the pilot-in-command from responsibility for avoiding collision.

6.1.3 In VMC control of traffic on the runway in use and in the air is shared between Aerodrome Control and Approach Control. Normally, departing aircraft is the responsibility of Approach Control when airborne, whilst arriving aircraft is handed over to Aerodrome Control after it has been properly sequenced for an approach to land. The actual point of transfer depends on traffic conditions and is coordinated between the two units. Control of traffic on other parts of the manoeuvring area, with the exception of the marshalling area, is the responsibility of Aerodrome Control.

6.1.4 CTR dimensions and controlling authorities are specified in section ENR 3.

6.2 PROCEDURE

6.2.1 Holding, instrument approach, arrival and departure procedures are specified in subsections ENR 1.5 and ENR 3.6.

6.2.2 Radio communication shall be established with the appropriate Aerodrome/Approach Control Unit:

a) Prior to taxiing for departure; or
b) When intending to operate in a CTR, CTA or ATZ.

6.2.3 For IFR or VFR operation in a CTR, aircraft shall be equipped with appropriate two-way VHF radio apparatus, plus a radio compass. Exemptions may be granted by the appropriate Controlling Authority.

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6.2.4 A pilot-in-command under IFR or VFR intending to enter, cross or operate within a CTR or ATZ shall request a clearance from the Aerodrome/Approach Control on the appropriate radio frequency. He shall:

a) Pass the aircraft's position, level, track and estimated time of crossing the zone boundary;
b) Maintain a continuous listening watch on that frequency while the aircraft is within the zone;
c) Navigate in accordance with the flight plan and ATC clearance;
d) Carry out any instructions received from Aerodrome/Approach Control.

6.2.5 All flights within a CTR, at night or in IMC, shall be conducted in accordance with IFR or special authorisation by ATC. However, in order to expedite traffic, ATC may clear an aircraft for a visual approach if weather conditions permit.

6.2.6 Special VFR Flight

6.2.6.1 A Special VFR flight is a VFR flight cleared by air traffic control to operate within a control zone in meteorological conditions below VMC.

6.2.6.2 Special VFR flights may be authorised to enter a control zone for the purpose of landing or to take-off and depart directly from a control zone when the ground visibility is not less than 1.5km (1 mile). The pilot of an aircraft on a Special VFR flight:

a) Must comply with ATC instructions;
b) Is responsible for ensuring that his flight conditions enable him to remain clear of cloud, determine his flight path with reference to the surface and keep clear of obstructions;
c) Is responsible for ensuring that he flies within the limitations of his licence. Controllers are not responsible for checking pilot's qualifications.

6.2.6.3 A Special VFR clearance shall be issued only when specifically requested by a pilot.

6.2.6.4 Before clearing a Special VFR flight a controller must consider the prevailing traffic conditions, the extent of the proposed flight and the availability of air/ground communications. IFR flights take precedence over Special VFR flights. Standard separation shall be provided:

a) Between IFR flights and Special VFR flights;
b) Between flights operating on Special VFR clearance except where a reduction is specifically authorised by CAAS.

6.2.6.5 Aircraft on Special VFR clearance are not normally given a specific height to fly but for the purpose of ensuring vertical separation from other aircraft flying above, the Special VFR flight may be required to fly not above a specified level.

6.3 SEPARATION MINIMA

6.3.1 All VFR or IFR flights within CTRs will be regulated in accordance with IFR separation standards unless the conditions stated in ENR 1.7 para 4.10.2 prevail. ATC Services are also provided to aircraft within ATZs.

6.4 WAKE TURBULENCE SEPARATION MINIMA

6.4.1 For arrival aircraft operating into Singapore Changi Airport, distance-based wake turbulence separation minima based on the seven wake turbulence groups will be applied.

6.5 VISUAL CIRCUIT REPORTING PROCEDURE

6.5.1 The pilot-in-command shall report position in accordance with the following diagram

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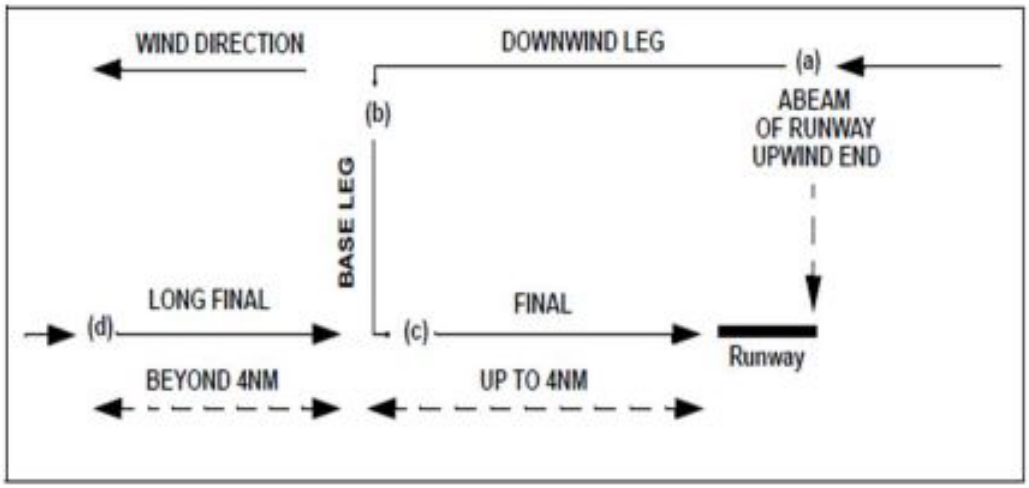

a) Downwind
Aircraft shall report “Downwind” abeam the upwind end of the runway.
b) Base Leg
Aircraft shall report “Base Leg” on completion of the turn on to base leg.
c) Final
Aircraft shall report “Final” after completion of the turn on to final approach, not more than 4NM from the approach end of the runway.
d) Long Final
Aircraft flying a straight-in approach shall report “Long Final” 8NM from the approach end of the runway, and “Final” when at 4NM.

Note: At grass aerodrome, the area to be used for landing is regarded as the runway for the purposes of reporting position in the circuit.

6.6 USE OF RUNWAY

6.6.1 The Aerodrome Controller will nominate the runway direction according to prevailing conditions.

6.6.2 Notwithstanding the runway direction nominated by ATC, the pilot-in-command shall ensure that there is sufficient length of run and that the crosswind or downwind component is within the operational limits of each particular operation. If the nominated runway direction is not suitable for these reasons or for any other safety reason, he may request for an alternative runway direction. ATC will grant the use of an alternative runway direction but the flight may be subject to some delay because of other traffic.

6.6.3 The decision to undertake a take-off or landing rests solely with the pilot-in-command.

6.6.4 Unless prior permission has been obtained from ATC, the pilot-in-command shall not hold on the runway in use.

6.6.5 Only one aircraft will be cleared to land on the runway in use at any one time.

6.6.6 In VMC, an aircraft may be cleared to continue approach to a runway occupied by a preceding aircraft but clearance to land will not be given until the runway is vacated.

6.7 CLOSURE OF AERODROMES

6.7.1 Aircraft will not be refused permission to land or take off from airfields in the Singapore FIR solely because of adverse weather conditions. The pilot-in-command of a public transport aircraft shall be responsible for operation in accordance with applicable company weather minima.

6.7.2 Aerodrome will be closed:
a) When the surface of the landing area is unfit (e.g. soft surface or dangerous obstruction on the manoeuvring area); or
b) At such other times and in conditions specified by NOTAM.

6.7.3 In an emergency, an aircraft will be permitted to land regardless of the conditions of the aerodrome and aerodrome facilities, but the pilot will be advised of these conditions.

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6.8 REGULATING OF AIR TRAFFIC MOVEMENTS AFTER CLOSURE OF SINGAPORE CHANGI AIRPORT'S RUNWAY/ CONTROL ZONE

6.8.1 In order to prevent unnecessary air traffic congestion which normally occurs following the resumption of air traffic operations after the closure of the Singapore Changi Airport's Runways/Control Zone, due to VIP Movement or Major Air Exercise, slot-times will be introduced to regulate the flow of aircraft which are scheduled to depart for a period of at least one hour after the commencement of operations. Thus, depending on the prevailing traffic conditions all such departures will be spaced at intervals of 5 minutes or more to minimise unnecessary delays on the ground, which may be caused by arriving aircraft.

6.8.2 During the one hour period, pilots will be required to give ATC 5 minutes notice prior to starting engines.

6.8.3 Slot time is defined as the time during which take-off clearance may be expected.

6.9 AIR TRAFFIC CONTROL CLEARANCES

6.9.1 All flights within a CTR, or ATZ, irrespective of weather conditions, require an air traffic control clearance.

6.9.2 The pilot-in-command of an aircraft departing from a CTR or an ATZ shall obtain an air traffic control clearance prior to departure.

6.9.3 A clearance to enter or cross a CTR or ATZ will include the following information:

a) A clearance limit and holding instructions, if necessary;
b) The route to be flown; and
c) The altitude or flight level.

6.10 NOISE ABATEMENT PROCEDURE

6.10.1 To alleviate the problem of noise, all aircraft on AWY G579 between SINJON and GUMPU shall operate at/above 5,000ft.

6.11 SPEED CONTROL PROCEDURES FOR ARRIVALS INTO AIRPORTS IN SINGAPORE

6.11.1 Speed control procedures are in force unless notified otherwise by ATC or on ATIS.

6.11.2 All arriving turboprop and turbo-jet aircraft are to fly not faster than indicated air speed 250 knots when within 40NM from airports in Singapore or when at or below 10,000ft. Aircraft cleared on RNAV STARS must comply with the published speed restrictions and transitions unless otherwise instructed by ATC.

6.11.3 All arrivals into Singapore Changi Airport instructed to intercept the final approach course, are to maintain 180 knots by 8NM from touchdown, and thereafter 150 knots till 4NM from touchdown.

6.11.4 Pilots who are unable to comply with the speed limits specified above for reasons of flight safety and/or weather must provide timely notifications to ATC and state the acceptable speed(s) which is appropriate.

6.12 AUTHORIZATION

6.12.1 Either an IFR clearance or a Special VFR authorisation shall be issued by Air Traffic Control prior to every movement within a control zone in the following weather conditions:

When the ceiling is less than 1,500ft and/or a visibility less than 5km.

6.12.2 The deciding factors determining whether conditions are such that compliance with IFR or Special VFR authorisation is required will be the official meteorological observations.

6.12.3 When a pilot so requests and traffic conditions permit, Special VFR flight may be authorised within control zones, clear of cloud and in sight of land or water.

6.12.4 When a Special VFR flight has been authorised, ATC will provide it with standard separation from other similar flights and any IFR flight.

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6.12.5 Special VFR flights will not normally be given a special level to fly; they will be merely instructed to remain clear of cloud and in sight of land or water. If, however, it is necessary to provide vertical separation from aircraft above, the Special VFR flight will be instructed not to fly above a certain level.

6.12.6 A Special VFR flight may be required to make good a prescribed track. When no track is prescribed, the pilot must fly directly towards his destination or towards the first turning point shown in the flight plan.

6.12.7 Special VFR absolves the pilot from complying with Instrument Flight Rules. Special VFR flight does not, however, absolve the pilot-in-command from the responsibility of maintaining minimum safe levels as prescribed in Part 2, para 5 of the eleventh Schedule of the Air Navigation Order. He must comply with ATC instructions and it will be entirely his responsibility to ensure that his flight conditions i.e. forward visibility and distance from cloud, will enable him to determine his flight path and remain clear of all obstructions.

6.12.8 Authorisation for Special VFR flight will depend not only upon zonal traffic conditions but also whether or not air/ground communications can be maintained and the extent of the flight proposed.

6.13 APPLICATION OF GENERAL FLIGHT RULES

6.13.1 Aircraft flying under Special VFR authorisation are subject to the general flight rules. Compliance with these rules is the responsibility of the pilot.

7 REQUIREMENTS FOR AERIAL PHOTOGRAPHY

7.1 Section 7 of the Air Navigation Act provides that no aerial photography of protected places in Singapore may be undertaken without the written permission of the Director-General of Civil Aviation. Applications for Aerial Photography Permits must be submitted in duplicate, one copy to the Director-General of Civil Aviation and the other copy to the Head, Field Security Branch, MINDEF, at least ten (10) days prior to the date of the photography flight.

8 LIGHT SIGNALS

Appendix A

Light	From Aerodrome Control To:	
Directed towards aircraft concerned	Aircraft in Flight	Aircraft on the Ground
STEADY GREEN	Cleared to land	Cleared for take-off
STEADY RED	Give way to other aircraft and continue circling	Stop
SERIES OF GREEN FLASHES	Return for landing *	Cleared to taxi
SERIES OF RED FLASHES	Aerodrome unsafe, do not land	Taxi clear of landing area in use
SERIES OF WHITE FLASHES	Land at this aerodrome and proceed to apron *	Return to starting point on the aerodrome

* Clearance to land and to taxi will be thereafter given as a steady green light and a series of green flashes respectively.

9 DATA LINK SERVICES IN SINGAPORE FIR

9.1 BACKGROUND

9.1.1 Controller Pilot Data Link Communications (CPDLC) and Automatic Dependent Surveillance (ADS) data link applications will be used to provide services to FANS 1/A equipped aircraft, in particular within the Singapore FIR beyond the range of existing radar / ADS-B and VHF voice communications. Area Navigation (RNAV) routes suitable for ADS-C and / or CPDLC logon are described in ENR 3.2.

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9.1.2 Messages will be transferred by VHF and satellite data link.

9.1.3 CPDLC supports the following services:

a) Emergency alerting;
b) Pilot to Controller downlink of position reports and clearance requests;
c) Controller to Pilot uplink of ATC clearances and instructions; and
d) Free text as a supplement to pre-formatted message elements.

9.1.4 Pre-Departure Clearance (PDC) via CPDLC is available on selected ATS routes/destinations as described in WSSS AD 2.22 paragraph 8.4.

9.1.5 Automatic Dependent Surveillance (ADS) supports automatic reporting by the aircraft Flight Management System (FMS) of aircraft position and intent information. The FMS reports the required information in accordance with parameters selected by the ground system.

9.2 LOGON PROCEDURES

9.2.1 The AFN LOGON address for the Singapore FIR is WSJC.

9.2.2 To avoid automatic rejection of the LOGON, the flight identification number used by the pilot in the LOGON process must be identical to the flight identification number filed in the flight plan.

9.2.3 A LOGON must be received from the aircraft before any data link connections can be initiated by the ground system. This is achieved via the ATS facility notification (AFN) LOGON process to be initiated by the pilot in accordance with company procedures.

9.2.4 Aircraft requesting data link services inbound to Singapore FIR are required to manually LOGON onto WSJC at least 10 minutes prior to the estimated time for entering Singapore FIR. Data link equipped aircraft departing from aerodromes within the Singapore FIR and requesting data link may LOGON to WSJC prior to departure. Pilots who are unable to establish a data link connection are to inform ATC on VHF or HF RTF.

9.2.5 Pilots are reminded to provide the flight level on first contact with HF, including when established on data link.

9.3 APPLICATION OF CPDLC

9.3.1 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:

a) prior instruction to contact ATC on VHF;
b) receive notice that CPDLC service is not available; and
c) during data link outage.

9.3.2 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.

9.3.3 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.

9.3.4 The down link response “WILCO” indicates that the pilot accepts the full terms of the whole uplink message.

9.3.5 A down link response “AFFIRM” is not an acceptable acknowledgement or reply to a CLEARANCE issued by CPDLC.

9.3.6 To avoid ambiguity in message handling and response, a CPDLC downlink message should not contain more than one clearance request.

9.3.7 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.

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9.3.8 If any ambiguity exists as to the intent of a particular message, clarification must be sought by voice.

9.3.9 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.

9.3.10 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]

9.3.11 Pilots should down link a CPDLC position report upon position over first compulsory reporting point when aircraft enters Singapore FIR.

9.3.12 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.

9.4 APPLICATION OF ADS

9.4.1 ADS Periodic contracts will be established automatically on receipt of a LOGON.

9.4.2 The Periodic reporting rate is 10 minutes for aircraft operating outside radar coverage and 20 minutes for aircraft operating within radar coverage.

9.4.3 For ADS logged-on aircraft, CPDLC position reports are required only when aircraft enters Singapore FIR upon the first compulsory reporting point.

9.4.4 ADS contracts will be terminated automatically at a system parameter time after the aircraft has left the Singapore FIR.

9.5 DATA LINK FAILURE

9.5.1 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.

9.5.2 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.

9.6 FLIGHT PLAN NOTIFICATION

9.6.1 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

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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/ .

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ENR 1.2 VISUAL FLIGHT RULES

1 GENERAL

1.1 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

1.2 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.

1.3 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:

a) when the ceiling is less than 450m (1 500ft); or
b) when the ground visibility is less than 5km.

1.4 Unless authorized, VFR flights shall not be operated:

a) above FL200;
b) at transonic and supersonic speeds.

1.5 Except when necessary for take-off or landing, or except by permission from the authority, a VFR flight shall not be flown:

a) 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;
b) elsewhere than as specified in 5. a, at a height less than 150m (500ft) above the ground or water.

1.6 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.

1.7 VFR flights shall comply with air traffic control instructions

a) when operated within Classes B, C and D airspace;
b) when forming part of aerodrome traffic at controlled aerodromes; or
c) when operated as special VFR flights.

1.8 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.

1.9 An aircraft operated in accordance with the visual flight rules which wishes to change to comply with the instrument flight rules shall:

a) if a flight plan was submitted, communicate the necessary changes to be effected to its current flight plan; or
b) submit a flight plan to the appropriate air traffic services unit and obtain a clearance prior to proceeding IFR in controlled airspace.

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1.10 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.

1.11 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 operating at FL290 to FL460 (both inclusive) should flight plan using the direct routes listed in the table below where applicable:

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	Applicable to northbound flights	1.1
IPRIX M753 ENREP L642 VMR	IPRIX DCT EGOLO L642 VMR	Applicable to southbound flights	1.1
PARDI G579 SJ B469 PU	PARDI DCT PU	Applicable to flights operating at FL290 to FL600 (both inclusive)	1.9
DUDIS L644 LIGVU	DUDIS DCT LIGVU	NIL	2.2
MELAS N892 MABAL	MELAS DCT MABAL	Applicable to Changi arrivals joining MABAL STAR and flights on ATS route N892	2.3
ESPOB L642 EGOLO	ESPOB DCT EGOLO	NIL	4.6
ESPOB Q801 ESBUM Q802 ELALO	ESPOB DCT ELALO	Applicable to Changi arrivals joining ELALO STAR	5.4

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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			
Airspace		*Flight Levels*	*Classification*
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	Surface to Upper Limit	C
	PAYA LEBAR CTR		D
	SELETAR CTR		C
ATZs		Surface to Upper Limit	D
Uncontrolled Airspace			G

2.1.1 The services provided and requirements for flights within each class of airspace in Singapore FIR are shown in the table below:

Class	Types of flight	Separation provided	Service provided	Speed limitations	Radio Communication requirement	Subject to ATC clearance
A	IFR only	All aircraft	Air traffic control service	Not applicable	Continuous two-way	Yes
B	IFR	All aircraft	Air traffic control service	Not applicable	Continuous two-way	Yes
	VFR	All aircraft	Air traffic control service	Not applicable	Continuous two-way	Yes
C	IFR	IFR from IFR	Air traffic control service	Not applicable	Continuous two-way	Yes
		IFR from VFR				
	VFR	VFR from IFR	1) Air traffic control service for separation from IFR; 2) VFR/VFR traffic information (and traffic avoidance advice on request)	250 kt IAS below 3050 m (10 000 ft) AMSL	Continuous two-way	Yes
D	IFR	IFR from IFR	Air traffic control service, traffic information about VFR flights (and traffic avoidance advice on request)	250 kt IAS below 3050 m (10 000 ft) AMSL	Continuous two-way	Yes
	VFR	Nil	IFR/VFR and VFR/VFR traffic information (and traffic avoidance advice on request)	250 kt IAS below 3050 m (10 000 ft) AMSL	Continuous two-way	Yes
G	IFR	Nil	Flight information service	250 kt IAS below 3050 m (10 000 ft) AMSL	Continuous two-way	Yes
	VFR	Nil	Flight information service	250 kt IAS below 3050 m (10 000 ft) AMSL	Continuous two-way[2]	Yes

[1]All arriving turbo-propeller and turbo-jet aircraft are to fly at not faster than the indicated air speed of 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 depicted on the transitions and RNAV STARs. Further speed reductions will be regulated by ATC as necessary. 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) acceptable.

[2]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 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.

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.

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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 as well as for the purpose of air traffic management.

d. If the departing aircraft is unable to comply with the minimum climb gradient required, the pilot-in-command shall inform ATC. Delays can be expected..

3.2 RUNWAY 02L

a. Except for paragragh 3.2b, departing aircraft on Runway 02L, regardless whether 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. ATC will inform pilots of departing aircraft when ATC receives information on vessels with height above 35m AMSL. Upon receipt of such information, the pilot-in-command shall calculate the climb gradient in accordance with paragraph3.6.

c. If the departing aircraft is unable to comply with the minimum climb gradient as stated in paragraph 3.2a, the pilot- in-command shall inform ATC before reaching the holding point for departure. Delays can be expected.

3.3 RUNWAY 02C

a. Except for paragraph 3.3b, departing aircraft on Runway 02C, regardless whether 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. ATC will inform pilots of departing aircraft when ATC receives information on vessels with height above 70m AMSL. Upon receipt of such information, the pilot-in-command shall calculate the climb gradient in accordance with paragraph3.6.

c. If the departing aircraft is unable to comply with the minimum climb gradient as stated in paragraph 3.3a, the pilot-in-command shall inform ATC before reaching the holding point for departure. Delays can be expected.

3.4 RUNWAY 02R

a. Except for paragraph 3.4b, departing aircraft on Runway 02R, regardless whether 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. ATC will inform pilots of departing aircraft when ATC receives information on vessels with height above 65m AMSL. Upon receipt of such information, the pilot-in-command shall calculate the climb gradient in accordance with paragraph3.6.

c. If the departing aircraft is unable to comply with the minimum climb gradient as stated in paragraph 3.4a, the pilot-in-command shall inform ATC before reaching the holding point for departure. Delays can be expected.

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%.

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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.

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.

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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.

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ENR 1.6 ATS SURVEILLANCE SERVICES AND PROCEDURES

1 PRIMARY RADAR

1.1 DESCRIPTION OF PRIMARY R ADAR SERVICES AND PROCEDURES

1.1.1 Surveillance services will be provided to aircraft operating in controlled airspace subject to surveillance coverage, equipment serviceability and situations that may result in a degradation of ATS provision.

1.1.2 Flight information service may be provided using ATS surveillance to aircraft operating in uncontrolled airspace subject to surveillance and communication coverage, and air traffic conditions. Pilot may request for the following:

a. Information regarding any aircraft observed to be on a conflicting path with the identified aircraft and suggestions or advice regarding avoiding action; and
b. Information on the position of significant weather and, as practicable, advice to the aircraft on how best to circumnavigate any such areas of adverse weather; and
c. Information to assist the aircraft in its navigation.

Aircraft receiving flight information services are not obliged to follow the advice and/or suggestions given by ATC.

1.1.3 Aircraft operating in uncontrolled airspace, intending to enter or cross controlled airspace shall seek ATC clearance to do so. ATC will identify the aircraft and provide ATS surveillance service prior to entering controlled airspace.

1.1.4 The pilot-in-command is responsible for navigation and obstacle clearance when operating on established ATS routes and instrument flight procedures. However, for purpose of ensuring separation and expeditious flow of traffic, ATC may instruct pilots to fly specific headings for an IFR flight to be vectored and/or provide direct routing which takes the aircraft off an ATS route or an instrument flight procedure. Under such circumstance, ATC will issue clearance such that the prescribed obstacle clearance will always exist until the aircraft reaches the point where pilots will resume own navigation.

1.1.5 Position information will be given as follows:

a. A well-known geographical position;
b. Bearing and distance (using points of the compass) from a known position;
c. Magnetic heading (QDM) and distance to the appropriate reporting point or en-route navigational facility;
d. A distance to the runway touchdown point (as “track miles” to run).

1.1.6 Aircraft will be identified by ATC before providing ATS surveillance services using one of the following methods:

a. By a pilot report over a prescribed position displayed on the radar map or plotted on the radar map outlay;
b. By instructing a pilot to carry out turn(s) and ATC observing the executed turn(s);
c. By observing and correlating the radar echo of a departing aircraft to a known airborne time.

1.1.7 It is not possible to specify separation minima between identified aircraft and unknown traffic considered to constitute a hazard due to unpredictable manoeuvres of the latter. However, whenever practicable, the minimum surveillance separation shall be applied.

1.2 SINGAPORE AIR TRAFFIC CONTROL UNITS

1.2.1 Singapore ATC will use the following callsigns when providing ATS surveillance services:

a. Aircraft provided with Area Control Service (ACC)
   i. Singapore Radar;
   ii. Singapore Control.

b. Aircraft provided with Approach Control Service (APP)
   i. Singapore Approach;
   ii. Singapore Arrival;
   iii. Singapore Departure;
   iv. Seletar Approach.

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1.3 MILITARY RADAR UNITS AUTHORISED TO PROVIDE RADAR CROSSING SERVICE

1.3.1 The Military Radar Units authorised to provide radar crossings of controlled areas (airways) by military aircraft are:

a. RSAF 201 Squadron (Air Defence Radar Unit-ADRU); and

b. RSAF 203 Squadron (Singapore Air Traffic Control Centre)

1.4 RADAR FAILURE

1.4.1 In the event of radar failure, instructions will be issued by the radar controller to restore standard longitudinal, lateral or vertical separation between those aircraft operating with radar separation. Instructions may also be given to aircraft to communicate on another ATC frequency.

1.5 RADIO FAILURE

1.5.1 In the event of failure of two-way communications while operating on the radar frequency, the pilot shall change to any other alternative ATC frequencies and request instructions.

1.5.2 If able to receive but not transmit, the pilot shall remain on the frequency on which he has been communicating and comply with instructions issued by the radar controller designed to establish that the aircraft is receiving. If this is established, further instructions appropriate to the circumstances will be issued.

1.5.3 If unable to make contact on the alternative frequencies, the pilot shall comply with the standard radio failure procedures as specified below.

1.6 TOTAL RADIO COMMUNICATION FAILURE PROCEDURES

1.6.1 If total radio communication failure occurs in VMC during daylight hours, the pilot shall continue to fly in VMC and land at the most suitable aerodrome. If it occurs in VMC during the hours of darkness (between sunset and sunrise) action shall be taken in accordance with paragraph 1.6.2 below.

1.6.2 If total radio communication failure occurs in IMC, ATC action is based on the assumption that the aircraft will continue to its destination and if unable to land, will proceed to its nominated alternate. Separation standards will be increased and airspace reserved accordingly (see Appendices ‘A’ and ‘B’).

1.6.3 In IMC, or if unable to maintain VFR, the pilot shall either leave or avoid controlled airspace and areas of dense traffic and establish VFR operation or, alternatively, shall:

a. Proceed according to the current flight plan, at the last assigned flight level, to the clearance limit and thereafter at the flight plan level.

b. Arrive at the destination as close as possible to ETA.

c. Commence descent as close as possible to EAT (or ETA if no EAT has been acknowledged).

d. If unable to land within 30 minutes of the time descent should have started (i.e. EAT or ETA if no EAT has been acknowledged), proceed to cross SAMKO Holding Area (SHA) at 4,000ft then via A457 at FL200 if Kuala Lumpur is the nominated alternate or via B470 at FL290 if Soekarno- Hatta is the nominated alternate or otherwise proceed at the planned flight level to other nominated alternate.

Note:

1) Aircraft are to follow the established radio failure procedures as laid down by the respective airports.

2) During this 30 minute period ATC will reserve the airspace at the aircraft’s flight level and below. At the expiry of this period with the concurrence of other users normal operations will resume.

1.6.4 In all cases, the pilot shall contact ATC as soon as possible after landing.

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1.7 TOTAL RADIO FAILURE - SPECIAL PROCEDURES - SINGAPORE CHANGI AP - ARRIVALS

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

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

a. Proceed according to the last acknowledged clearance received from Singapore ATC, or
b. If no specific instructions or clearance has been received from Singapore ATC:

i. Maintain the last assigned altitude or flight level and proceed via planned ATS Routes thereafter the appropriate STAR for RWY 02L/02C /02R to SAMKO Holding Area (SHA). If SHA is not part of the STAR, flight shall proceed to SHA after the last waypoint on the STAR.
ii. Commence descent from SHA at or as close as possible to the ETA as indicated on the flight plan.
iii. Carry out the appropriate instrument approach procedure from SHA to land on RWY 02L/02C/02R.

c. If radio failure occurs while flight is on assigned heading from an ATC issued instruction which takes the aircraft off the STAR, the pilot shall rejoin the last assigned STAR by resuming own navigation to the next ensuing waypoint on STAR
d. Identify the runway-in-use in accordance with paragraph 1.8. If unable to effect a landing on:

i. RWY 02L
Carry out missed approach procedure to AKOMA (PU R-356/20DME) (014522N 1035443E). Leave AKOMA at 4,000ft to NYLON Holding Area (NHA) and execute the appropriate instrument procedure from NHA to land on RWY 20R, RWY 20C or RWY 20L, as appropriate.
ii. RWY 02C
Carry out missed approach procedure to NYLON Holding Area (NHA) and execute the appropriate instrument procedure from NHA to land on RWY 20R, RWY 20C or RWY 20L, as appropriate.
iii. RWY 20R
Carry out missed approach procedure to SAMKO Holding Area (SHA) and execute the appropriate instrument procedure from SHA to land on RWY 02L, RWY 02C or RWY 02R, as appropriate.
iv. RWY 20C
Carry out missed approach procedure to EXOMO (VTK R-158/22DME) (010425.49N 1040933.17E). Leave EXOMO at 4,000ft to SAMKO Holding Area (SHA) and execute the appropriate instrument procedure from SHA to land on RWY 02L, RWY 02C or RWY 02R, as appropriate.
v. RWY 02R
Carry out missed approach procedure to HOSBA (VTK R-103/24DME) (011948N 1042418E) Holding Area (HHA). Leave HHA at 7,000ft to NHA via ATS route W401 and VTK DVOR. Execute the appropriate instrument procedure from NHA to land on RWY 20L, RWY 20C or RWY 20R.
vi. RWY 20L
Carry out missed approach procedure to HOSBA (SJ R-079/34DME) (011948N 1042418E) Holding Area (HHA). Leave HHA at 7,000ft to SHA via ATS route G580 and SJ DVOR. Execute the appropriate instrument procedure from SHA to land on RWY 02L, RWY 02C or RWY 02R.

1.8 IDENTIFICATION OF RUNWAY-IN-USE

1.8.1 ATC will switch on the appropriate approach lights and the ILS serving the runway-in-use to assist the pilot in its identification. If the approach lights for the runway-in-use are sighted but the ILS frequency is not received, the pilot shall assume that the ILS is inoperative and shall proceed to land on the runway on which the approach lights have been sighted.

1.8.2 If unable to land within 30 minutes of EAT or ETA, if no EAT has been received and acknowledged, proceed in accordance with paragraph 1.6.3 (d) above.

1.9 TOTAL RADIO FAILURE - SPECIAL PROCEDURES - SINGAPORE CHANGI AP - DEPARTURES

1.9.1 When an aircraft which has been cleared by ATC to an intermediate level experiences total radio communication failure immediately after departure from Singapore Changi Airport and it is deemed unsafe for it to continue to its destination, the pilot will adhere to the procedures below.

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1.9.2 When radio communication failure occurs immediately after the aircraft has departed on RWY 02L/02C/02R, the pilot shall proceed according to the following procedures:

a. Proceed straight ahead to NYLON Holding Area (NHA) climbing to the last assigned altitude. At NHA, climb/descend to maintain 7,000ft;
b. Hold at NHA for 4 minutes and leave NHA on track 203°. At 10 DME north of VTK, turn left for HOSBA Holding Area (HHA) to jettison fuel, maintaining 7,000ft;
c. After fuel jettison, proceed to SAMKO Holding Area (SHA) via Airway G580 and SINJON DVOR. Maintain 7,000ft. At SHA descend for an instrument approach on RWY 02L/02C/02R. Identify the runway-in-use in accordance with paragraph 1.8 above.

1.9.3 When radio communication failure occurs immediately after the aircraft has departed on RWY 20R/20C/20L, the pilot shall proceed according to the following procedures:

a. Proceed straight ahead to SAMKO Holding Area (SHA) climbing to the last assigned altitude. At SHA climb/descend to maintain 7,000ft;
b. Hold at SHA for 4 minutes. Leave SHA for HOSBA Holding Area (HHA) via SJ DVOR and Airway G580 to jettison fuel, maintaining 7,000ft;
c. After fuel jettison, proceed to NHA via Airway W401. Maintain 7,000ft. On crossing VTK 042R turn right to intercept VTK 023R. At NHA descend to carry out an instrument approach on RWY 20R/20C/20L.

1.9.4 ATC action is based on the assumption that the aircraft will take a minimum of 10 min to jettison fuel. An aircraft therefore should not leave earlier than 10 min after arrival at HOSBA Holding Area even if fuel jettison is completed at a shorter time or if jettisoning is not necessary or possible unless circumstances require an immediate return.

1.9.5 Alternatively, aircraft may jettison fuel between HOSBA and point 80NM from VTK DVOR/DME on Airway G580.

1.10 TOTAL RADIO FAILURE - SPECIAL PROCEDURES - SELETAR AP - ARRIVALS

1.10.1 If total radio communication failure occurs in VMC during daylight hours to an aircraft bound for Seletar AD, the pilot shall continue to fly in VMC and land at the most suitable aerodrome.

1.10.2 If in IMC or when weather conditions are such that the total radio communication failure aircraft cannot complete its flight in accordance with paragraph 1.10.1, the pilot will EITHER:

a. proceed in accordance with the last acknowledged clearance from ATC; OR

b. if no specific instructions or clearances have been received and acknowledged:

i. maintain the last assigned level and proceed via flight planned route, then to OMKOM;
ii. commence descent from OMKOM at or as close as possible to the ETA Seletar AD as indicated on the flight plan or last EAT passed by ATC and acknowledged by aircraft;
iii. leave OMKOM at 2,500ft and proceed to overhead Seletar;
iv. if Seletar Aerodrome is visual, initiate the standard arrival procedures for RWY 21;
v. if unable to effect a landing on RWY 21, carry out a missed approach at or below 1,500ft and land on RWY 03.

1.10.3 ATC will assist the pilot in identifying RWY-in-use by switching on the RWY lights and appropriate PAPI.

1.10.4 The pilot shall keep a look-out for light signals from Seletar Tower. On receipt of a green light from Seletar Tower, a landing may be made.

1.10.5 If unable to land within 30 minutes of ETA Seletar as indicated in the flight plan or last acknowledged EAT, aircraft will proceed to its flight planned alternate.

1.10.6 It is the pilot’s responsibility to ensure that he is clear of other traffic while carrying out the standard arrival procedure.

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1.11 TOTAL RADIO FAILURE - SPECIAL PROCEDURES - SELETAR AP - DEPARTURES

1.11.1 If total radio communication failure occurs to a departing aircraft within the Seletar Control Zone, the pilot shall maintain 2,500ft and if Seletar AD is visual, initiate the standard arrival procedures for RWY 21. If unable to effect a landing on RWY 21, carry out a missed approach at or below 1,500ft and land on RWY 03. When in the circuit, the pilot shall keep a look-out for light signals from Seletar Tower.

1.11.2 If departing aircraft experiences total radio communication failure outside the Seletar Control Zone, the pilot shall follow procedures as set out in paragraph 1.10.

1.11.3 At night, aircraft experiencing total radio communication failure will proceed to its flight planned alternate.

1.12 RADIO FAILURE - SPECIAL PROCEDURES - SELETAR AP - HELICOPTERS

1.12.1 Helicopters experiencing RTF failure should approach low level (not above 300ft) and fly past the Control Tower on the eastern side of the runway rocking laterally.

1.12.2 Unless the pilot unmistakably sees a green light from the Tower, he is not to assume that he is cleared to land but is to carry out the same procedure again.

1.12.3 In each circumstance, it is the pilot's responsibility to ensure that he is cleared of other circuit traffic and does not encroach on the approach of the runway.

1.13 RADIO FAILURE - SPECIAL PROCEDURES - SELETAR AP - FIXED WING AIRCRAFT

1.13.1 Aircraft experiencing radio failure are to descend on the western side of the runway to 600ft and rock the aircraft when passing abeam the Control Tower.

1.13.2 Unless the pilot unmistakably sees a green light from the Tower, he is not to assume that he is cleared to land but is to carry out the same procedure again.

1.13.3 When carrying out radio failure procedure, the pilot-in-command shall not infringe the helicopter circuit whenever it is active and shall keep a sharp look-out for helicopters and other aircraft operating in the aerodrome circuit.

1.14 ACTION TAKEN BY ATC DURING RADIO FAILURE

1.14.1 In addition to the action specified in paragraph 1.6.2, if unable to establish normal communication with an aircraft, ATC will:

a. Maintain separation between the aircraft and other aircraft known to be operating in its vicinity;
b. Transmit essential information to the aircraft, including the flight levels reserved for its use, route to be flown, and any significant weather information, such as terminal weather, areas in which VMC may be expected, etc.;
c. Advise other aircraft in the vicinity of the presumed position of the aircraft experiencing radio failure;
d. Use ground radar to check whether the aircraft is receiving and complying with ATC instructions, and to ensure separation from other aircraft;
e. Inform the operator concerned or his representative;
f. Inform the alternate aerodrome of the circumstances of the failure and request attempts to establish communication with the aircraft;
g. Inform all concerned and end all radio failure actions if communication with aircraft is established and when aircraft lands.

1.15 VOICE AND CPDLC POSITION REPORTING REQUIREMENTS

1.15.1 There are no voice and CPDLC position reporting requirements for the Primary Radar coverage area stipulated in paragraph 1.16.1.

1.16 AREA OF PRIMARY RADAR COVERAGE

1.16.1 Maximum operating range of the Primary Radar is 250 NM from Singapore Changi Airport.

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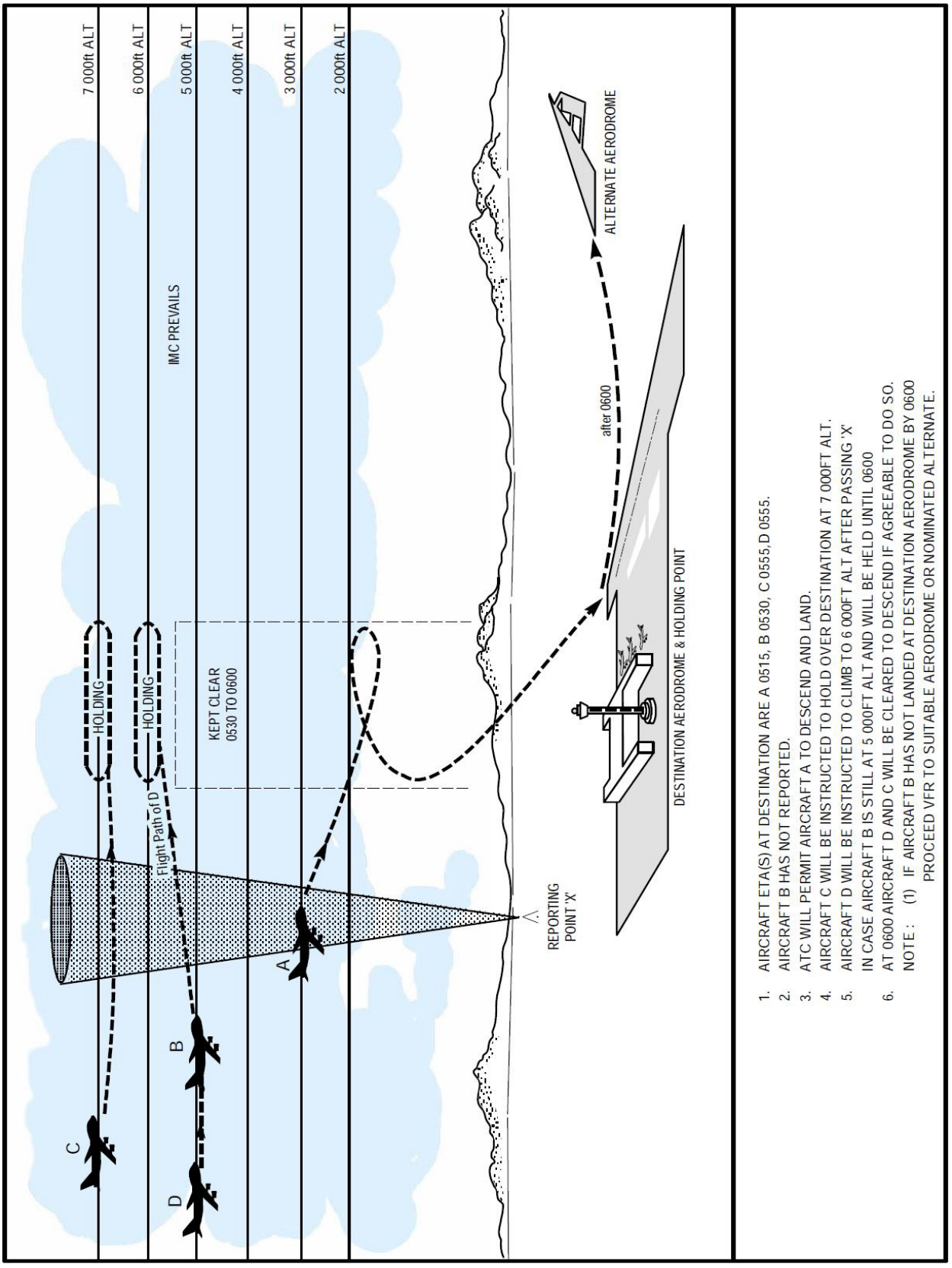
ATC PROCEDURE FOR RADIO FAILURE

APPENDIX 'A'



1. AIRCRAFT ETA(S) AT DESTINATION ARE A 0515, B 0530, C 0555,D 0555.
2. AIRCRAFT B HAS NOT REPORTED.
3. ATC WILL PERMIT AIRCRAFT A TO DESCEND AND LAND.
4. AIRCRAFT C WILL BE INSTRUCTED TO HOLD OVER DESTINATION AT 7 000FT ALT.
5. AIRCRAFT D WILL BE INSTRUCTED TO CLIMB TO 6 000FT ALT AFTER PASSING 'X'
   IN CASE AIRCRAFT B IS STILL AT 5 000FT ALT AND WILL BE HELD UNTIL 0600
6. AT 0600 AIRCRAFT D AND C WILL BE CLEARED TO DESCEND IF AGREEABLE TO DO SO.

NOTE : (1) IF AIRCRAFT B HAS NOT LANDED AT DESTINATION AERODROME BY 0600
PROCEED VFR TO SUITABLE AERODROME OR NOMINATED ALTERNATE.

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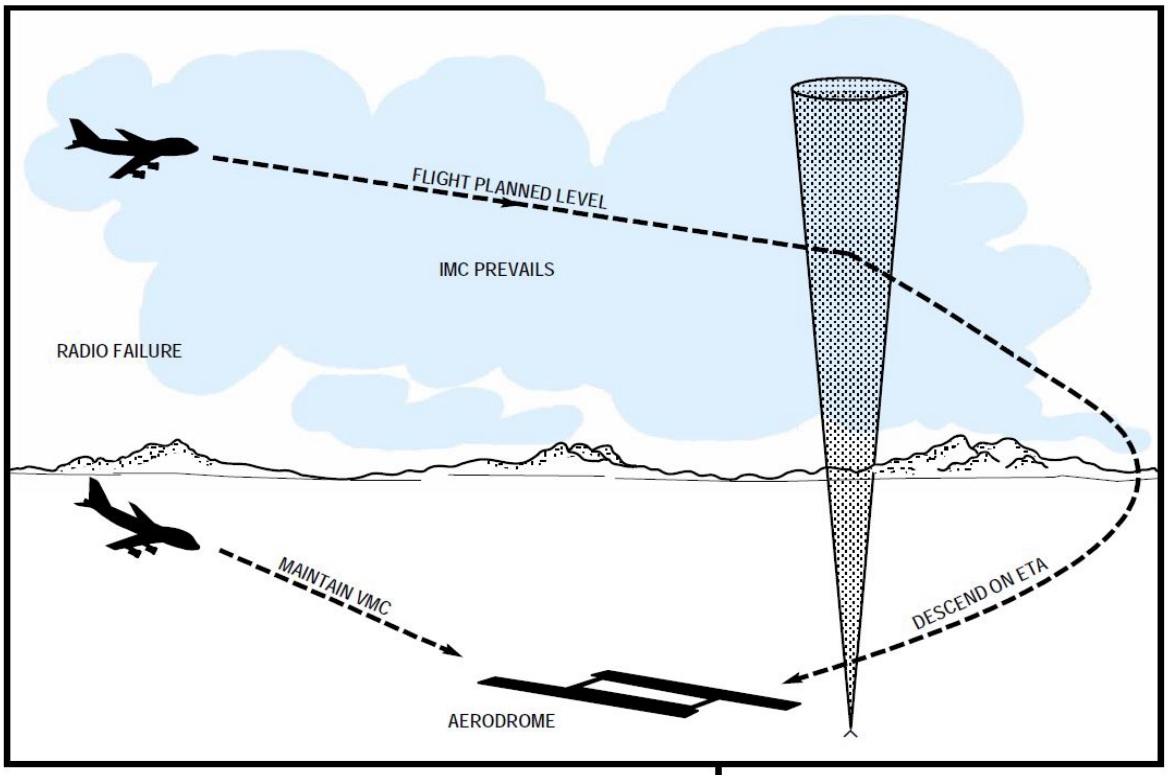
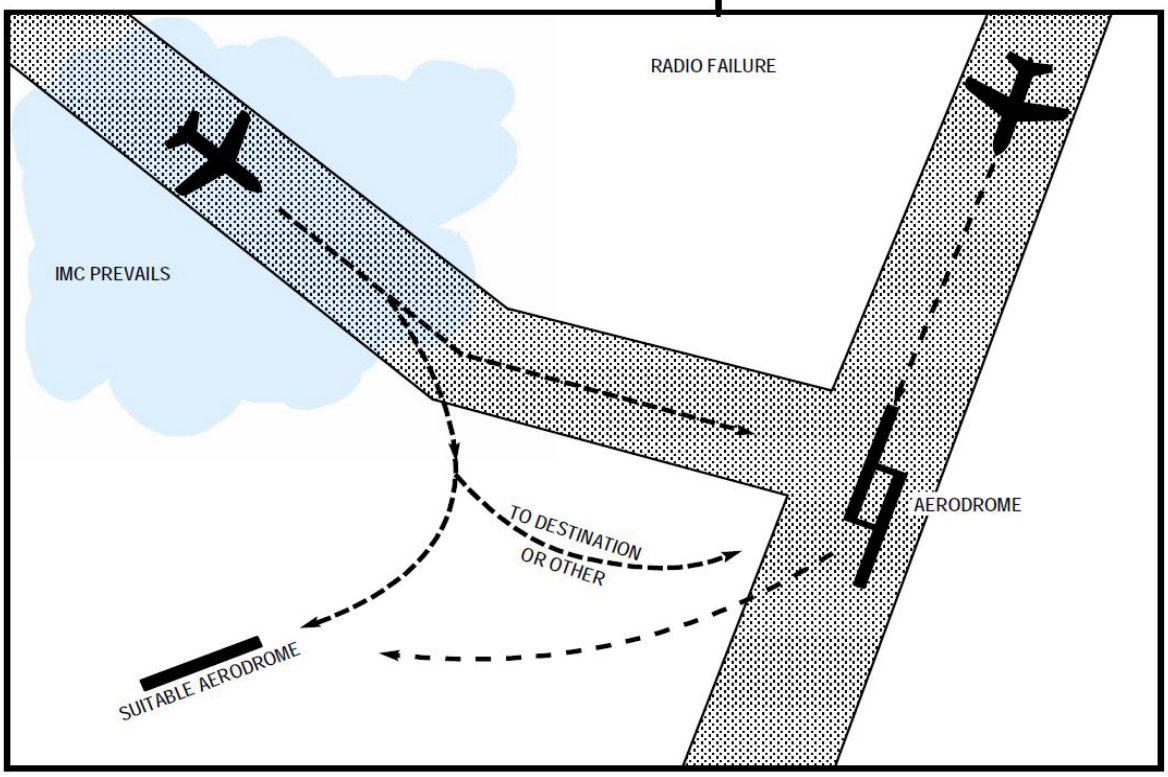
PILOT PROCEDURE FOR RADIO FAILURE

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



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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
Lost C2 Link state	7400
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.

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2.6 AREA OF SSR COVERAGE

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

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:

a. 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
b. European Aviation Safety Agency (EASA) CS-ACNS (Subpart D - Surveillance - SUR), or
c. Federal Aviation Administration - Advisory Circular No: 20-165A (or later versions) Airworthiness Approval of Automatic Dependent Surveillance - Broadcast (ADS-B) Out Systems, or
d. 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:

a. Direct recognition of the aircraft identification in an ADS-B label displayed to ATC on their air situation display system;
b. 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:

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.

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:

a. B1: ADS-B with dedicated 1090 MHz ADS-B “out” capability
b. B2: ADS-B with dedicated 1090 MHz ADS-B “out” and “in” capability

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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 .

4 OTHER RELEVANT INFORMATION AND PROCEDURES

NIL

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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.

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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	Metres
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.

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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)

TRACK			
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

TRACK			
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

QUADRANTAL CRUISING LEVELS			
70	75	80	85
90	95	100	105
110	-	-	-
130	135	140	145
150	155	160	165
170	175	180	185
190	195	-	-

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.

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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

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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 .

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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 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 (L625, L642, M767, M771, N884 and N892) that involve the 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 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.

1.1.3 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.

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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.

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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.

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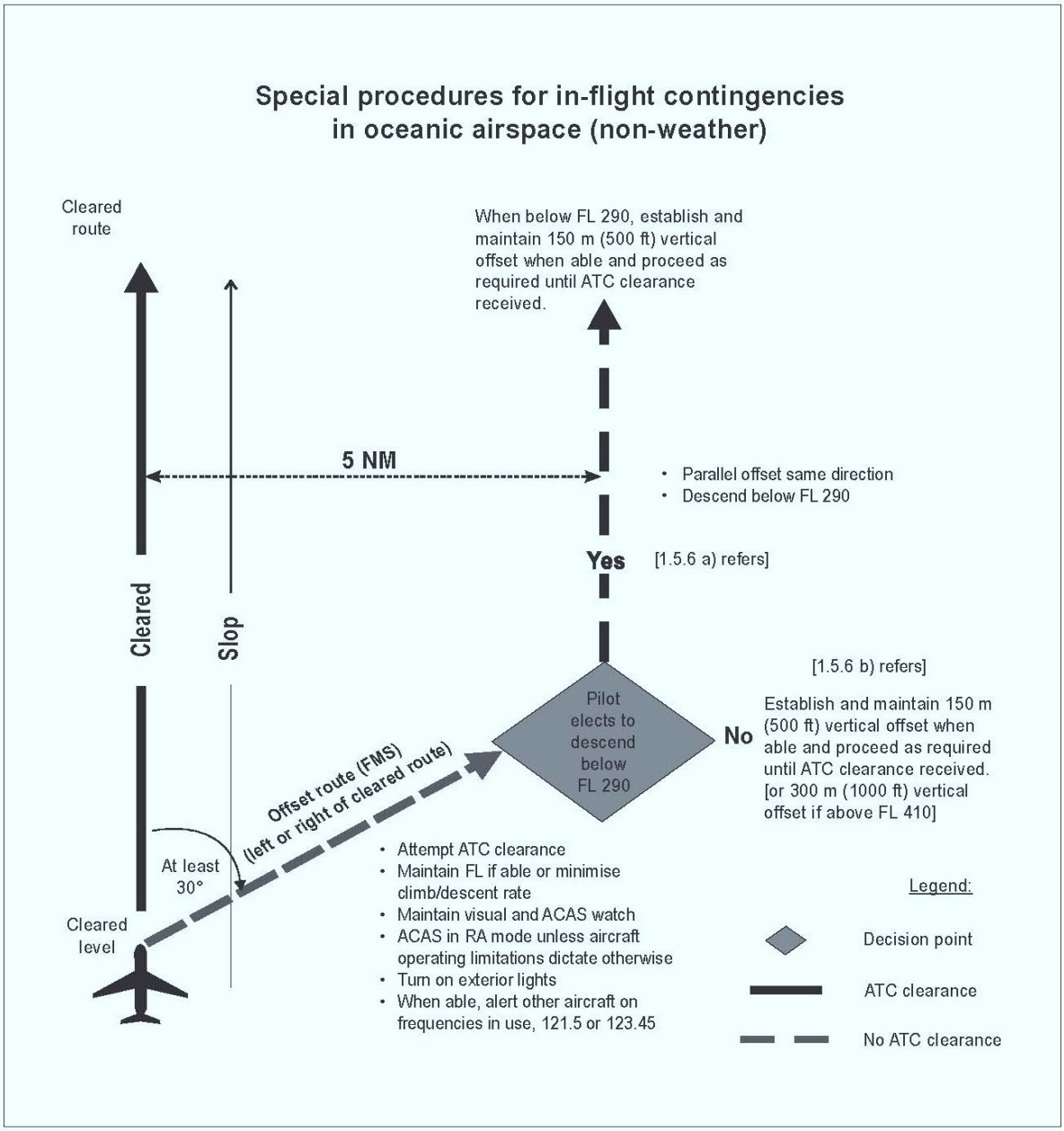

Figure 1.5-1. Visual aid for contingency procedures guidance

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

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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.

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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:
Initially, Maintain CFL Evaluate the aircraft's capability to maintain altitude through manual control Subsequently, 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 failure and intended course of action. Possible courses of action include: a) Maintaining the CFL and route, provided that the aircraft can maintain level. 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. 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.	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:** Loss of redundancy in primary altimetry systems

The pilot should:	ATC can be expected to:
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.	Acknowledge the situation and continue to monitor progress.

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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).	Obtain pilot's intention and pass essential traffic information.
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).	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.
Consider declaring an emergency. Notify ATC of the failure and intended course of action.	If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible.
Possible courses of action include: a) Maintaining 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 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.	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 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 displace 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: 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. Possible courses of action include: a) Maintaining CFL and route, provided ATC can provide lateral, longitudinal or conventional vertical separation. b) Requesting flight level change, if necessary c) Executingthecontingencymanoeuvreshowninparagraphs 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.

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CONTROLLER / PILOT PHRASEOLOGY

Phrases	Purpose
(callsign) 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 (callsign) CONFIRM RVSM APPROVED.
(callsign) UNABLE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN [or DESCEND TO, or CLIMB TO] FLIGHT LEVEL *(number)*	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.

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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 B

Table

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
M768 - BTN AKMON and ASISU
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.

APPENDIX B

Table

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
M768 - BTN AKMON and ASISU
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 operation on RNAV routes L625, L642, L649, M635, M767, M768, 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, M768, 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	

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ATS Route	No-PDC Flight Levels (Other levels available with prior approval)	Remarks
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 routes L510, L759, L515/M770, N571, N571/N877, P628 and P574 will be assigned No-PDC FL280. Succeeding aircraft on the same route will be assigned FL280 with10 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 operating on ATS routes L510, N571, P574 and P628, which are equipped with Automatic Dependent Surveillance – Contract (ADS-C) and Controller-Pilot Data Link Communication (CPDLC), 7 minutes longitudinal separation will be applied between pair(s) of suitably equipped aircraft on the same route provided there is no closing speed with the preceding aircraft.

4.2.5 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.

4.2.6 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.

4.2.7 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.

4.2.8 For aircraft on P628, the first aircraft from Singapore or Kuala Lumpur to be over VPL can expect its requested flight level.

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4.2.9 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:

a. The decision to apply a strategic lateral offset is the responsibility of the flight crew;
b. 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;
c. 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.

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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:

a. comply with the ATC clearance issued; or
b. 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.

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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:

a. if possible, deviate away from an organized track or ATS route system;
b. 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);
   i. aircraft identification;
   ii. flight level;
   iii. position (including ATS route designator or the track code); and
   iv. intentions.
c. watch for conflicting traffic both visually and by reference to ACAS (such as TCAS, if equipped);
d. turn on all aircraft exterior lights (commensurate with appropriate operating limitations);
e. for deviations of less than 5.0 NM from the originally cleared track or ATS route, remain at a level assigned by ATC;
f. 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

g. 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

h. 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:

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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.

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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.

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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**

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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)	International operators may choose to avoid the Singapore FIR by using alternate ATS routes in other FIRs.
CRM-3	N884 (LAXOR - LULBU)	East	FL310 FL350 FL390	Singapore ACC	Applicable between 2100-1300 UTC At LULBU, contact Puerto Princesa Approach 122.0	International operators may choose to avoid the Manila FIR by using alternate ATS routes in other FIRs. Puerto Princesa Approach Facility Hours of Operations 2100-1300UTC
	N884 (LAXOR - LEGED)				Applicable between 1300-2100UTC At LUBAN, contact Clark Tower 118.7	International operators may choose to avoid the Manila FIR by using alternate ATS routes in other FIRs. Clark Control Tower Hours of Operations: H24

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CR	ATS Route	Direction	FLAS	ACC	Transfer of Communication (TOC)	Remarks
CRM-4	M767 (TOSOV - TEGID)	West	FL320 FL360 FL400	Singapore ACC	Applicable between 2100-1300UTC At TOSOV to contact Singapore ATC: - ADS/CPDLC: Logon WSJC - HF: 6556 / 8942	International operators may choose to avoid the Manila FIR by using alternate ATS routes in other FIRs.
	M767 (TELEN - TEGID)				Applicable between 1300-2100UTC At TELEN to contact Singapore ATC: - ADS/CPDLC: Logon WSJC - HF: 6556 / 8942	
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 / 119.35 - 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.
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 / 119.35	

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CR	ATS Route	Direction	FLAS	ACC	Transfer of Communication (TOC)	Remarks
CRH-1	N891 (XONAN - IGARI)	North	FL300	Hanoi ACC	At IGARI, contact Hanoi ACC: - VHF: 120.9 / 133.85	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: 134.9 / 134.35 - HF: 6556 / 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: 134.9 / 134.35 - HF: 6556 / 8942	
CRH-3	R468 / M768 (SAPEN – TSH – AKMON)	East	FL270	Hanoi ACC	At AKMON, contact Singapore ATC: - ADS / CPDLC: Logon WSJC - HF: 6556 / 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 / 119.35 - 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: 134.9 / 134.35 - HF: 6556 / 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 / 119.35 - 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: 134.9 / 134.35 - HF: 6556 / 8942	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.
CRH-7	L625 (AKMON – ARESI)	East	FL310 FL320 FL390 FL400	Hanoi ACC	At AKMON, contact Hanoi ACC: - VHF: 133.05 / 119.35 - 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.

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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 broadcasts**

VHF 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)

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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/Adminstrations	Airport
Cambodia	VDPP, VDSA, VDSV
China	ZGGG, ZGSZ, ZJHK, ZJSY
Hong Kong	VHHH, VMMC
Indonesia	WIII, WADD, WARR
Malaysia	WBGG, WBKK, WMKI, WMKJ, WMKK, WMKL, WMKP, WMSA
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:

a. file and submit FPLs at least 3 hours before the Estimated Off Block Time (EOBT);
b. transmit the appropriate ATS messages (CHG / DLA) when the EOBT changes by more than 15 minutes; and
c. 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

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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 BOBCAT service is provided by Aeronautical Radio of Thailand LTD (AEROTHAI) from the Bangkok Air Traffic Flow Management Unit (ATFMU) for westbound flights intending to transit Kabul FIR between 2000 UTC and 2359 UTC daily. The service provided includes calculation, promulgation, and management of mandatory Calculated Take-Off Time (CTOT) and flight level, ATS route, and Calculated Time Over (CTO) at entry waypoint for entry into Kabul FIR for each affected flight.

5.1.2 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 5.2. The objectives of this ATFM service 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 workload in handling increased air traffic flow through Kabul FIR.

5.1.3 Bangkok ATFMU utilises the automated, web-based BOBCAT in providing ATFM service in Kabul FIR. These responsibilities will be managed in coordination with airspace users and Singapore ATC in the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1).

5.2 ATFM AFFECTED ATS ROUTES, FLIGHT LEVELS AND APPLICABLE HOURS

5.2.1 All westbound flights intending to enter Kabul FIR between 2000 UTC and 2359 UTC daily on ATS routes and flight levels specified in the Table below shall comply with the BOBCAT procedures. This includes a mandatory requirement for all flights to obtain a specific ATFM slot allocation - CTOT, CTO at Kabul FIR entry waypoint, allocated flight level and allocated ATS route from Bangkok ATFMU for entry into Kabul FIR.

Routing through the Kabul FIR	Metering Waypoint	Flight Level
M875 – TAPIS – L509	LAJAK	FL320, FL340, FL360, FL380, FL400
N644	DOBAT	FL320, FL340, FL360, FL380, FL400
L750	BIROS	FL320, FL340, FL360, FL380, FL400
P628	ASLUM	FL320, FL340, FL360, FL380, FL400
UL333	SERKA	FL320, FL340, FL360, FL380, FL400

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Note: Flight Levels availability may be subject to changes. Stakeholders may access the BOBCAT website for updated information.

5.2.2 Flights that plan to enter Kabul FIR without an ATFM slot allocation will be accommodated only after flights with slots have been processed. Such flights should expect delayed pushback and start clearances, non- preferred routes and/or flight levels, enroute holding and/or diversion around Kabul FIR.

5.2.3 The following flights are exempted from the BOBCAT procedures:

a. Flights experiencing an emergency, including aircraft subjected to unlawful interference;
b. Flights on search and rescue or rescue and firefighting missions;
c. Urgent medical evacuation flights or humanitarian flights specifically declared by State medical authorities that flight delays would put the life of patients aboard at risk; and
d. Flights with “Head of State” status; or
e. Other flights specifically identified by State authorities.

Note: After medical flights have completed their mission, they should be subjected to ATFM measures. Scheduled patient transfer flights are, by their nature, non-urgent and should not be given priority under normal operational situation.

5.2.4 Flights exempted from ATFM procedures shall indicate the exemption in their flight plan as follows:
(Field 18 - STS-BOB ATFM EXMP).

5.3 MANDATORY CTOT AND KABUL FIR SLOT ALLOCATION

5.3.1 Affected flights shall obtain the mandatory Kabul FIR slot allocation - CTOT, CTO at Kabul FIR entry waypoint, allocated flight level and allocated ATS route from the BOBCAT system. The Kabul FIR slot allocation will enable ANSPs to tactically control westbound flights transiting the Kabul FIR at specified times by assigning minimum spacing requirements at specified FIR boundary waypoints of the Kabul FIR.

5.3.2 The application, calculation and distribution of CTOT and associated Kabul FIR entry waypoint slot allocations will be managed via internet access to the BOBCAT system in accordance with the BOBCAT operating procedures in paragraph 5.4.

5.4 BOBCAT OPERATING PROCEDURES

5.4.1 All affected flights are required to submit their slot requests to the BOBCAT system by logging onto https://www.bobcat.aero between 0000 UTC and 1159 UTC on the day of flight and completing the electronic templates provided.

5.4.2 Affected operators who do not have dedicated BOBCAT username/password access should contact Bangkok ATFMU for an account creation as soon as possible.

Slot Allocation Process

5.4.3 The slot allocation is divided into 3 phases, namely, the slot request submission, initial slot allocation, and slot distribution to aircraft operators and ANSPs.

a) Slot Request Submission

i. Includes preferred ATS routes, flight level and Maximum Delay (MAD). These should be lodged between 0000 UTC and 1159 UTC on the day of flight. Slot requests may subsequently be amended prior to the cut-off time of 1200 UTC. Aircraft operators are encouraged to submit additional slot request options in case their first choice is not available. This may include variations to ATS route, flight level and MADs.

ii. Slot requests shall be for flight parameters that are able to be met by the flight. For example, flights requesting a slot at FL360 must be able to enter Kabul FIR at FL360. Flight subsequently unable to meet slot parameters (flight level, ATS route, or CTO at Kabul FIR entry waypoint) should expect non-preferred routes and/or flight levels, enroute holding and/or diversion around Kabul FIR.

iii. Flights that were not allocated a slot in the initial slot allocation, are not satisfied with the allocated slot or did not submit a slot request should select slots from the listing of remaining unallocated slots available immediately after slot distribution has been completed.

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b) Slot Allocation and Distribution

i. Slot allocation will commence at the cut-off time of 1200 UTC. BOBCAT will process and generate the slot allocation based on the information submitted in the slot requests. Notification of slot allocation will be made not later than 1230 UTC via the BOBCAT website and via AFTN using Slot Allocation Message (SAM) in accordance with the Asia/Pacific AFTN/AMHS-Based Interface Control Document.

ii. After the slot allocation has been published at https://www.bobcat.aero, airspace users can:

– Use the slot allocation result for ATS flight planning purposes;
– Cancel the allocated slot; and / or
– Change slot allocation to another available slot in the published list of unallocated slots.

5.5 SUBMISSION OF ATS FLIGHT PLAN

5.5.1 Once aircraft operators are in receipt of the slot allocation, they shall submit the ATS flight plan using the time, ATS route and flight level parameters of the BOBCAT allocated slot.

5.5.2 In addition to the normal AFTN addressees, operators should also address the flight plan (FPL) and related ATS messages (e.g. DLA, CNL, CHG) to the Bangkok ATFMU via AFTN address VTBBZDZX for all flights that have submitted a slot request.

5.6 AIRCRAFT OPERATOR / PILOT-IN-COMMAND AND ANSP RESPONSIBILITIES

Aircraft Operator / Pilot-in-Command

5.6.1 In accordance with ICAO PANS-ATM provisions, it is the responsibility of the Pilot-in-Command (PIC) and the airspace user to ensure that the aircraft is ready to taxi in time to meet any required departure time. PIC shall be kept informed by their aircraft operators of the CTOT, CTO at Kabul FIR entry waypoint and flight parameters (route, flight level) allocated by BOBCAT.

5.6.2 The PIC, in collaboration with ATC, shall arrange take-off as close as possible to the CTOT in order to meet the allocated CTO at Kabul FIR entry waypoint.

5.6.3 For flights with CTOTs from BOBCAT operating out of an A-CDM airport, where the CTOT is integrated into the A-CDM process, PIC is advised to comply with the local A-CDM procedures.

ANSPs

5.6.4 In accordance with ICAO PANS-ATM provisions, flights with an ATFM slot allocation should be given priority for take-off to facilitate compliance with the CTOT.

5.6.5 CTOT shall be included as part of the initial ATC clearance. In collaboration with PIC, Singapore ATC shall ensure that every opportunity and assistance is granted to a flight to meet the allocated CTOT and CTO at Kabul FIR entry waypoint.

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

5.6.7 CTOT compliance window for facilitation of BOBCAT flights is defined to be -5/+10 minutes. As far as practicable, ATC shall manage flights to depart as close to the CTOT as possible.

5.7 COORDINATION BETWEEN AIRCRAFT OPERATOR / PILOT-IN-COMMAND, ANSPs AND BANGKOK ATFMU

5.7.1 The PIC shall include the CTOT in the initial ATC clearance request.

5.7.2 PIC shall adjust cruise flight to comply with slot parameters at the Kabul FIR entry waypoint, requesting appropriate ATC clearances including speed variations in accordance with the published AIP requirements.

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5.7.3 Prior to departure, in circumstances where it becomes obvious that the allocated Kabul FIR entry waypoint slot parameters will not be met, a new slot allocation should be obtained as soon as possible primarily via aircraft operators / flight dispatches. Early advice that the Kabul FIR slot parameters would be missed also enables the slots vacated to be efficiently reassigned to other flights.

5.7.4 A missed slot results in considerable increased coordination workload for ATC and PIC and should be avoided. To minimise coordination workload in obtaining a revised slot allocation, the following procedures are recommended:

a. If the flight is still at the gate, coordination should take place via aircraft operators / flight dispatchers to Bangkok ATFMU;
b. If the flight has left the gate, coordination to Bangkok ATFMU may also take place via the ATS unit presently communicating with the flight.

5.7.5 The Bangkok ATFMU (VTBBZDZX) shall be included in the list of AFTN addressees for NOTAMs regarding any planned activities that may affect slot availability (e.g. reservation of airspace / closure of airspace, non- availability of routes, etc.).

5.7.6 The Bangkok ATFMU (VTBBZDZX) shall be included in the list of AFTN addressees for ATS messages (e.g. FPL, DEP, DLA, CHG, CNL) relating to flights subject to ATFM procedures.

5.8 SYSTEM REQUIREMENT

5.8.1 Aircraft operators and Singapore ATC are required to have a device capable of connecting to the BOBCAT website https://www.bobcat.aero via the internet, using the following minimum web browser software (supported with security patches):

a) Microsoft Edge version 129 or newer; or
b) Google Chrome version 137 or newer; or
c) Safari version 18.5 or newer

5.9 ATFM USERS HANDBOOK

5.9.1 Supporting documentation, including detailed information in respect of the ATFM operations described above and other pertinent information has been included in the Bay of Bengal and South Asia ATFM Handbook (the “ATFM Users Handbook”), available at https://www.bobcat.aero

5.9.2 ANSPs and aircraft operators shall ensure that they are conversant with and able to apply the relevant procedures described in the ATFM Users Handbook.

5.10 CONTINGENCY PROCEDURES

5.10.1 In the event that an aircraft operator or Singapore ATC is unable to access the BOBCAT website, the Bangkok ATFMU shall be contacted via the alternative means (telephone, AFTN) described in paragraph 5.12.

5.10.2 Contingency procedures for submission of slot request, including activation of Contingency Slot Request Templates (CSRT), are included in the ATFM Users Handbook.

5.10.3 In the event of BOBCAT system failure, Bangkok ATFMU shall notify all parties concerned and advise that ATFM slot allocation procedures are suspended. In this event, all parties concerned will revert to the existing ATM procedures as applicable outside the daily period of ATFM metering.

5.11 BOBCAT SYSTEM FAULT REPORTING

5.11.1 An ATFM system fault is defined as a significant occurrence affecting an ATS unit, an aircraft operator or Bangkok ATFMU resulting from the application of ATFM procedures.

5.11.2 Aircraft operators and Singapore ATC experiencing an ATFM system fault should complete an ATFM System Fault Report Form from the ATFM Users Handbook and forward it to the Bangkok ATFMU at the address indicated on the form. The Bangkok ATFMU will analyse all reports, make recommendations / suggestions as appropriate and provide feedback to the parties concerned to enable remedial action.

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5.12 BANGKOK AIR TRAFFIC FLOW MANAGEMENT UNIT (ATFMU) CONTACT INFORMATION

5.12.1 Bangkok ATFMU may be contacted as follows:

Unit Name	:	Bangkok ATFMU
Telephone	:	+66 2 287 8024
Contingency Mobile	:	+66 8 1829 5256
E-mail	:	atfmu@bobcat.aero
AFTN	:	VTBBZDZX

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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 functional check 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:

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"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 9) 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 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

1.5.2 Aircraft using data link surveillance (see ENR 1.1 section 9) 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	**G** (GNSS) **I** (Inertial Navigation) **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).	True Mach NR and FL at entry and exit points	The types of external GNSS augmentation, if any, are specified following the indicator NAV/ and separated by a space. The performance based navigation levels that can be met shall be specified following the indicator PBN/.

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

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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://iwish.kemenhub.go.id/ 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 General

1.1 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)	WSJCZQZX
	Airspace within the Jakarta FIR (WIIF) where ATS is provided by Singapore (see ENR 2.1)	WSJCZQZX WIIFZQZX
	Inbound to:	
	Singapore Changi Airport (WSSS) Seletar Airport (WSSL) Paya Lebar Airport (WSAP) Tengah Airport (WSAT)	WSJCZQZX
	Outbound from:	
	Singapore Changi Airport (WSSSWSSS)	WSSSZPZX
	Seletar Airport (WSSLWSSL)	WSSLZPZX
	Paya Lebar Airport (WSAPWSAP)	WSAPZPZX
	Paya Lebar Airport (WSATWSAT)	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 1.12 INTERCEPTION OF CIVIL AIRCRAFT

1 INTERCEPTION PROCEDURES

The following procedures and visual signals shall apply over the territory and territorial waters of the Republic of Singapore in the event of interception of an aircraft.

1.1 ACTION BY INTERCEPTED AIRCRAFT

1.1.1 An aircraft which is intercepted by another aircraft shall immediately:

a. Follow the instructions given by the intercepting aircraft, interpreting and responding to the visual signals listed on pages ENR 1.12-3 to 1.12-4.
b. Notify, if possible, the appropriate air traffic services unit;
c. Attempt to establish radiocommunication with the intercepting aircraft or with the appropriate intercept control unit, by making a general call on the emergency frequency 121.5MHz, giving the identity of the intercepted aircraft and the nature of the flight; and if no contact has been established and if practicable, repeating this call on the emergency frequency 243MHz;
d. If equipped with SSR transponder, select Mode A, Code 7700, unless otherwise instructed by the appropriate ATS unit.
e. If equipped with ADS-B or ADS-C, select the appropriate emergency functionality, if available, unless otherwise instructed by the appropriate ATS unit.

1.2 RADIO COMMUNICATION DURING INTERCEPTION

1.2.1 If radio contact is established during interception but communication in a common language is not possible, attempts shall be made to convey instructions, acknowledgement of instructions and essential information by using the following phrases and pronunciations and transmitting each phrase twice:

Phrases for use by INTERCEPTED aircraft		
Phrase	**Pronunciation[@]**	**Meaning**
CALL SIGN (call sign)[*]	KOL SA-IN (call sign)	My call sign is (call sign)
WILCO	VILL-KO	Understood. Will comply
CAN NOT	KANN NOTT	Unable to comply
REPEAT	REE-PEET	Repeat your instruction
AM LOST	AMLOST	Position unknown
MAYDAY	MAYDAY	I am in distress
HIJACK[#]	HI-JACK	I have been hijacked
LAND (place name)	LAAND (place name)	I request to land at (place name)
DESCEND	DEE-SEND	I require descent

[@] In the second column, syllables to be emphasised are underlined.

[*] The call sign required to be given is that used in radiotelephony communications with air traffic services units and corresponding to the aircraft identification in the flight plan.

[#] Circumstances may not always permit, nor make desirable, the use of the phrase “HIJACK”.

1.3 The phrases shown in the table below shall be used by the intercepting aircraft and transmitted twice in the circumstances described in the preceding paragraph.

Phrases for use by INTERCEPTING aircraft		
Phrase	**Pronunciation[@]**	**Meaning**
CALL SIGN	KOL SA-IN	What is your call sign?
FOLLOW	FOL-LO	Follow me
DESCEND	DEE-SEND	Descend for landing
YOU LAND	YOULAAND	Land at this aerodrome
PROCEED	PRO-SEED	You may proceed

[@] In the second column, syllables to be emphasized are underlined.

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1.4 If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by visual signals, the intercepted aircraft shall request immediate clarification while continuing to comply with the visual instructions given by the intercepting aircraft.

1.5 If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by radio, the intercepted aircraft shall request immediate clarification while continuing to comply with the radio instructions given by the intercepting aircraft.

1.6 The visual signals for use in the event of interception are detailed on page ENR 1.12-3

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SIGNALS INITIATED BY INTERCEPTING AIRCRAFT AND RESPONSES BY INTERCEPTED AIRCRAFT

Series	INTERCEPTING Aircraft Signals	Meaning	INTERCEPTED Aircraft Responds	Meaning
1	DAY or NIGHT - Rocking aircraft and flashing navigational lights at irregular intervals (and landing lights in the case of a helicopter) from a position slightly above and ahead of, and usually to the left of, the intercepted aircraft (or to the right if the intercepted aircraft is a helicopter) and, after acknowledgement, a slow level turn, normally to the left, (or to the right in the case of a helicopter) on the desired heading. Note: 1. Meteorological conditions or terrain may require the intercepting aircraft to reverse the positions and direction of turn given above in Series 1. Note: 2. If the intercepted aircraft is not able to keep pace with the intercepting aircraft, the latter is expected to fly a series of race- track patterns and to rock the aircraft each time it passes the intercepted aircraft.	You have been intercepted, Follow me	DAY or NIGHT - Rocking aircraft, flashing navigational lights at irregular intervals and following. Note: Additional action required to be taken by intercepted aircraft is prescribed in Chapter 3 para 3.8, Annex 2, Rules of the Air.	Understood, will comply
2	DAY or NIGHT - An abrupt breakaway manoeuvre from the intercepted aircraft consisting of a climbing turn of 90 degrees or more without crossing the line of flight of the intercepted aircraft.	You may proceed.	DAY or NIGHT – Rocking the aircraft.	Understood, will comply.
3	DAY or NIGHT - Lowering landing gear (if fitted), showing steady landing lights and overflying runway in use or, if the intercepted aircraft is a helicopter, overflying the helicopter landing area. In the case of helicopters, the intercepting helicopter makes a landing approach, coming to hover near to the landing area.	Land at this aerodrome.	DAY or NIGHT - Lowering landing gear, (if fitted), showing steady landing lights and following the intercepting aircraft and, if, after overflying the runway in use or helicopter landing area, landing is considered safe, proceeding to land.	Understood, will comply.

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SIGNALS INITIATED BY INTERCEPTED AIRCRAFT AND RESPONSES BY INTERCEPTING AIRCRAFT

Series	INTERCEPTED Aircraft Signals	Meaning	INTERCEPTING Aircraft Responds	Meaning
4	DAY or NIGHT - Raising landing gear (if fitted) and flashing landing lights while passing over runway in use or helicopter landing area at a height exceeding 300m (1 000ft) but not exceeding 600m (2 000ft) (in the case of a helicopter, at a height exceeding 50m (170ft) but not exceeding 100m (330ft))above the aerodrome level, and continuing to circle runway in use or helicopter landing area. If unable to flash landing lights, flash any other lights available.	Aerodrome you have designated is inadequate	DAY or NIGHT - If it is desired that the intercepted aircraft follow the intercepting aircraft to an alternate aerodrome, the intercepting aircraft raises its landing gear (if fitted) and uses the Series 1 signals prescribed for intercepting aircraft.	Understood, follow me.
			If it is decided to release the intercepted aircraft, the intercepting aircraft uses the Series 2 signals prescribed for intercepting aircraft.	Understood, you may proceed.
5	DAY or NIGHT – Regular switching on and off of all available lights but in such a manner as to be distinct from flashing lights.	Cannot comply.	DAY or NIGHT – Use Series 2 signals prescribed for intercepting aircraft.	Understood.
6	DAY or NIGHT – Irregular flashing of all available lights.	In distress.	DAY or NIGHT – Use Series 2 signals prescribed for intercepting aircraft.	Understood.

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ENR 1.13 UNLAWFUL INTERFERENCE

1 General

1.1 The pilot of an aircraft in flight which is subjected to unlawful interference shall endeavour to set his transponder to Code 7500.

1.2 When a pilot has selected Mode A and Code 7500 and is subsequently requested to confirm his code by ATC he shall either confirm this or not reply at all. The absence of a reply from the pilot will be taken by ATC as an indication that the use of Code 7500 is not due to an inadvertent false code selection.

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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.

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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 60 Airport Boulevard, #04-01, Changi Airport Terminal 2 SINGAPORE 819643	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 can submit the report online direct to ICAO at: https://portal.icao.int/WTER/Pages/default.aspx

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

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CIVIL AVIATION AUTHORITY OF SINGAPORE
REPUBLIC OF SINGAPORE

AIR TRAFFIC INCIDENT REPORT FORM

For use when submitting and receiving reports on air traffic incidents. In an initial report by radio, shaded items should be included.

A – AIRCRAFT IDENTIFICATION	**B – TYPE OF INCIDENT** AIRPROX / OBSTRUCTION ON RUNWAY / RUNWAY INCURSION / PROCEDURE / FACILITY*

C — THE INCIDENT

1. General

a) Date / time of incident _____UTC

b) Position _____

2. Own aircraft

a) Heading and route _____

b) True airspeed _____ measured in ( ) kt _____ ( ) km/h _____

c) Level and altimeter setting _____

d) Aircraft climbing or descending

( ) Level flight ( ) Climbing ( ) Descending

e) Aircraft bank angle

( ) Wings level ( ) Slight bank ( ) Moderate bank

( ) Steep bank ( ) Inverted ( ) Unknown

f) Aircraft direction of bank

( ) Left ( ) Right ( ) Unknown

g) Restrictions to visibility (select as many as required)

( ) Sun glare ( ) Windscreen pillar ( ) Dirty windscreen

( ) Other cockpit structure ( ) None

h) Use of aircraft lighting (select as many as required)

( ) Navigation lights ( ) Strobe lights ( ) Cabin lights

( ) Red anti-collision lights ( ) Landing / taxi lights ( ) Logo (tail fin) lights

( ) Other ( ) None

i) Traffic avoidance advice issued by ATS

( ) Yes, based on ATS surveillance system ( ) Yes, based on visual sighting ( ) Yes, based on other information

( ) No

j) Traffic information issued

( ) Yes, based on ATS surveillance system ( ) Yes, based on visual sighting ( ) Yes, based on other information

( ) No

* Delete as appropriate

k) Airborne collision avoidance system — ACAS

( ) Not carried ( ) Type ( ) Traffic advisory issued

( ) Resolution advisory issued ( ) Traffic advisory or resolution advisory not issued

l) Identification

( ) No ATS surveillance system Available ( ) Identification ( ) No identification

m) Other aircraft sighted

( ) Yes ( ) No ( ) Wrong aircraft sighted

n) Avoiding action taken

( ) Yes ( ) No

o) Type of flight plan IFR / VFR / none*

3. Other aircraft

a) Type and call sign / registration (if known) _____

b) If a) above not known, describe below

( ) High wing ( ) Mid wing ( ) Low Wing

( ) Rotorcraft

( ) 1 engine ( ) 2 engines ( ) 3 engines

( ) 4 engines ( ) More than 4 engines

Marking, colour or other available details

_____
_____
_____
_____

c) Aircraft climbing or descending

( ) Level flight ( ) Climbing ( ) Descending

( ) Unknown

d) Aircraft bank angle

( ) Wings level ( ) Slight bank ( ) Moderate bank

( ) Steep bank ( ) Inverted ( ) Unknown

e) Aircraft direction of bank

( ) Left ( ) Right ( ) Unknown

f) Lights displayed

( ) Navigation lights ( ) Strobe lights ( ) Cabin lights

( ) Red anti-collision lights ( ) Landing / taxi lights ( ) Logo (tail fin) lights

( ) Other ( ) None ( ) Unknown

* Delete as appropriate

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g) Traffic avoidance advice issued by ATS

( ) Yes, based on ATS surveillance system ( ) Yes, based on visual sighting ( ) Yes, based on other information
( ) No ( ) Unknown

h) Traffic information issued

( ) Yes, based on ATS surveillance system ( ) Yes, based on visual sighting ( ) Yes, based on other information
( ) No ( ) Unknown

i) Avoiding action taken

( ) Yes ( ) No ( ) Unknown

4. Distance

a) Closest horizontal distance _____

b) Closest vertical distance _____

5. Flight meteorological conditions

a) IMC / VMC*

b) Above / below* clouds / fog / haze or between layers*

c) Distance vertically from cloud _____ m / ft* below _____ m / ft* above

d) In cloud / rain / snow / sleet / fog / haze*

e) Flying into / out of* sun

f) Flight visibility _____ m / km*

6. Any other information considered important by the pilot-in-command

_____
_____
_____
_____
_____

D — MISCELLANEOUS

1. Information regarding reporting aircraft

a) Aircraft registration _____

b) Aircraft type _____

c) Operator _____

d) Aerodrome of departure _____

e) Aerodrome of first landing _____ Destination _____

f) Reported by radio or other means to _____ (name of ATS unit) at date/time _____ UTC

g) Date / time / place of completion of form _____

* Delete as appropriate

2. Function, address and signature of person submitting report

a) Function _____

b) Address _____

c) Signature _____

d) Telephone number _____

3. Function and signature of person receiving report

a) Function _____ b) Signature _____

E — SUPPLEMENTARY INFORMATION BY ATS UNIT CONCERNED

1. Receipt of report

a) Report received via AFTN / radio / telephone / other (specify)* _____

b) Report received by _____ (name of ATS unit)

2. Details of ATS action

Clearance, incident seen (ATS surveillance system/visually, warning given, result of local enquiry, etc.)

_____

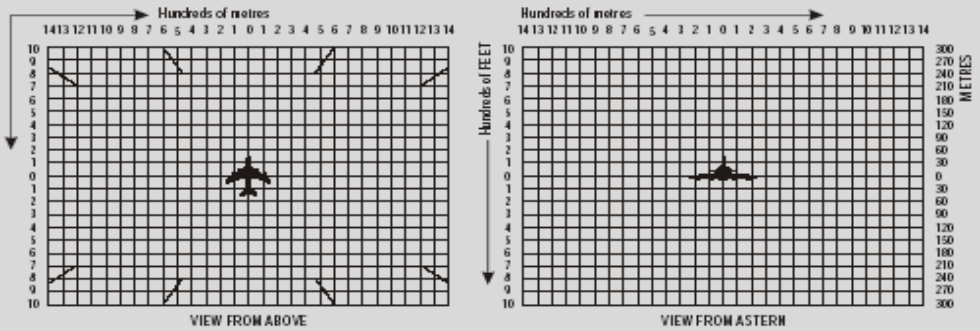
_____

_____

_____

DIAGRAMS OF AIRPROX

Mark passage of other aircraft relative to you, in plan on the left and in elevation on the right, assuming YOU are at the centre of each diagram. Include first sighting and passing distance.



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ENR 2 AIR TRAFFIC SERVICES AIRSPACE

ENR 2.1 FIR, UIR, TMA

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
SINGAPORE FIR 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 **UNL** **SFC**	SINGAPORE ACC	SINGAPORE RADAR English H24	255.4MHz Primary 123.7MHz 133.25MHz 134.4MHz 133.8MHz 134.2 MHZ 134.9 MHZ 134.7MHz Secondary 127.3MHz 135.8MHz 128.1MHz 133.35MHz 134.35 MHZ 134.15kHZ SEA 1 6556kHz 11297kHz SEA 2 5655kHz 8942kHz 11396kHz SEA 3 6556kHz	The responsibility for providing air traffic services to flights within the following portions of the Singapore FIR is vested in the Kuala Lumpur ACC: 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. SEA 1, SEA 2, SEA 3: SSB Suppressed Carriers.
		SINGAPORE CONTROL SOUTH CHINA SEA English H24	AFN LOGON WSJC	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.

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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 JAKARTA FIR WHERE PROVISION OF ATS IS DELEGATED TO 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 Excluding the Tanjungpinang Terminal Control Area and Control Zone FL370 **SFC**	SINGAPORE ACC	SINGAPORE RADAR English H24	255.4MHz Primary 133.25MHz 134.4MHz 134.2MHz Secondary 135.8MHz 128.1MHz 133.35 MHz	

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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. Note: *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 123.7MHz 133.8MHz Secondary 127.3MHz	
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		

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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
SINGAPORE /JOHOR AIRSPACE COMPLEX All controlled airspace within 022600N 1025605E - 022600N 1043400E - 004300N 1043400E - 004300N 1025605E. *FL250 2000ft ALT	SINGAPORE ACC	SINGAPORE RADAR English H24	Primary 123.7MHz 133.8MHz Secondary 127.3MHz	*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 123.7MHz 133.8MHz Secondary 135.8MHz 127.3MHz	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

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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
TANJUNGPINANG TMA 002448N 1043700E follow the circle radius 30NM from 005511N 1043134E anti-clockwise until 010342N 1050018E 005612N 1053200E thence along the circle with radius 60NM from 005511N 1043134E clockwise until 000224N 1050206E 002448N 1043700E 10 000ft 3000 FT	TANJUNGPINANG APPROACH CONTROL OFFICE (APP)	TANJUNGPINANG RADAR English H24	Primary 130.2MHz Secondary 119.35MHz	
TANJUNGPINANG NORTH CONTROL ZONE (CTR)				
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 3 000ft GND/MSL				
TANJUNGPINANG SOUTH CONTROL ZONE (CTR)				
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 6 000ft GND/MSL				

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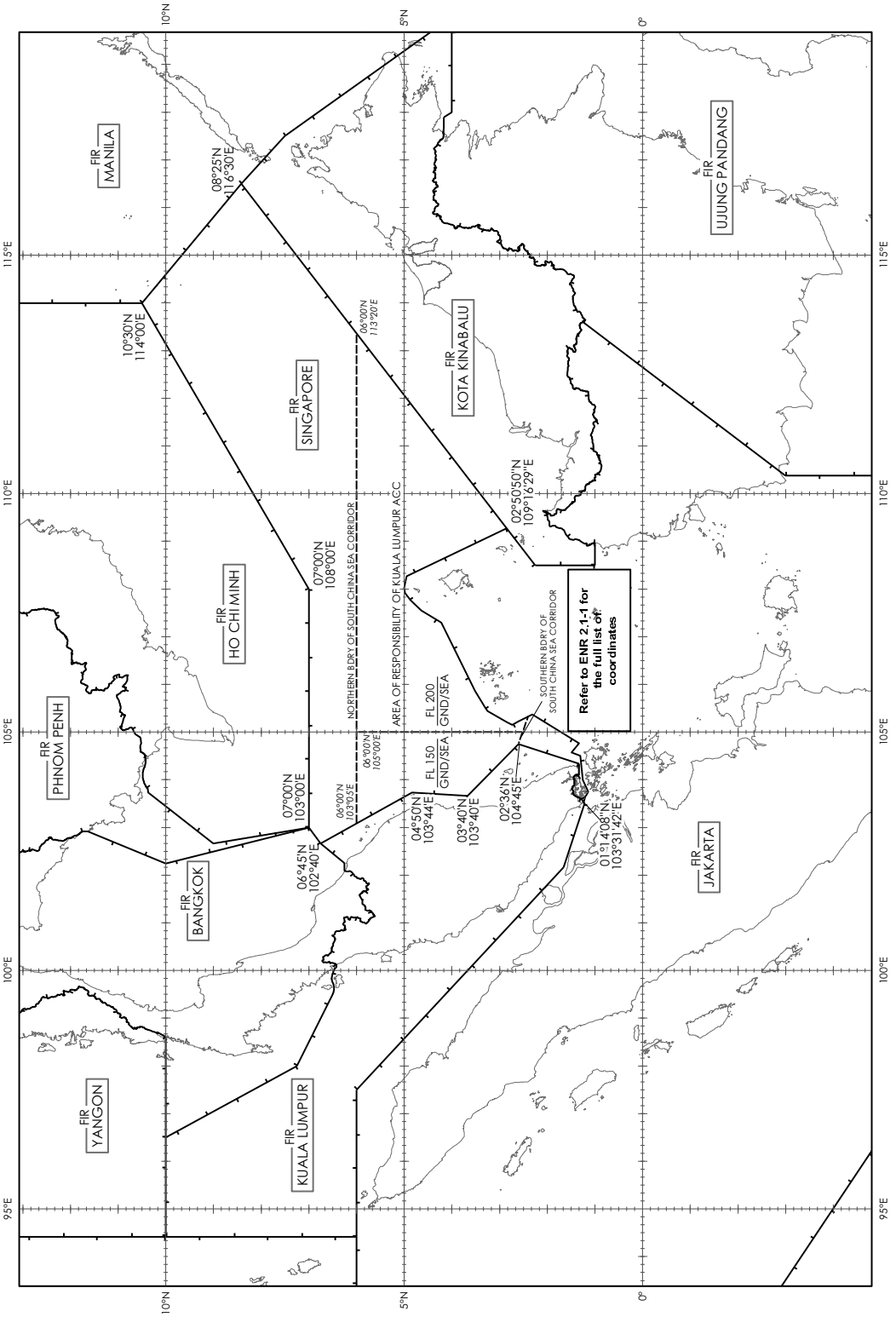
SINGAPORE AND ADJACENT FLIGHT INFORMATION REGIONS



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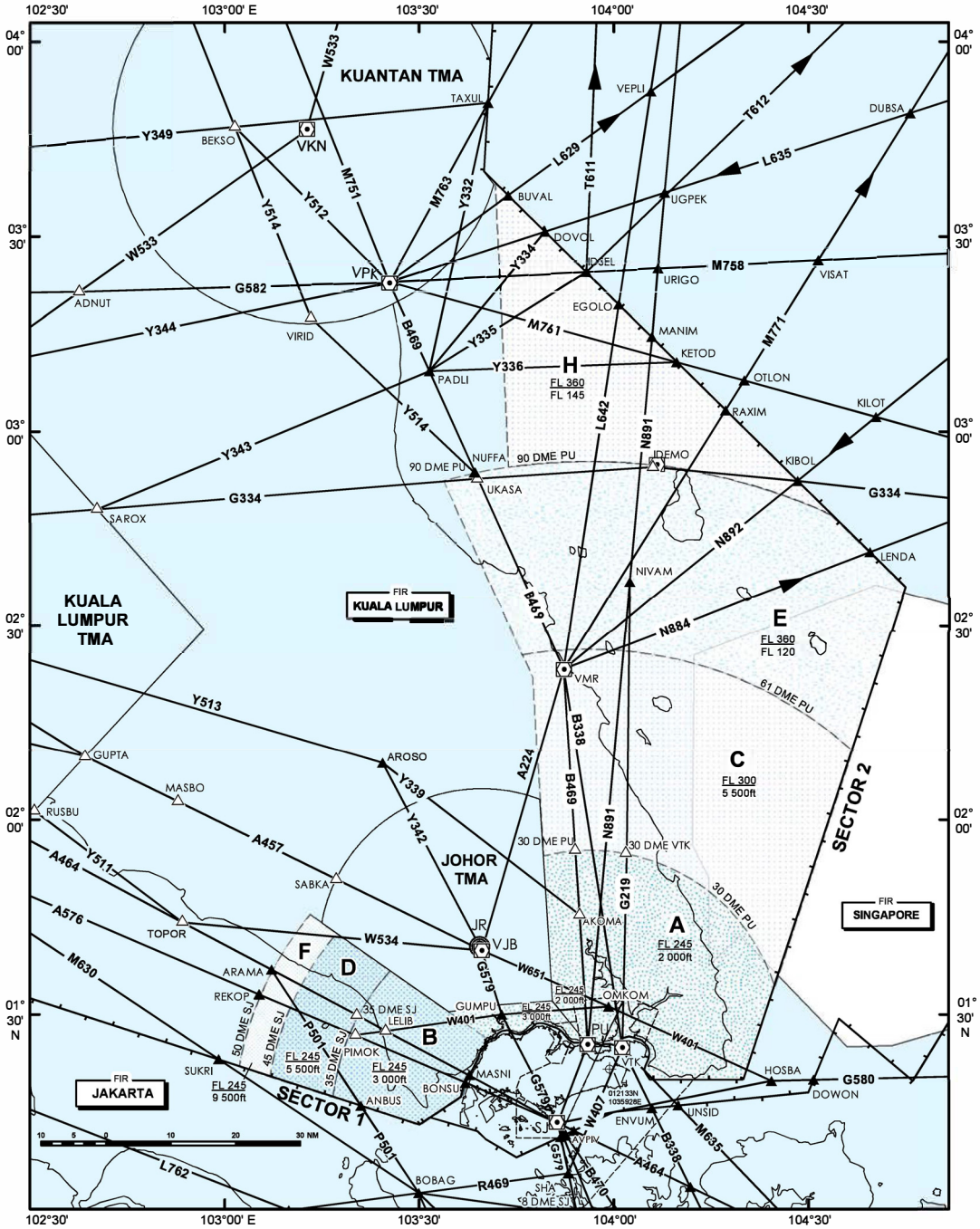
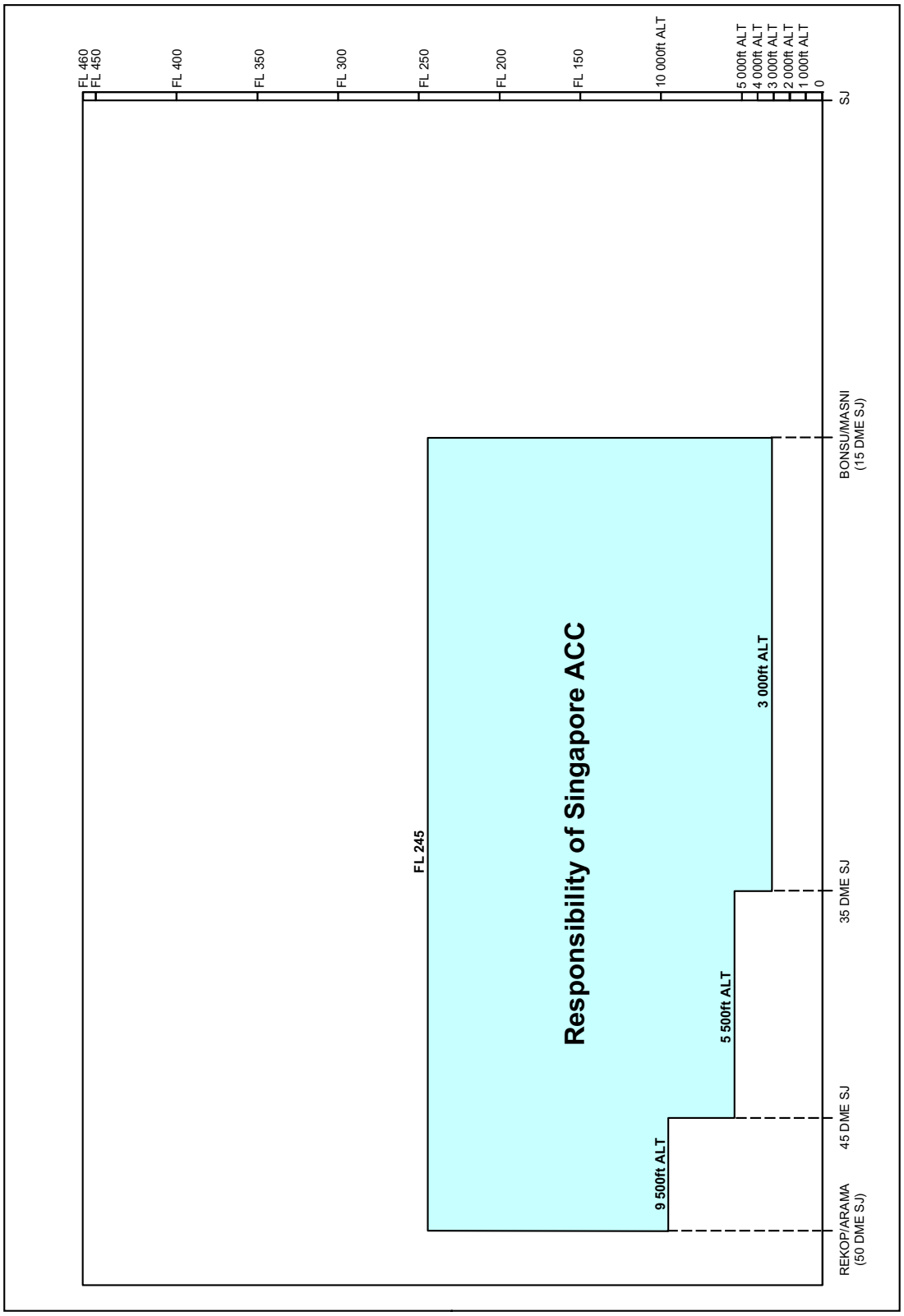
AIRSPACE DIVISION KUALA LUMPUR/SINGAPORE AREAS CONTROL CENTRES



LONGITUDINAL CROSS-SECTION OF SECTOR 1
SJ-REKOP/ARAMA (50 DME SJ)



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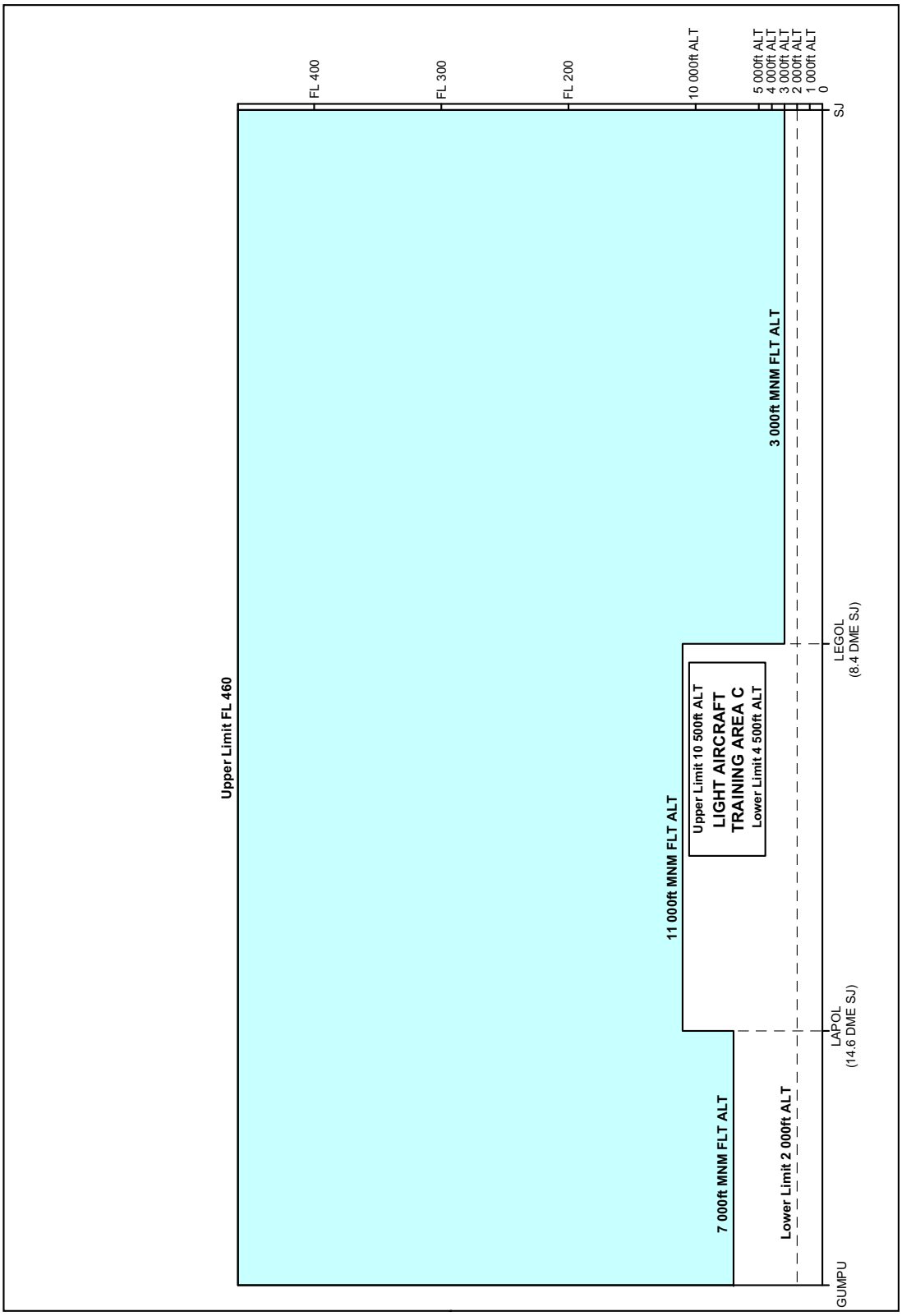
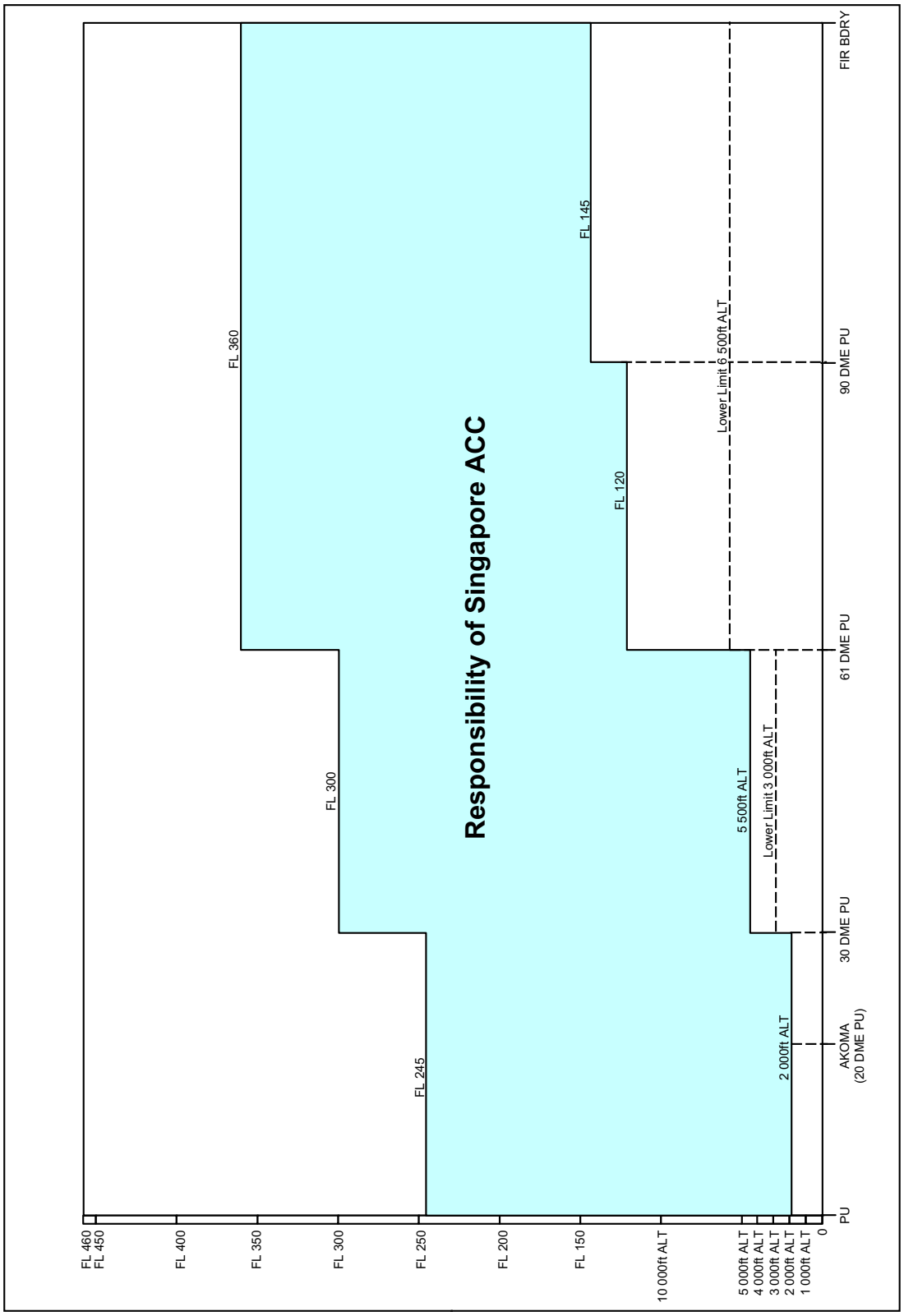
LONGITUDINAL CROSS-SECTION OF G579 FROM GUMPU TO SJ



LONGITUDINAL CROSS-SECTION OF SECTOR 2
PU-SINGAPORE/LUMPUR FIR BOUNDARY



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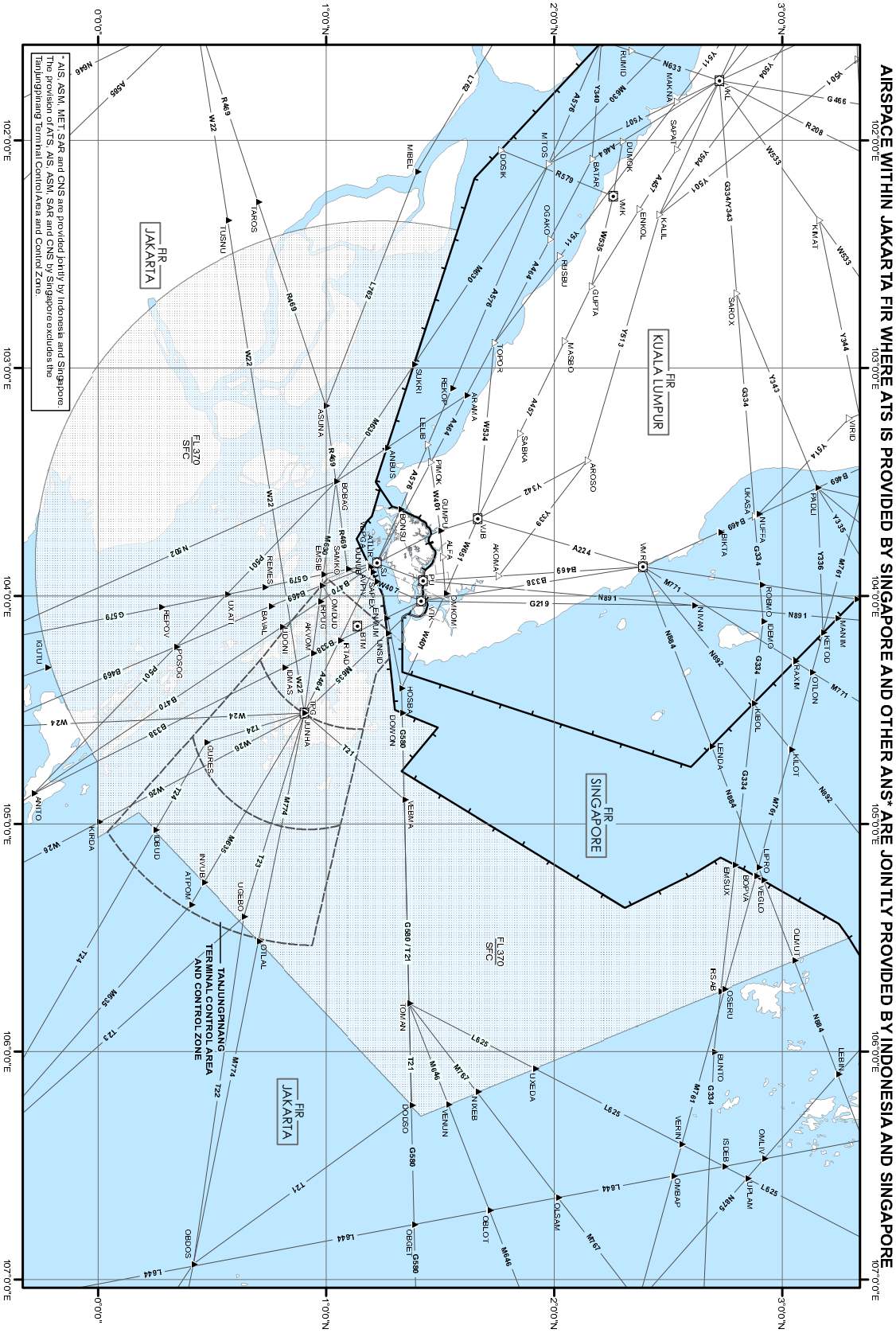
AIRSPACE WITHIN JAKARTA FIR WHERE ATS IS PROVIDED BY SINGAPORE AND OTHER ANS* ARE JOINTLY PROVIDED BY INDONESIA AND SINGAPORE



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ENR 2.2 OTHER REGULATED AIRSPACE

NIL (not applicable).

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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* ↓	*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 remarks: - *Point/Segment Remarks:* -										

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* ↓	*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]
△ 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]
△ MASBO	020248N 1025251E								

Route remarks:

Flight Planning:
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

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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 ↓	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]
△	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]
△	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								

Route remarks:

Singapore ACC FREQ:
P133.25 MHz S135.8 MHz
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.
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).
Flights above FL370 between AVPIV and TPG VOR/DME, see AIP Indonesia ENR2.1.

Point/Segment Remarks:
-

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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* ↓	*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)
△	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								

Route remarks:

15 min longitudinal separation.
RMK: AVBL for southbound FLT only BTN PIMOK and SJ DVOR/DME.
Southbound FLT landing at WSSS are to flight plan via ATS Route A464.
Singapore ACC FREQ:
P133.25MHz S135.8MHz (westbound)
P134.4MHz S128.1MHz (southbound)

Point/Segment Remarks:
(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

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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 ↓	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		Odd(1)	Even(1)	[Class A - ABV FL150] [Class B - BLW FL150](2)
△	20DME PU	014530N 1035812E								
		171° / 351°	20.7NM		FL 460 / 3500 FT ALT	4000 FT		Odd(1)	Even(1)	[Class A - ABV FL150] [Class B - BLW FL150](2)
▲	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								

Route remarks:
Flights above FL370 between ENVUM and ANITO, see AIP Indonesia ENR2.1.

Point/Segment Remarks:
(2) Segment from MERSING to VTK use:
P133.8MHz
S127.3MHz
(3) Kuala Lumpur/Singapore FIR boundary approximately 1.2NM north of VTK
(4) Segment from VTK to ANITO use:
P134.4MHz
S128.1MHz

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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 ↓	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)
△ 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)
△ 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)
△ 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)
△ 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								

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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 ↓	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 600 / 2000 FT ALT	4000 FT	10	Odd(1)	Even(1)	[Class A - ABV FL150] [Class B - BLW FL150](3)
▲ ENPUX	002859S 1043434E								

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

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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* ↓	*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								

Route remarks:
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.
Flight Planning Instructions:
All departures from WIDD and WIDN to WIKK, WIII, WIHH, WICA, WAHH, WAHI to flight plan via KIRDA W26 PKP B470 or ANITO B470.
Singapore ACC FREQ:
P134.4MHz S128.1MHz
Flights above FL370 from VEPGA to ANITO, see AIP Indonesia ENR 2.1.

Point/Segment Remarks:
-

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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 ↓	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)
△ 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)

Route remarks:
Singapore ACC FREQ:
P123.7 MHz, S127.3 MHz

Point/Segment Remarks:
(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.
(3) Singapore/Kuala Lumpur FIR boundary approximately 1.2NM north of VTK.

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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 ↓	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								
△ 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								

Route remarks:
10 min longitudinal separation between RNAV-equipped aircraft applying Mach Number Technique.
15 min longitudinal separation between other aircraft.
Singapore ACC FREQ:
P134.7MHz S134.15MHz
Flight Planning Instructions:
Non-PBN and Non-RVSM equipped aircraft on ATS route G334:
1. 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.
2. 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.

Point/Segment Remarks:
-

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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 ↓	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](2)
▲	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)(3)
△	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](2)
△	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](2)
▲	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](2)(4)
▲	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](4)
▲	EMSIB	005911N 1035419E								
		- / 348°	15.8NM		FL 600 / 2000 FT ALT	5000 FT	10		Even(1)	[Class A - ABV FL150] [Class B - BLW FL150](4)
▲	REMES	004342N 1035735E								
		- / 349°	10.0NM		FL 600 / 2000 FT ALT	5000 FT	10		Even(1)	[Class A - ABV FL150] [Class B - BLW FL150](4)
▲	UXATI	003348N 1035933E								
		- / 349°	17.7NM		FL 600 / 2000 FT ALT	5000 FT	10		Even(1)	[Class A - ABV FL150] [Class B - BLW FL150](4)
▲	REPOV	001623N 1040300E								
		- / 348°	51.1NM		FL 600 / 2000 FT	5000 FT	10		Even(1)	[Class A - ABV FL150] [Class B - BLW FL150](4)
▲	PARDI	003400S 1041300E								

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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**

Route remarks:
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.
Flight Planning Instructions for Direct Routing Operations (DRO):
All aircraft operating at FL290 to FL600 (both inclusive) via PARDI should flight plan using the direct route PARDI DCT PU.
Singapore ACC FREQ:
P134.4MHz S128.1MHz
Flights above FL370 from PARDI to OLNUB, see AIP Indonesia ENR2.1

Point/Segment Remarks:
(2) Bidirectional route between SJ and VJB.
(3) Kuala Lumpur/Singapore FIR boundary is approximately 2NM south of GUMPU.
(4) Unidirectional route from PARDI to SJ.

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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 ↓	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 1042417E								
		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								

Route remarks:
Singapore ACC FREQ:
P134.2MHz S133.35MHz
Flights above FL370 between DOWON and DODSO, see AIP Indonesia ENR2.1.

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
R208	*Route availability:* (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								

Route remarks:
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

Point/Segment Remarks:
-

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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* ↓	*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								

Route remarks:
Singapore ACC FREQ:
P133.25MHz S135.8MHz
Flights above FL370 between TAROS and SAMKO, see AIP Indonesia ENR2.1.

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
W22	*Route availability:* (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								

Route remarks:
Singapore ACC FREQ:
P133.25MHz S135.8MHz
Flights above FL370 between TUSNU and TPG VOR/DME, see AIP Indonesia ENR 2.1.

Point/Segment Remarks:
-

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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* ↓	*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								

Route remarks:
Singapore ACC FREQ:
P134.4MHz S128.1MHz
Flight Planning Instructions:
All departures from WIDD and WIDN to WIPP to flight plan via ENPUX W24 NIPES PLB.
All departures from WIDD and WIDN to WILL to flight plan via ENPUX W24 PLB W21 TERKA.
All departures from WIDD and WIDN to WIJJ to flight plan via ENPUX W24 NIPES JMB.
Flights above FL370 between ENPUX and TPG VOR/DME, see AIP Indonesia ENR 2.1.

Point/Segment Remarks:
-

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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 ↓	Direction of cruising levels ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7	8	9	10
W26	*Route availability:* (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								

Route remarks:
Singapore ACC FREQ:
P134.4MHz S128.1MHz
Flight Planning Instructions:
All departures from WIDD and WIDN to WIKK to flight plan via KIRDA W26 PKP.
All departures from WIDD and WIDN to WIII, WIHH, WICA, WAHH, WAHI to flight plan via KIRDA W26 PKP B470.
Flights above FL370 between TPG VOR/DME and KIRDA, see AIP Indonesia ENR 2.1.

Point/Segment Remarks:
-

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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* ↓	*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 1042417E								
		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.

Point/Segment Remarks:
-

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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* ↓	*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 *Point/Segment Remarks:* -									

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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* ↓	*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								
△	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 remarks:
-
Point/Segment Remarks:
-

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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* ↓	*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								
Route remarks: - *Point/Segment Remarks:* -									

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ENR 3.2 AREA NAVIGATION ROUTES

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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		**2**	**3**	**4**	**5**	**6**	**7**
L517		*Route availability:* (1) H24					
▲	TERIX	041521N 1093456E					
			92.0NM	FL 460 / FL 240		Even(1)	[Class A]
▲	GULIB (WSJC/WBFC FIR BDRY)	041714N 1110633E					(2)

Route remarks:
Lateral Limits:
25NM either side of line joining GULIB to TERIX.
ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover within the Singapore FIR.

Point/Segment Remarks:
(2) VMI 269°
173NM

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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* ↓	*Direction of cruising levels* ↑	*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					

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.
Flights above FL370 from TOMAN to UXEDA, see AIP Indonesia ENR2.1.

Point/Segment Remarks:
(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover between GUTUP and AKMON within the Singapore FIR.
(3) Segment from UXEDA to GUTUP to contact Jakarta ACC.
(4) Segment from TOMAN to UXEDA use:
P134.2 MHz
S133.35 MHz

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
L629	*Route availability:* (1) H24					
▲ DOLOX	044841N 1052247E					
		43.1NM	FL 460 / FL 240		Odd(1)	[Class A]
▲ NOPAT	042313N 1044756E					
		52.2NM	FL 460 / FL 240		Odd(1)	[Class A]
▲ VEPLI	035223N 1040542E					
		27.2NM	FL 460 / FL 240		Odd(1)	[Class A]
▲ BUVAL (WSJC/WMFC FIR BDRY)	033622N 1034341E					
		22.6NM	FL 460 / FL 240		Odd(1)	[Class A]
▲ PEKAN DVOR/DME (VPK)	032259N 1032524E					

Route remarks:
Lateral Limits:
10NM either side of line joining VPK DVOR/DME to BUVAL and 25NM either side of line joining BUVAL to DOLOX.
Singapore ACC FREQ:
P123.7 MHz
S127.3 MHz

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		2	3	4	5	6	7
L635		*Route availability:* (1) H24					
▲	MABLI	041717N 1061247E					
			59.9NM	FL 460 / FL 240	Even(1)		[Class A]
▲	SUSAR	035848N 1051547E					
			31.6NM	FL 460 / FL 240	Even(1)		[Class A]
▲	DUBSA	034901N 1044540E					
			39.7NM	FL 460 / FL 240	Even(1)		[Class A]
▲	UGPEK	033647N 1040752E					
			19.4NM	FL 460 / FL 240	Even(1)		[Class A]
▲	DOVOL (WSJC/WMFC FIR BDRY)	033047N 1034923E					
			25.2NM	FL 460 / FL 240	Even(1)		[Class A]
▲	PEKAN DVOR/DME (VPK)	032259N 1032524E					

Route remarks:
Lateral Limits:
10NM either side of line joining VPK DVOR/DME to DOVOL and 25NM either side of the line joining DOVOL to MABLI
Singapore ACC FREQ:
P123.7 MHz
S127.3 MHz

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
L642	*Route availability:* (1) H24					
▼ ESPOB (VVHM/WSJC FIR BDRY)	070000N 1053318E					
(10)		149.2NM	FL 460 / FL 135			[Class A](2)(3)(4)
▲ ENREP	045224N 1041442E					(7)
(10)		60.4NM	FL 460 / FL 135	Odd(1)	Even(1)	[Class A](5)
▲ VEPLI	035223N 1040542E					(8)
(10)		33.0NM	FL 460 / FL 135	Odd(1)	Even(1)	[Class A](5)
▲ EGOLO (WSJC/WMFC FIR BDRY)	031934N 1040047E					(9)
(10)		25.1NM	FL 460 / FL 135	Odd(1)	Even(1)	[Class A](6)
▲ ROBMO	025440N 1035700E					(10)
(10)		31.6NM	FL 460 / FL 135	Odd(1)	Even(1)	[Class A](6)
▲ MERSING DVOR/DME (VMR)	022318N 1035218E					

Route remarks:
Lateral Limits:
10NM either side of line joining VMR DVOR/DME to EGOLO and 25NM either side of line joining EGOLO to ESPOB.
Bi-directional between VMR and ENREP.
Flight planning for Direct Routing Operations (DRO):
Arriving aircraft to 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.
All other aircraft operating at FL290 to FL460 (inclusive) and entering Singapore FIR via ESPOB should flight plan using the direct route ESPOB DCT EGOLO.

Point/Segment Remarks:
(2) ADS-C service is available to suitably equipped aircraft operating outside radar cover (between ESPOB and ENREP) and not in the exclusive ADS-B airspace within Singapore FIR.
(3) Uni-directional for southbound flights from ESPOB to ENREP. No PDC Flight Levels FL310, FL320, FL350, FL360, FL390, FL400 applicable. Other levels available with prior approval.
(4) Segment from ESPOB to ENREP use:
P134.9 MHz
S134.35 MHz
(5) Segment from ENREP to EGOLO use:
P123.7 MHz
S127.3 MHz
(6) Segment from EGOLO to VMR use:
P133.8 MHz
S127.3 MHz
(7) VMR 008°
150.0NM
(8) VMR 008°
89.7NM
(9) VMR 008°
56.6NM
(10) VMR 008°
31.6NM

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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* ↓	*Direction of cruising levels* ↑	*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					

Route remarks:
Flight Planning Instructions for Direct Routing Operations (DRO):
All aircraft operating at FL290 to FL460 (inclusive) and entering Singapore FIR via DUDIS should flight plan using the direct route DUDIS DCT LIGVU.

Point/Segment Remarks:
(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:
P134.9 MHz
S134.35 MHz
(4) Segment from MABLI to LIGVU use:
P134.7 MHz
S134.15 MHz

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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* ↓	*Direction of cruising levels* ↑	*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					
(10)		62.0NM	FL 460 / FL 240		Even(1)	[Class A]
▲ DAKIX (WBFC/WSJC FIR BDRY)	070854N 1145054E					(2)

Route remarks:
Lateral Limits: 25NM either side of line joining DAKIX to LAXOR.
Available only for flights departing from Brunei (WBSB), Labuan (WBKL) and Miri (WBGR) to Hong Kong (VHHH) only.
No-PDC Flight Levels FL300 and FL380 applicable.
ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover within the Singapore FIR.

Point/Segment Remarks:
(2) BRU 359°
136NM

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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*** ↓	***Direction of cruising levels*** ↑	***Controlling unit Frequency {Airspace class} Remarks***
1	**2**	**3**	**4**	**5**	**6**	**7**
L762	*Route availability:* (1) H24					
▲ ASUNA	005948N 1030954E					
(10)	291° 111°	66.2NM	FL 600 9500 FT ALT	Even(1)	Odd(1)	[Class A - ABV FL150] [Class B - BLW FL150]
▲ MIBEL	012351N 1020816E					

Route remarks:
Singapore ACC FREQ:
P133.25MHz S135.8MHz
Flight Planning Instructions:
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.
Flights above FL370 between ASUNA and MIBEL, see AIP Indonesia ENR 2.1.

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		**2**	**3**	**4**	**5**	**6**	**7**
M522		*Route availability:* (1) H24					
▲	VINIK (WSJC/RPHI FIR BDRY)	083830N 1161348E					
			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					

Route remarks:
Portion of M522 within the Singapore FIR has been delegated to Kota Kinabalu ACC for provision of ATS
Kinabalu ACC FREQ:
126.1 MHz

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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					

Route remarks:
Flight departing from aerodromes in Peninsular Malaysia with planned cruising level of FL270 or above are required to cross SUKRI at FL270 or above.
Singapore ACC FREQ:
P133.25 MHz S135.8 MHz
Flights above FL370 from SUKRI to JUNHA, see AIP Indonesia ENR2.1.

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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 / 5500 FT 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					

Route remarks:
Singapore ACC FREQ:
P134.4 MHz S128.1 MHz
Flight Planning Instructions:
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.
Flights overflying Singapore to land at Kuala Lumpur and Subang are to flight plan via M635 JUNHA IRTAD A464 SJ G579 VJB A457.
All departures from Singapore aerodromes joining ATS route M635 to flight plan via JUNHA T24.
Flights above FL370 between UNSID and SURGA, see AIP Indonesia ENR2.1.

Point/Segment Remarks:
(2) Kuala Lumpur / Singapore FIR boundary approximately 1.2NM north of VTK.

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
M646	*Route availability:* (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					

Route remarks:
Singapore ACC FREQ:
P134.2 MHz S133.35 MHz
Flights above FL370 between VENUN and TOMAN, see AIP Indonesia ENR 2.1.

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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]
▲ ENREP	045224N 1041442E					

Route remarks:
Singapore ACC FREQ:
P134.9 MHz
S134.35 MHz
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.
Flight planning for Direct Routing Operations (DRO):
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.
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.
Lateral Limits:
25NM either side of line joining ENREP to IPRIX.

Point/Segment Remarks:
-

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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* ↓	*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/WMFC FIR BDRY)	080242N 1160054E					

Route remarks:
Lateral Limits:
10NM either side of line joining SUMLA to VINIK.
Portion of M754 within the Singapore FIR has been delegated to Kinabalu ACC for provision of ATS.
Kinabalu ACC FREQ:
126.1 MHz

Point/Segment Remarks:
(2) BRU 019°
238.9NM

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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* ↓	*Direction of cruising levels* ↑	*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](2)
▲	IDSEL (WMFC/WSJC FIR BDRY)	032432N 1035544E					
		087° / 267°	11.1NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A](3)
▲	URIGO	032505N 1040647E					
		087° / 267°	24.8NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A](3)
▲	VISAT	032620N 1043134E					
		087° / 267°	41.1NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A](3)
▲	MABAL	032826N 1051236E					
		087° / 267°	35.7NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A](3)
▲	ELGOR	033014N 1054818E					
		087° / 267°	2.6NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A](3)
△	UPVUN (WSJC/WIIF FIR BDRY)	033022N 1055053E					
		087° / 267°	30.5NM	FL 600 / FL 245	Odd(1)	Even(1)	[Class A](3)(4)
▲	OPULA	033155N 1062118E					
		087° / 267°	34.3NM	FL 600 / FL 245	Odd(1)	Even(1)	[Class A](4)
▲	LUSMO	033341N 1065534E					
		075° / 255°	110.7NM	FL 600 / FL 245	Odd(1)	Even(1)	[Class A](4)
▲	GULGU (WSJC/WIIF FIR BDRY)	040141N 1084242E					
		075° / 255°	53.9NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A](5)
▼	TERIX	041521N 1093456E					
		075° / 255°	140.5NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A](5)
▲	OLKIT (WSJC/WBFC FIR BDRY)	045010N 1115118E					

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**

Route remarks:

-

Point/Segment Remarks:

(2) Segment from VPK to IDSEL use:
P123.7 MHz
S127.3 MHz
(3) Segment from IDSEL to UPVUN use:
P134.7 MHz
S134.15 MHz
(4) Segment from UPVUN to GULGU to contact Jakarta ACC.
(5) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover between GULGU and OLKIT within the Singapore FIR.

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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 ↓	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)(4)
▲	OSERU (Delegated airspace BDRY)	024450N 1054334E					

Route remarks:

-

Point/Segment Remarks:

(2) Segment from VPK to KETOD use:
P123.7 MHz
S127.3 MHz

(3) Segment from KETOD to OSERU use:
P134.7 MHz
S134.15 MHz

(4) Flights above FL370 between BOPVA and OSERU, see AIP Indonesia ENR2.1

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		2	3	4	5	6	7
M763		*Route availability:* (1) H24					
▲	ENREP	045224N 1041442E					
			70.3NM	FL 460 / FL 240	Even(1)	Odd(1)	[Class A]
▲	TAXUL (WMFC/WSJC FIR BDRY)	035035N 1034037E					
			31.4NM	FL 460 / FL 240	Even(1)	Odd(1)	[Class A]
▲	PEKAN DVOR/DME (VPK)	032259N 1032524E					

Route remarks:
Lateral Limits:
10NM either side of line joining VPK DVOR/DME to TAXUL and 25NM either side of line joining TAXUL to ENREP.
Singapore ACC FREQ:
P123.7 MHz
S127.3 MHz

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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					

Route remarks:
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

Point/Segment Remarks:
(2) VKB 058°
88.8NM

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
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	Even(1)		[Class A] [Class B](2)(3)(4)
▲ BOBOB	022206N 1070558E					
(10)	233° -	69.6NM	FL 600 FL 205	Even(1)		[Class A] [Class B](4)
▲ NIXEB (Delegated airspace BDRY)	013943N 1061040E					
(10)	232° -	29.4NM	FL 600 FL 205			[Class A - ABV FL150](4)(5)
▲ 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 ENR2.1.

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
M768	*Route availability:* (1) H24					
▲ AKMON	081254N 1101306E					
(10)		96.9NM	FL 460 / FL 135	Odd(1)	Even(1)	[Class A]
▼ LAGOT	071632N 1113243E					
(10)		76.9NM	FL 460 / FL 135	Odd(1)	Even(1)	[Class A]
▲ TODAM	063138N 1123536E					
(10)		55.4NM	FL 460 / FL 135	Odd(1)	Even(1)	[Class A]
▲ ASISU (WSJC/WBFC FIR BDRY)	055906N 1132046E					(2)

Route remarks:
Lateral Limits:
25NM either side of line joining ASISU to AKMON.
ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover within the Singapore FIR.

Point/Segment Remarks:
(2) BRU 305°
113.3NM

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
M771	*Route availability:* (1) H24					
▲ DUDIS (WSJC/VVHM FIR BDRY)	070000N 1064836E					
(10)		156.2NM	FL 460 / FL 135			[Class A](2)(3)
▲ DOLOX	044841N 1052247E					(7)
(10)		42.5NM	FL 460 / FL 135			[Class A](4)
▲ DAMOG	041225N 1050014E					(8)
(10)		27.5NM	FL 460 / FL 135			[Class A](4)
▲ DUBSA	034901N 1044540E					(9)
(10)		26.6NM	FL 460 / FL 135			[Class A](5)
▲ VISAT	032620N 1043134E					(10)
(10)		21.7NM	FL 460 / FL 135			[Class A](5)
▲ OTLON	030752N 1042006E					(11)
(10)		5.4NM	FL 460 / FL 135			[Class A](5)
▲ RAXIM (WMFC/WSJC FIR BDRY)	030318N 1041713E					(12)
(10)		47.0NM	FL 460 / FL 135			[Class A](6)
▲ MERSING DVOR/DME (VMR)	022318N 1035218E					

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**

Route remarks:
Lateral Limits:
10NM either side of line joining VMR DVOR/DME to RAXIM and 25NM either side of line joining RAXIM to DUDIS.
Uni-directional for north-east bound flights from VMR to DUDIS. No PDC Flight Levels FL310, FL320, FL350, FL360, FL390, FL400 applicable. Other levels available with prior approval.

Point/Segment Remarks:
(2) ADS-C service is available to suitably equipped aircraft operating outside radar cover (between DOLOX and DUDIS) and not in exclusive ADS-B airspace within the Singapore FIR.
(3) Segment from DUDIS to DOLOX use:
P134.9 MHz
S134.35 MHz
(4) Segment from DOLOX to DUBSA use:
P123.7 MHz
S127.3 MHz
(5) Segment from DUBSA to RAXIM use:
P134.7 MHz
S134.15 MHz
(6) Segment from RAXIM to VMR use:
P133.8 MHz
S127.3 MHz
(7) VMR 031°
170.6NM
(8) VMR 031°
128.1NM
(9) VMR 032°
100.6NM
(10) VMR 032°
74.0NM
(11) VMR 032°
52.4NM
(12) VMR 032°
47.0NM

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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* ↓	*Direction of cruising levels* ↑	*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					
(10)	020° / -	147.5NM	FL 460 / FL 240		Even(1)	[Class A]
▲ BIDAG	073101N 1135544E					
(10)	020° / -	97.9NM	FL 460 / FL 240		Even(1)	[Class A](2)
▲ ASISU (WBFC/WSJC FIR BDRY)	055906N 1132046E					

Route remarks:
Lateral Limits:
25NM either side of line joining ASISU to LAXOR.
Available only for flights departing from :
- WIII and WIHH to VHHH and airports in People's Republic of China.
- WBGB, WBSB, WBGG, WBKL, WBGR and WBGS to VHHH only.
ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover within the Singapore FIR.

Point/Segment Remarks:
(2) BRU 305°
113.3NM

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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* ↓	*Direction of cruising levels* ↑	*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					

Route Remarks:
Singapore ACC FREQ:
P134.4 MHz S128.1 MHz
Flight Planning:
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.
Flights above FL370 between JUNHA and OBDOS, see AIP Indonesia ENR 2.1.

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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)]
▲ ODONO	063614N 1030129E					
(10)	144°/324°	33.1NM	FL 460/FL 145	Odd(1)	Even(1)	[Class A (FL290 and ABV)]
▲ UPRON	060903N 1032040E					
(10)	144°/324°	93.4NM	FL 460/FL 245	Odd(1)	Even(1)	[Class A (FL290 and ABV)]
▲ ENREP	045224N 1041442E					

Route remarks:
Singapore ACC FREQ:
P134.9 MHz
S134.35 MHz
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.

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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					

Route remarks:
Singapore ACC FREQ:
P134.4 MHz S128.1 MHz
Flights above FL370 from PARDI to BOBAG, see AIP Indonesia ENR 2.1.

Point/Segment Remarks:
-

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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* ↓	*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					

Route remarks:
-
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

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
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](3)
▲ LUSMO	033341N 1065534E					
(10)	069° / -	53.0NM	FL 600 / 6500 FT ALT		Odd(1)	[Class A] [Class B](3)
▲ LEBIN	031438N 1060604E					
(10)	069° / -	32.2NM	FL 600 / 6500 FT ALT		Odd(1)	[Class A] [Class B](3)
▲ OLMUT (Delegated airspace BDRY)	030306N 1053558E					
(10)	069° / -	22.5NM	FL 600 / 6500 FT ALT			[Class A - ABV FL150] [Class B - BLW FL150](4)
▲ VEGLO (WSJC/WIIF FIR BDRY)	025502N 1051457E					
(10)	069° / -	3.7NM	FL 460 / 6500 FT ALT			[Class A](4)
▲ LIPRO	025342N 1051128E					
(10)	069° / -	34.2NM	FL 460 / 6500 FT ALT			[Class A](4)
▲ LENDA (WSJC/WMFC FIR BDRY)	024124N 1043932E					
(10)	069° / -	50.6NM	FL 460 / 6500 FT ALT			[Class A](5)
▲ MERSING DVOR/DME (VMR)	022318N 1035218E					

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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*** ↓	***Direction of cruising levels*** ↑	***Controlling unit Frequency {Airspace class} Remarks***
1	**2**	**3**	**4**	**5**	**6**	**7**

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.
Flight planning:
Not available for flight planning between VMR and OLMUT. Flight Plan via TOMAN L625.
Flights above FL370 from VEGLO to OLMUT, see AIP Indonesia ENR2.1.

Point/Segment Remarks:
(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between RILRI and LAXOR) within the Singapore FIR.
(3) Segment from OLMUT to RILRI to contact Jakarta ACC.
(4) Segment from OLMUT to LENDA use:
P134.7 MHz
S134.15 MHz
(5) Segment from LENDA to VMR use:
P133.8 MHz
S127.3 MHz

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
N891	*Route availability:* (1) H24					
▲ IGARI (WSJC/VVHM FIR BDRY)	065612N 1033506E					
(10)	162° 342°	65.4NM	FL 460 FL 155	Odd(1)	Even(1)	[Class A](2)
▲ IKUMI	055338N 1035509E					
(10)	162° 342°	64.0NM	FL 460 FL 155	Odd(1)	Even(1)	[Class A](2)
▲ ENREP	045224N 1041442E					
(10)	185° 005°	75.5NM	FL 460 FL 155	Odd(1)	Even(1)	[Class A](3)
▲ UGPEK	033647N 1040752E					
(10)	185° 005°	11.7NM	FL 460 FL 155	Even(1)	Odd(1)	[Class A](3)
▲ URIGO	032505N 1040647E					
(10)	184° 004°	10.6NM	FL 460 FL 155	Even(1)	Odd(1)	[Class A](3)
▲ MANIM (WMFC/WSJC FIR BDRY)	031430N 1040554E					
(10)	185° 005°	2.6NM	FL 460 FL 155	Even(1)	Odd(1)	[Class A](4)
▲ OBDAB	031153N 1040538E					
(10)	185° 005°	106.4NM	FL 460 FL 155	Even(1)	Odd(1)	[Class A](4)
▲ PAPA UNIFORM DVOR/DME (PU)	012524N 1035600E					(5)

Route remarks:
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

Point/Segment Remarks:
(2) Segment from IGARI to ENREP use:
P134.9 MHz
S134.35 MHz
(3) Segment from ENREP to MANIM use:
P123.7 MHz
S127.3 MHz
(4) Segment from MANIM to PU use:
P133.8 MHz
S127.3 MHz
(5) WSJC/WMFC FIR boundary approximately 0.4NM North of PU.

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
N892	*Route availability:* (1) H24					
▼ MELAS (VVHM/WSJC FIR BDRY)	070518N 1080912E					
(10)		203.6NM	FL 460 / FL 135			[Class A](2)(3)
▲ MABLI	041717N 1061247E					(6)
(10)		52.1NM	FL 460 / FL 135			[Class A](4)
▲ MUMSO	034420N 1053213E					(7)
(10)		25.2NM	FL 460 / FL 135			[Class A](4)
▲ MABAL	032826N 1051236E					(8)
(10)		41.4NM	FL 460 / FL 135			[Class A](4)
▲ KILOT	030217N 1044023E					(9)
(10)		15.7NM	FL 460 / FL 135			[Class A](4)
▲ KIBOL (WSJC/WMFC FIR BDRY)	025224N 1042818E					(10)
(10)		28.1NM	FL 460 / FL 135			[Class A](5)
▲ PEKLA	023437N 1040618E					(11)
(10)		18.0NM	FL 460 / FL 135			[Class A](5)
▲ MERSING DVOR/DME (VMR)	022318N 1035218E					

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**

Route remarks:
Lateral Limits:
10NM either side of line joining VMR DVOR/DME to KIBOL and 25NM either side of line joining KIBOL to MELAS.
Uni-directional for south-west bound flights from MELAS to VMR. No PDC Flight Levels FL310, FL320, FL350, FL360, FL390, FL400 applicable. Other levels available with prior approval.
Flight planning for Direct Routing Operations (DRO):
Arriving aircraft into Singapore Changi Airport operating at FL290 to FL460 (inclusive) and entering Singapore FIR via MELAS should flight plan using the direct route MELAS DCT MABAL.
All other aircraft operating at FL290 to FL460 (inclusive) and entering Singapore FIR via MELAS should flight plan using the direct route MELAS DCT MABAL.

Point/Segment Remarks:
(2) ADS-C service is available to suitably equipped aircraft operating outside radar cover (between MELAS and MABLI) and not in the exclusive ADS-B airspace within the Singapore FIR.
(3) Segment from MELAS to MABLI use:
P134.9 MHz
S134.35 MHz
(4) Segment from MABLI to KIBOL use:
P134.7 MHz
S134.15 MHz
(5) Segment from KIBOL to VMR use:
P133.8 MHz
S127.3 MHz
(6) VMR 051°
180.6NM
(7) VMR 051°
128.4NM
(8) VMR 051°
103.2NM
(9) VMR 051°
61.8NM
(10) VMR 050°
46.1NM
(11) VMR 051°
18.0NM

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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* ↓	*Direction of cruising levels* ↑	*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					

Route remarks:
Flights above FL370 from ANBUS to ANITO, see AIP Indonesia ENR2.1.

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

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		**2**	**3**	**4**	**5**	**6**	**7**
Q801		*Route availability:* (1) H24					
▲	ESPOB (VVHM/WSJC FIR BDRY)	070000N 1053318E					
			143.0NM	FL 460 / FL 200			[Class A]
▲	ESBUM	045210N 1042830E					

Route remarks:
Lateral Limits:
15NM either side of line joining ESPOB TO ESBUM.
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.
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.
Singapore ACC FREQ:
P134.9 MHz
S134.35 MHz

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		2	3	4	5	6	7
Q802		*Route availability:* (1) H24					
▲	IPRIX (VVHM/WSJC FIR BDRY)	070000N 1040754E					
			130.0NM	FL 460 / FL 200	Odd(1)		[Class A]
▲	ESBUM	045210N 1042830E					
			39.0NM	FL 460 / FL 200	Odd(1)		[Class A]
▲	ELALO	041240N 1043329E					

Route remarks:
Lateral Limits:
15NM either side of line joining IPRIX to ELALO
Singapore ACC FREQ:
P134.9 MHz
S134.35 MHz

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		**2**	**3**	**4**	**5**	**6**	**7**
Q803		*Route availability:* (1) H24					
▲	UPRON	060903N 1032040E					
			87.0NM	FL 460 / FL 240	Odd(1)		[Class A]
▲	IPDOL	045111N 1035920E					
			15.0NM	FL 460 / FL 200	Odd(1)		[Class A]
▲	KEXOL	043930N 1040942E					
			36.0NM	FL 460 / FL 200	Odd(1)		[Class A]
▲	ELALO	041240N 1043329E					

Route remarks:
Lateral Limits:
15NM either side of line joining UPRON to ELALO
Singapore ACC FREQ:
P134.9 MHz
S134.35 MHz

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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					

Route remarks:
Singapore ACC FREQ:
P134.2 MHz S133.35 MHz
Flight Planning Instructions:
All departures from Singapore aerodromes, Batam and Tanjungpinang joining ATS route L504 or M774 to flight plan via DODSO T21.
Flights above FL370 from JUNHA to DODSO, see AIP Indonesia ENR 2.1.

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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]
▲	UGEBO	003813N 1052432E					

Route remarks:
Singapore ACC FREQ:
P134.2 MHz S133.35 MHz
Flight Planning Instructions:
Arrivals into Changi, Batam and Tanjungpinang on L504 or M774 to flight plan via OBDOS – UGEBO. After UGEBO, to join the UGEBO STAR.
Arrivals into WSSL and WSAP on L504 or M774 to flight plan via OBDOS – T22 – UGEBO – T23 – JUNHA. After JUNHA to route either to OMKOM or SJ.
Flights above FL370 from OBDOS to UGEBO, see AIP Indonesia ENR 2.1.

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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					

Route remarks:
Singapore ACC FREQ:
P134.2 MHz S133.35 MHz
Flight Planning Instructions:
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.
Flights above FL370 from SURGA to JUNHA, see AIP Indonesia ENR 2.1

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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					

Route remarks:
Singapore ACC FREQ:
P134.4 MHz S128.1 MHz
Flight Planning Instructions:
All departures from Singapore aerodromes, Batam and Tanjungpinang joining ATS route M635 to flight plan via IDBUD T24.
Flights above FL370 from JUNHA to SURGA, see AIP Indonesia ENR 2.1.

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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.
Flight planning unidirectional for northbound flights from DOLTA-IGUTU to Batam and Tanjungpinang.
All departures from WIPP to WIDD and WIDN to flight plan via T25 IGUTU.
All departures from WIKK to WIDD and WIDN to flight plan via DCT NIPES T25 IGUTU.
All departures from WIJJ to WIDD and WIDN to flight plan via IGUTU.

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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					

Route remarks:
Lateral Limits:
15NM either side of line joining IDSEL to IPRIX.
Singapore ACC FREQ:
P123.7 MHz
S127.3 MHz

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		2	3	4	5	6	7
T612		*Route availability:* (1) H24					
▲	DOLOX	044841N 1052247E					
			121.0NM	FL 460 / FL 200			[Class A]
▲	IDSEL (WMFC/WSJC FIR BDRY)	032432N 1035544E					

Route remarks:
Lateral Limits:
15NM either side of line joining IDSEL to DOLOX.
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.
Singapore ACC FREQ:
P123.7 MHz
S127.30 MHz

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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					
		192° / -	42.1NM	FL 460 / FL 245	Even(1)		
▲	PADLI	030918N 1033133E					

Route remarks:
Lateral Limits:
10NM either side of line joining TAXUL to PADLI.
Singapore ACC FREQ:
P123.7 MHz
S127.3 MHz

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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					
		219° -	27.8NM	FL 460 FL 245	Even(1)		
▲	PADLI	030918N 1033133E					

Route remarks:
Lateral Limits:
10NM either side of line joining DOVOL to PADLI.
Singapore ACC FREQ:
P123.7 MHz
S127.3 MHz

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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)	
▲	PADLI	030918N 1033133E					

Route remarks:
Lateral Limits:
10NM on either side of line joining IDSEL to PADLI.
Singapore ACC FREQ:
P123.7 MHz
S127.3 MHz

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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					

Route remarks:
Lateral Limits:
10NM on either side of line joining KETOD to PADLI.
Singapore ACC FREQ:
P123.7 MHz
S127.3 MHz

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		**2**	**3**	**4**	**5**	**6**	**7**
Y339		*Route availability:* (1) H24					
△	AKOMA (20 DME PU)	014522N 1035443E					
(2)			38.3NM	FL 460 5500 FT ALT	Even(1)		[Class A-ABV FL150 Class B-BLW FL150]
△	AROSO	020846N 1032421E					

Route remarks:
Lateral Limits:
11.5NM either side of line joining AKOMA to AROSO.
Flight Planning
Flights departing from or overflying Singapore FIR to destinations north of WMKK and WMSA are to flight plan via Y339.
Flights landing at WMKK and WMSA, or flights operating at FL220 and below, refer to A457.
Singapore ACC FREQ:
P133.25 MHz
S135.8 MHz

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*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					
			32.6NM	FL 460 / 4500 FT ALT	Even(1)		[Class A-ABV FL150 Class B-BLW FL150]
△	AROSO	020846N 1032421E					

Route remarks:
Lateral Limits:
10NM either side of line joining VJB to AROSO.
Flight Planning
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.

Point/Segment Remarks:
-

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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* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		**2**	**3**	**4**	**5**	**6**	**7**
Y514		*Route availability:* (1) H24					
△	VIRID	031728N 1031318E					
(2)			34.6NM	FL 460 / 11000 FT ALT	Odd(1)		[Class A]
▲	NUFFA	025341N 1033830E					

Route remarks:
Singapore ACC FREQ:
P123.7MHz
S127.3MHz
Flight Planning
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

Point/Segment Remarks:
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ENR 3.3 NIL

NIL (not applicable).

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ENR 3.4 NIL

NIL (not applicable).

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ENR 3.5 OTHER ROUTES

1 SINJON CROSSING BY MILITARY AIRCRAFT

1.1 Introduction

1.1.1 In order to facilitate the movement of various types of military traffic operating through the Changi Control Zone without impeding the flow of procedural traffic operating into and out of the Zone, the following procedures have been established for strict compliance by pilots-in-command (refer to chart ENR 3.5-3).

1.2 Crossing by Slow-moving Military Aircraft (Slow-lane Crossings)

1.2.1 All slow-moving military aircraft are permitted to cross the Changi CTR 8.1NM and 6.7NM south of the extended centreline of RWY 02L and RWY 02C respectively. EASTBOUND and WESTBOUND flights at 500ft AMSL without reference to Singapore Tower or Singapore Approach.

1.2.2 The EASTBOUND is from PULAU AYER MERBAU (011600.00N 1034340.00E) on track of 110° MAG to the northern tip of Lazarus Island (SINJON). Thereafter, the track is 89° MAG to Point “E1” (10 DME SJ) and then direct to NEXUS [34 DME SJ R-077 (23 DME VTK R-100)] (012048.00N 1042424.00E).

1.2.3 The WESTBOUND is from NEXUS direct to Point “E1”. Thereafter, the track is 269° MAG to the northern tip of Lazarus Island (SINJON) and then 290°MAG until entering Tengah Aerodrome Traffic Zone.

1.3 Crossing by Fast-moving Military Aircraft (Fast-lane Crossings)

1.3.1 All fast-moving military aircraft are permitted to cross the Changi Control Zone 9.4NM and 8NM south of the extended centreline of RWY 02L and RWY 02C respectively. EASTBOUND flights are to operate at 1,000ft AMSL and WESTBOUND flights at 500ft AMSL without reference to Singapore Tower or Singapore Approach.

1.3.2 The EASTBOUND is from PULAU SAKRA (011545.00N 1034200.00E) on a track of 115° MAG to Pulau Bukom Kechil and then track 110° MAG to 1NM south of the southern tip of Lazarus Island (SINJON). Thereafter, the track is 089° MAG to Point “E” (011221.00N 1040121.00E) and then direct to SIERRA (011830.00N 1042600.00E).

1.3.3 The WESTBOUND is from Point “E” on the reciprocal of the eastbound track to PULAU SAKRA.

1.4 SINJON Crossings at 1,500 FT

1.4.1 Eastbound and Westbound military aircraft are permitted to cross Changi Control Zone via the Low Level track at 1,500ft without reference to Singapore Tower or Singapore Approach. The Low Level track is established from SIERRA to SJ DVOR via Point "E" and a point 0.5NM north of PULAU SAMBU (011045.00N 1035356.00E). Aircraft on the Low Level track are only allowed to maintain 1,500ft and below between SJ DVOR and PULAU SAMBU.

1.5 Operating Hours of SINJON Crossings

1.5.1 SINJON Crossings are applicable at all times of the day.

1.6 Suspension of Unrestricted Military Crossings

1.6.1 In view of military traffic crossing the Changi CTR to the south, whenever it is known or has been made known that procedural or civil training traffic are unable for reasons of load or performance, etc., to effect a normal climb on RWY 20R/20C, the unrestricted crossings shall be suspended and the RSAF FIS Controller be informed immediately.

1.6.2 All aircraft departing on RWY 20R/20C on SID are required to cross 8 DME VTK at or above 2,000ft. If the height restriction cannot be complied with, the pilot-in-command of an aircraft departing on RWY 20R/20C shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure.

1.7 Altimeter Setting

1.7.1 The Singapore QNH setting shall be used by military aircraft crossing the Changi CTR under the above procedures.

1.8 Emergency

1.8.1 In the event of an emergency occurring to a procedural aircraft in the area e.g. an engine cut on takeoff or landing etc., all unrestricted military crossings under these procedures shall be forthwith suspended. Such suspensions shall be notified immediately to the Duty RSAF FIS Controller, SATCC.

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2 TRANSIT CHANNEL

2.1 Introduction

2.1.1 To ensure safety of aircraft operations and minimise interruptions to aircraft operating in Light Aircraft Training Area A, a transit channel is established for military traffic to transit through. The Transit Channel will be all the airspace within Area A north of Mandai Road.

2.2 Activation

2.2.1 The Transit Channel will be activated only when there is a military aircraft crossing. Activation will be initiated by Paya Lebar Approach. All aircraft operating within the area are advised to vacate the channel on receipt of the activation. Such aircraft shall report their intentions to Paya Lebar Approach.

2.2.2 To ensure safety of operation, all aircraft operating within the lateral and vertical limits of the channel shall notify Paya Lebar Approach.

2.3 Dimensions

2.3.1 The co-ordinates for the Channel are:

012714N 1034752E 012442N 1034705E 012438N 1034556E 012650N 1034619E.
(refer to chart ENR 3.5-3).

2.4 Vertical Limits

2.4.1 Ground level to 2,000ft.

3 HORSBURGH LIGHTHOUSE

3.1 Horsburgh Lighthouse (011949N 1042420E) is a visual reference point for VFR flights.

3.2 For the purpose of safe navigation, all VFR traffic in the vicinity of the Horsburgh Lighthouse shall exercise extra caution when approaching the area.

3.3 Vertical Limits: Ground/sea level to 2,000 feet for VFR flights.
Note: Minimum flight altitude on ATS Route G580 above the Horsburgh Lighthouse is 3,000 feet.

3.4 The Singapore QNH shall be used by all aircraft in the vicinity of Horsburgh Lighthouse.

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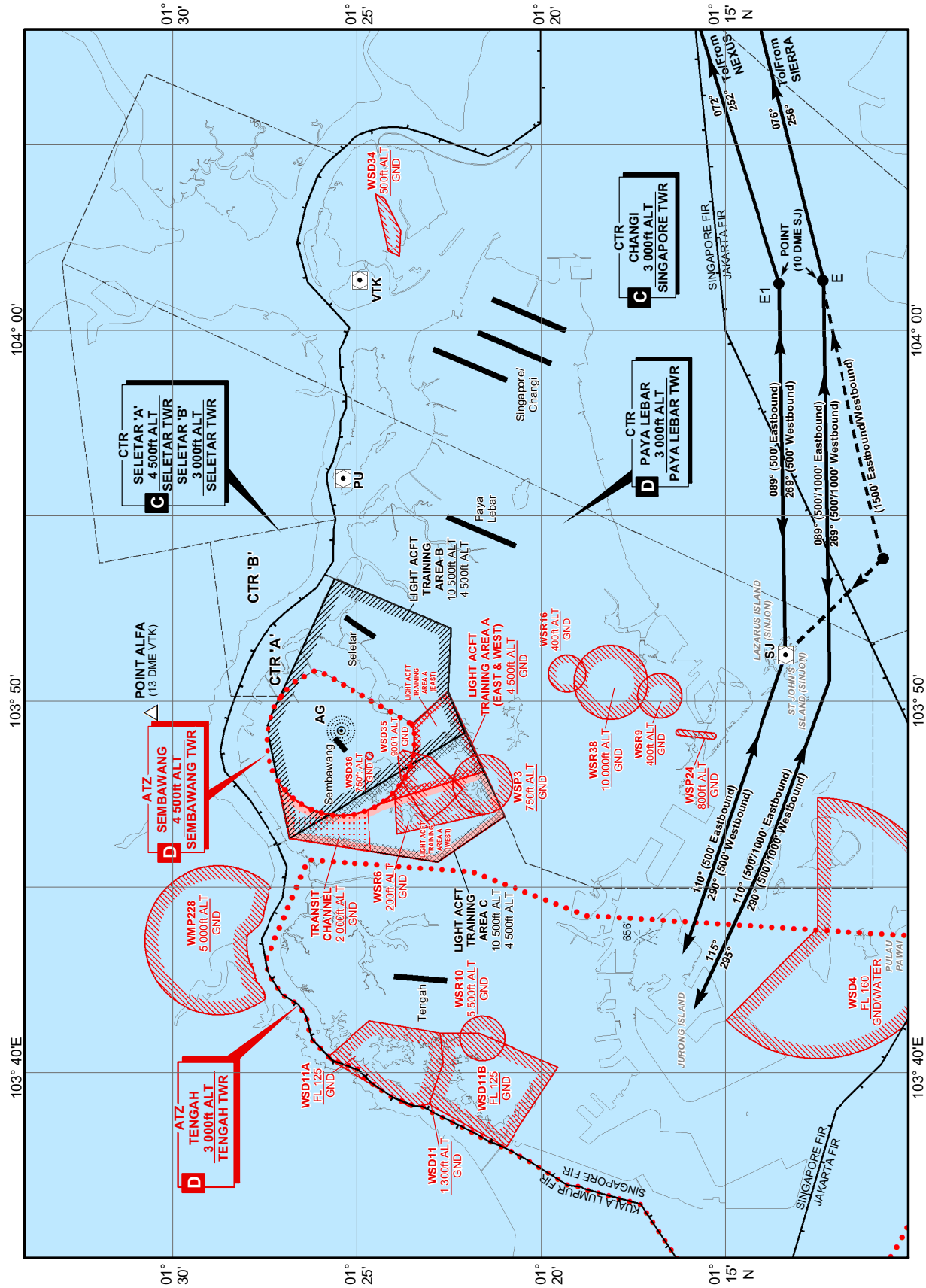
VMC CROSSING BY MILITARY AIRCRAFT



4 HELICOPTER OPERATIONS OVER SINGAPORE ISLAND

4.1 INTRODUCTION

4.1.1 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.

4.2 RESTRICTED AREA -SINGLE-ENGINE HELICOPTER OPERATIONS RESTRICTED

4.2.1 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).

4.2.2 Part of this triangle lies within the existing Restricted Area WSR38 (see charts ENR 3.5-8 and ENR 3.5-9).

4.3 ROUTINGS

4.3.1 All helicopters must fly over water or use routes approved by the CAAS. There are two over-water and one over-land helicopter routes.

4.3.2 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 3.5-8).

4.4 OVER-WATER ROUTES

4.4.1 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.

4.4.1.1 **Heli-Route Alpha**

4.4.1.2 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 3.5-5).

	Markers Description	*Coordinates*	*Remarks*
a)	CHANGI BEACON	011909.00N 1040206.00E	WHITE lights, 3 flashes every 15 sec
b)	BUOY CNB-04	011844.00N 1040224.00E	YELLOW buoy, 3m above waterline YELLOW lights, 1 flash every 2 sec
c)	BUOY CNB-03	011809.00N 1040224.00E	YELLOW buoy, 3m above waterline YELLOW lights, 1 flash every 2 sec
d)	BUOY CNB-02	011806.00N 1040100.00E	YELLOW buoy, 3m above waterline YELLOW lights, 1 flash every 2 sec
e)	BUOY CNB-01	011829.00N 1040059.00E	YELLOW buoy, 3m above waterline YELLOW lights, 1 flash every 2 sec
f)	Singapore Armed Forces Yacht Club Jetty	011851.00N 1040058.00E	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.

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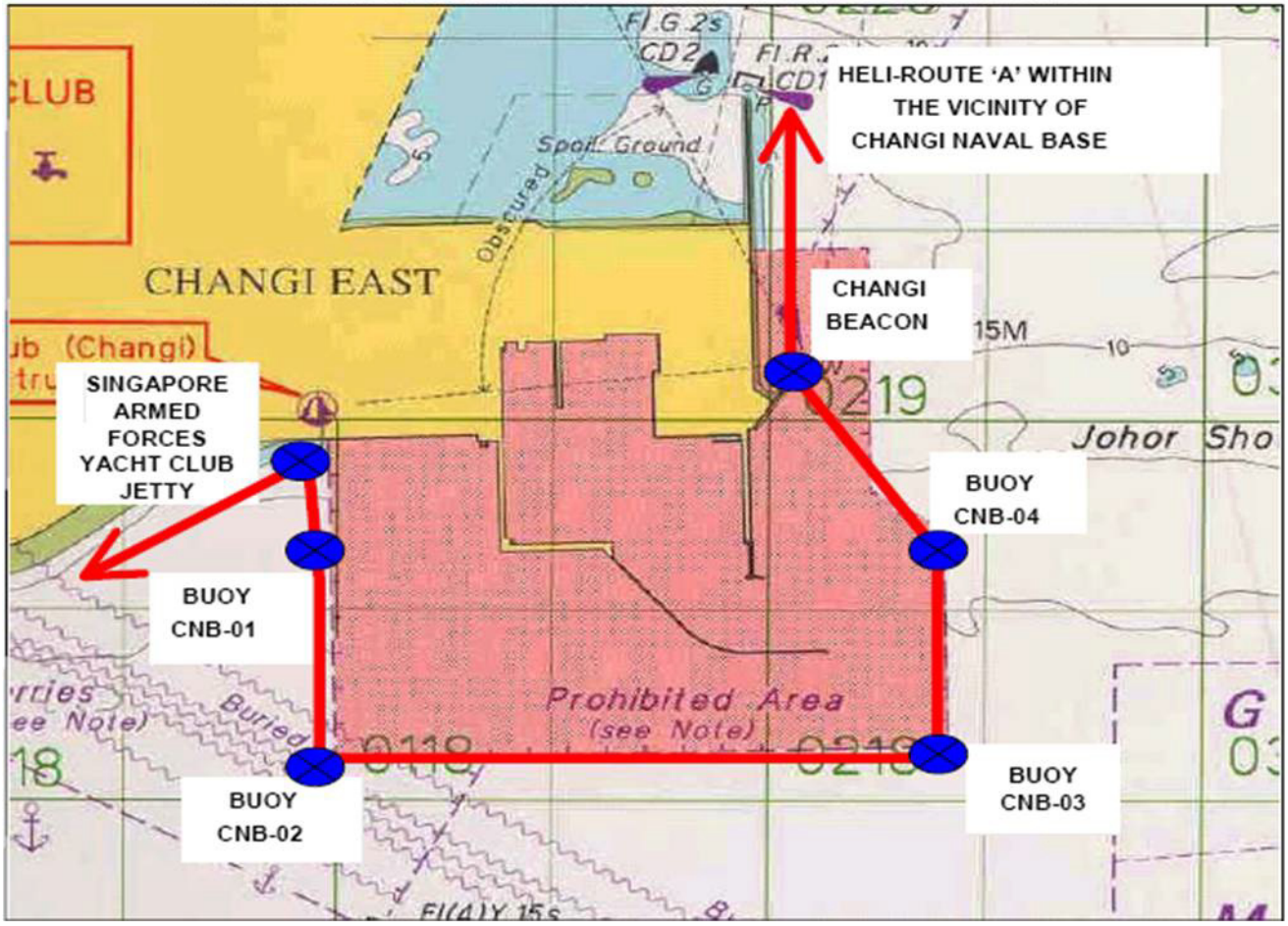
HELI-ROUTE 'A' WITHIN THE VICINITY OF CHANGI NAVAL BASE



4.4.1.3 **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.

4.5 OVER-LAND ROUTE

4.5.1 The over-land transit route established to facilitate helicopter movements across the Singapore Island is as follows:

4.5.1.1 **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).

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4.6 CONDITIONS GOVERNING THE USE OF HELI-ROUTE CHARLIE

4.6.1 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.

4.7 FLIGHTS OPERATING OUTSIDE THE ESTABLISHED ROUTINGS

4.7.1 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.

4.7.2 While this requirement is not applicable for helicopter training flights operating within a designated aircraft training area (Light Aircraft Training Areas A, B or C), flight planning requirements per paragraphs 1.1.2 and 1.1.3 in page ENR 1.10-1 remain applicable.

4.7.3 An application for permission can be submitted to caas_ats_ansp@caas.gov.sg. CAAS may ask for a flight inspection of the proposed route and / or areas of operation. The applicant shall provide the means and bear the cost of the flight inspection. Each case would be considered on its own merits and unless CAAS is satisfied that there are very good justifications, approval would normally not be given.

4.8 FLIGHT PLAN REQUIREMENTS

4.8.1 For Flight Plan requirements, refer to ENR 1.10 FLIGHT PLANNING.

5 PROCEDURES FOR THE CONTROL OF HELICOPTER OPERATIONS AT SINGAPORE CHANGI AIRPORT

5.1 APPROACH AND DEPARTURE PROCEDURES

5.1.1 Before entering the Changi Control Zone, a helicopter pilot is to advise Singapore Tower of his direction of approach, distance from the airport, altitude and type of helicopter. Singapore Tower will pass to the pilot the runway in use, QNH (QFE on request), surface wind and direction and if necessary the position of the helicopter alighting area:

Example:	RWY 20R QNH 1008, Wind 020/7kt, light on the runway, Clear to make an approach or hold clear of the Control Zone until advised.

5.1.2 All alightings and take-offs are to be made in a north/south direction as determined by the prevailing wind. The approach from and the turn after take-off shall be made clear of all airport buildings, aprons and obstructions. Requests for approach into and take-offs from Singapore Changi Airport shall be made to Singapore Tower.

5.1.3 Helicopters intending to cross the Changi Control Zone must cross the runway immediately on receipt of clearance and cross at right angles to the runway. Helicopters would be cleared to cross the runway up to the time when a fixed wing aircraft has reached 4NM final approach and Singapore Tower has the landing aircraft in sight. If the weather condition is such that it is not expected that Singapore Tower can see the landing aircraft at 4NM final approach, crossing will only be cleared up to the time the landing aircraft reports leaving the SAMKO Holding Area or NYLON Holding Area inbound.

5.1.4 After take-off, the helicopter is to make a turn-off right or left as appropriate as soon as possible and proceed until well clear of the Changi Control Zone. On reaching the boundary of the zone, the pilot will report 'clearing your zone' and normal clearance will be given.

5.2 GROUND OR AIR TAXIING

5.2.1 After landing, the helicopter is required either to ground or air taxi via the taxiways into its allocated aircraft stand.

5.2.2 For take-offs, the helicopter will either ground or air taxi away from its aircraft stand and move out of the parking area via taxiways to the runway or helicopter area for take-off.

5.3 ALLOCATION OF AIRCRAFT STANDS

5.3.1 The allocation of aircraft stands for helicopters rests with the Apron Control Unit. In allocating aircraft stands the Duty Officer at the Apron Control Unit shall take into consideration the type of helicopter, stand occupancy time and the nature of the flight i.e. passenger carrying, training or for maintenance purposes.

5.3.2 Helicopter ferrying passengers will normally be allocated remote aircraft stands, i.e. stands without aerobridges.

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5.4 RADIO FAILURE PROCEDURE

5.4.1 In the event of radio failure, the helicopter affected if on the ground shall not take-off

5.4.2 If radio failure occurs while in the air, alighting and taxiing clearances will be given by the Tower by the use of the appropriate light signals as described in page ENR 1.1-10, Appendix ‘A’.

5.5 NIGHT OPERATIONS BY HELICOPTERS

5.5.1 Helicopters that are required to operate into and out of Singapore Changi Airport at night shall land on the runway and ground taxi into its aircraft stand via the lighted taxiways.

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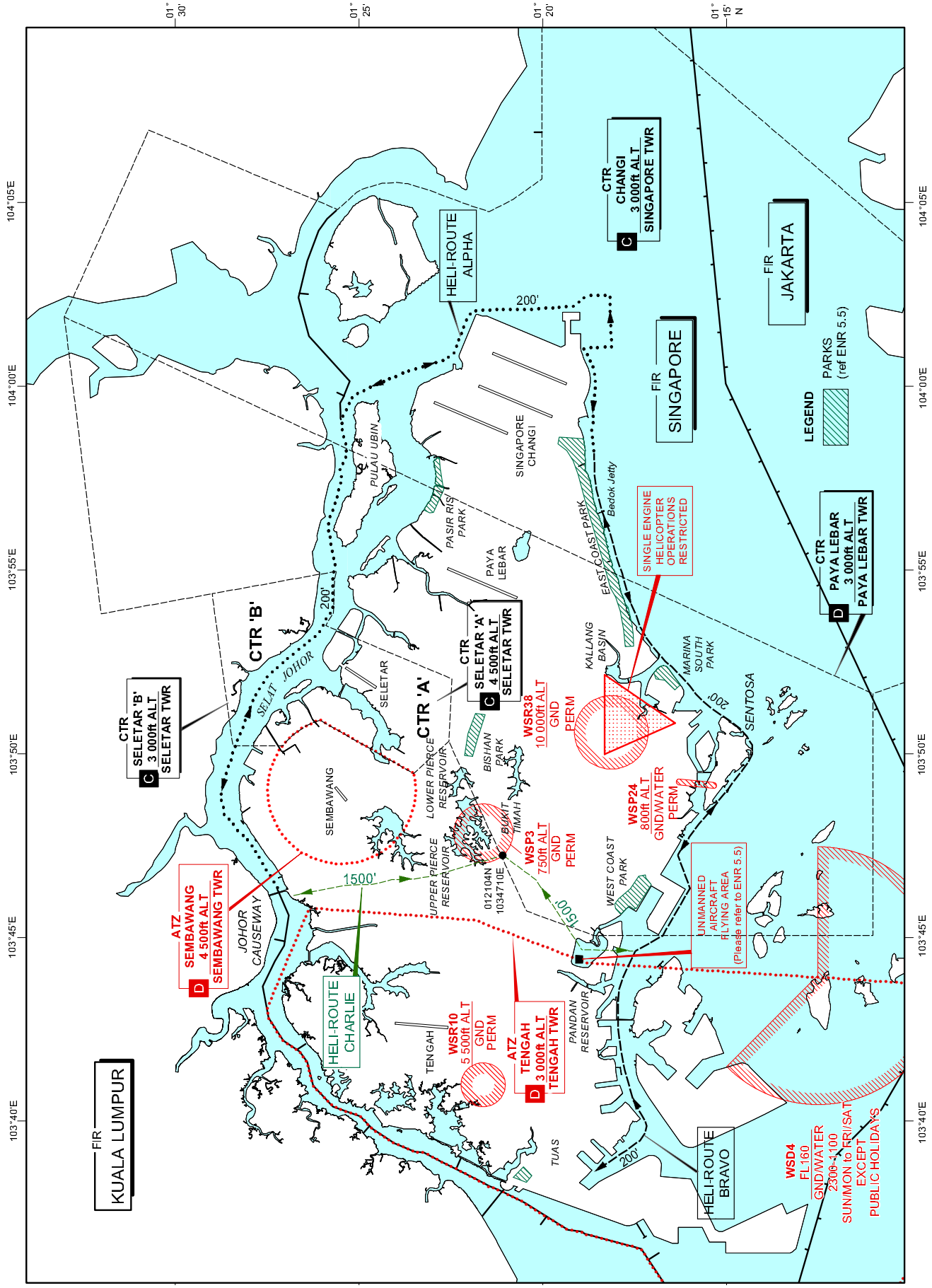
HELICOPTER ROUTES IN VMC



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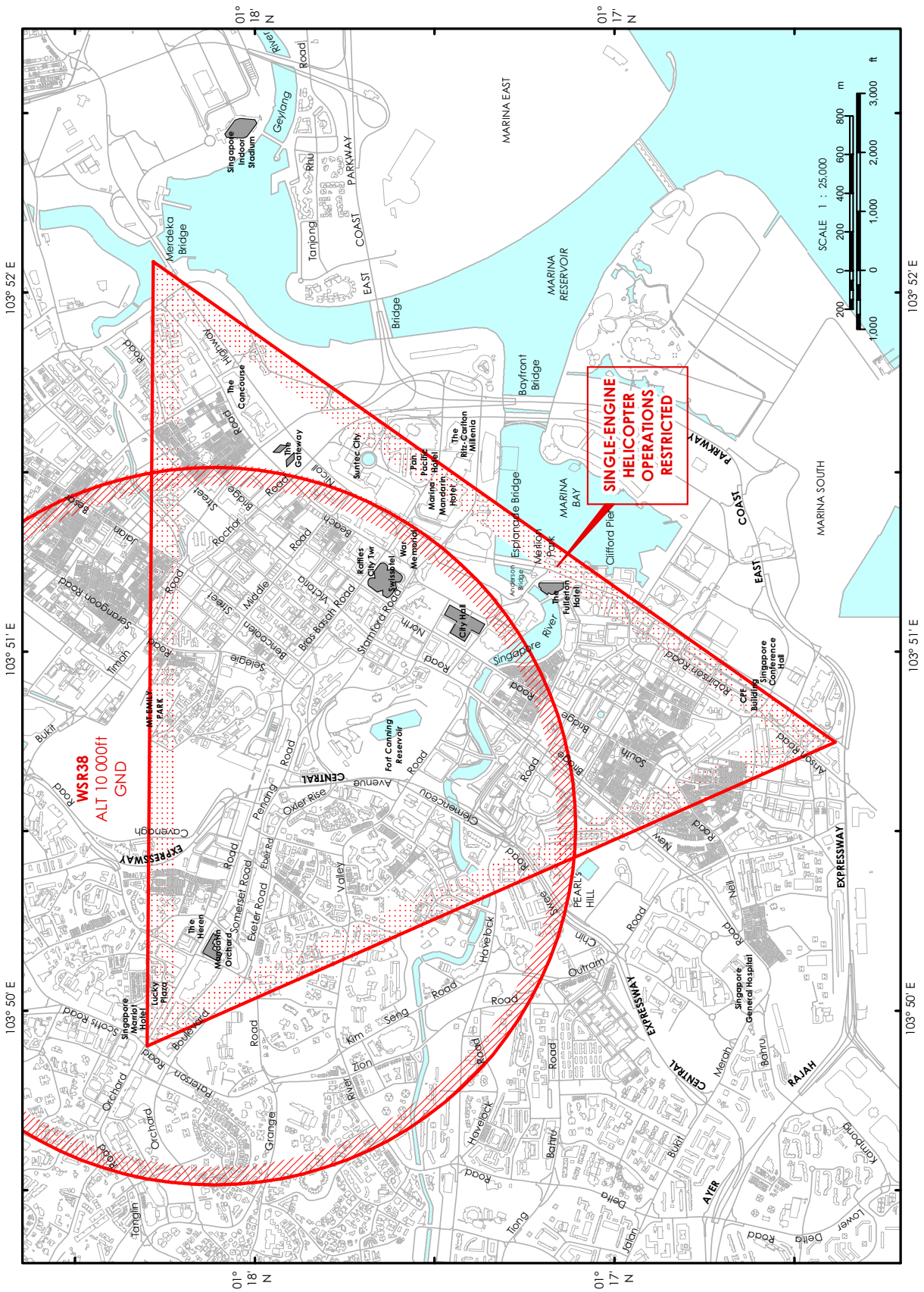
RESTRICTED AREA-SINGLE-ENGINE HELICOPTER OPERATIONS RESTRICTED



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ENR 3.6 EN-ROUTE HOLDING

HLDG ID/FIX/WPT Coordinates	INBD TR (°MAG)	Direction of PTN	MAX IAS (KT)	MNM-MAX HLDG Level	TIME (MIN)	Controlling Unit and Frequency
ASODU 003007N 1032704E	091	Right	220*	FL 130-FL 160	1	Singapore APP 124.6 MHZ (PRI) 132.15 MHZ (SRY)
BOBAG 38.6 DME VTK R-234.7 24.0 DME SJ R-243.2 010230N 1032954E	082	Right	220*	Low Level 6000 FT - FL 140	1	Singapore APP 124.6 MHZ (PRI) 132.15 MHZ (SRY)
			250*	High Level FL 150 - FL 180	1	Singapore ACC 133.25 MHZ (PRI) 135.8 MHZ (SRY)
ELALO 041240N 1043329E	174	Left	300*	FL 280 - FL 350	1.5	Singapore ACC 123.7 MHZ (PRI) 127.3 MHZ (SRY)
HOSBA 34 DME SJ R-079 24 DME VTK R-103 011948N 1042418E	259	Right	230*	Low Level 7000 FT ALT - FL 140	1	Singapore APP 120.3 MHZ (PRI) 133.0 MHz (SRY) 132.15 MHz (SRY)
			265*	High Level FL 150 - FL 250	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	250*	FL 170 - FL 310	1.5	Singapore ACC 134.2 MHZ (PRI) 133.35 MHZ (SRY)
KEXAS 49.2 DME VTK R-107.2 011019N 1044818E	268	Left	220*	11000 FT ALT - FL 160	1	Singapore APP 124.05 MHZ (PRI) 132.15 MHZ (SRY)
KILOT 030217N 1044023E	227	Left	250*	FL 220 - FL 270	1.5	Singapore ACC 134.7 MHZ (PRI) 134.15 MHZ (SRY)
LAMA 7 DME PU R-024 013150N 1035850E	204	Right	230*	2500 FT ALT - FL140	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	300*	FL 280- FL 350	1.5	Singapore ACC 123.7 MHZ (PRI) 127.3 MHZ (SRY)
NYLON 13 DME VTK R-023 013657N 1040624E	203	Left	220*	Low Level 3000 FT ALT - FL 140	1	Singapore APP 124.05 MHZ (PRI) 132.15 MHZ (SRY)
			265*	High Level FL 150 - FL 250	1.5	Singapore ACC 124.6 MHZ (PRI) 132.15 MHZ (SRY)
REMES 30 DME SJ R-168 004342N 1035735E	348	Left	220*	6000 FT ALT - FL140	1	Singapore APP 124.6 MHZ (PRI) 132.15 MHZ *SRY)
REPOV 68.2 DME VTK R-178.6 77.9 DME SJ R-168.3 001623N 1040300E	348	Left	250*	FL 150 - FL 250	1.5	Singapore ACC 134.4 MHZ (PRI) 128.1 MHZ (SRY)
SAMKO 8 DME SJ R-168 21 DME VTKR-203.5 010530N 1035255E	348	Left	220*	Low Level 4000 FT ALT - FL 140	1	Singapore APP 120.3 MHZ (PRI) 124.6 MHZ (SRY)
			265*	High Level FL 150 - FL 250	1.5	Singapore ACC 133.25 MHZ (PRI) 135.8 MHZ (SRY)

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HLDG ID/FIX/WPT Coordinates	INBD TR (°MAG)	Direction of PTN	MAX IAS (KT)	MNM-MAX HLDG Level	TIME (MIN)	Controlling Unit and Frequency
SINJON SJ DVOR/DME 011321N 1035115E	348	Right	230*	4500 FT ALT - FL 140	1	Singapore APP 120.3 MHZ (PRI) 124.6 MHZ (SRY)
TUSPI 003301N 1040959E	350	Right	220*	4000 FT ALT - 10000 FT ALT	1	Singapore APP 124.6 MHZ (PRI) 132.15 MHZ (SRY)
UGEBO 003813N 1052432E	310	Left	250*	FL 170 - FL 310	1.5	Singapore ACC 134.2 MHZ (PRI) 133.35 MHZ (SRY)
UPSAN 004536N 1045439E	238	Left	220*	150 FL - 11000 FT	1	Singapore APP 124.05 MHZ (PRI) 132.15 MHZ (SRY)
VAMPO 44.5 DME VTK R233.9 005833N 1032525E	149	Right	220*	6000 FT ALT - FL 180	1	Singapore APP 124.6 MHZ (PRI) 132.15 MHZ SRY)

*Maximum speed of 280kt in conditions of turbulence subject to ATC clearance.

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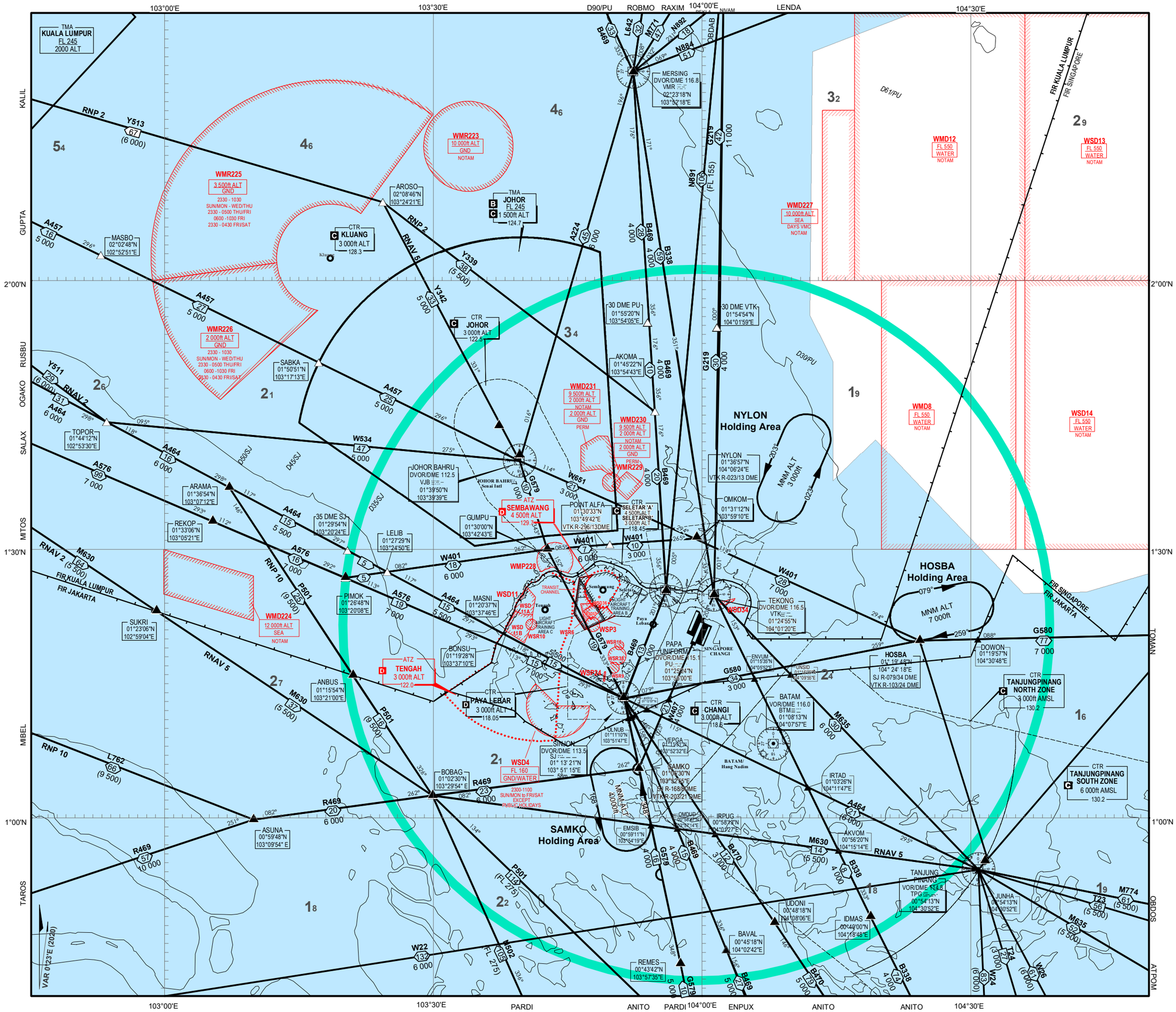
AREA CHART - ICAO



LEGEND

Terminal Control Area (TMA)	Name of TMA; Airspace Classification; Upper Limit; Lower Limit; Radio frequency(ies) — TMA JOHOR, B FL 145, C 1 500ft, 124.7
Control Zone (CTR)	Name of CTR; Airspace Classification; Upper Limit; Radio frequency(ies) — CTR CHANGI, C 3 000ft, 118.6m
Aerodrome Traffic Zone (ATZ)	Name of ATZ; Airspace Classification; Upper Limit; Radio frequency(ies) — ATZ TENGAH, D 3 000ft, 122.0
ATS Routes	Route designator; Distance in nautical miles; Minimum flight altitude (ft)/flight level; Lower limit (ft)/flight level — B469, 20, 4 000/FL 160, (4 000)/(FL 160)
Reporting Point	Compulsory ▲; On request △
DME distance from SJ Navaid	*D35/SJ*
Radio Navigation Aid	Name; Identification and frequency; Geographical Coordinates; Elevation of DME site — SINJON DVOR/DME 113.5 SJ 01° 13' 21"N 103° 51' 15"E 58m
Collocated VOR and DME Radio Navigation Aids	Compass rose orientated on the chart to Magnetic North
Restricted Airspace (P - Prohibited, R - Restricted, D - Danger)	Identification of area; Nationality letter; Vertical limits; Activation by NOTAM — WSD13, FL 400, WATER, NOTAM
NOTE :- See flip side for details of designated areas	

Area Minimum Altitude (AMA)

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 terrains and obstacles in the quadrilateral. It is represented in thousands and hundreds of feet above mean sea level.

Example : 3 400 feet **34**

NOTE :- In computing the area minimum altitude, a margin of 200 feet (60m) for vegetation has been added for spot elevations.

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 or when at or below 10,000ft except all 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.

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) acceptable.

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
Control Zone (CTRs)	Changi CTR	Surface to upper limit	C
	Paya Lebar CTR		D
	Seletar CTR		C
ATZs		Surface to upper limit	D
Uncontrolled airspace			G*

* 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 ATS authority.

SINGAPORE	D-ATIS	DEP	128.6
		ARR	128.025
	APP	DEP	120.3
		ARR	119.3
		APP	124.05
	TWR		118.6
			118.25

Note :

FOR DEPARTURE AND ARRIVAL ROUTES REFER TO AD-2-WSSS-SID-1 TO AD-2-WSSS-SID-64 AND AD-2-WSSS-STAR-1 TO AD-2-WSSS-STAR-19

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CHANGES : Revision to Restricted Areas WSR9 and WSR16

Nautical Miles 10 0 10 20 30 40

Kilometers 10 0 10 20 30 40 50 60 70 80

PROHIBITED, RESTRICTED AND DANGER AREAS

	ACTIVITY	UPPER LIMIT / LOWER LIMIT	REMARKS
WSP3	-	750ft ALT / GND	Permanently Active as in ENR 5
WSD4	A/G and G/G Firing Range	FL 160 / GND/WATER	Permanently Active as in ENR 5
WMD8	Naval Air/Air Firing Range	FL 550 / WATER	Activation by NOTAM
WSD11	Small Arm Firing	1 300ft ALT / GND	Permanently Active as in ENR 5
WSD11A	Artillery Firing	FL 125 / GND	Activation by NOTAM
WSD11B	Artillery Firing	FL 125 / GND	Activation by NOTAM
WMD12	Naval Anti-aircraft Firing	FL 550 / WATER	Activation by NOTAM
WSD13	Naval Anti-aircraft Firing	FL 550 / WATER	Activation by NOTAM
WSD14	Naval Anti-aircraft Firing & Live Air/Air Firing	FL 550 / WATER	Activation by NOTAM
WSP24	-	800ft ALT / GND/WATER	Permanently Active as in ENR 5
WSR6	Helicopter Operations	200ft ALT / GND	Permanently Active as in ENR 5
WSR9	Helicopter Operations	400ft ALT / GND	Permanently Active as in ENR 5
WSR16	Helicopter Operations	400ft ALT / GND	Permanently Active as in ENR 5
WSD34	Rifle Range	500ft ALT / GND	Permanently Active as in ENR 5
WSD35	Rifle Range	900ft ALT / GND	Permanently Active as in ENR 5
WSD36	Rifle Range	750ft ALT / GND	Permanently Active as in ENR 5
WSR10	-	5 500ft ALT / GND	Permanently Active as in ENR 5
WSR38	-	10 000ft ALT / GND	Permanently Active as in ENR 5
	Transit Channel	2 000ft ALT / GND	Activated only for Military acft crossing
*	Light Aircraft Training Area A	4 500ft ALT / GND/*2 000ft	Training & Local Flts in VMC only
*	Light Aircraft Training Area B	10 500ft ALT / 4 500ft ALT	High Flying Training Ops in VMC only
*	Light Aircraft Training Area C	10 500ft ALT / 4 500ft ALT	High Flying Training Ops in VMC only
WMR223	Parachute Dropping	10 000ft ALT / GND	Permanently Active as in ENR 5
WMD224	Firing Range	12 000ft ALT / SEA	Activation by NOTAM
WMR225	RMAF Helicopter Training Area	3 500ft ALT / GND	Permanently Active as in ENR 5
WMR226	RMAF Helicopter Training Area	2 000ft ALT / GND	Permanently Active as in ENR 5
WMD227	Radar Bombing Range	10 000ft ALT / SEA	Activation by NOTAM
WMP228	Sultan's Palace	5 000ft ALT / GND	Permanently Active as in ENR 5
WMR229	Helicopter Operations	1 500ft ALT / GND	Permanently Active as in ENR 5
WMD230	Artillery Firing Range	2 000ft ALT / GND	Permanently Active as in ENR 5
WMD231	Artillery Firing Range	2 000ft ALT / GND	Permanently Active as in ENR 5

* In Transit Channel

* **AEROBATICS IS PROHIBITED IN LIGHT AIRCRAFT TRAINING AREAS A, B and C.**

SPECIAL NOTE :-

1. WEATHER BALLOONS

BALLOONS WILL BE RELEASED FOR MET OBSERVATION AT THE CENTRE FOR CLIMATE RESEARCH SINGAPORE, UPPER AIR OBSERVATORY (012025N 1035317E), BEARING 244° MAG AND DISTANCE 1.5NM FROM SOUTHERN END OF PAYA LEBAR RWY 02.

(I) BALLOONS WILL BE RELEASED DAILY AT 2330UTC AND 1040UTC. CUT-OFF TIMINGS FOR THE RELEASE ARE AT 0030UTC AND 1230UTC RESPECTIVLEY. RATE OF ASCENT IS 320M PER MIN. MAX HGT OF BALLOON 115 000FT (35 000M). THE BALLOON, UNCOLOURED AND 162CM IN DIAMETER, IS ATTACHED WITH RADIOSONDE EQUIPMENT. IT WILL BURST 1.5 TO 2HRS AFTER RELEASE AND RADIOSONDE EQUIPMENT WILL DECSEND WITHIN 60NM RADIUS.

(II) A BALLOON WILL BE RELEASED BETWEEN 2330UTC AND 0030UTC ON EITHER THE 3rd OR 4th WEEK OF THE MONTH. RATE OF ASCENT IS 320M PER MIN. MAX HGT OF BALLOONS IS 115 000FT (35 000M). THE BALLOON, UNCOLOURED AND 191CM IN DIAMETER, IS ATTACHED WITH OZONESONDE/RADIOSONDE EQUIPMENT AND PARACHUTE. IT WILL BURST 1.5 TO 2HR AFTER RELEASE.

2. AEROMODELLING AND KITE FLYING

(A) GENERAL WARNING

i) PILOTS FLYING AT LOW ALTITUDES SHOULD WATCH OUT FOR POSSIBLE HAZARDS SUCH AS MODEL AIRCRAFT AND KITES, ESPECIALLY WHEN FLYING NEAR PARKS AND OPEN GROUND.

ii) THE LOCATION OF SOME OF THE PARKS IN SINGAPORE WHERE KITE AND AERO MODEL FLYING MAY OCCUR ARE SHOWN ON ENR 3.4-5. PILOTS SHOULD NOTE THAT THE CHART AT ENR 3.4-5 DOES NOT SHOW ALL THE PARKS IN SINGAPORE AND THAT HAZARDS SUCH AS KITE FLYING AND AERO MODEL FLYING MAY TAKE PLACE AT PARKS AND OPEN GROUND NOT INDICATED IN ENR 3.4-5.

iii) ACCORDING TO THE SINGAPORE AIR NAVIGATION ORDER, 1985, KITE FLYING AND AERO MODEL FLYING ARE NOT PERMITTED ABOVE 200ft OR WITHIN 5km OF AN AERODROME. HOWEVER, PILOTS ARE ADVISED TO LOOK OUT FOR SUCH HAZARDS AT ALL TIMES AS MEMBERS OF THE PUBLIC MAY INADVERTENTLY FLY KITES OR AERO MODELS ABOVE THE HGT OF 200ft OR WITHIN 5km OF AN AERODROME.

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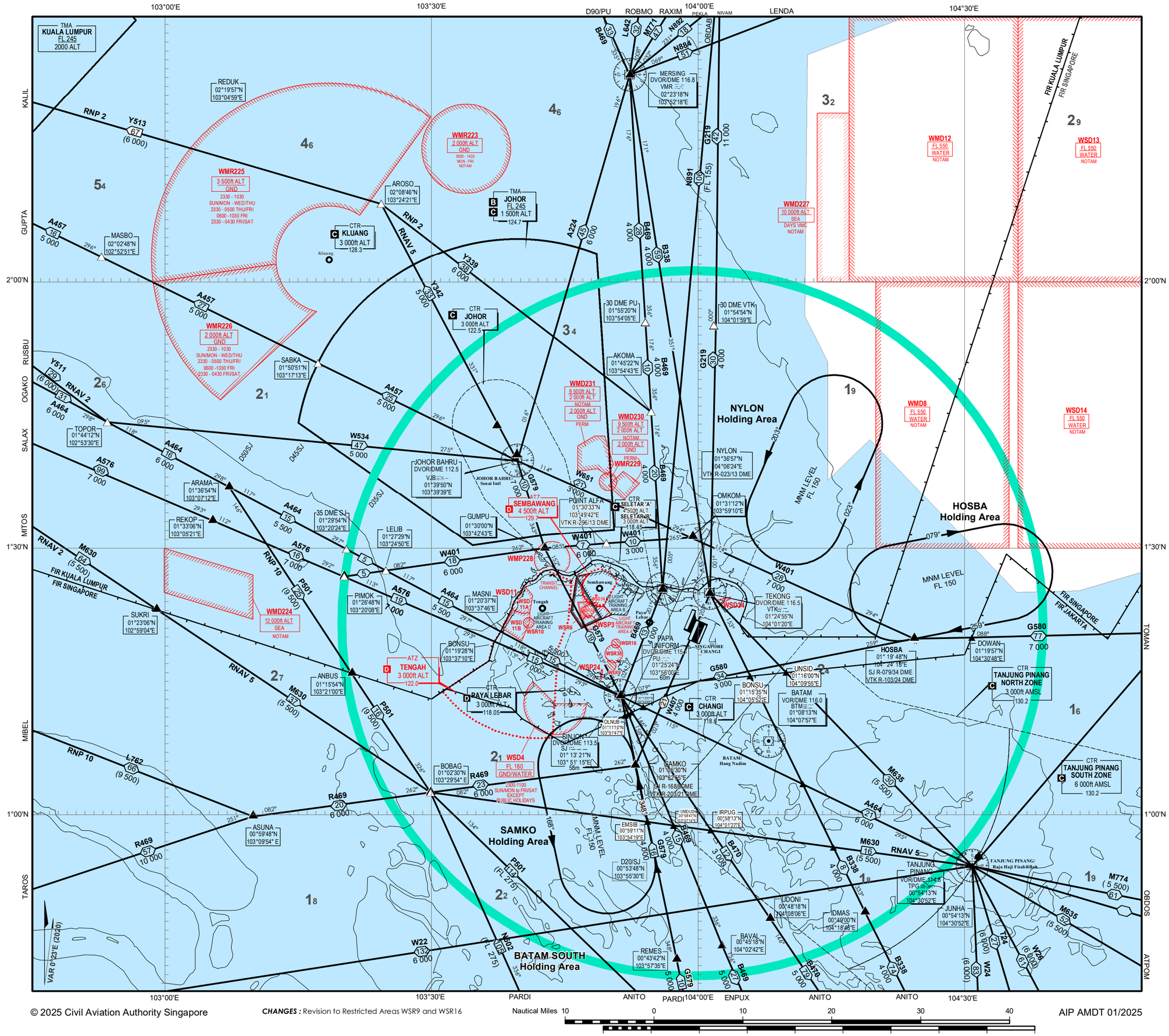
AREA CHART - ICAO



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CHANGES : Revision to Restricted Areas WSR9 and WSR16

AIP AMDT 01/2025

LEGEND

Terminal Control Area (TMA)
Name of TMA — TMA JOHOR
Airspace Classification — B
Upper Limit — FL 145
Lower Limit — C 1 500ft
Radio frequency(ies) — 124.7

Control Zone (CTR)
Name of CTR — CTR CHANGI
Airspace Classification — C
Upper Limit — 3 000ft
Radio frequency(ies) — 118.6m

Aerodrome Traffic Zone (ATZ)
Name of ATZ — ATZ TENGAH
Airspace Classification — D
Upper Limit — 3 000ft
Radio frequency(ies) — 122.0

ATS Routes
Route designator — B469
Distance in nautical miles — 20
Minimum flight altitude (ft)/flight level — 4 000/FL 160
Lower limit (ft)/flight level — (4 000)/(FL 160)

Oceanic Control Area (OCA)

Reporting Point
Compulsory
On request

DME distance from SJ Navaid — *D35/SJ*

Radio Navigation Aid
Name — SINJON DVOR/DME 113.5 SJ
Identification and frequency
Geographical Coordinates — 01° 13' 21"N 103° 51' 15"E
Elevation of DME site — 58m

Collocated VOR and DME Radio Navigation Aids
Compass rose orientated on the chart to Magnetic North

Restricted Airspace
(P - Prohibited, R - Restricted, D - Danger)
Identification of area — WSD13
Nationality letter — FL 400
Vertical limits — WATER
Activation by NOTAM — NOTAM

NOTE :- See flip side for details of designated areas

Area Minimum Altitude (AMA)

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 terrains and obstacles in the quadrilateral. It is represented in thousands and hundreds of feet above mean sea level.

Example : 3 400 feet **3 4**

NOTE :- In computing the area minimum altitude, a margin of 200 feet (60m) for vegetation has been added for spot elevations.

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 or when at or below 10,000ft except all 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.

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) acceptable.

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
Control Zone (CTRs)	Changi CTR	Surface to upper limit	C
	Paya Lebar CTR		D
	Seletar CTR		C
ATZs		Surface to upper limit	D
Uncontrolled airspace			G*

* 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 ATS authority.

SINGAPORE	D-ATIS	DEP	128.6
		ARR	128.025
	APP	DEP	120.3
		ARR	119.3
		APP	124.05
	TWR		118.6
			118.25

Note :

FOR DEPARTURE AND ARRIVAL ROUTES REFER TO AD-2-WSSS-SID-1 TO AD-2-WSSS-SID-64 AND AD-2-WSSS-STAR-1 TO AD-2-WSSS-STAR-19

PROHIBITED, RESTRICTED AND DANGER AREAS

	ACTIVITY	UPPER LIMIT / LOWER LIMIT	REMARKS
WSP3	-	750ft ALT / GND	Permanently Active as in ENR 5
WSD4	A/G and G/G Firing Range	FL 160 / GND/WATER	Permanently Active as in ENR 5
WMD8	Naval Air/Air Firing Range	FL 550 / WATER	Activation by NOTAM
WSD11	Small Arm Firing	1 300ft ALT / GND	Permanently Active as in ENR 5
WSD11A	Artillery Firing	FL 125 / GND	Activation by NOTAM
WSD11B	Artillery Firing	FL 125 / GND	Activation by NOTAM
WMD12	Naval Anti-aircraft Firing	FL 550 / WATER	Activation by NOTAM
WSD13	Naval Anti-aircraft Firing	FL 550 / WATER	Activation by NOTAM
WSD14	Naval Anti-aircraft Firing & Live Air/Air Firing	FL 550 / WATER	Activation by NOTAM
WSP24	-	800ft ALT / GND/WATER	Permanently Active as in ENR 5
WSR6	Helicopter Operations	200ft ALT / GND	Permanently Active as in ENR 5
WSR9	Helicopter Operations	400ft ALT / GND	Permanently Active as in ENR 5
WSR16	Helicopter Operations	400ft ALT / GND	Permanently Active as in ENR 5
WSD34	Rifle Range	500ft ALT / GND	Permanently Active as in ENR 5
WSD35	Rifle Range	900ft ALT / GND	Permanently Active as in ENR 5
WSD36	Rifle Range	750ft ALT / GND	Permanently Active as in ENR 5
WSR10	-	5 500ft ALT / GND	Permanently Active as in ENR 5
WSR38	-	10 000ft ALT / GND	Permanently Active as in ENR 5
	Transit Channel	2 000ft ALT / GND	Activated only for Military acft crossing
*	Light Aircraft Training Area A	4 500ft ALT / GND/*2 000ft	Training & Local Flts in VMC only
*	Light Aircraft Training Area B	10 500ft ALT / 4 500ft ALT	High Flying Training Ops in VMC only
*	Light Aircraft Training Area C	10 500ft ALT / 4 500ft ALT	High Flying Training Ops in VMC only
WMR223	Parachute Dropping	10 000ft ALT / GND	Permanently Active as in ENR 5
WMD224	Firing Range	12 000ft ALT / SEA	Activation by NOTAM
WMR225	RMAF Helicopter Training Area	3 500ft ALT / GND	Permanently Active as in ENR 5
WMR226	RMAF Helicopter Training Area	2 000ft ALT / GND	Permanently Active as in ENR 5
WMD227	Radar Bombing Range	10 000ft ALT / SEA	Activation by NOTAM
WMP228	Sultan's Palace	5 000ft ALT / GND	Permanently Active as in ENR 5
WMR229	Helicopter Operations	1 500ft ALT / GND	Permanently Active as in ENR 5
WMD230	Artillery Firing Range	2 000ft ALT / GND	Permanently Active as in ENR 5
WMD231	Artillery Firing Range	2 000ft ALT / GND	Permanently Active as in ENR 5

* In Transit Channel

* **AEROBATICS IS PROHIBITED IN LIGHT AIRCRAFT TRAINING AREAS A, B and C.**

SPECIAL NOTE :-

1. WEATHER BALLOONS

BALLOONS WILL BE RELEASED FOR MET OBSERVATION AT THE CENTRE FOR CLIMATE RESEARCH SINGAPORE, UPPER AIR OBSERVATORY (012025N 1035317E), BEARING 244° MAG AND DISTANCE 1.5NM FROM SOUTHERN END OF PAYA LEBAR RWY 02.

(I) BALLOONS WILL BE RELEASED DAILY AT 2330UTC AND 1040UTC. CUT-OFF TIMINGS FOR THE RELEASE ARE AT 0030UTC AND 1230UTC RESPECTIVLEY. RATE OF ASCENT IS 320M PER MIN. MAX HGT OF BALLOON 115 000FT (35 000M). THE BALLOON, UNCOLOURED AND 162CM IN DIAMETER, IS ATTACHED WITH RADIOSONDE EQUIPMENT. IT WILL BURST 1.5 TO 2HRS AFTER RELEASE AND RADIOSONDE EQUIPMENT WILL DECSEND WITHIN 60NM RADIUS.

(II) A BALLOON WILL BE RELEASED BETWEEN 2330UTC AND 0030UTC ON EITHER THE 3rd OR 4th WEEK OF THE MONTH. RATE OF ASCENT IS 320M PER MIN. MAX HGT OF BALLOONS IS 115 000FT (35 000M). THE BALLOON, UNCOLOURED AND 191CM IN DIAMETER, IS ATTACHED WITH OZONESONDE/RADIOSONDE EQUIPMENT AND PARACHUTE. IT WILL BURST 1.5 TO 2HR AFTER RELEASE.

2. AEROMODELLING AND KITE FLYING

(A) GENERAL WARNING

i) PILOTS FLYING AT LOW ALTITUDES SHOULD WATCH OUT FOR POSSIBLE HAZARDS SUCH AS MODEL AIRCRAFT AND KITES, ESPECIALLY WHEN FLYING NEAR PARKS AND OPEN GROUND.

ii) THE LOCATION OF SOME OF THE PARKS IN SINGAPORE WHERE KITE AND AERO MODEL FLYING MAY OCCUR ARE SHOWN ON ENR 3.4-5. PILOTS SHOULD NOTE THAT THE CHART AT ENR 3.4-5 DOES NOT SHOW ALL THE PARKS IN SINGAPORE AND THAT HAZARDS SUCH AS KITE FLYING AND AERO MODEL FLYING MAY TAKE PLACE AT PARKS AND OPEN GROUND NOT INDICATED IN ENR 3.4-5.

iii) ACCORDING TO THE SINGAPORE AIR NAVIGATION ORDER, 1985, KITE FLYING AND AERO MODEL FLYING ARE NOT PERMITTED ABOVE 200ft OR WITHIN 5km OF AN AERODROME. HOWEVER, PILOTS ARE ADVISED TO LOOK OUT FOR SUCH HAZARDS AT ALL TIMES AS MEMBERS OF THE PUBLIC MAY INADVERTENTLY FLY KITES OR AERO MODELS ABOVE THE HGT OF 200ft OR WITHIN 5km OF AN AERODROME.

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ENR 4 RADIO NAVIGATION AIDS/SYSTEMS

ENR 4.1 RADIO NAVIGATION AIDS - EN-ROUTE

Name of station (VOR/VAR)	ID	Frequency (CH)	Hours of operation	Coordinates	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
MERSING DVOR/DME	VMR	116.8MHz (CH 115X)	H24	022318N 1035218E	-	Operating Authority: Department of Civil Aviation Malaysia. 50w
PAPA UNIFORM DVOR/DME	PU	115.1MHz (CH 98X)	H24	012524N 1035600E	Antenna HGT: 190FT AMSL	BRG 020° DIST 9km from THR RWY 02 (WSAP). MAINT Period: Third WED of EV month BTN 0200-0600, Coverage 200NM EM:F1
SINJON DVOR/DME	SJ	113.5MHz (CH 82X)	H24	011321N 1035115E	Antenna HGT: 190FT 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	116.5MHz (CH 112X)	H24	012455N 1040120E	Antenna HGT: 150FT 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

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ENR 4.2 SPECIAL NAVIGATION SYSTEM

NIL (not applicable).

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ENR 4.3 GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)

Name of GNSS element	Frequency	Coordinates Nominal SVC area Coverage area	Remarks
1	2	3	4
Nil	Nil	Nil	Nil

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ENR 4.4 NAME-CODE DESIGNATORS FOR SIGNIFICANT POINTS

Name-code designator	Coordinates	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	011203N 1040514E		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
ASODU	003007N 1032704E		HLDG ID
ASOMI	010142N 1040207E		SID-WSSS
ASUNA	005948N 1030954E	L762, R469	STAR-WSSS
ATLEX	010302N 1033331E		SID-WSSS
ATLIR	011120N 1035208E	B469	
ATPOM	002425N 1052114E	M635	

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Name-code designator	Coordinates	ATS route or other route	Terminal Area
1	2	3	4
ATRUM	013256N 1040057E		SID-WSSS
AVLUB	003112S 1042501E	T25	
AVPIV	011207N 1035349E	A464	
BAVAL	004518N 1040242E	B469	
BETBA	013302N 1035331E		STAR-WSSS
BIDAG	073101N 1135544E	M772	
BIDUS	013554N 1035755E		IAC-WSSS, STAR-WSSS
BIKTA	024337N 1034308E	B469	
BIMOS	011512N 1035815E		IAC-WSSS
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	M630, N502, P501, R469	HLDG ID, STAR-WSSS, SID-WSSS
BOBOB	022206N 1070558E	M767	
BOKIP	010421N 1034353E		SID-WSSS, STAR-WSSS
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	

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Name-code designator	Coordinates	ATS route or other route	Terminal Area
1	2	3	4
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-WSS
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	
ENSUN	012603N 1040048E		IAC-WSSS
ENVUM	011535N 1040552E	B338	
ERVIV	010445N 1041013E		SID-WSSS
ERVOT	011120N 1035436E		IAC-WSSS
ESBIT	012212N 1040009E		IAC-WSSS

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Name-code designator	Coordinates	ATS route or other route	Terminal Area
1	2	3	4
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 1042417E	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	M765, N891, R208	
IGNON	010847N 1041257E		STAR-WSSS

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Name-code designator	Coordinates	ATS route or other route	Terminal Area
1	2	3	4
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	
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	
KIKOR	002244S 1070524E		

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Name-code designator	Coordinates	ATS route or other route	Terminal Area
1	2	3	4
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
LENDA	024124N 1043932E	N884	
LEPNA	010648N 1035339E		IAC-WSSS
LETGO	011411N 1035548E		SID-WSSS
LIDVA	010506N 1035255E		IAC-WSSS
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

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Name-code designator	Coordinates	ATS route or other route	Terminal Area
1	2	3	4
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	025341N 1033830E	Y514	
NYLON	013657N 1040624E		HLDG ID, IAC-WSSS, SID-WSSS, STAR-WSSS
OBDAB	031153N 1040538E	N891	
OBDOS	002503N 1065551E	M774, T22	
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	
OPULA	033155N 1062118E	M758	
OSERU	024450N 1054334E	M761	
OTLAL	004209N 1053052E	M774	
OTLON	030752N 1042006E	M761, M771	
PADLI	030918N 1033133E	B469, Y332, Y334, Y335, Y336	

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Name-code designator	Coordinates	ATS route or other route	Terminal Area
1	2	3	4
PALGA	011059N 1034759E		STAR-WSSS
PAMSI	010459N 1034845E		STAR-WSSS
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	

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Name-code designator	Coordinates	ATS route or other route	Terminal Area
1	2	3	4
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
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	
UPSAN	004536N 1045439E		HLDG ID
UPTEL	005925N 1040730E		SID-WSSS
UPVUN	033022N 1055053E	M758	
URIGO	032505N 1040647E	M758, N891	
URKET	081130N 1145000E	L649	
UXATI	003348N 1035933E	G579, P501	
UXEDA	015449N 1060423E	L625	

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Name-code designator	Coordinates	ATS route or other route	Terminal Area
1	2	3	4
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	031728N 1031318E	Y514	
VISAT	032620N 1043134E	M758, M771	
VOVOS	011123N 1032651E		SID-WSSS

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ENR 4.5 AERONAUTICAL GROUND LIGHTS - ENROUTE

Name Ident (Coordinates)	*Type and Intensity (1,000 Candelas)*	*Characteristics*	*Operating Hours*	*Remarks*
1	2	3	4	5
BEDOK LIGHTHOUSE 011833N 1035558E	Marine 369	FLG W EV 5 SEC	HN	
HORSBURGH LIGHTHOUSE 011949N 1042420E	Marine 266	FLG W EV 10 SEC	HN	
PAYA LEBAR 012100N 1035354E	IBN †	FLG R 'PL' EV 12 SEC	HN + IMC	† 3KW
PULAU PISANG LIGHTHOUSE 012810N 1031521E	Marine 291	FLG W EV 10 SEC	HN	-
RAFFLES LIGHTHOUSE 010936N 1034427E	Marine 240	GP FLG (3) W EV 20 SEC	HN	-
SAKIJANG BEACON 011318N 1035116E	Marine 15.95	FLG W EV 2.5 SEC	HN	-
SELETAR 012509.94N 1035152.14E	IBN	FLG G 'SL' EV 7 SEC	HN + IMC	-
SELETAR 012448.00N 1035207.96E	ABN	ALTN FLG W G EV 2.5 SEC	HN + IMC	-
SEMBAWANG 012528.43N 1034845.75E	IBN 2.1 #	FLG R 'AG' EV 20 SEC	HN + IMC	# 0.7KW
SINGAPORE CHANGI 012301.27N 1035959.49E	IBN	FLG G 'SS' EV 7 SEC	HN + IMC	-
SINGAPORE CHANGI 12209.20N 1035858.43E	ABN W 10.8 G 2.2	ALTN FLG W G EV 4 SEC	HN + IMC	-
SULTAN SHOAL LIGHTHOUSE 011423N 1033853E	Marine 260	GP FLG (2) W EV 15 SEC	HN	-
TENGAH 012400N 1034254E	IBN	FLG R 'TN'	HN	-

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ENR 5 NAVIGATION WARNINGS

ENR 5.1 PROHIBITED, RESTRICTED AND DANGER AREAS

1 INTRODUCTION

1.1 All airspace in which a potential hazard to aircraft operations may exist and all areas over which the operation of civil aircraft may, for one reason or another be restricted either temporarily or permanently, are classified according to three types of areas as defined by ICAO.

1.2 Each area is described in the tabulation found in pages ENR 5.1-2 to 5.1-5 which indicates its lateral and vertical limits, the type of restriction or hazard involved, the times at which it applies and other pertinent information.

2 DANGER AREA

2.1 An airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times. This term is used only when the potential danger to aircraft has not led to the designation of the airspace as restricted or prohibited. The effect of the creation of the danger area is to caution operators or pilots of aircraft that it is necessary for them to assess the dangers in relation to their responsibility for the safety of their aircraft.

3 PROHIBITED AREA

3.1 An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited. This term is used only when the flight of civil aircraft within the designated airspace is not permitted at any time under any circumstances.

4 RESTRICTED AREA

4.1 An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions. This term is used whenever the flight of civil aircraft within the designated airspace is not absolutely prohibited but may be made only if specified conditions are complied with. Thus, prohibition of flight except at certain meteorological conditions. Similarly, prohibition of flight unless special permission had been obtained, leads to the designation of restricted area. However, conditions of flight imposed as a result of application of rules of the air or air traffic service practice or procedures (for example, compliance with minimum safe heights or with rules stemming from the establishment of controlled airspace) do not constitute conditions calling for designation as a restricted area.

5 DESIGNATION OF AREA

5.1 Each area is numbered and single series of numbers is used for all areas, regardless of type, to ensure that a number is never duplicated.

5.2 The type of area involved is indicated by the letter “P” for Prohibited, “R” for Restricted and “D” for Danger, preceded by the Nationality letters “WS”. For example, areas are assigned numbers and letters in the following manner - WSP3, WSR6 and WSD4.

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Identification, Name and Lateral Limits	Upper Limit Lower Limit	Remarks (time of activity, type of restriction, nature of hazard, risk of interception)
1	2	3
PROHIBITED AREAS		
WSP3 A circle, 0.8NM radius centred at 012136N 1034746E	750 FT GND	Active: Permanent. Under no circumstances shall a forced landing be permitted within the area. Rotary wing aircraft shall avoid overflying the area.
WSP24 Area within two circles, 150m radius, centred at Mt. Faber (011616N 1034910E) and Sentosa Island (011520N 1034904E) and the tangential lines joining these circles.	800 FT ALT GND/WATER	Active: Permanent.
WMP228 BUKIT SERENE Area within 2NM centred at 012845N 1034334E with the southern border of the Prohibited Area coinciding with the coastline of South Johor.	5000 FT ALT GND	Sultan's Palace. Active: Permanent. (refer to AIP Malaysia)

Identification, Name and Lateral Limits	Upper Limit Lower Limit	Remarks (time of activity, type of restriction, nature of hazard, risk of interception)
1	2	3
RESTRICTED AREAS		
WSR6 Area bounded by 012355N 1034626E to 012359.0N 1034734.1E then along the boundaries of Sembawang ATZ, WSD35, WSP3 and 012130.00N 1034658.37E to 012355N 1034626E.Area bounded by 012355N 1034626E to 012359.0N 1034734.1E then along the boundaries of Sembawang ATZ, WSD35, WSP3 and 012130.00N 1034658.37E to 012355N 1034626E.	200 FT ALT GND	Helicopter Operations. Active: Permanent.
WSR9 A circle, 0.6NM radius centred at 011647N 1035009E.	400 FT ALT GND	Helicopter Operations Active: Permanent
WSR10 A circle, 06NM radius centred at 012136.00N 1034055.02E	5500 FT ALT GND	Active: Permanent
WSR16 A circle,0.5NM radius centred at 011918N 1035045E	400 FT ALT GND	Helicopter Operations Active: Permanent
WSR38 A circle, 1NM radius centred at 011807N 1035031E	10000 FT ALT GND	Istana. Active: Permanent All FLT BTN SJ/GUMPU on AWY G579 are to avoid at all times the area which overlaps the eastern edge of G579.
WMR104 032859N 1030254E - 023959N 1023454E - 022300N 1025954E - 022300N 1034554E - 032059N 1032054E - 031859N 1031554E - 032559N 1031254E - 032859N 1030254E	10000FT ALT 3000 FT ALT	Training. Active: 2230-1030 SUN-MON to FRI-SAT (refer to AIP Malaysia)
WMR223 KANGAR KAHANG A circle, 5NM radius centred at 021500N 1033354E	10000 FT ALT GND	Parachute Dropping. Active: by NOTAM Controlling Authority: Kluang Tower 128.3Mhz/122.4Mhz (refer to AIP Malaysia)

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Identification, Name and Lateral Limits	Upper Limit Lower Limit	Remarks (time of activity, type of restriction, nature of hazard, risk of interception)
1	2	3
RESTRICTED AREAS		
WMR225 NORTH-KLUANG An arc of a circle, radius 20NM, centred at 020230N 1031824E (Kluang Control Tower) from 020000N 1025839E to 021830N 1032954E; then an arc of a circle, radius 6NM, centred at 020230N 1031824E(Kluang Control Tower) from 020200N 1031224E to 0202730N 1032154E; then straight lines joining 020000N 1025839E to 020200N 1031224E and 021830N 1032954E to 020730N 1032224E.	3500 FT ALT GND	Army Airwing Helicopter Training Area Active: 2330-1030 SUN-MON TO WED-THU; 2330-0500 THU-FRI; 0600-1030 FRI; and 2330-0430 FRI-SAT; SUN and PH closed. Controlling Authority: Kluang Tower 128.3MHz and 122.4MHz, PPR for all non-Malaysian Army aircraft. During hours of operations, request through Kluang Army Airwing Operations (48 hours prior notice). No refuelling for civil aircraft. (refer to AIP Malaysia)
WMR226 WEST-KLUANG An arc of a circle, radius 20NM, centred at 020230N 1031824E (Kluang Control Tower) from 020000N 1025839E to 014630N 1030554E; then an arc of a circle, radius 6NM, centred at 020230N 1031824E (Kluang Control Tower) from 020200N 1031224E to 015650N 1031709E.	2000 FT ALT GND	
WMR229 A circle, 1NM radius centred at 013730N 1034952E.	1500 FT ALT GND	Helicopter Operations. Active: 0100-0830 MON-FRI. Visiting military aircraft are required to give advance notice of movements to Jungle Warfare School. (refer to AIP Malaysia)

Identification, Name and Lateral Limits	Upper Limit Lower Limit	Remarks (time of activity, type of restriction, nature of hazard, risk of interception)
1	2	3
DANGER AREAS		
WSD4 SOUTHERN ISLAND LIVE FIRING RANGE An arc,3.5NM radius, centred at 011230N 1034354E with eastern extremity at 011230N 1034724E and western extremity at 011459N 1034125E.	FL160 GND/WATER	Air to GND and GND to GND Firing Range. Active: 2300-1500 SUN-MON to THU-FRI; 2300-1100 FRI-SAT to SAT-SUN and PH Eve-PH Activities outside these hours will be notified by NOTAM.
WSD11 PASIR LABA 012550N 1034024E - 012333N 1033904E - 012303N 1033909E - 012058N 1033759E - 011933N 1034009E - 012142N 1034104E - 012245N 1034104E - 012440N 1034124E - 012550N 1034024E (General Area).	1300 FT ALT GND	Small Arm Firing Active: Permanent.
WSD11A PASIR LABA 012550N 1034024E - 012333N 1033904E - 012303N 1033909E - 012240N 1034016E - 012245N 1034104E - 012440N 1034124E - 012550N 1034024E (Northern Area within the General Area).	FL 125 GND	Artillery Firing At least 7 days advance notice by NOTAM.
WSD11B PASIR LABA 012303N 1033909E - 012240N 1034016E - 012245N 1034104E - 012142N 1034104E - 011933N 1034009E - 012058N 1033759E - 012303N 1033909E (Southern Area within the General Area).	FL 125 GND	Artillery Firing At least 7 days advance notice by NOTAM.

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Identification, Name and Lateral Limits	Upper Limit Lower Limit	Remarks (time of activity, type of restriction, nature of hazard, risk of interception)
1	2	3
DANGER AREAS		
WSD13 AREA KILO BTN LAT 020000N 023000N and LONG 1043600E 1045500E.	FL 550 WATER	Naval Anti-Aircraft Firing 72 HR notice by NOTAM.
WSD14 AREA LIMA BTN LAT 013000N 020000N and LONG 1043600E 1045500E.	FL 550 WATER	Naval Anti-Aircraft Firing and Live Air to Air Firing. 72 HR notice by NOTAM.
WSD15 AREA MIKE BTN LAT 013000N 020000N and LONG 1045500E 1053000E.	FL 550 WATER	Naval Carrier Operation Area 72 HR notice by NOTAM.
WSD20 AREA HOTEL BTN LAT 023000N 030000N and LONG 1043600E 1045500E.	2000 FT ALT WATER	Naval Exercise Area 72 HR notice by NOTAM.
WSD34 PULAU TEKONG 012409N 1040208E - 012430N 1040340E - 012415N 1040333E - 012349N 1040240E - 012351N 1040200E - 012409N 1040208E	500 FT ALT GND	Rifle Range Active: Permanent
WSD35 NEE SOON 012354N 1034834E - 012345N 1034841E - 012300N 1034830E - 012208N 1034739E - 012234N 1034709E - 012307N 1034646E - 012349N 1034755E - 012354N 1034834E	900 FT ALT GND	Rifle Range Active: Permanent
WSD36 NEE SOON A circle, 0.1NM radius centred at 012440N 1034832E.	750 FT ALT GND	Rifle Range Active: Permanent
WSD44 BTN LAT 020000N 023000N and LONG 1045500E 1051230E	FL 550 WATER	Naval Exercise Area Active: 72hr prior notice by NOTAM
WSD45 BTN LAT 020000N 023000N and LONG 1051230E 1053000E.	FL 550 WATER	Naval Exercise Area Active: 72hr prior notice by NOTAM
WMD8 CHINA SEA NORTH RANGE BTN LAT 013000N 020000N and LONG 1042000E 1043500E.	FL 550 WATER	Naval Air to Air Firing Range Active: 72hr prior notice by NOTAM
WMD12 AREA JULIET BTN LAT 020000N 023000N and LONG 1041700E 1043600E.	FL 550 WATER	Naval Anti-Aircraft Firing Range Active: 72hr prior notice by NOTAM
WMD21 AREA GOLF BTN LAT 023000N 030000N and LONG 1043600E 1041700E.	2000 FT ALT WATER	Naval Exercise Area Active: 72hr prior notice by NOTAM
WMD224 MALAYSIAN NAVAL EXERCISE AREA 012500N 1025954E - 013000N 1025954E - 012700N 1030954E - 012200N 1030954E - 012500N 1025954E	12000 FT ALT WATER	Firing Range Active: 48hr prior notice by NOTAM. 2 exercises per month.
WMD227 PULAU YU 021900N 1041324E - 020000N 1041324E - 020000N 1041700E - 021900N 1041700E - 021900N 1041324E	10000 FT ALT WATER	Radar Bombing Range Active: 72hr prior notice by NOTAM. Area will be confirmed 'clear' by participating aircraft prior to commencing live attacks. (refer to AIP Malaysia)
WMD230 ULU TIRAM (SOUTH) 013720N 1035324E - 013840N 1035135E - 013704N 1034954E - 013530N 1035140E - 013720N 1035324E	2000 FT ALT # GND	Artillery Firing Range. Active: PERM # When activity necessitates raising upper limit to 9,500ft ALT, 48hr prior notice will be given by NOTAM. (refer to AIP Malaysia)

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Identification, Name and Lateral Limits	Upper Limit Lower Limit	Remarks (time of activity, type of restriction, nature of hazard, risk of interception)
1	2	3
DANGER AREAS		
WMD231 ULU TIRAM (NORTH) 013815N 1034950E - 013927N 1035028E - 014238N 1034929E - 014239N 1034822E - 014133N 1034627E - 013840N 1034627E - 013858N 1034840E - 013815N 1034950E	2000 FT ALT * GND	Artillery Firing Range. Active: PERM * When activity necessitates raising upper limit to 9,500ft ALT, 48hr prior notice will be given by NOTAM. (refer to AIP Malaysia)

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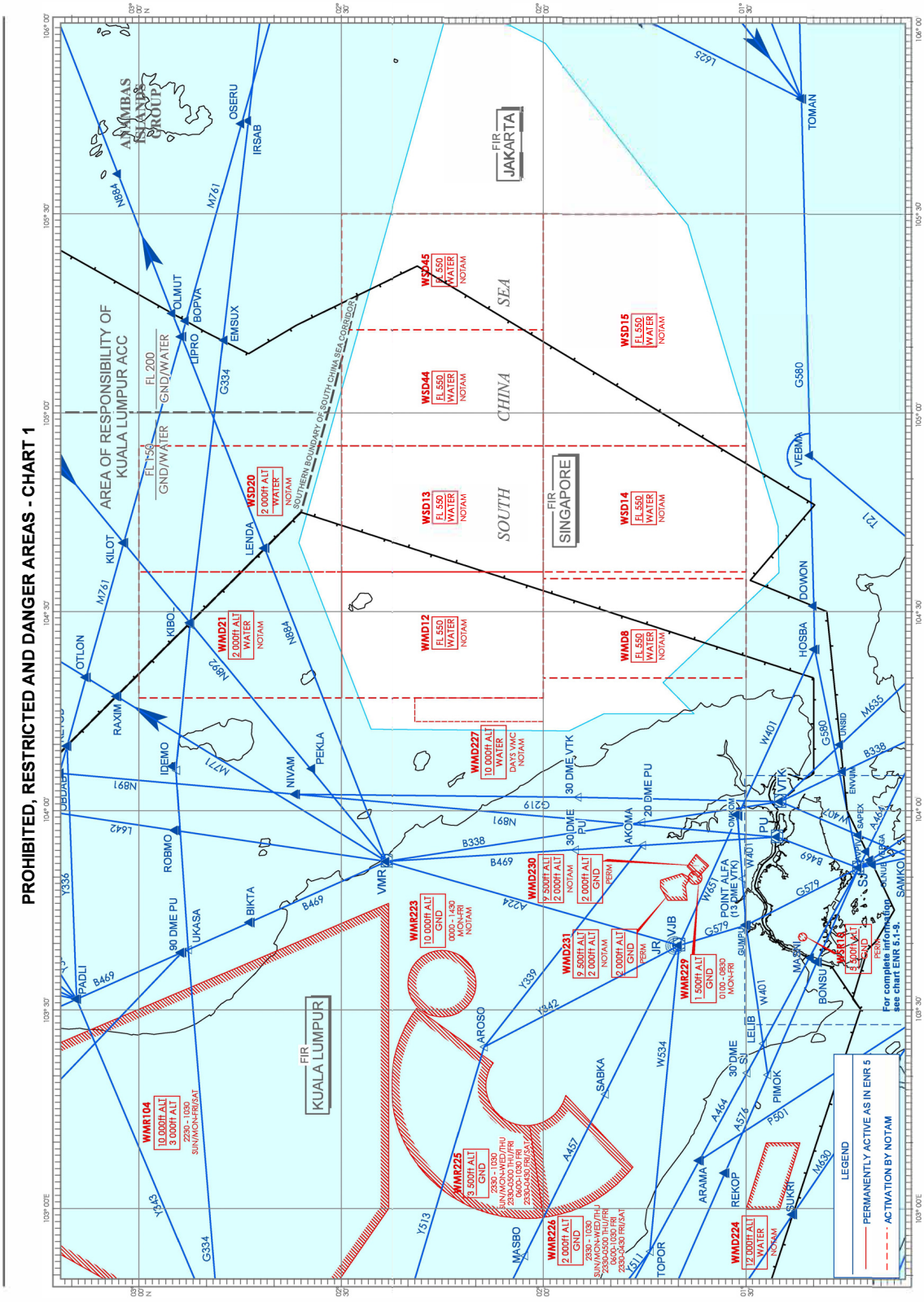

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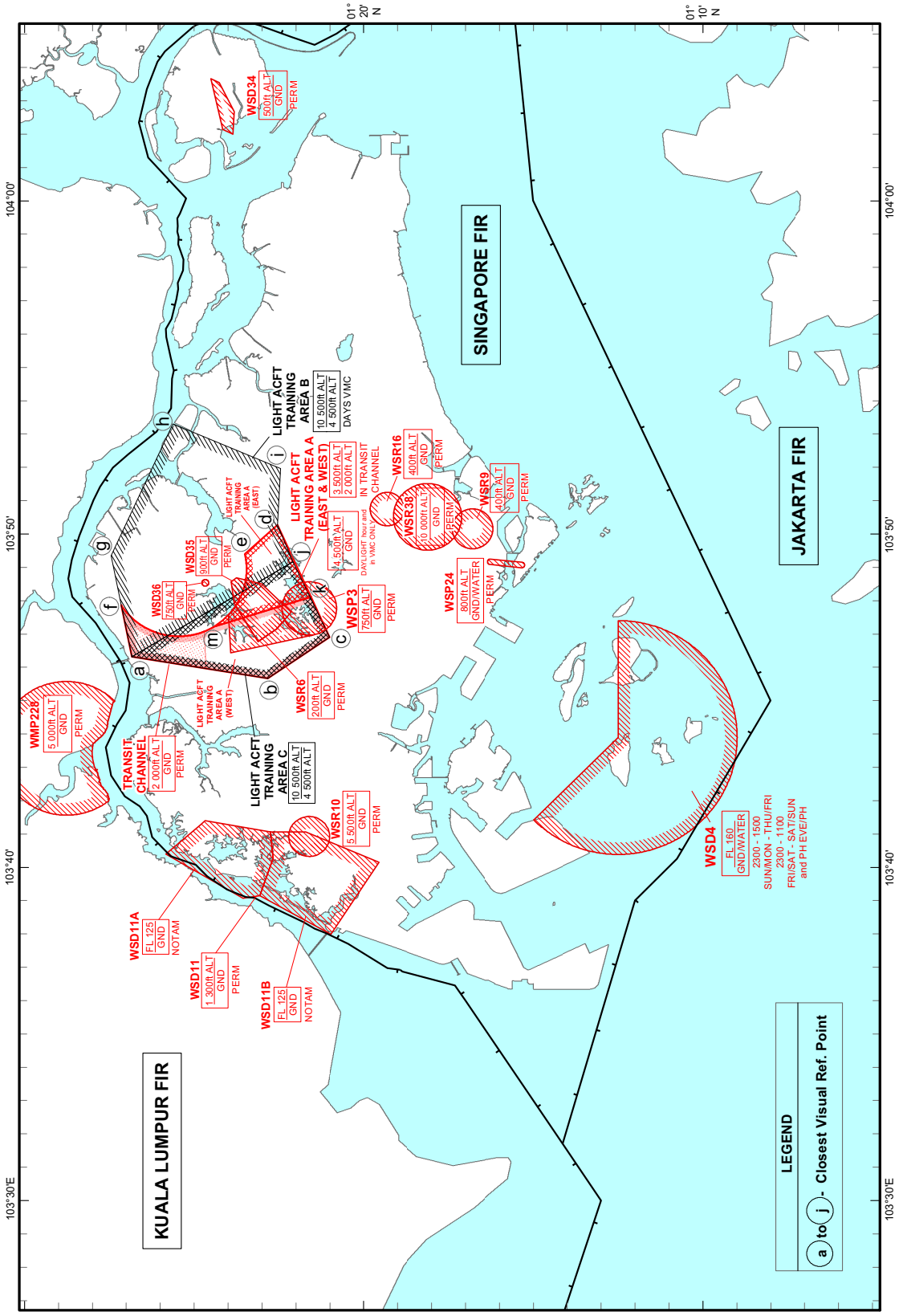
PROHIBITED, RESTRICTED AND DANGER AREAS - CHART 2



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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 Lower Limit	Remarks Time of Act
1	2	3
LIGHT AIRCRAFT TRAINING AREA A		
(Training and Local Flying) All the airspace contained within the boundaries bounded by the following: 012650N 1034619E @ (Woodlands Customs Checkpoint) (a) 012249N 1034540E @ (cross-road junction of Upper Bukit Timah Road and Bukit Panjang Road/Choa Chu Kang Road) (b) 012100N 1034654E @ (Bukit Timah) (c) 012232N 1035016E @ (MayflowerGarden) (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)	4,500ft ALT GND 3,500ft ALT 2,000ft ALT Maximum Usable ALT: 4,000ft	# Above Transit Channel (see chart ENR3.5-3) @ Closest Visual Reference Point (see chart ENR 5.1-9) Day light hour and in VMC only

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Name and Lateral Limits	Upper Limit Lower Limit	Remarks Time of Act
1	2	3
LIGHT AIRCRAFT TRAINING AREA A (EAST)		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.
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	
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	
LIGHT AIRCRAFT TRAINING AREA C		
012650N 1034619E 012249N 1034540E 012100N 1034654E 012205N 1034910E 012650N 1034619E	10,500ft ALT 4,500ft ALT Maximum Usable ALT: 10,000ft Minimum Usable ALT: 5,000ft	The minimum flight altitude over Light Aircraft Training Area C is 11,000ft.

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Name and Lateral Limits	Upper Limit Lower Limit	Remarks Time of Act
1	2	3
LOW FLYING OPERATIONS		
Helicopter Operations Extensive low flying operations mainly by helicopter operate during daylight hours within the Natuna/ Anambas Groups of Islands in the area of the South China Sea Corridor between the longitudes 105°E and 110°E and the Indonesian Mainland.	5,000ft ALT GND/SEA	All aircraft intending to operate within this area are to contact Natuna Radio on 9025KHz, 122.1MHz or 118.1MHz for traffic information.

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ENR 5.3 OTHER ACTIVITIES OF A DANGEROUS NATURE AND OTHER POTENTIAL HAZARDS

1 OTHER ACTIVITIES OF A DANGEROUS NATURE

1.1 Weather Balloons

1.1.1 Balloons will be released for MET observation at the Centre for Climate Research Singapore, Upper Air Observatory (012025N 1035317E).

1.1.2 At Upper Air Observatory, balloons will be released daily at 2330UTC and 1040UTC. Cut-off timings for the release are at 0030UTC and 1230UTC respectively.

Rate of ascent of balloon: 320m per minute.
Maximum height of balloon: 115 000ft (35 000m).
Colour of balloon: uncoloured.
Diameter of balloon: 162cm.

The balloon is attached with radiosonde equipment.
Weight of radiosonde equipment: 130g.
Payload (radiosonde plus parachute): 170g.
Size of radiosonde equipment: 145mm x 63mm x 46mm.

The balloon will burst 1.5 to 2 hours after release and radiosonde equipment will descend within 60NM radius.

1.1.3 At Upper Air Observatory, a balloon will be released between 2330UTC and 0030UTC on either the 3rd or 4th week of the month.

Rate of ascent of balloon: 320m per minute.
Maximum height of balloon: 115 000ft (35 000m).
Colour of balloon: uncoloured.
Diameter of balloon: 191cm.

The balloon is attached with ozonesonde/radiosonde equipment and parachute.
Payload (ozonesonde/radiosonde equipment with parachute): 910g.
Size of ozonesonde equipment box: 191mm x 191mm x 254mm.
Size of radiosonde equipment: 145mm x 63mm x 46mm.

The balloon will burst 1.5 to 2 hours after release. Equipment will descend within 60NM radius.

2 OTHER POTENTIAL HAZARDS

2.1 Pengerang Integrated Complex (PIC)

2.1.1 Malaysia's Pengerang Integrated Complex is located in the vicinity of WSSS, in Pengerang, Johor.

2.1.2 Refer to AIP Malaysia “Pengerang Integrated Complex Safety Area”. Bounded area (SFC to 2,000ft) contains a petrochemical refinery plant with LNG storage tanks, plants, gas stacks and flares which could extend up to a height of 1,500ft AMSL. Aircraft may overfly the area at 2,000ft and above.

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ENR 5.4 AIR NAVIGATION OBSTACLES - AREA 1

(Height 100m AGL or higher)

OBST ID or designation	OBST type	OBST position	ELEV/HGT (M)	OBST LGT Type/ Colour	Remarks
Under development					

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ENR 5.5 AERIAL SPORTING AND RECREATIONAL ACTIVITIES

1 UNMANNED AIRCRAFT OPERATIONS AND KITE FLYING

1.1 General Warning

1.1.1 Pilots flying at low altitudes should watch out for possible hazards such as unmanned aircraft and kites, especially when flying near parks and open ground.

1.1.2 The location of some of the parks in Singapore where kite and unmanned aircraft operations may occur are shown in chart ENR 3.4-5. Pilots should note that chart ENR 3.4-5 does not show all the parks in Singapore and that hazards such as kite flying and unmanned aircraft operations may take place at parks and open ground not indicated in chart ENR 3.4-5.

1.1.3 According to the Singapore Air Navigation Order, kite flying and unmanned aircraft operations are not permitted above 200ft or within 5km of an aerodrome. However, pilots are advised to look out for such hazards at all times as members of the public may inadvertently conduct these activities above the height of 200ft or within 5km of an aerodrome.

2 AIRCRAFT OPERATIONS PROHIBITED OVER THE TERRITORY OF SINGAPORE

2.1 Owing to the high concentration of built-up areas, severe airspace limitations and intense low flying aircraft operations, flights by the following aircraft types are prohibited over the territory of Singapore: Aircraft principally designed for the purpose of sports or recreation, commonly referred to as home-built, ultralight, microlight, hang-glider and such others,even though they may have a valid Certificate of Registration or a Certificate of Airworthiness.

3 SEARCHLIGHT DISPLAY / LASER SHOWS - PAYA LEBAR CTR

3.1 BTN 1200-1215 and 1300-1315 daily searchlight display and laser shows will take place at 011658N 1035138E (within Paya Lebar CTR). Additional show time will be BTN 1400-1415 on FRI and SAT. Danger Height UNL.

4 UNMANNED AIRCRAFT OPERATIONS - PAYA LEBAR CTR

4.1 Unmanned aircraft operations may take place up to 200ft AMSL at Paya Lebar CTR and within the following coordinates: 011828N 1034707E, 011832N 1034727E, 011734N 1034758E, 011720N 1034727E, 011754N 1034657E.

4.2 An Unmanned Aircraft Flying Area (UAFA) has been established at Dover Road within the following coordinates: 011824N 1034642E, 011823N 1034641E, 011818N 1034642E, 011818N 1034644E, 011824N 1034643E,up to 200ft. Pilots to exercise caution.

5 UNMANNED AIRCRAFT OPERATIONS - TENGAH ATZ

5.1 An Unmanned Aircraft Flying Area (UAFA) has been established over Pandan Reservoir within the following coordinates: 011905N 1034414E, 011905N 1034427E, 011854N 1034426E, 011854N 1034414E, up to 200ft. Pilots to exercise caution.

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ENR 5.6 BIRD MIGRATION

1 BIRD MIGRATION

1.1 Bird migrations generally occur between September and March. Migratory birds come from as far away as North and Central Asia.

2 REPORTING OF WILDLIFE STRIKE

2.1 To facilitate efforts to reduce wildlife hazards at and around Singapore airports, pilots and aircraft engineers are requested to report all wildlife strikes to Air Traffic Control.

2.2 To facilitate the reporting of wildlife strikes, pilots may report them at the earliest opportunity via RTF to Air Traffic Control.

The RTF phraseology should include the following:

- Aircraft Callsign
- The phrase “WILDLIFE STRIKE REPORT”
- Altitude
- Approximate geographical location
- Time of incident
- Effect on flight (e.g. state damage to fuselage, etc.)
- Number of wildlife (an estimate)
- Size/Type of wildlife (if possible)

2.3 To obtain better perspective of the extent of wildlife hazards, the Authority is also collecting data on “near misses” with wildlife. A “near miss” is defined as a situation in which a wildlife or flock of birds is within close proximity of an aircraft to cause alarm to the extent whereby pilots would have to take evasive action had such an action been possible. Pilots should report all “near misses” via RTF to Air Traffic Control.

The RTF phraseology should include the following:

- Aircraft Callsign
- The phrase “WILDLIFE SIGHTING REPORT”
- Altitude
- Approximate geographical location
- Time of incident
- Number of wildlife (an estimate)
- Size/Type of wildlife (if possible)

2.4 A copy of the Wildlife Strike Reporting Form is shown on page ENR 5.6-2. Airline operators may send the completed Wildlife Strike Reporting Form to email address: changi.airside@changiairport.com

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WILDLIFE STRIKE REPORTING FORM

(This information is required for aviation safety)

OPERATOR or CALL SIGN .....
ENGINE TYPE .....
DATE: Day .....
Month ..... Year .....
AIRCRAFT TYPE _____
AIRCRAFT REGISTRATION _____
TIME OF INCIDENT (L) ..... (UTC) .....
Day / Dawn / Dusk / Night

AERODROME NAME .....
HEIGHT AGL..... ft **SPEED (IAS)..... kt**
RUNWAY USED _____
APRX LOC _____

PHASE OF FLIGHT
☐ Unknown ☐ En-route
☐ Taxi ☐ Descend
☐ Take-off run ☐ Approach
☐ Climb ☐ Landing Roll

SKY CONDITION
☐ No Cloud
☐ Some Cloud
☐ Overcast

PRECIPITATION
☐ Fog
☐ Rain

PART(S) OF AIRCRAFT

	Struck	Damaged
Radome	☐	☐
Windshield	☐	☐
Nose (excluding above)	☐	☐
Engine No. 1	☐	☐
Engine No. 2	☐	☐
Engine No. 3	☐	☐
Engine No. 4	☐	☐
Propeller	☐	☐
Wing/Rotor	☐	☐
Fuselage	☐	☐
Landing gear	☐	☐
Tail	☐	☐
Lights	☐	☐
Others (specify)	☐	☐

BIRD SPECIES

NUMBER OF BIRDS **Seen** ..... **Struck** .....

SIZE OF BIRD ☐ Small ☐ Medium ☐ Large

PILOT WARNED OF BIRDS Yes / No

LIGHTS USED:
Landing ☐ Yes ☐ No
Strobe Anti-Collision ☐ Yes ☐ No

EFFECT ON FLIGHT
☐ None
☐ Precautionary landing
☐ Aborted take-off
☐ Engines shut down
☐ Others (specify) .....

REMARKS
(Describe damage, injuries and other pertinent information)
_____
_____

NAME OF REPORTING OFFICER: _____ ORGANISATION: _____

Please send completed Wildlife Strike Reporting Form to:
Airside Management Centre (email: changi.airside@changiairport.com)
CHANGI AIRPORT GROUP (SINGAPORE) PTE LTD
P.O. Box 168, Singapore Changi Airport
Singapore 918146

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ENR 6 EN-ROUTE CHARTS

ENROUTE CHART - ICAO	ERC-6-1 En-Route Chart
WORLD AERONAUTICAL CHART - ICAO	WAC-2860-Singapore-Island

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ENROUTE CHART - ICAO

LEGEND

Aerodrome

Flight Information Region (FIR)
Name of FIR — SINGAPORE
Upper Limit — UNL
Lower Limit — GND/WATER
Unit providing service — ACC SINGAPORE

Terminal Control Area (TMA)
Name of TMA — KUCHING
Airspace Classification — C
Upper Limit — FL 250
Lower Limit — 3 000ft
Radio Frequency (ies) — 134.5,120.2

Control Zone (CTR)
Name of CTR — KUCHING
Airspace Classification — C
Upper Limit — 3 000ft
Radio Frequency (ies) — 120.2

ATS route
Route designator — L642
Magnetic track — 032° — 122
Distance in nautical miles
Minimum flight altitude (ft)/flight level — 7 000/FL 140 — RNP 10
Lowest unit (ft)/flight level — (7 000)/(FL 140)
Required navigation performance

ATS route reporting point by-pass
(No report is required on this route)

Reporting Point (REP)
Compulsory
On Request

ATS/MET reporting point (MRP)
Compulsory
On Request

Restricted Airspace
(P-Prohibited, R-Restricted, D-Danger)
Identification of area — WSD8
Nationality letter — FL 400
Vertical limits — WATER

Note : Restricted airspace outside Singapore FIR are not shown.

Collocated VOR and DME navigation aids (VOR/DME)
Compass rose oriented on the chart to Magnetic North

Identification for radio navigation aids (NAVAID)
Name — SNJON
NAVAID, frequency, identification or call sign — DVOR/DME 113.3 — 01°12'21"N 103°51'12"E
Geographical coordinates in WGS-84
Elevation of DME site (to the nearest 30m) — 60m

COP at mid-point between VOR are not shown

Area Minimum Altitude (AMA)

Each 2° 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 terrains and obstacles in the quadrilateral. It is represented in thousands and hundreds of feet above mean sea level.

Example : 3 500 feet **3**5

(A) Airway in which Mach Number Technique and RNAV are applied (Refer to pages ENR 1.8-13 to 1.8-18)

(B) Inbound and Outbound flights exempted from reporting aircraft observations at these points.

WSJC/WMFC FIR BDRY REPORTING POINTS

TAXUL 03 55 35N 103 40 37E	**MANIM** 03 14 30N 104 05 54E
BUVAL 03 56 22N 103 43 45E	**KETOD** 03 10 42N 104 09 42E
DOVOL 03 30 47N 103 49 23E	**RAXIM** 03 03 18N 104 17 13E
IDSEL 03 24 32N 103 55 44E	**KIBOL** 02 32 24N 104 28 18E
EGOLO 03 19 34N 104 00 47E	**LENDA** 02 41 24N 104 39 32E

RVSM SEPARATION AVAILABLE SINGAPORE FIR BTN FL 290 AND FL 410 (Inclusive)

AIRSPACE CLASSIFICATION IN THE SINGAPORE FIR

Airspace		Levels	Classification
Controlled airspace		FL 150 to FL 460	A
		Surface to FL 150	B
Controlled airspace more than 100 nm seaward from the shoreline		Lower limit to FL 460	A
Control Zones (CTRs)	Changi CTR	Surface to upper limit	C
	Paya Lebar CTR		D
	Seletar CTR		C
ATZs		Surface to upper limit	D
Uncontrolled airspace			G*

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

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

COMMUNICATION FACILITIES

SINGAPORE (ACC) SINGAPORE RADAR	P123.7 133.8 (0000-1430)	S127.3	For Awy B469, G219, G334, L629, L635, L642, L644, M751, M758, M761, M763, M771, N875, N884, N891 & N892 in the vicinity of YMR and VPK.
	P133.25	S135.8	For Awy A457, A464, A574 (all northbound), L762, M630, R469 & W22
	P134.2	S133.35	For Awy G580, L625, M635, M646, M767, M774, 121, T22 & T23
	P134.4 255.4	S128.1	For Awy A464, A576, B338, B469, G579, B470, M635, M774, N502, P501, W24, W26 & T24 and in area in the immediate vicinity of Singapore.
SINGAPORE RADIO	6 556, 11 297 5 655, 8 942, 11 396 6 556		SEA 1 SEA 2 SEA 3
SINGAPORE APPROACH	APP	P124.05 S124.6	TAR - 1) Intermediate approach to Singapore Changi Airport and other airports in Singapore. 2) Dep from all airports in Singapore.
SINGAPORE ARRIVAL	APP	119.3	TAR - Intermediate and final approach to Singapore Changi Airport.
SINGAPORE/ Singapore Changi (WSSS)	D-ATIS TWR	128.6 118.6	Data Link Service available H24. For Take-off/Landing

P - Primary ; S - Secondary

NOTE : *Information on radio communication facilities outside Singapore FIR are not included. See respective AIPs of States concerned.*

CONICAL CONFORMAL PROJECTION

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CHANGES : Reprint

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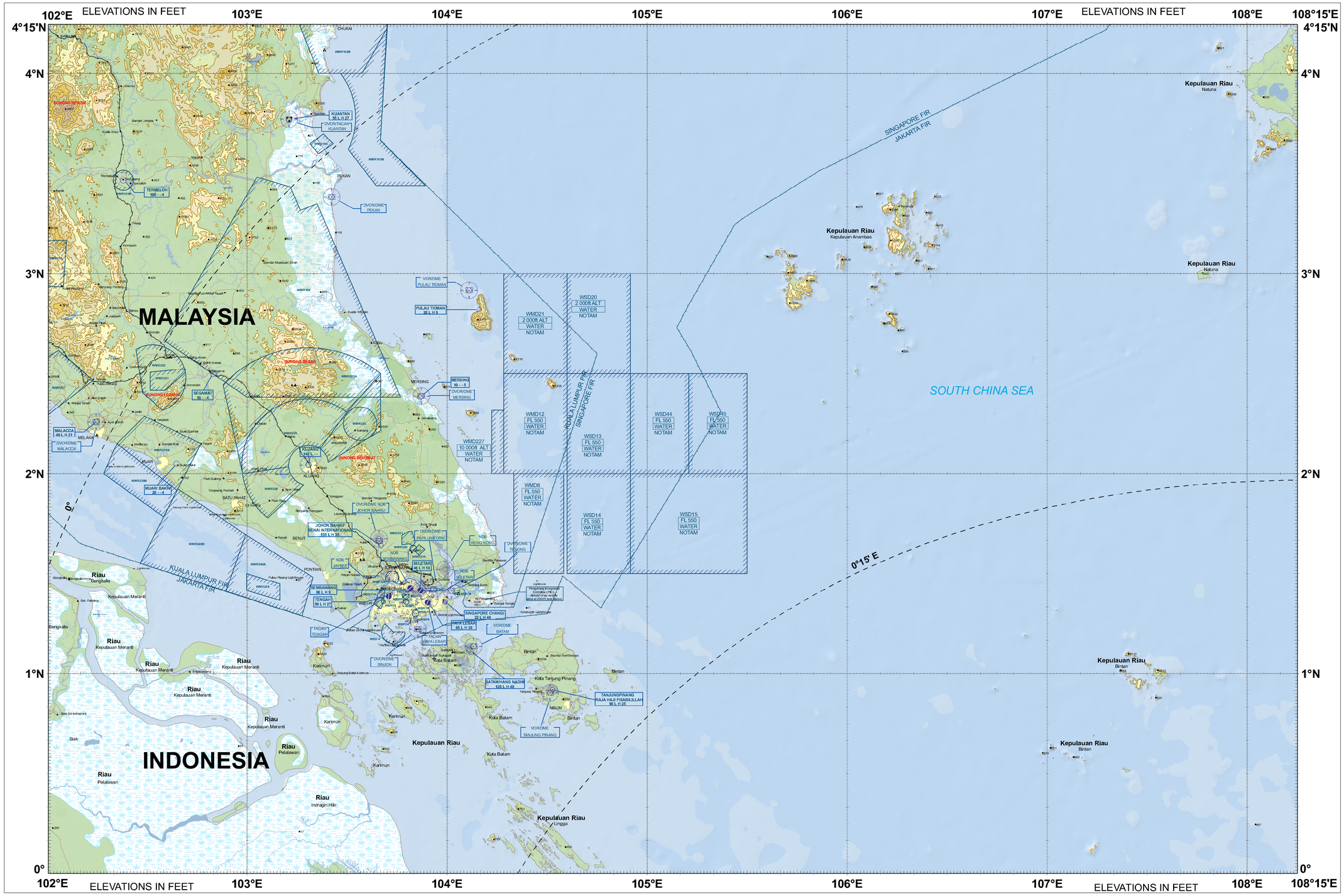
(2860) SINGAPORE ISLAND

WORLD AERONAUTICAL CHART
ICAO 1:1,000,000

WAC-2860
21 MAR 2024



HYPSOMETRIC 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	6096
18000	5000
16000	4000
14000	4000
12000	3000
10000	3000
8000	2000
6000	2000
4000	1000
2000	1000
500	152

Feet	Metres
150	45.7
140	45
130	40
120	40
110	35
100	30
90	30
80	25
70	20
60	20
50	15
40	10
30	10
20	5
10	3

PROJECTION
Lambert Conformal Conic Projection
Standard Parallels 0°40' and 3°20'
Spheroid - World Geodetic System 1984 (WGS-84)

Published by the Civil Aviation Authority of Singapore, 2022
Produced by SLC Geomatic Solutions Ltd, United Kingdom

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CHANGES : Realignment of Jakarta-Singapore FIR

Kilometers 10 5 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240

Nautical Miles 10 5 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140

Contours basic interval 1000 feet. Intermediate contours shown at 500 feet.

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.

NOTE
Due to congestion in the Singapore area, only selected Navigation Aids and Restricted Airspace are shown.

AIP AMDT 02/2024

Compiled by Civil Aviation Authority of Singapore and SLC Geomatic Solutions Ltd, United Kingdom from the following sources:

a) Digital World Ocean Basemap, Sources: Esri

b) Magnetic Information for the year 2020, NOAA World Magnetic Model produced by National Geospatial-Intelligence Agency (NGA), United States and the Defence Geographic Centre (DGC), United Kingdom.

c) Aeronautical Information supplied by the Civil Aviation Authority of Singapore.

d) Terrain data used for topography information, Contours, Spot Elevations and Hypsometric tints Source: SRTM PlusV3 Worldwide Elevation data,1-arc-second resolution.

e) Culture information Source: OpenStreetMap datasets published by Geofabrik GmbH, last updated 2021.

MAGNETIC INFORMATION FOR THE YEAR 2020

Aeronautical Information: March 2022

AERONAUTICAL INFORMATION

AERODROMES

- Major — PAYA LEBAR 65 L H 38
- Civil Land
- Military Land
- Aerodrome with no facilities

Major aerodromes portrayed have a hard surface runway length of 3000 feet or more.

VERTICAL OBSTRUCTIONS

Obstacle	310 (300)
Lighted Obstacle	614 (600)
Lighted Group Obstacles	913 (780)
Elevation of top above mean sea level (AMSL)	913
Height of top above ground level (AGL)	(780)

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 quality.

AIR TRAFFIC SERVICES

- Flight Information Region — FIR
- Prohibited, Restricted or Danger Area

RADIO NAVIGATION AIDS

- NDB — NDB SELETAR
- VOR / DME — DVOR/DME TEKONG
- VOR / TAC — VOR/TAC KUANTAN
- TACAN — TACAN TENGAH

VISUAL AIDS

- Aeronautical Ground Light ★
- Marine light ● Fl
- Group Flashing ● GP Fl

Marine lights are white unless colours are stated.

MISCELLANEOUS

Isogonic line – – –1°E– – –

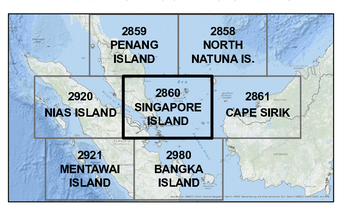
GLOSSARY

Gunong, Gunung	mountain
Kampong, Kg	village
Kepulauan	island group
Pulau	island
Selat	strait
Sungai, S	river, stream
Tanjong, Tanjung, Tg	point, cape
Tasik	lake
Telok, Tk	bay

- Primary Road
- Secondary Road
- Expressway
- Railway
- Spot elevation accurate, approximate — *1752*
- Highest known elevation — ●6907 3°49'23.0080"N 102°05'38.4844"E
- Contours — 1000

- City or large town
- Town
- Small river, large river
- Lake, dam
- Swamp
- Cliff
- Ruins
- Fort

INDEX TO ADJOINING SHEETS



(2860) SINGAPORE ISLAND

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AD PART 3 — AERODROMES (AD)

AD 0 TABLE OF CONTENTS TO PART 3

AD 0.1 [NIL] PREFACE

NIL (not applicable).

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AD 0.2 [NIL] RECORD OF AIP AMENDMENTS

NIL (not applicable).

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AD 0.3 [NIL] RECORD OF AIP SUPPLEMENTS

NIL (not applicable).

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AD 0.4 [NIL] CHECKLIST OF AIP PAGES

NIL (not applicable).

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AD 0.5 [NIL] LIST OF HAND AMENDMENTS TO THE AIP

NIL (not applicable).

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AD 1 AERODROMES/HELIPORTS - INTRODUCTION

AD 1.1 AERODROME AVAILABILITY

1 INTRODUCTION

1.1 This section contains information on all aerodromes which are available for international and domestic aircraft operations. Section AD 1 describes the use of aerodromes and the clearance formalities involved. Section AD 2 contains information on the physical characteristics of aerodromes available for international and domestic operations.

As there are no heliports, section AD 3 has been omitted.

1.2 AERODROMES ADMINISTRATION

1.2.1 The administration of the civil aerodromes is the responsibility of the Civil Aviation Authority of Singapore.

1.2.2 REGULATIONS CONCERNING AIRPORT USE

1.2.2.1 Standard conditions applicable to the landing, parking or storage of aircraft on aerodromes under the control of the Civil Aviation Authority of Singapore are as follows:

a) The fees and charges for the landing, parking or housing of aircraft shall be those prescribed in section GEN 4.
b) The Director-General of Civil Aviation shall have a lien on the aircraft, its parts and accessories, for such fees and charges as aforesaid.
c) If payment of such fees and charges is not made to the Director-General of Civil Aviation within fourteen days after a letter demanding payment thereof has been sent by post addressed to the registered owner of the aircraft, the Director-General of Civil Aviation shall be entitled to sell, remove, destroy or otherwise dispose of the aircraft, and of its parts and accessories, and to apply the proceeds from so doing to the payment of such fees and charges.
d) Neither the Director-General of Civil Aviation nor any servant or agent of the Government shall be liable for loss of or damage to the aircraft, its parts or accessories or any property contained in the aircraft, howsoever such loss or damage may arise, occurring while the aircraft is on any of the aerodromes under the control of CAAS or is in the course of landing or taking-off at any such aerodrome, or of being removed or dealt with elsewhere.

1.2.3 LANDINGS MADE ELSEWHERE OTHER THAN AT ALTERNATE AIRPORTS

1.2.3.1 If a landing is made elsewhere other than at an international airport or a designated alternate airport, the pilot-in-command shall report the landing as soon as practicable to the health, customs and immigration authorities at the international airport at which the landing was scheduled to take place. This notification may be made through any available communication link.

1.2.3.2 The pilot-in-command shall be responsible for ensuring that:

a) If pratique has not been granted to the aircraft at the previous landing, contact between other persons on the one hand and the passengers and crew on the other is avoided;
b) That cargo, baggage and mail are not removed from the aircraft except as provided below;
c) Any foodstuffs of overseas origin, of any plant material is not removed from the aircraft except where local food is unobtainable. All food refuse including peelings, cores, stones of fruit, etc., must be collected and returned to the galley refuse container, the contents of which should not be removed from the aircraft except for hygiene reasons, in which case they must be destroyed by burning or deep burial.

1.2.4 TRAFFIC OF PERSONS AND VEHICLES ON AERODROMES

1.2.4.1 Demarcation of Zones

1.2.4.1.1 The grounds of each aerodrome are divided as follows:

a) a public zone comprising the part of the aerodrome open to public;
b) a security area comprising the rest of the aerodrome.

1.2.4.2 Movement of Persons

1.2.4.2.1 Access to the security area is authorised only under conditions prescribed by CAAS.

1.2.4.2.2 The customs, police and health inspection offices and the premises assigned to transit traffic are normally accessible only to passengers, to staff of the public authorities and airlines and to authorised persons in pursuit of their duty.

1.2.4.2.3 The movement of persons having access to the security area is subject to the special rules laid down by CAAS.

1.2.4.3 Movement of Vehicles

1.2.4.3.1 The movement of vehicles in the security area is strictly limited to specially approved vehicles driven by authorised persons.

1.2.4.3.2 Drivers of vehicles, of whatever type, driving within the confines of the aerodrome, must respect the direction of the traffic signs and the posted speed limits and generally comply with the provisions of the Civil Aviation Authority of Singapore (Aerodrome) Regulations and with instructions given by the competent authorities.

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1.2.4.4 Policing

1.2.4.4.1 Care and protection of aircraft, vehicles, equipment and goods for which the aerodrome facilities are used are not the responsibility of the State or any concessionaire who cannot be responsible for loss or damage which is not incurred through action by them or their agents.

1.3 CONDITIONS OF AVAILABILITY

1.3.1 Aerodromes marked as military are not available for public use unless prior permission has been obtained.

2 APPLICABLE ICAO DOCUMENTS

2.1 ICAO Standards and Recommended Practices are applied in accordance with Annex 14.

3 CIVIL USE OF MILITARY AIR BASES

3.1 Conditions of Use

3.1.1 Military aerodromes may be used by civil aircraft:

a) at any time in genuine emergency requiring immediate landing at the nearest aerodrome;
b) on agreed scheduled services;
c) at other times with the permission of the authority responsible for the aerodrome, obtained prior to taking off for the aerodrome.

3.2 Civil aircraft using military aerodromes are subject to landing, housing and parking appropriate. Captains of aircraft are to report to ATC after landing and prior to taking off.

3.3 No responsibility will be undertaken for the provision of fuel oil, maintenance or other facilities except in cases of distress or exceptional circumstances. Pilots may make their own arrangements with civil fuel agents to refuel their civil aircraft on the aerodrome, provided that they furnish adequate cover against damage or loss arising from the presence of the agent's equipment and that prior permission is obtained from the Commanding Officer of the station.

3.4 Passengers embarking from this aerodrome will also have to pay the passenger service charge, where applicable. Foreign military aircraft are normally exempted by MINDEF Singapore from the airport charges. If exemption has not been granted, charges will be levied on foreign military aircraft.

3.5 Liability will not be accepted by the controlling Authority, its servants or agents, or by any agent or servant of the Government for the loss or damage, by accident, fire, flood, tempest, explosion of any other cause, to aircraft; or for loss or damage, from whatever cause arising to goods, mail or other articles, or for loss or injury from whatever cause, arising to passengers or other persons (including pilots, engineers or other personnel of aircraft), landing at, departing from, or accommodated in or at any service aerodrome; even if such loss, damage or injury is caused by or arises from negligence on the part of the Authority's servants or agents or of any servant or agent of the Government.

3.6 The use of any apparatus such as tractors, cranes, chocks, starter trolleys, etc., belonging to or under the charge of the controlling authority by the personnel of aircraft or other persons making use of the aerodrome, will be entirely at the risk of the person using such apparatus, and no liability will be accepted for any loss, damage or injury caused by or arising from the use of any such apparatus (whether under the control or management of any servant or agent of the controlling authority of the Government or otherwise) which may result to the user thereof or to any other person or thing. The use of such apparatus will be permitted only upon the understanding that the controlling authority and the Government will be held indemnified against all claims which may result from such use. It must, further be clearly understood that the controlling authority does not in any way guarantee the safety or fitness of any such apparatus or of any equipment, petrol or oil, or similar products, supplied.

3.7 Production of Documents for Inspection

3.7.1 The pilot-in-command of an aircraft shall produce to any authorised person as and when requested by that person to do so, within reasonable time before the commencement or after the termination of a flight, any of the following documents:

a) Certificate of Airworthiness;
b) Certificate of Registration;
c) The licences of its operating crew and of any person required under paragraph 19 of the Air Navigation Order to be the holder of such a licence;
d) The Telecommunications Log Book in all cases which is required under the Air Navigation Order to be carried in the aircraft;
e) Radio Station Licence;
f) Copy of Load Sheet (Singapore registered aircraft only);
g) Passenger Manifest showing name and place of embarkation and destination;
h) Cargo Manifest;
i) Copy of Certificate of Maintenance Review (Singapore registered aircraft only);
j) Noise Certificate as required by paragraph 51 of the Air Navigation Order.

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Note: An 'authorised person' means any person authorised by the Minister either generally or in relation to a particular case or class of cases, and reference to an authorised person include references to the holder for the time being of any office designated by the Minister.

4 CAT II / III OPERATIONS AT AERODROMES

Refer to WSSS AD 2.22 paragraphs 1.1 to 1.7.

5 FRICTION MEASURING DEVICE USED AND FRICTION LEVEL BELOW WHICH THE RUNWAY IS DECLARED SLIPPERY WHEN IT IS WET

5.1 Responsibility

5.1.1 The Changi Airport Group (Singapore) Pte Ltd is responsible for maintaining the civil aerodromes in a satisfactory condition for flight operations.

5.2 Measurement of Runway Surface Friction

5.2.1 The friction of the runway is calibrated periodically by the use of a Surface Friction Tester using self- wetting features on a clean surface at a speed of 95 km/hr. The principle employed in this case is the measurement of the force acting on the measuring wheel along the distance travelled. The equipment provides a continuous register of the mean coefficient of friction values.

5.2.2 Friction tests will be made over the usable length of the runway, by sections of one third of the length, and at approximately 3, 6, and 9 metres each side of the centreline in such manner as to produce mean values for each runway.

5.2.3 Should the friction value fall to 0.34 or less, NOTAM will be promulgated to notify the runway as liable to be slippery when wet.

5.2.4 The following table would be adopted by Changi Airport Group (Singapore) Civil Maintenance when they report the friction values tested on the runways.

Friction Value (from friction test)	Changi Airport Group's Comment on values obtained
> 0.34	Normal
≤ 0.34	May be Slippery when wet (NOTAM would be issued)

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AD 1.2 RESCUE AND FIRE FIGHTING SERVICES, RUNWAY SURFACE CONDITION ASSESSMENT AND REPORTING AND SNOW PLAN

1 Introduction

1.1 Adequate rescue and fire fighting vehicles, equipment and personnel have been provided at all aerodromes available for use by international commercial air transport. The levels of rescue and fire fighting facilities available for use are shown in item AD 2.6 of each aerodrome.

2 RUNWAY SURFACE CONDITION ASSESSMENT AND REPORTING AND SNOW PLAN

2.1 SNOW PLAN

NIL (not applicable)

2.2 RUNWAY SURFACE CONDITION ASSESSMENT AND REPORTING

The following information are based on the implementation of the new ICAO methodology for assessing and reporting runway surface conditions, commonly known as the ICAO Global Reporting Format (GRF). Aircraft operators should utilize the information in conjunction with the performance data provided by the aircraft manufacturer to determine if landing or take-off operations can be conducted safely and provide runway braking action special air reports (AIREP) to ATC.

2.2.1 Assessment and Reporting

2.2.1.1 Runway surface conditions are assessed and reported in the ICAO GRF whenever water is present on an operational runway.

2.2.1.2 Runway Condition Report (RCR) is disseminated when there are significant changes in the runway surface condition.

2.2.1.3 The RCR contains Runway Condition Code (RWYCC) and information that describes the runway surface condition, i.e., type of contaminants, depth, coverage for each runway third. Other relevant information is reported in the situational awareness section of the RCR.

2.2.1.4 The RWYCC is derived from the Runway Condition Assessment Matrix (RCAM), which contains the information that is relevant to the current weather environment in Singapore.

Runway condition assessment matrix (RCAM)

Assessment criteria		Downgrade assessment criteria	
Runway condition code (RWYCC)	**Runway surface description**	**Aeroplane deceleration or directional control observation**	**Pilot report of runway braking action**
6	Dry	--	--
5	WET (The runway surface is covered by any visible dampness or water up to and including 3 mm depth)	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	Good
3	WET (“slippery wet” runway)	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	Medium
2	STANDING WATER (more than 3 mm depth)	Braking deceleration OR directional control is between Medium and Poor.	Medium to Poor

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2.2.1.5 The RCR is disseminated via ATIS, SNOWTAM, and Air-Ground Voice Communications.

Communication Channels for RCR

Runway condition code (RWYCC)	Air-Ground Voice Communications	ATIS	SNOWTAM
6 (Dry)	Yes*	No	No**
5 (Wet)	Yes	Yes	No**
3 (Slippery Wet)	Yes	Yes	No**
2 (Standing Water more than 3 mm)	Yes	Yes	Yes

** Upon request*

*** Except when RWYCC 2 was previously reported*

2.2.2 Dissemination of Runway Condition Report (RCR)

2.2.2.1 **ATIS**

2.2.2.1.1 The RCR is communicated in addition to the MET REPORT elements. The information is communicated for each runway third in the direction of landing/take-off.

2.2.2.2 **SNOWTAM**

2.2.2.2.1 The SNOWTAM will be promulgated whenever RWYCC 2 is reported. The assessment and reporting of runway surface conditions continue until the runway is no longer contaminated. The RCR is communicated from the lowest runway designation number.

2.2.2.3 **Air-Ground Voice Communications**

2.2.2.3.1 Only the Runway Condition Code (RWYCC) for each runway third will be communicated through the frequency. The contamination type, contamination depth, and coverage will be provided upon request by the pilot. The information is communicated for each runway third in the direction of landing/take-off.

2.2.2.3.2 Pilots are to make special air reports (AIREP) whenever worse braking action than previously reported is experienced. Otherwise, the pilots may be asked by the ATC to report their assessment of the braking performance. The terms to describe braking action are provided in the RCAM in para 6.1.4.

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AD 1.3 INDEX TO AERODROMES

Aerodrome name Location indicator	Type of traffic permitted to use the aerodrome			Reference to AD section and remarks
	International (INTL) National (NTL)	IFR-VFR	Scheduled (S) Non-scheduled (NS) Private (P)	
1	2	3	4	5
SINGAPORE / SINGAPORE CHANGI INTL WSSS	INTL	IFR	S-NS (limited usage)	WSSS AD 2
SINGAPORE / SELETAR WSSL	INTL-NTL	VFR	NS-P	WSSL AD 2
PAYA LEBAR (Military AD) WSAP	NTL	IFR-VFR		WSAP AD 2
TENGAH (Military AD) WSAT	NTL	IFR-VFR		WSAT AD 2
SEMBAWANG (Military AD) WSAG	NTL	VFR		WSAG AD 2

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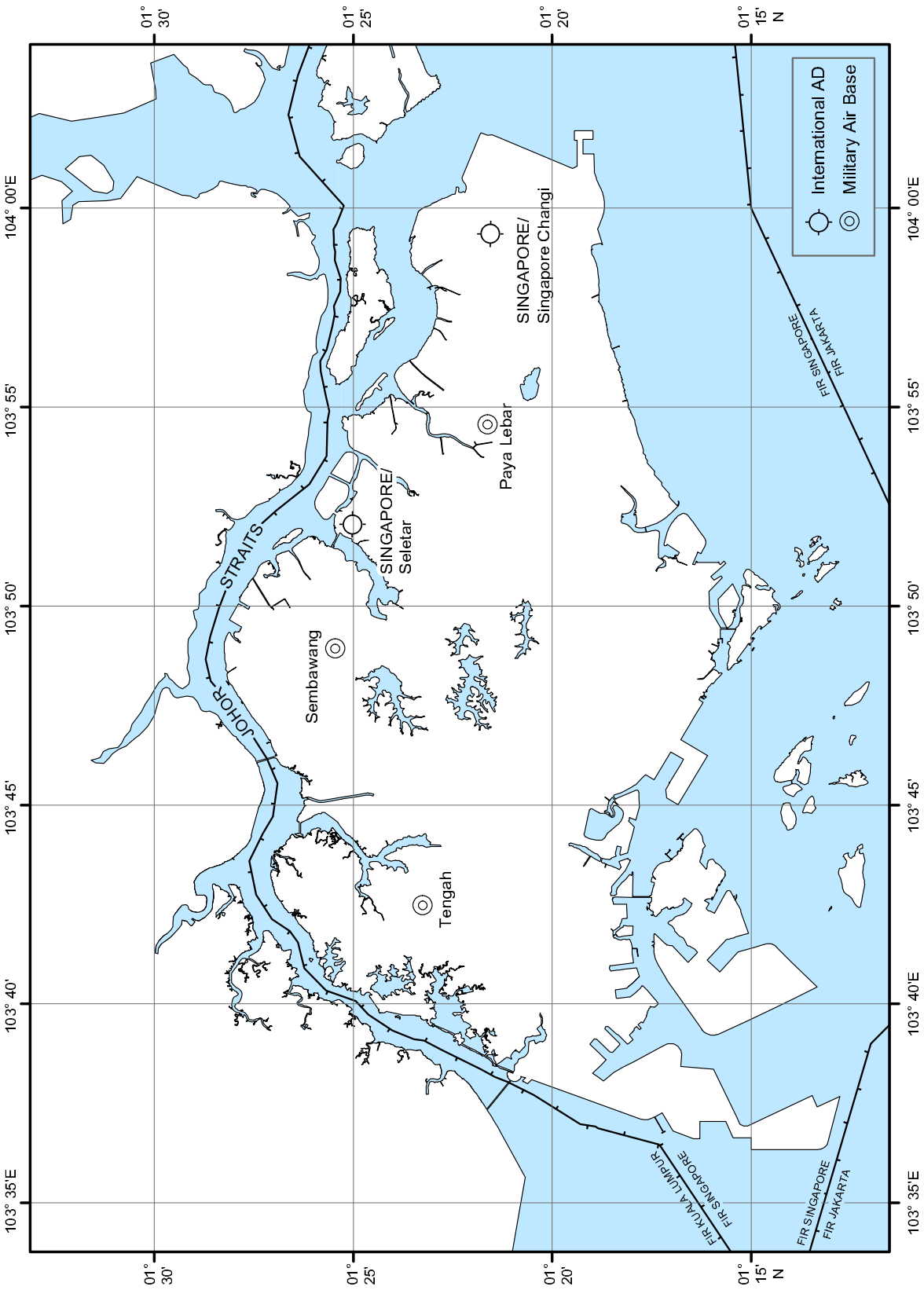
AERODROME INDEX - CHART



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AD 1.4 GROUPING OF AERODROMES

The criteria applied by Singapore in grouping aerodromes for the provision of information in this AIP is as follows:

1 Primary/Major International Aerodrome

1.1 The aerodrome of entry and departure for international air traffic, where all formalities concerning customs, immigration, health, animal and plant quarantine and similar procedures are carried out and where air traffic services are available on a regular basis.

2 Secondary/Other International Aerodrome

2.1 Another aerodrome available for the entry or departure of international air traffic, where the formalities concerning customs, immigration, health and similar procedures and air traffic services are made available, on a restricted basis, to flights with prior approval only.

3 National Aerodrome

3.1 An aerodrome available only for domestic air traffic, including those military aerodromes where civil air traffic is allowed under certain conditions.

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AD 1.5 STATUS OF CERTIFICATION OF AERODROMES

Aerodrome Name and Location Indicator	Status of Certification	Date of Certificate	Validity of Certification	Remarks
Singapore Changi WSSS	Certified	1 July 2024	5 years from the date of certification	ARC: Code 4F ADG: V
Seletar WSSL	Certified	1 July 2024	5 years from the date of certification	ARC: Code 3C ADG: III
Paya Lebar WSAP	NA	NA	NA	Military Aerodrome Operator: Republic of Singapore Air Force Alternate/Emergency Diversionary Aerodrome for Singapore Changi Airport (See AIP section WSAP AD 2.20)

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AD 2 AERODROMES

WSSS SINGAPORE / SINGAPORE CHANGI INTL

WSSS AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WSSS - SINGAPORE / SINGAPORE CHANGI INTL

WSSS AD 2.2 AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA

1	*ARP coordinates and site at AD*	012133.16N 1035921.57E (Control Tower)
2	*Direction and distance from (city)*	17.2km North-East from City Centre (The Fullerton Hotel, Singapore)
3	*Elevation/Reference temperature*	6.66m / 32.6 °C
4	*Geoid Undulation (AD elevation position)*	10.24 M
5	*MAG VAR /Annual change*	0°23' E (2020) / Negligible
6	*AD Administration, address, telephone, telefax, AFS*	
CHANGI AIRPORT GROUP (SINGAPORE) PTE LTD Singapore Changi Airport P.O.Box 168, SINGAPORE 918146 Tel: (65)65956868		
7	*Types of traffic permitted*	IFR
8	*Remarks*	
a. Not available to all non-scheduled civil aircraft types of 40-seater or below except in special circumstances. Aircraft larger than the above category shall not plan their arrival between 0900-1559UTC. b. Aircraft shall leave nose-in position (90 degrees) with the aid of aircraft tow tractors. Reverse thrust or variable pitch propellers shall not be used. Aircraft operators shall make suitable arrangements. c. Prior permission required for aircraft not equipped with radiotelephony. d. A subsonic jet aircraft, unless otherwise exempted, is not permitted to operate in Singapore unless it possesses a noise certificate stating that it meets the noise standards of ICAO Annex 16, Volume 1, Chapter 3, or equivalent. The noise certificate may also take the form of a suitable statement contained in another document approved by the State of Registry of the aircraft. e. RVR minima for CATII ILS operations is limited to 350m due to runway and taxiway light spacing requirements on the airfield. f. Frangible poles are installed for the purpose of identifying 90m away from the centreline of RWY 02L/20R and RWY 02C/20C		

WSSS AD 2.3 OPERATIONAL HOURS

	Operational Hours		
1	Aerodrome Administration:	RWY 02L/20R RWY 02C/20C RWY 02R/20L	H24
2	Customs and Immigration	H24	
3	Health and Sanitation	H24	
4	AIS Briefing Office	H24	
5	ATS Reporting Office	H24	
6	MET Briefing Office	H24	
7	Air Traffic Services	H24	

WSSS AD 2.4 HANDLING SERVICES AND FACILITIES

1	*Cargo Handling Facilities*	Cargo terminals equipped with advanced storage stacker, material and pallet container handling systems, computerised cargo information, data and documentation systems. By arrangement with airlines.
2	*Fuel / Oil Types*	JET A1(for aircraft). Oils: Various by arrangement with fuel companies.
3	*Fuelling Facilities / Capacity*	Hydrant refueling
4	*Hangar space for visiting aircraft*	By arrangement with SIA Engineering Company (SIAEC) or ST Aerospace Services Co.

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5	*Repair facilities for visiting aircraft*	Maintenance and repairs for commercial aircraft up to and including A380 is by arrangement.
6	*Remarks*	a) Marshalling Service: No pilot shall taxi an aircraft on its own into a gate/stand without the aid of a docking system or a marshaller. b) Oxygen and related servicing: Oxygen for all cabin and aircraft system. No CO? recharging facilities.

WSSS AD 2.5 PASSENGER FACILITIES

1	*Hotels*	Transit area and adjacent to airport terminal.
2	*Restaurants*	Transit and public areas of terminal building.
3	*Transportation*	Buses, taxis, MRT train and car rental service.
4	*Medical Facilities*	Available at airport.
5	*Bank and Post Office*	Available at airport.
6	*Tourist Office*	Available at airport.
7	*Remarks*	Internet address: http://www.changiairport.com.sg for airport and flight information, shops and restaurants, facilities and services, flight connections and tourist information.

WSSS AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

1	*AD category for fire fighting*	RWY 02L/20R, RWY 02C/20C and RWY 02R/20L CAT10 (No facilities for foaming of runways)
2	*Rescue equipment*	Adequately provided as recommended by ICAO.
3	*Capability for removal of disabled aircraft*	Specialised aircraft recovery equipment available for up to and including A380 size aircraft operation.
4	*Remarks*	All Airport Emergency Service personnel are trained in rescue and fire-fighting as well as medical first-aid.

WSSS AD 2.7 SEASONAL AVAILABILITY - CLEARING

There is no requirement for clearing. The aerodrome is available throughout the year.

WSSS AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

1	*Apron surface and strength*	Aircraft stands C11, C16, C19, D30, D35, D38, E2, E6, E7, E10, F32, F36, F37, 301, 303, 304, 305, 307, 308, 309, 402, 403, 404, 605, 952, G1 to G17 and 471 to 487 – Concrete surface; strength PCR 680/R/B/W/U Aircraft stand 306 – Concrete surface; strength PCR 784/R/B/W/U All other aircraft stands – Concrete surface; strength PCR 1006/R/B/W/U

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2	*Taxiway width, surface and strength*	Minimum width 23m for all taxiways TWY A1, A2, A11, A12, A (between A1 and A2, and between A11 and A12), B1, B2, B13, B14, B (between B1 and B2, and between B13 and B14), C1, C2, C13, C14, C (between C1 and C2) and L (between C13 and C14), D1, D2, D13, D14, D (between D1 and D2, and between D13 and D14), T1, T2, T4, T12, T13, T (between T11 and T13), U12, U13, U (between U12 and U13), W1, W9 – Concrete surface; strength PCR 1006/R/B/W/U TXL U2, TWY U7 (between TWY U and TXL U2), TWY U8 (between TWY U and TXL U2), TWY U9 (between TWY U and TXL U2), TXL S6, S8, S9, TWY S7 – Asphalt surface; strength PCR 530/F/B/X/U All other taxiways – Asphalt surface; strength PCR 710/F/B/X/U Note: Open-air drains, demarcated by frangible poles, are installed within non-graded TWY strips at least 30m from the TWY centrelines. 0.5m-high lateral restraint at 30m east of TWY P8 and TXL N5 centreline before the open drain. 0.8m-high lateral restraints, located at 43m from the centreline of TWY G and TWY H, on the taxiway bridges.
3	*Altimeter checkpoints location and elevation*	See AD-2-WSSS-ADC-2/ Chart (flip side) for coordinates and elevations of aircraft stands.
4	VOR checkpoint location	NIL
5	*INS checkpoints position*	See AD-2-WSSS-ADC-2/ Chart (flip side) for coordinates and elevations of aircraft stands.
6	*Remarks*	NIL

WSSS AD 2.9 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS

1	Use of aircraft stand ID signs, TWY guidelines and visual docking/parking guidance system of aircraft stands.
	Taxiing guidance signs at all intersections with TWY and RWY at all holding positions. Apron markings at aircraft stands. Nose-in guidance at aircraft stands. For information on Safegate Aircraft Docking Guidance System, Taxiing Guidance System at Singapore Changi Airport, refer to WSSS AD 2.9.
2	RWY and TWY markings and LGT.
	RWY 02L RWY LGT: refer to WSSS AD 2.14 and WSSS AD 2.15. TWY LGT: BLUE lights on TWY curved edges. BLUE TWY edge markers along selected straight TWY edge sections. Red stop bar at TWY INT controllable on/off. Red stop bar lights at Pattern "A" RWY HLDG PSN entrances to RWY are controllable on/off and are supplemented with elevated RWY guard lights and RWY designation sign at the sides. Red stop bar lights at Pattern “B” RWY HLDG PSN before entry into the RWY ILS sensitive area on the west of RWY 02L/20R are controllable on/off with Category I RWY HLDG PSN sign. Internally lighted mandatory or information TWY signboards. "MIL" destination signs on the west of RWY 02L/20R indicate the direction to aircraft movement area for military use only. Alternate green and yellow taxiway centreline lights along taxiways within ILS sensitive zone in the vicinity of the runway and green taxiway centreline lights with selective controls along taxi-routes to/from main RWY and aprons. On the west of RWY 02L/20R, no taxiway centreline lights. MARKING AIDS: THR, touchdown zone, RWY centreline, RWY side stripe, RWY designations, aiming point markings, TWY centreline, taxi holding positions – all taxiways, apron markings.
	RWY 20R RWY LGT: refer to WSSS AD 2.14 and WSSS AD 2.15. TWY LGT: same as for RWY 02L and RWY 02C/20C. MARKING AIDS: Pre-threshold centreline, transverse stripe for displaced THR, THR, touchdown zone, RWY centreline, RWY side stripe, RWY designations, aiming point markings, TWY centreline, taxi holding positions – all taxiways, apron markings.

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	RWY 02C/20C RWY LGT: refer to WSSS AD 2.14 and WSSS AD 2.15. TWY LGT: BLUE lights on TWY curved edges. BLUE TWY edge markers along selected straight TWY edge sections. Red stop bar lights at TWY INT are controllable on/off. Red stop bar lights at Pattern "A" RWY HLDG PSN entrances to RWY are controllable on/off and are supplemented with elevated RWY guard lights and RWY designation sign at the sides. Red stop bar lights at Pattern "B" RWY HLDG PSN before entry into the RWY ILS sensitive area are controllable on/off with Category I/II RWY HLDG PSN sign. Internally lighted mandatory or information TWY signboards. On the east and west of RWY 02C/20C, alternate green and yellow taxiway centreline lights along taxiways within ILS sensitive zone in the vicinity of the runway and green taxiway centreline lights with selective controls along taxi-routes to/from main RWY and aprons. On the east of RWY 02C/20C between Pattern "A" RWY HLDG PSN and Pattern "B" RWY HLDG PSN TWY, alternate green and yellow taxiway centreline lights along taxiways within ILS sensitive zone. Rapid Exit Taxiway Indicator LGT comprises a set of yellow unidirectional LGT positioned in a 3-2-1 sequence at 100m intervals prior to the point of tangency of the rapid exit taxiway centreline. MARKING AIDS: THR, touchdown zone, RWY centreline, RWY side stripe, RWY designations, aiming point markings, TWY centreline, taxi holding positions – all taxiways, apron markings.
	RWY 02R/20L RWY LGT: refer to WSSS AD 2.14 and WSSS AD 2.15. TWY LGT: Blue lights on TWY curved edges. Blue TWY edge markers along selected straight TWY edge sections. Red stop bar lights at TWY INT are controllable on/off. Red stop bar lights at Pattern “A” RWY HLDG PSN entrances to RWY are controllable on/off and are supplemented with elevated RWY guard lights and RWY designation sign at the sides. Red stop bar lights at Pattern “B” RWY HLDG PSN before entry into the RWY ILS sensitive area are controllable on/off with Category I/II RWY HLDG PSN sign. Internally lighted mandatory or information TWY signboards. “MIL” destination signs on the east of RWY 02R/20L indicate the direction to aircraft movement area for military use only. On the west of RWY 02R/20L, alternate green and yellow taxiway centreline lights along taxiways within ILS sensitive zone in the vicinity of the runway and green taxiway centreline lights with selective controls along taxi-routes to/from main RWY and aprons. On the east of RWY 02R/20L, no taxiway centreline lights. MARKING AIDS: THR, touchdown zone, RWY centreline, RWY side stripe, RWY designations, aiming point markings, TWY centreline, taxi holding positions – all taxiways, apron markings.
3	*Stop bars:* Stop bars where appropriate.
4	*Remarks:* Where Red stop bar is not present at the TWY INT, Yellow INTERMEDIATE HLDG PSN LGT will be used at TWY INT and switched on between sunset and sunrise or during periods of poor visibility.

1 ADB SAFEGATE AIRCRAFT DOCKING GUIDANCE SYSTEM - SAFEDOCK

1.1 INTRODUCTION

1.1.1 The ADB Safegate Aircraft Docking Guidance System (ADGS) - SAFEDOCK is a fully automatic aircraft docking guidance system installed at the contact aircraft stands at Terminals 1, 2, 3 and 4, and at the remote aircraft stands at South Apron and North Remote Apron (951 to 954) of Singapore Changi Airport.

1.2 DESCRIPTION OF SYSTEM

1.2.1 The system is based on a laser scanning technique and it tracks both the lateral and longitudinal position of the aircraft. This 3D technique allows the system to identify the incoming aircraft and check it against the one selected by the operator to ensure that the pilot is provided with the correct stop indication for the aircraft.

1.2.2 The system is operated only in the Automatic Mode. When the system fails, the aircraft is to be marshalled into the stand manually.

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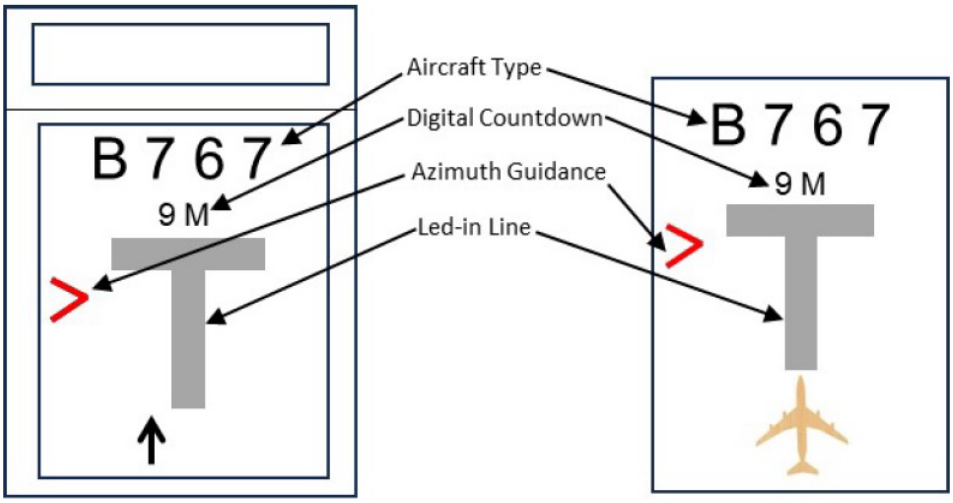
1.2.3 Azimuth guidance, continuous closing rate information, aircraft type, etc., are shown to the pilot on a single display clearly visible for both pilot and co-pilots. Figure A and Figure B shows the Display and Laser Scanning Unit mounted on the terminal in front of the aircraft stand.

LED DISPLAY AND LASER SCANNING UNIT

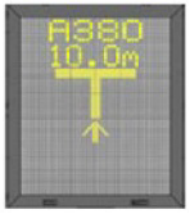
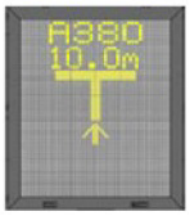
LED DISPLAY AND LASER SCANNING UNIT



Safedock Type 1
Figure A

Safedock FleX
Figure B

1.3 DOCKING PROCEDURES

Description	Display on ADGS
Checking of Aircraft Type – Check that the correct aircraft type is displayed. The scrolling arrows indicate that the system is activated. – Follow the lead-in line.	Safedock Type 1 Safedock FleX
Capture of Correct Aircraft Type – When the aircraft has been caught by the scanning unit, the scanning unit checks that the aircraft is the correct type and the display provides azimuth guidance information. When the solid yellow closing rate bar appears, the aircraft is being tracked by the system.	Safedock Type 1 Safedock FleX
Steering and Alignment of Aircraft – Look for the flashing red arrow and solid yellow arrow which provide azimuth guidance information. The flashing red arrow shows which direction to steer, while the solid yellow arrow gives an indication of how far the aircraft is off the centreline.	Safedock Type 1  Safedock FleX
Distance of Aircraft from STOP Position – When the aircraft is 15m from the stop position, closing rate information is given. “Distance to go” is indicated by turning off one row of LEDs (Laser Electronic Displays) for every half metre that the aircraft advances towards the stop position. From 15m to the stop position, the display will indicate the distance from the stop position for every 1m. At 3m from the stop position, the display will indicate the distance from the stop position for every 0.2m.	Safedock Type 1  Safedock FleX

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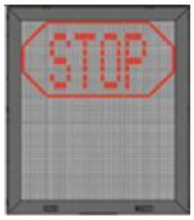
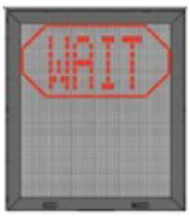
Description	Display on ADGS
STOP Position – When the correct stop position is reached, all of the LEDs for the closing rate bar will be off, the word “STOP” in red with red border will appear in the display.	Safedock Type 1  Safedock FleX
Checking of STOP Position – If the aircraft stops at the correct position, “OK” will be displayed after a few seconds.	Safedock Type 1 Safedock FleX
Overshooting of STOP Position – If the aircraft has gone past the correct stop position, the display will show “TOO FAR” after the aircraft comes to a complete stop.	Safedock Type 1 Safedock FleX
Object Blocking the View – If some object is blocking the view towards the approaching aircraft or the detected aircraft is lost before 12m to the correct stop position, the system will show “WAIT”.	Safedock Type 1  Safedock FleX

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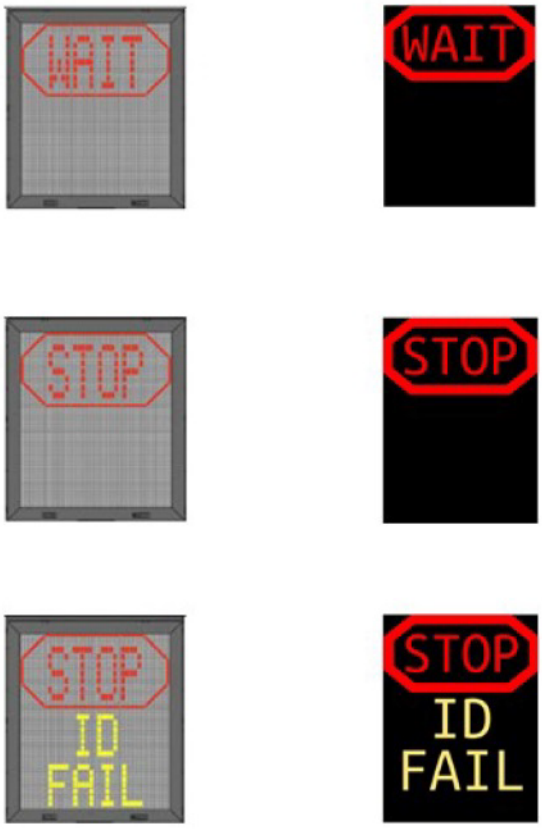
Description	Display on ADGS
Identification of Aircraft – The aircraft must be identified at least 12m before the correct stop position. Otherwise, the display will show “WAIT”, “STOP” and “ID FAIL”.	**Safedock Type 1** / **Safedock FleX** 

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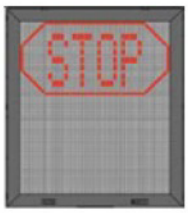
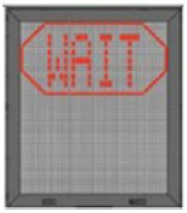
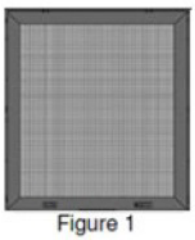
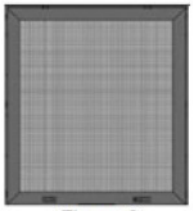
1.4 SAFETY MEASURES

Description	Display on ADGS
ADGS Blank / Wrong Aircraft Type – Pilot should not turn an aircraft into the aircraft stand if the docking system is not activated or on seeing a wrong aircraft type displayed on the system.	Safedock Type 1 Safedock FleX
Proceeding beyond Passenger Loading Bridges – Pilot should not proceed beyond the passenger loading bridges unless the scrolling arrows (see figure 1) have been superseded by the solid yellow closing rate bar (see figure 2).	Safedock Type 1 Figure 1 Figure 2 Safedock FleX Figure 1 Figure 2
Minimum Speed – When using the docking system, pilots are to taxi into the aircraft stand at minimum speed. The system will display “SLOW” to inform the pilot if the aircraft’s taxiing speed exceeded 1.2m/s.	Safedock Type 1 Safedock FleX

Description	Display on ADGS
Slow Down (In Abnormal Situations) – In bad weather conditions, the docking system may go into downgrade mode. The display will show the aircraft type and "SLOW" and the scrolling arrows are disabled (See Figure 1). When the system has detected the aircraft, the solid yellow closing rate bar appears. Docking process is allowed to continue but pilot should exercise caution.	**Safedock Type 1** Figure 1 **Safedock FleX** Figure 1
Overshooting – To avoid overshooting, pilots are advised to approach the stop position slowly and observe the closing rate information displayed. Pilots should stop the aircraft immediately when seeing the "STOP" or "WAIT" display or when given the stop sign by the aircraft marshaller or is unsure of the information displayed during the docking process.	**Safedock Type 1**  **Safedock FleX** **Safedock Type 1**  **Safedock FleX**
No Display – Pilot should stop the aircraft immediately if the display goes black, for power failure (see figure 1) or system failure (see figure 2), during the docking process. The aircraft is to be manually marshalled into the aircraft stand.	**Safedock Type 1**  Figure 1 **Safedock FleX** Figure 1  Figure 2 Figure 2

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Description	Display on ADGS
Safety Backup (SBU) Stop - When a non-recoverable error has occurred during the docking due to either 1. Hardware failure; 2. Aircraft more than +/- 0.5 meters off the centerline when two (2) meters or less to stop-position; or 3. System Failure - Pilot are to stop the aircraft immediately when seeing the “SBU STOP” display or when given the stop sign by the aircraft marshaller or is unsure of the information displayed during the docking process.	Safedock Type 1 Safedock FleX
View Blocked - When the view towards the aircraft is hindered, the display will show “WAIT VIEW BLOCK” Pilot are to stop the aircraft immediately or when given the stop sign by the aircraft marshaller or is unsure of the information displayed during the docking process.	Safedock Type 1 Safedock FleX
Gate Block - When an object is found to be blocking the view from the ADGS toward the aircraft, the display will show "WAIT GATE BLOCK". Pilot are to stop the aircraft immediately or when the stop sign by the aircraft marshaller or is unsure of the information displayed during the docking process.	Safedock Type 1 Safedock FleX

2 PROCEDURES FOR START-UP AND PUSHBACK OF AIRCRAFT

2.1 Ground crew shall ensure that the area behind an aircraft is clear of vehicles, equipment and other obstructions before the start-up or pushback of aircraft commences.

2.2 When it becomes necessary to vary a procedure to expedite aircraft movements, Ground Movement Controller (“Singapore Ground”) shall issue specific instructions to the pilot.

2.3 When the pilot is ready for start-up and pushback, he shall seek confirmation from the ground crew that there is no hazard to his aircraft starting up. He shall then notify Singapore Ground that he is ready for pushback. On being told by Singapore Ground that pushback is approved, he shall co-ordinate with the ground crew for the start-up and pushback of the aircraft.

2.4 The lead-in lines are for aircraft nose-in guidance. For aircraft stands without dedicated pushback lines, ground crew may use the lead-in lines for pushback guidance.

2.5 For more information, refer to Airport Operations Centre System (AOCS) at https://aoc.changiairport.com/ for detailed pushback procedures.

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3 ADVANCED MULTILATERATION SYSTEM

3.1 INTRODUCTION

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

3.2 CARRIAGE OF MODE-S SSR TRANSPONDER

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

3.3 MULTILATERATION SYSTEM OUTLINE

3.3.1 The Multilateration System uses multiple receivers to pick up “squitters” transmitted by aircraft or vehicle Mode S transponders. It calculates the position of an aircraft or a vehicle by comparing the time its “squitter” arrives at each receiver.

3.3.2 The System will derive the identity of an aircraft by selectively interrogating its transponder to receive its assigned Mode A code or extracting its aircraft identification [that is, the ICAO callsign used in flight and inserted in the Flight Management System (FMS) or the Transponder Control Panel], if available, from its squitter. For transponder equipped vehicles, the system will derive their respective identities from the unique Mode S addresses contained in their squitters.

3.4 AIRCRAFT REQUIREMENTS

3.4.1 The Multilateration System is essentially passive. It relies on aircraft transponders squittering at all times when moving on the airfield. At present, some aircraft checklist procedures instruct pilots to turn off the transponder shortly after leaving the runway on arrival and, not to switch it on until reaching the runway holding point for departure. This is in line with the requirement that Mode A/C transponders should not transmit on the ground, which does not apply to Mode S transmissions.

3.4.2 For the Multilateration System to work effectively, all aircraft Mode S transponders need to transmit Mode S squitters at all times when moving on the airfield, starting immediately prior to the request for pushback, and for arrival aircraft until they are stationary at the aircraft stands. The Mode S transponders should not respond to All-Call interrogations, but should respond to addressed interrogations.

3.5 PROCEDURES/ACTIONS REQUIRED BY PILOTS

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

3.5.2 Pre-Pushback / Taxi

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

3.5.3 After Landing

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

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4 AIRFIELD LIGHTING CONTROL SYSTEM (ALCS) AND MARKINGS

4.1 INTRODUCTION

4.1.1 The Advanced Surface Movement Guidance and Control System (A-SMGCS) at Singapore Changi Airport is able to control and monitor the runway and taxiway airfield lights such as the stop bars and green taxiway centreline lights, through the Airfield Lighting Control System. The system is designed to provide pilots with visual guidance while taking off, landing and taxiing during day/night operations and during periods of low visibility. It is controlled by air traffic controllers at Singapore Changi Airport using the A-SMGCS display.

4.2 TAXI INSTRUCTIONS

4.2.1 When the green centreline lights are switched on, ATC will issue verbal instructions to pilots/ airline operators for taxi / tow clearance. The green taxiway centreline lights are provided for guidance. Pilots/ airline operators shall stop at all red stop bar lights.

4.2.2 All green centreline lights on taxiways leading to the runways terminate at the runway holding positions where, by default, red stop bar lights remain on unless deselected by the Runway Controller. When deselected, these stop bar lights will re-activate automatically. Pilots and drivers shall not cross any lighted red stop bar lights.

4.2.3 Pilots and drivers shall enter / cross the runway or taxiway only when both the following conditions are met:
The crew have

a) Received positive ATC clearance to enter / cross the runway or taxiway, and
b) Observed that the red stop-bar lights are turned off.

4.3 INFORMATION AND MANDATORY SIGNS/MARKINGS

4.3.1 When following ATC verbal taxi instructions, pilots are advised to also navigate their taxi route with reference to information and mandatory signs/markings provided at the airport so as to maintain situational awareness of their whereabouts at all times.

WSSS AD 2.10 AERODROME OBSTACLES

1. Obstacles in Approach / TKOF areas

IN APPROACH / TKOF AREAS			
RWY/Area affected		*Obstacles type, ELEV,Markings/LGT*	Location of Obstacles
1		2	3
1)	RWY 20R APCH	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 2120m from DTHR RWY 20R.
	RWY 02L TKOF	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 1110m from DER RWY 02L.
2)	RWY 02L/20R APCH RWY 02L/20R TKOF	ILS LLZ co-located with LLZ antennae.	Within the RWY strip.
3)	RWY 20R APCH	Two antennae, HGT 72ft AMSL, marked and LGTD	012311N 1035928E
4)	RWY 20R APCH	Antenna, HGT 88ft AMSL, marked and LGTD	012315N 1035931E
5)	RWY 02L APCH	Antenna, HGT 82ft AMSL, marked and LGTD	012051N 1035827E
6)	RWY 02L APCH	Pole, HGT 128ft AMSL, marked and LGTD	011859N 1035748E
7)	RWY 02L APCH	Pole, HGT 160ft AMSL, marked and LGTD	012058N 1035814E
8)	RWY 02L APCH	Pole, HGT 131ft AMSL, marked and LGTD	012038N 1035848E
9)	RWY 20C APCH	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 2650m from THR RWY 20C.
	RWY 02C TKOF	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 2590m from DER RWY 02C.
10)	RWY 02C APCH RWY 20C TKOF	Trees HGT ranging up to 75ft AMSL	011909.0N 1035849.0E
11)	RWY 02C APCH RWY 20C TKOF	Approach lighting masts HGT ranging up to 35ft AMSL	Within APCH/TKOF
12)	RWY 02C APCH RWY 20C TKOF	ILS LLZ (South), 27ft AMSL, marked	011932.4N 1035901.3E

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IN APPROACH / TKOF AREAS			
RWY/Area affected		*Obstacles type, ELEV,Markings/LGT*	Location of Obstacles
13)	RWY 02C APCH RWY 20C TKOF	LLZ Hut (South), 31ft AMSL, marked and LGTD	011934.1N 1035856.8E
14)	RWY 02C APCH RWY 20C TKOF	Mast, 62ft AMSL, marked and LGTD	011917.8N 1035901.5E
15)	RWY 20C APCH RWY 02C TKOF	Trees HGT ranging up to 92ft AMSL	012221.0N 1040022.2E
16)	RWY 20C APCH RWY 02C TKOF	Approach lighting masts HGT ranging up to 35ft AMSL	Within APCH/TKOF
17)	RWY 20C APCH RWY 02C TKOF	ILS LLZ (North), 27ft AMSL, marked	012154.8N 1040001.2E
18)	RWY 20C APCH RWY 02C TKOF	LLZ Hut (North), 31ft AMSL, marked and LGTD	012156.3N 1035957.6E
19)	RWY 20C APCH RWY 02C TKOF	Mast, 55ft AMSL, marked and LGTD	012200.4N 1040012.0E
20)	RWY 20L APCH	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 2190m from THR RWY 20L.
	RWY 02R TKOF	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 2130m from DER RWY 02R.
21)	RWY 02R APCH RWY 20L TKOF	ILS LLZ (South), 26ft AMSL	011909.5N 1035954.7E
22)	RWY 02R APCH RWY 20L TKOF	LLZ Building (South), 27ft AMSL	Within Approach
23)	RWY 02R APCH RWY 20L TKOF	MM Building (South), 27ft AMSL	Within Approach / Takeoff
24)	RWY 20L APCH RWY 02R TKOF	ILS LLZ (North), 26ft AMSL	012131.5N 1040054.7E
25)	RWY 20L APCH RWY 02R TKOF	LLZ Building (North), 28ft AMSL	Within Approach
26)	RWY 20L APCH RWY 02R TKOF	MM Building (North), 27ft AMSL	Within Approach / Takeoff
Remarks: Obstacles are shown on the AOC, IAC and VAC.			

2. Obstacles in Circling area and at Aerodrome

IN CIRCLING AREA AND AT AERODROME		
Obstacles type, ELEV, Markings/LGT		Location of Obstacles
1		2
1)	RWY 02L/20R and RWY 02R/20L Wind direction indicators, marked and LGTD	Located at each end of RWY adjacent to GP Hut
2)	RWY 02C Wind direction indicator, 38ft AMSL, marked and LGTD	011954.7N 1035915.2E
3)	RWY 20C Wind direction indicator, 38ft AMSL, marked and LGTD	012124.9N 1035953.4E
4)	RWY 02L Anemometer, 48ft AMSL, marked and LGTD	012110.5N 1035840.2E
5)	RWY 20R Anemometer, 44ft AMSL, marked and LGTD	012222.7N 1035910.9E
6)	RWY 02C Anemometer, 49ft AMSL, marked and LGTD	011954.3N 1035914.9E
7)	RWY 20C Anemometer, 49ft AMSL, marked and LGTD	012043.4N 1035935.7E
8)	RWY 20C Anemometer, 49ft AMSL, marked and LGTD	012129.4N 1035955.1E
9)	RWY 02R Anemometer, 47ft AMSL, marked and LGTD	012105.7N 1040048.5E
10)	RWY 20L Anemometer, 48ft AMSL, marked and LGTD	011931.7N 1040008.8E
11)	RWY 02L GP Antenna, 67ft AMSL, marked and LGTD	012108.5N 1035839.1E
12)	RWY 20R GP Antenna, 67ft AMSL, marked and LGTD	012225.5N 1035912.2E
13)	RWY 02C GP Antenna, 67ft AMSL, marked and LGTD	011952.2N 1035913.7E

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IN CIRCLING AREA AND AT AERODROME		
Obstacles type, ELEV, Markings/LGT		Location of Obstacles
14)	RWY 20C GP Antenna, 67ft AMSL, marked and LGTD	012131.7N 1035955.7E
15)	RWY 02R GP Antenna, 67ft AMSL, marked and LGTD	012108.9N 1040049.4E
16)	RWY 20L GP Antenna, 67ft AMSL, marked and LGTD	011929.1N 1040007.3E
17)	Antenna, HGT 82ft AMSL, marked and LGTD	012036N 1035819E
18)	Antenna, HGT 85ft AMSL, marked and LGTD	012039N 1035821E
19)	Antenna, HGT 78ft AMSL, marked and LGTD	012042N 1035823E
20)	Antenna, HGT 82ft AMSL, marked and LGTD	012053N 1035827E
21)	Antenna, HGT 78ft AMSL, marked and LGTD	012049N 1035826E
22)	FOD detection mast, HGT 46ft AMSL, marked and LGTD	011952.5N 1035913.9E
23)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	011959.1N 1035917.2E
24)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012005.0N 1035919.6E
25)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012016.9N 1035924.7E
26)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012028.7N 1035929.7E
27)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012033.8N 1035931.8E
28)	FOD detection mast, HGT 38ft AMSL, marked and LGTD	012045.5N 1035936.8E
29)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012056.5N 1035941.5E
30)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012108.7N 1035946.6E
31)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012114.0N 1035948.8E
32)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012124.0N 1035953.1E
33)	FOD detection mast, HGT 38ft AMSL, marked and LGTD	012129.0N 1035954.9E
34)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	011929.5N 1040007.5E
35)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	011934.4N 1040009.8E
36)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	011943.2N 1040013.6E
37)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	011954.2N 1040018.2E
38)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012003.3N 1040022.0E
39)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012004.5N 1040022.5E
40)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012027.2N 1040031.8E
41)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012027.8N 1040032.0E
42)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012052.8N 1040042.9E
43)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012054.9N 1040043.8E
44)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012103.4N 1040047.4E
45)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012108.4N 1040049.3E
46)	Liquefied Natural Gas storage tanks, plants, gas stacks and flares within Malaysia's Pengerang Integrated Complex (PIC) extending up to HGT 1,500ft AMSL. Refer to AIP Malaysia for information on "Pengerang Integrated Complex Safety Area". Aircraft may overfly the area at 2,000ft and above.	Within area bounded by 012245N 1040705E 012245N 1040831E 012306N 1040954E 012301N 1041056E 012232N 1041058E 012114N 1041057E 012038N 1040939E 012031N 1040813E 012136N 1040704E 012245N 1040705E
Remarks: Obstacles are shown on the AOC, IAC and VAC.		

WSSS AD 2.11 METEOROLOGICAL INFORMATION PROVIDED

1	*Associated MET Office*	Singapore Changi (WSSS)
2	*Hours of service*	H24

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3	*Office responsible for TAF preparation* *Periods of validity*	Singapore Changi (WSSS) 12, 30
4	*Type of landing forecast, Interval of issuance*	TREND
5	*Briefing/consultation provided*	P
6	*Flight documentation, Language used*	Charts or Tabular forms, English
7	*Charts and other information available for briefing or consultation*	S, U, P
8	*Supplementary equipment available for providing information*	HRPT: High Resolution Picture Transmission APT: Automatic Picture Transmission MDWR: MET Doppler Weather Radar MAINT: Second WED of every month BTN 0200-0900 ALTN period: THU following the second WED.
9	*ATS units provided with information*	Singapore ACC, Singapore RCC
10	*Additional information*	Tel: 65422837 (MET Office)

WSSS AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

Designations RWY NR	TRUE BRG	Dimensions of RWY	Strength (PCR) and surface of RWY and SWY	THR coordinates and RWY end coordinates (THR Geoid Undulation)	THR Elevation and highest elevation of TDZ of precision APCHRWY
1	2	3	4	5	6
02L	023.02°	4000m X 60m	710/F/B/X/U Grooved Bituminous Concrete	THR coordinates: 012056.27N 1035838.82E RWY end coordinates: 012256.13N 1035929.42E (10.23m)	6.64m 6.64m
20R (Threshold displaced by 740m southwards)	203.02°	4000m X 60m	710/F/B/X/U Grooved Bituminous Concrete	THR coordinates: 012234.02N 1035920.09E RWY end coordinates: 012056.27N 1035838.82E (10.26m)	3.98m 4.67m
02C	023.01°	4000m X 60m	710/F/B/X/U Grooved Bituminous Concrete	THR coordinates: 011943.51N 1035905.86E RWY end coordinates: 012143.37N 1035956.46E (10.27m)	4.80m 4.80m
20C	203.01°	4000m X 60m	710/F/B/X/U Grooved Bituminous Concrete	THR coordinates: 012143.37N 1035956.46E RWY end coordinates: 011943.51N 1035905.86E (10.30m)	4.80m 4.80m
02R	023.01°	4000m X 60m	710/F/B/X/U Grooved Bituminous Concrete	THR coordinates: 011920.59N 1035959.45E RWY end coordinates: 012120.45N 1040050.05E (10.32m)	4.77m 4.77m

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Designations RWY NR	TRUE BRG	Dimensions of RWY	Strength (PCR) and surface of RWY and SWY	THR coordinates and RWY end coordinates (THR Geoid Undulation)	THR Elevation and highest elevation of TDZ of precision APCHRWY
1	2	3	4	5	6
20L	203.01°	4000m X 60m	710/F/B/X/U Grooved Bituminous Concrete	THR coordinates: 012120.45N 1040050.05E RWY end coordinates: 011920.59N 1035959.45E (10.36m)	4.71m 4.75m

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	OFZ
7	8	9	10	11	12	13
RWY 02L 1.15% / 0.07% SWY 1.44% / 0.23%	60 X 60	270 X 150	4250 X 280	240 X 150	Not Applicable	Yes
RWY 20R 1.15% / 0.07% SWY 0.74% / 0.28%	60 X 60	270 X 150	4240 X 280	240 X 150	Not Applicable	Yes
RWY 02C 1.25% / 0.00% SWY 1.25% / 0.00%	60 X 60	60 X 150	4240 X 280	240 X 150	Not Applicable	Yes
RWY 20C 1.25% / 0.00% SWY 1.25% / 0.00%	60 X 60	60 X 150	4240 X 280	240 X 150	Not Applicable	Yes
RWY 02R 1.25% / 0% SWY 1.21% / 0%	60 X 60	60 X 150	4240 X 280	240 X 150	Not Applicable	Yes
RWY 20L 1.25% / 0% SWY 1.22% / 0%	60 X 60	60 X 150	4240 X 280	240 X 150	Not Applicable	Yes

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Remarks
14
1) Open-air drains, demarcated by frangible poles, within the runway strip of RWY 02R/20L. 2) Not in use military hookwire system embedded in runway pavement at 490m from RWY 02R and RWY 20L thresholds. 3) Frangible End Around Taxiway (EAT) visual screens located at the approach/take-off end of RWY 02C and RWY 20C do not penetrate the obstacle limitation surfaces of RWY 02C/20C. The EAT visual screens are marked in diagonal red-white stripes and installed with additional red obstacle lights. The EAT visual screens are intended to help pilots operating on RWY 02C/20C to differentiate between an aircraft crossing the runway or taxiing on end-around taxiways TWY K and TWY L. 4) **Scheduled Closure of RWY 02L/20R** a) BTN 1700-2100UTC on every SUN and WED of the month (preventive maintenance work). In the event of emergency, RWY will be re-opened within 30 minutes. b) A 5-minute inspection conducted within the periods BTN 0100-0359UTC 0500-0759UTC 0800-1059UTC daily. 5) **Scheduled Closure of RWY 02C/20C** a) BTN 1700-2100UTC on every MON of the month (preventive maintenance work). In the event of emergency, RWY will be re-opened within 30 minutes. b) A 5-minute inspection conducted within the periods BTN 0100-0359UTC 0500-0759UTC 0800-1059UTC daily. 6) **Scheduled Closure of RWY 02R/20L** a) BTN 1700-2100UTC on every TUES and FRI of the month (preventive maintenance work). In the event of emergency, RWY will be re-opened within 30 minutes. b) A 5-minute inspection conducted within the periods BTN 0100-0359UTC 0500-0759UTC 0800-1059UTC daily. 7) **Additional Inspection and Maintenance Closures** a) On days when there is a scheduled 4-hour runway closure BTN 1700-2100UTC i. 10-minute inspection conducted within the period BTN 1500-1610UTC on the other operational runway(s); ii. 15-minute inspection conducted within the period BTN 2300-2359UTC on the other operational runway(s); iii. 5-minute inspection conducted within period BTN 2300-2359UTC on the re-opened runway. b) On days when there is no scheduled 4-hour runway closure BTN 1700-2100UTC I. RWY 02L/20R: i. 5-minute inspection conducted BTN 2300-2305UTC ii. 30-minute maintenance will be conducted BTN 1830-1900UTC II. RWY 02C/20C: i. 5-minute inspection conducted BTN 2315-2320UTC ii. 60-minute maintenance will be conducted BTN 2000-2100UTC III. RWY 02R/20L: i. 5-minute inspection conducted BTN 2330-2335UTC ii. 60-minute maintenance will be conducted BTN 2100-2130UTC

WSSS AD 2.13 DECLARED DISTANCES

RWY Designator	Intersection Departures	TORA (m)	TODA (m)	ASDA (m)	LDA (m)	Remarks
1	2	3	4	5	6	7
20R	Not applicable	4000	4270	4060	3260	THR displaced by 740m southwards
	W2	3842	4112	3902	Not applicable	
	W3	3026	3296	3086	Not applicable	
02L	Not applicable	4000	4270	4060	4000	NIL
	W8	3842	4112	3902	Not applicable	
	W7	3026	3296	3086	Not applicable	

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RWY Designator	Intersection Departures	TORA (m)	TODA (m)	ASDA (m)	LDA (m)	Remarks
1	2	3	4	5	6	7
20C	Not applicable	4000	4060	4060	4000	NIL
	T3	3808	3868	3868	Not applicable	
	T4	3421	3481	3481	Not applicable	
	T5	2721	2781	2781	Not applicable	
	D3	3842	3902	3902	Not applicable	
	D4	3502	3562	3562	Not applicable	
	D5	3027	3087	3087	Not applicable	
	D6	2552	2612	2612	Not applicable	
02C	Not applicable	4000	4060	4060	4000	NIL
	T11	3842	3902	3902	Not applicable	
	T10	3329	3389	3389	Not applicable	
	T9	3197	3257	3257	Not applicable	
	T8	2551	2611	2611	Not applicable	
	D12	3842	3902	3902	Not applicable	
	D11	3480	3540	3540	Not applicable	
	D10	2877	2937	2937	Not applicable	
	D9	2402	2462	2462	Not applicable	
20L	Not applicable	4000	4060	4060	4000	NIL
	A3	3842	3902	3902	Not applicable	
	A4	3027	3087	3087	Not applicable	
	A5	2552	2612	2612	Not applicable	
02R	Not applicable	4000	4060	4060	4000	NIL
	A10	3842	3902	3902	Not applicable	
	A9	2877	2937	2937	Not applicable	
	A8	2402	2462	2462	Not applicable	

Note: Intersection departures are allowed subject to the following:

a) initiated by pilot and approved by ATC, traffic permitting.

b) ATC is able to keep aircraft visual at all times

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WSSS AD 2.14 APPROACH AND RUNWAY LIGHTING

RWY	APCH LGT Type, LEN, Intensity	THR LGT colour WBAR	PAPI (MEHT)	TDZ LGT LEN	RWY Centreline LGT, LEN, spacing, colour, INTST	RWY Edge LGT, LEN, spacing, colour, INTST	RWY End LGT colour	SWY LGT colour
1	2	3	4	5	6	7	8	9
02L	CAT II High Intensity approach lighting (900m) consisting of extended centreline and RED row barrettes, 2 crossbars, 2 approach beacons and sequenced flashing lights.	GREEN supplemented by Green wing-bar and 2 THR ident lights.	PAPI 003° located either side of RWY, 422m behind RWY THR. 2 WHITE LGT and 2 RED LGT (20.0m), 3 WHITE LGT and 1 RED LGT (24.0m), 4 WHITE LGT (26.4m). ACFT with eye-to-wheel height greater than 8m are advised to fly with 2 WHITE and 2 RED LGT visible so as to achieve sufficient wheel clearance.	WHITE	Inset High Intensity centreline lights (longitudinal spacing at 30m apart) as follows: From THR to 900m from RWY end: WHITE, 300m to 900m from RWY end: ALTN RED/ WHITE, 300m to RWY end: RED.	Bi-directional White/Amber edge lights (longitudinal spacing at 60m apart) as follows: From THR to 600m from RWY end: White, 600m to RWY end: Amber.	RED	RED
20R	CAT1 High Intensity approach lighting (900m) distance coded centreline lights showing variable WHITE and crossbars at 150m, 300m, 450m, 600m and 750m.	GREEN supplemented by Green wing-bar and 2 THR ident lights.	PAPI 003° located either side of RWY, 410m from THR. 2 WHITE LGT and 2 RED LGT (19.5m), 3 White LGT and 1 RED LGT (23.3m), 4 WHITE LGT (25.7m). ACFT with eye-to-wheel height greater than 8m are advised to fly with 2 WHITE and 2 RED LGT visible so as to achieve sufficient wheel clearance.	NIL	Inset High Intensity centreline lights (longitudinal spacing at 30m apart) as follows: From THR to 900m from RWY end: WHITE, 300m to 900m from RWY end: ALTN RED/ WHITE, 300m to RWY end: RED.	RED RWY edge lights (longitudinal spacing at 60m apart) in the direction of RWY 20R before the displaced THR. Bi-directional raised WHITE/ AMBER edge lights (longitudinal spacing at 60m apart) after the displaced THR.	RED	Elevated RED

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RWY	APCH LGT Type, LEN, Intensity	THR LGT colour WBAR	PAPI (MEHT)	TDZ LGT LEN	RWY Centreline LGT, LEN, spacing, colour, INTST	RWY Edge LGT, LEN, spacing, colour, INTST	RWY End LGT colour	SWY LGT colour
1	2	3	4	5	6	7	8	9
02C	CAT II High Intensity approach lighting (900m) consisting of extended centreline and RED row barrettes , 2 crossbars, 2 approach beacons and sequenced flashing lights.	Green supplemented by green wing-bar and 2 THR ident lights.	PAPI 003° located either side of RWY, 418m from THR. 2 WHITE LGT and 2 RED LGT (19.8m), 3 WHITE LGT and 1 RED LGT (23.7m), 4 WHITE LGT (26.2m). ACFT with eye-to-wheel height greater than 8m are advised to fly with 2 WHITE and 2 RED LGT visible so as to achieve sufficient wheel clearance.	WHITE. 900m (From THR) TDZ. Every 60m from THR.	Inset High Intensity centreline lights as follows: From THR to 900m from RWY end: WHITE, 300m to 900m from RWY end: ALTN RED/ WHITE, 300m to RWY end: RED.	Bi-directional WHITE/ AMBER edge lights as follows: From THR to 600m from RWY end: White, 600m to RWY end: Amber.	RED	RED
20C	CAT II High Intensity approach lighting (900m) consisting of extended centreline and RED row barrettes, 2 crossbars, 2 approach beacons and sequenced flashing lights.	Green supplemented by green wing-bar and 2 THR ident lights.	PAPI 003° located on left side of RWY, 418m from THR. 2 WHITE LGT and 2 RED LGT (19.8m), 3 WHITE LGT and 1 RED LGT (23.7m), 4 WHITE LGT (26.2m). ACFT with eye-to-wheel height greater than 8m are advised to fly with 2 WHITE and 2 RED LGT visible so as to achieve sufficient wheel clearance.	WHITE 900m (From THR) TDZ. Every 60m from THR.	Inset High Intensity centreline lights as follows: From THR to 900m from RWY end: WHITE, 300m to 900m from RWY end: ALTN RED/WHITE, 300m to RWY end: RED.	Bi-directional WHITE/ AMBER edge lights as follows: From THR to 600m from RWY end: White, 600m to RWY end: Amber.	RED	RED

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RWY	APCH LGT Type, LEN, Intensity	THR LGT colour WBAR	PAPI (MEHT)	TDZ LGT LEN	RWY Centreline LGT, LEN, spacing, colour, INTST	RWY Edge LGT, LEN, spacing, colour, INTST	RWY End LGT colour	SWY LGT colour
1	2	3	4	5	6	7	8	9
02R	CAT II High Intensity Approach Lights (900m) consisting of extended centreline and Red row barrettes, 2 crossbars, 2 approach beacons and sequenced flashing lights.	Green supplemented by green wing-bar and 2 THR ident lights.	PAPI 003° located either side of RWY, 415m from THR. 2 White lights and 2 Red lights (19.7m), 3 White lights and 1 Red light (23.6m), 4 White lights (26.0m). ACFT with eye-to- wheel height greater than 8m are advised to fly with 2 White and 2 Red lights visible so as to achieve sufficient wheel clearance.	White. 900m (From THR) TDZ. Every 60m from THR.	Inset High Intensity centreline lights (longitudinal spacing at 30m apart) as follows: From THR to 900m from RWY end: White, 300m to 900m from RWY end: ALTN Red/ White, 300m to RWY end: Red.	Bi-directional White/Amber edge lights (longitudinal spacing at 60m apart) as follows: From THR to 600m from RWY end: White, 600m to RWY end: Amber.	Red	Red
20L	CAT II High Intensity Approach Lights (900m) consisting of extended centreline and Red row barrettes, 2 crossbars, 2 approach beacons and sequenced flashing lights.	Green supplemented by green wing-bar and 2 THR ident lights.	PAPI 003° located either side of RWY, 415m from THR. 2 White lights and 2 Red lights (19.7m), 3 White lights and 1 Red light (23.6m), 4 White lights (26.0m). ACFT with eye-to- wheel height greater than 8m are advised to fly with 2 White and 2 Red lights visible so as to achieve sufficient wheel clearance.	White. 900m (From THR) TDZ. Every 60m from THR.	Inset High Intensity centreline lights (longitudinal spacing at 30m apart) as follows: From THR to 900m from RWY end: White, 300m to 900m from RWY end: ALTN Red/ White, 300m to RWY end: Red.	Bi-directional White/Amber edge lights (longitudinal spacing at 60m apart) as follows: From THR to 600m from RWY end: White, 600m to RWY end: Amber.	Red	Red

WSSS AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

1	*ABN/IBN location, characteristics and hours of operation*	ABN: 012209.20N 1035858.43E (western side of RWY 02L/20R) ALTN FLG W G EV 2.3 SEC, Operating hours HN + IMC IBN: 012301.27N 1035959.49E (top of Cargo Agents Building E) FLG G 'SS' EV 7 SEC, Operating hours HN + IMC

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2	*Anemometer location and LGT*	RWY 02L/20R: Pressure tube anemometer and wind vane situated 345m west of middle of the runway. Cup anemometers and wind vanes at ends and middle of the runway. Windsocks at ends of the runway. Transmissometers at both ends and in the middle of the runway. RWY 02C/20C: Three ultrasonic wind sensors at the ends and middle of the runway. Windsocks at the ends of the runway. Transmissometers at both ends and in the middle of the runway. RWY 02R/20L: Three ultrasonic wind sensors at the ends and middle of the runway. Windsocks at the ends of the runway. Transmissometers at both ends and in the middle of the runway.
3	*TWY Edge and Centreline Lighting*	RWY 02L/20R and RWY 02C/20C: BLUE lights on TWY curved edges and apron TWY edges and GREEN centreline lights on all TWY. RWY 02R/20L: Blue lights on TWY curved edges and Green centreline lights on all TWY.
4	*Secondary power supply/switch-over time*	Automatic standby generator power supply AVBL for airfield lighting with switchover time of 1 second during Category II low visibility operations.
5	*Remarks*	Vehicles painted yellow or displaying chequered red/white or orange/white flag at highest point of vehicle

WSSS AD 2.16 HELICOPTER LANDING AREA

Refer to ENR 3.4

WSSS AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	**CHANGI CTR** 013300N 1040149E 013042N 1040654E 012542N 1040448E thence along Kuala Lumpur/ Singapore FIR BDRY to 012000N 1041218E 010018N 1035524E 011100N 1035134E 013300N 1040149E
2	*Vertical Limits*	SFC to 3,000ft ALT
3	*Airspace Classification*	C
4	*ATS Unit Callsign* *Language(s)*	Singapore Tower English
5	*Transition Altitude*	11000 FT (3,350m)
6	*Remarks*	A helicopter shall not be operated within the Changi CTR unless prior permission has been obtained from the Director-General of Civil Aviation, CAAS. Email to caas_ats_ansp@caas.gov.sg

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 S133.0 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.

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Service Designation	Call sign	*Frequency (P-Pri, S-Sec)*	Hours of operation	Remarks
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	0000-1800 2100- 0000	for push-back / taxiing of all ACFT, including ACFT on tow, west of Terminal 3
		121.725 MHz	0000-1700 2100-0000	for push-back / taxiing of all ACFT (including ACFT on tow) east of Terminal 2 and west of TWY B (excluding TWY J8, J9, J10 and J12)
		121.85 MHz	0000-1600	for push-back / taxiing of all ACFT including ACFT on tow, north of Terminal 1
			1600- 0000	for push-back/ taxiing of all ACFT
		121.00 MHz	H24	for ground emergency
		122.55 MHz		for push-back / taxiing of all ACFT (including ACFT on tow) east of Terminal 4
		125.65 MHz		for push-back / taxiing of all ACFT (including ACFT on tow) west of Terminal 4
		127.275 MHz		for taxiing of all ACFT (including ACFT on tow) west of RWY 02R/20L
	Singapore Delivery	121.65 MHz	H24	for Pre-flight check/ATC clearance
		119.6 MHz	0030-0230 1200-1300	for issuance of ATC clearance

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Service Designation	Call sign	*Frequency (P-Pri, S-Sec)*	Hours of operation	Remarks
TWR	Changi Tower / Changi Apron	121.9MHz	H24	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. Request for vehicular movements on taxiways, excluding runways, would be regulated by Changi Tower. For ACFT on tow and vehicular movements on the runway when the runway is closed for maintenance. 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.
	Changi East Tower	119.675MHz	H24	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. For ACFT on tow and vehicular movements on RWY 02R/20L when the runway is closed for maintenance. 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.
	Changi East Ground	120.95MHz	Not for use, unless with prior coordination	For start-up / taxiing of all aircraft
D-ATIS	Changi Airport Departure Information	128.6MHz	H24	(broadcasting with half hourly updated MET INFO)
	Changi Airport Arrival Information	128.025MHz	H24	Data Link Service available. AP IDENT WSSS Messages comply with ARINC 623 Standards. Updating of data: H+00 to H+10 and H+30 to H+40
ATIS	Changi East Information (02R/ 20L)	139.95MHz	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	113.5MHz CH82X	H24	011321.34N 1035115.22E	201° MAG 14.5km from THR RWY 02 (Paya Lebar). Antenna HGT: 190ft AMSL. Coverage 200NM. EM: F1. Maintenance period: Third Thursday of every month between 0200-0600

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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
TEKONG DVOR/DME	VTK	116.5MHz 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	012131.73 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.
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.

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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 GP	-	330.8 MHz	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 AERODROME 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.

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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 Remarks and Differences
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-WSSS-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.

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WSSS AD 2.22 FLIGHT 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.

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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	**W6*(1655)**, **W7*(2123)** and W8(3061)	Note 1: Recommended exit taxiways are bold and underlined. Note 2: * Indicates Rapid Exit Taxiway (RET) and maximum design ground speed for the exit taxiway is 50kts.
20C	**T7*(1924)**,**T8*(2375)**, **D8*(1750)**, **D9*(2225)** and D10*(2700)	
20L	**A7*(1750)**, **A8*(2225)**, and A9*(2700)	
02L	**W5*(1996)**, **W4*(2491)** and W3*(2876)	
02C	**T6*(2040)**, **T5*(2545)**, T4*(3245) **D7*(1900)**, **D6*(2375)** and D5*(2850)	
02R	**A6*(1900)**, **A5*(2375)** 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.

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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.

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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.

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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.

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6 A-CDM INFORMATION VIA AIRCRAFT DOCKING GUIDANCE SYSTEM (ADGS)

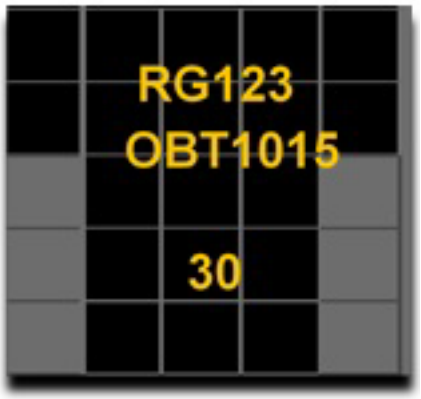
6.1 All contact stands in Singapore Changi Airport will have ADGS. The fundamental operation and usage of ADGS still remain the same for flight crew. Additional information which includes TOBT, TSAT and TOBT count-down timer will be displayed in local times as part of the improvements to support A-CDM operations.

<table>
<tr><th colspan="2">Aircraft Docking Guidance System (ADGS)</th></tr>
<tr><th>Description</th><th>Display on ADGS</th></tr>
<tr><td>Aircraft arrival to stand
– No change in existing functionality and display</td><td>
</td></tr>
<tr><td>40 minutes prior to TOBT
– 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</td><td>Snapshot 1

Snapshot 2
 

Snapshot 3
</td></tr>
</table>

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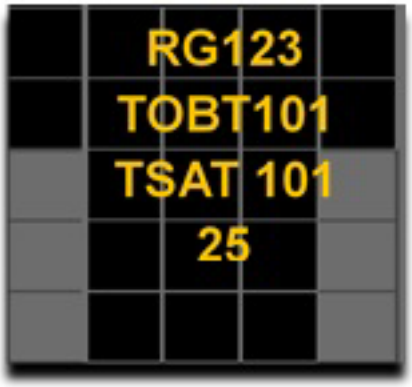
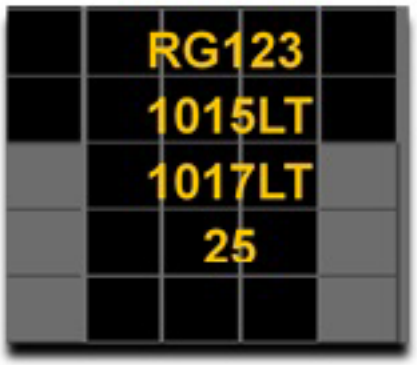
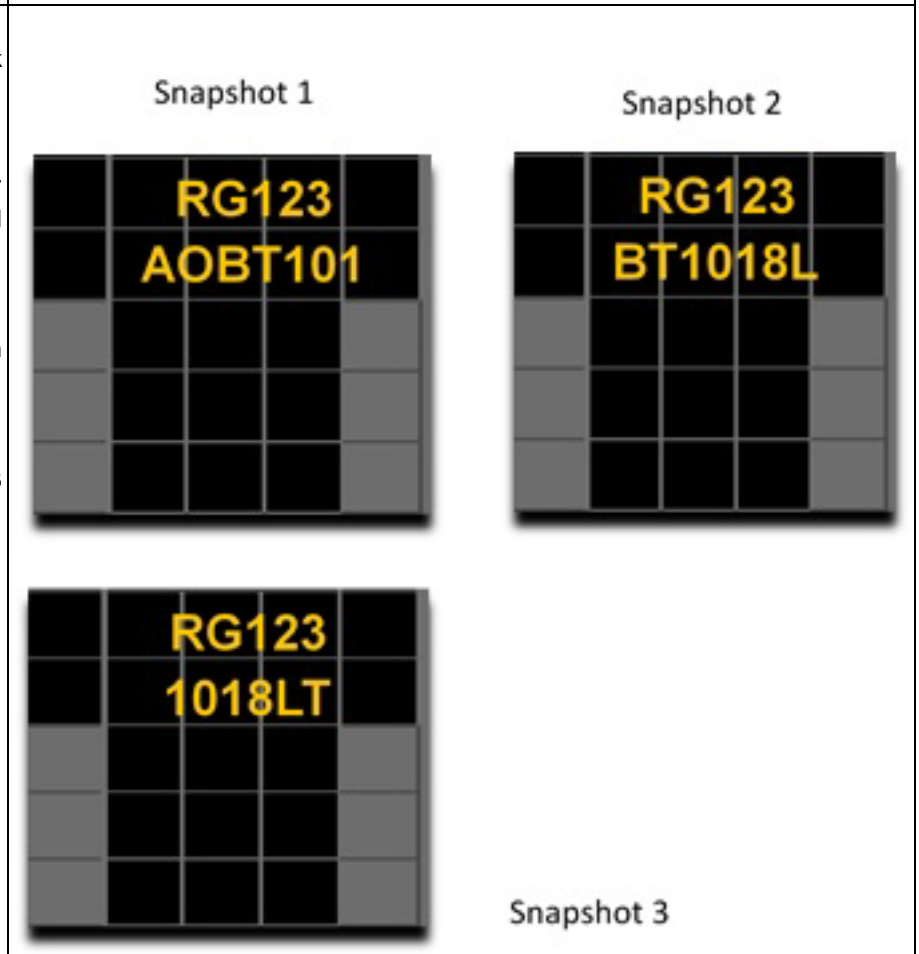
Aircraft Docking Guidance System (ADGS)	
Description	Display on ADGS
25 minutes prior to TOBT – ADGS will display TSAT derived by PDS – As ADGS can only display up to 7 characters per line, the displayed message will be scrolling. – TSAT timings may change as the PDS is continuously optimising push back times based on real time traffic conditions	Snapshot 1  Snapshot 2  Snapshot 3

Aircraft Docking Guidance System (ADGS)	
Description	Display on ADGS
Aircraft departure from stand – 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	

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:

a) Destinations in Peninsular Malaysia via ATS Routes A457 and B466
b) Destinations in Thailand via ATS Routes B466 and B469 / M751
c) Destinations in Indonesia via ATS Route A457, R469 and B470
d) Destinations in Australia and New Zealand via ATS Route B470
e) Flights with allocated Calculated Take-Off Time (CTOT) under Bay of Bengal Cooperative Air Traffic Flow Management (BOBCAT)

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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.

a) For flights with allocated CTOT under BOBCAT, to input "CTOT HHMMz'' under the free text field in RCD message.
b) For flights routed via ANITO B470, to input "ANITO FLxxx"(ANITO crossing level) under the free text field in RCD message.
c) 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.

a) The planned flight level (PFL) filed in flight plan field 15b will be used as requested level unless otherwise specified by pilot.
b) 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:

a) Flight's routes / destinations not stated in paragraph 8.4
b) RCD message does not comply with ED-85A or have inaccurate flight data,
   e.g. different Callsign / ADES from flight plan
c) Invalid TOBT
d) 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 Aircraft departing Singapore requesting FL280, FL300 or FL320 on ATS routes L510, L759, L515/M770, N571, N571/N877, P628 or P574:

a) Aircraft will be assigned No-PDC FL280.
b) Succeeding aircraft on the same ATS route will be assigned No-PDC FL280 with 10-minute longitudinal separation behind provided there is no closing speed with the preceding aircraft.
c) If the succeeding aircraft is faster than the preceding aircraft, additional longitudinal separation as appropriate shall be imposed by ATC.

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9.2.1 For aircraft on ATS routes L510, N571, P574 or P628 that are equipped with Automatic Dependent Surveillance – Contract (ADS-C) and Controller-Pilot Data Link Communication (CPDLC):

a) Succeeding aircraft on the same ATS route will be assigned No-PDC FL280 with 7-minute longitudinal separation behind and provided there is no closing speed with the preceding aircraft.
b) If the succeeding aircraft is faster than the preceding aircraft, additional longitudinal separation as appropriate shall be imposed by ATC.

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.

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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

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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.

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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.
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.

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20 COORDINATES OF SID/STAR WAYPOINTS (WGS84 DATUM)

Name	Coordinates	Radius/Distance from VTK	Radius/Distance from SJ
ABVIP	010008.00N 1035032.00E	VTK R-203.5 / D27.0	SJ R-183.5 / D13.2
ADPON	010108.00N 1035808.00E	VTK R-163.1 / D13.4	SJ R-95.3 / D14.1
AGROT	010108.00N 1035808.00E	VTK R-187.7 / D24	SJ R-150.8 / D14.0
AGVAR	014719.00N 1034145.00E	VTK R-318.8 / D29.8	SJ R-344.3 / D35.3
AKMET	015355.00N 1034339.00E	VTK R-328.6 / D34.0	SJ R-349.3 / D41.3
AKOMA	014522.00N 1035443.00E	VTK R-342.0 / D21.4	SJ R-6.2 / D32.0
ALFA	013033.00N 1034942.00E	VTK R-295.7 / D12.9	SJ R-354.8 / D17.2
ANITO	001700.00S 1045200.00E	VTK R-153.4 / D113.4	SJ R-146.0 / D108.6
ARAMA	013654.00N 1030712.00E	VTK R-282.4 / D55.5	SJ R-298.0 / D50.0
AROSO	020846.00N 1032421.00E	VTK R-319.9 / D57.4	SJ R-334.0/ D61.7
ASITI	004906.00N 1035042.00E	VTK R-196.6 / D37.2	SJ R-181.3 / D24.1
ASOMI	010142.00N 1040207.00E	VTK R-178.1 / D23.1	SJ R-136.9 / D15.9
ASUNA	005948.00N 1030954.00E	VTK R-244.1 / D57.3	SJ R-252.0 / D43.6
ATLEX	010302.00N 1033331.00E	VTK R-232 / D-35.4	SJ R-240 / D20.5
ATRUM	013256.00N 1040057.00E	VTK R-357.3 / D8.0	SJ R-26.1 / D21.8
BETBA	013302.00N 1035331.00E	VTK R-316.1/ D11.3	SJ R-6.3 / D19.8
BIDUS	013554.05N 1035754.86E	VTK R-326.0 / D13.2	SJ R-6.9 / D22.6
BIPOP	013121.83N 1041018.03E	VTK R-54.5 / D11.0	SJ R-46.8 / D26.2
BISOV	004229.00N 1025214.00E	VTK R-238.6 / D81.1	SJ R-242.6 / D66.6
BITAM	010813.00N 1040757.00E	VTK R-158.3 / D17.9	SJ R-107 / D17.5
BOBAG	010230.00N 1032954.00E	VTK R-234.7 / D38.6	SJ R-243.2 / D24
BOKIP	010421.00N 1034353.00E	VTK R-220.5 / D27.0	SJ R-219.5 / D11.6
DODSO	012225.00N 1061402.00E	VTK R-91 / D154.3	SJ R-86.4 / D143.3
DOVAN	011938.00N 1041249.00E	VTK R-114.6 / D12.7	SJ R-73.9 / D22.5
DUBOT	010846.00N 1040103.00E	VTK R-181 / D16.1	SJ R-115 / D10.8
DUMUP	005430.00N 1035516.00E	VTK R-191.4 / D30.9	SJ R-167.9 / D19.2
ELALO	041240.00N 1043329.00E	VTK R-10.6 / D169.9	SJ R-13.4 / D183.3
EMRIX	012606.00N 1041040.00E	VTK R-83.0 / D9.4	SJ R-57.0 / D23.2
ERVIV	010445.00N 1041013.00E	VTK R-156.1 / D22	SJ R-114.3 / D20.8
GIXEM	004920.00N 1042539.00E	VTK R-145.5 / D43	SJ R-124.8 / D41.9
GOTGA	012013.00N 1044200.00E	VTK R-96.6 / D41	SJ R-82.3 / D51.3
GUMPU	013000.00N 1034243.20E	VTK R-285.1 / D19.3	SJ R-332.6 / D18.6
GUNUD	011042.00N 1050618.00E	VTK R-102.3 / D66.6	SJ R-92 / D75.2
GURES	002814.00N 1043835.00E	VTK R-146.4 / D67.5	SJ R-133.3 / D65.2
HOSBA	011947.80N 1042417.50E	VTK R-102.5 / D23.6	SJ R-79 / D33.7
IBASU	005751.00N 1033410.00E	VTK R-225.3 / D38.3	SJ R-228 / D23.1
IBIVA	011351.00N 1035637.00E	VTK R-203.1/ D12.0	SJ R-84.3 / D5.3
IBIXU	011621.00N 1035740.00E	VTK R-203.2 / D9.3	SJ R-64.4 / D7.0
IDBUD	001454.00N 1050139.00E	VTK R-139.1 / D92.2	SJ R-129.5 / D91.4
IDKIV	005652.00N 1041333.00E	VTK R-156.3 / D30.5	SJ R-126.3 / D27.7
IGNON	010847.00N 1041257.00E	VTK R-144.1 / D19.8	SJ R-101.8 / D22.2
IGOSI	005645.00N 1040644.00E	VTK R-169.1 / D28.6	SJ R-136.8 / D22.7
IKIRO	000849.00N 1044420.00E	VTK R-150.4 / D87.1	SJ R-140.4 / D83.4
ISGIL	004246.00N 1031257.00E	VTK R-229.1 / D64.1	SJ R-231.6 / D49
ISNOM	010629.00N 1035826.00E	VTK R-189 / D18.6	SJ R-133.6 / D9.9

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Name	Coordinates	Radius/Distance from VTK	Radius/Distance from SJ
KANLA	034556.00N 1043606.00E	VTK R-13.8 / D144.5	SJ R-16.5 / D158.3
KARTO	011124.00N 1053343.00E	VTK R-98.3 / D93.5	SJ R-91.1 / D102.6
KEXAS	011019.00N 1044818.00E	VTK R-107.2 / D49.2	SJ R-93.0 / D57.2
KILOT	030217.00N 1044023.00E	VTK R-22.0 / D104.5	SJ R-24.4 / D119.0
KIRDA	000009.00N 1045934.00E	VTK R-145.4 / D102.7	SJ R-136.8 / D100.1
LAVAX	010950.00N 1042714.00E	VTK R-120.1 / D30.0	SJ R-95.5 / D36.2
LEDOX	011642.00N 1035651.00E	VTK R-208.6 / D9.4	SJ R-58.5 / D6.5
LELIB	012729.00N 1032450.00E	VTK R-274.0 / D36.6	SJ R-298.0 / D30.0
LETGO	011411.00N 1035548.00E	VTK R-207.3 / D12.1	SJ R-79.1 / D4.6
MABAL	032826.00N 1051236.00E	VTK R-30.1 / D142.1	SJ R-31.2 / D157.2
MASBO	020248.00N 1025251.00E	VTK R-299.0 / D78.3	SJ R-310.2 / D76.6
MIBEL	012351.00N 1020816.00E	VTK R-269.5 / D113.2	SJ R-275.8 / D103.7
MOLVO	012955.00N 1040227.00E	VTK R-12.8 / D5.1	SJ R-34.2 / D20
MOXIB	012933.00N 1040315.00E	VTK R-22.7 / D5	SJ R-36.7 / D20.1
MUMDU	010521.00N 1042714.00E	VTK R-126.9 / D32.4	SJ R-102.5 / D36.9
NYLON	013656.90N 1040623.80E	VTK R-23 / D13	SJ R-32.9 / D30.0
PALGA	011059.00N 1034759.00E	VTK R-223.8 / D19.3	SJ R-235.1 / D4.1
PAMSI	010459.00N 1034845.00E	VTK R-212.3 / D23.6	SJ R-197.2 / D8.7
PASPU	015915.00N 1040618.00E	VTK R-8.3 / D34.5	SJ R-18.3 / D48.1
PIBAP	023023.00N 1040618.00E	VTK R-4.4 / D65.3	SJ R-11.1 / D78.1
POSUB	012725.00N 1040748.00E	VTK R-69.0 / D6.9	SJ R-49.8 / D21.7
POVEB	011344.00N 1040130.00E	VTK R-179.2 / D11.1	SJ R-87.9 / D10.3
PU	012524.00N 1035600.00E	VTK R-275.2 / D5.4	SJ R-21.1 / D13.0
REMES	004342.00N 1035735.00E	VTK R-185.2 / D41.2	SJ R-167.9 / D30.2
REPOV	001623.00N 1040300.00E	VTK R-178.6 / D68.2	SJ R-168.3 / D57.9
RWY 02R DER	012122.00N 1040051.00E	VTK R-187.8 / D3.6	SJ R-50.3 / D12.5
RWY 02C DER	012145.00N 1035957.00E	VTK R-203.3 / D3.4	SJ R-45.8 / D12.1
RWY 02L DER	012305.00N 1035933.00E	VTK R-224.1 / D2.5	SJ R-40.6 / D12.8
RWY 20C DER	011942.00N 1035905.00E	VTK R-203 / D5.7	SJ R-50.8 / D10.1
RWY 20R DER	012047.00N 1035835.00E	VTK R-213.7 / D4.9	SJ R-44.8 / D10.4
RWY 20L DER	011919.00N 1035959.00E	VTK R-193.7 / D5.7	SJ R-55.8 / D10.6
SABKA	015051.00N 1031713.00E	VTK R-300.4/ D51.2	SJ R-317.7 / D50.7
SALRU	011701.00N 1040802.00E	VTK R-139.5 / D10.3	SJ R-77.8 / D17.2
SAMKO	010529.51N 1035254.86E	VTK R-203.5 / D21.1	SJ R-168 / D8
SANAT	010748.79N 1035929.76E	VTK R-186.1 / D17.1	SJ R-123.7 / D9.9
SEBVO	011259.00N 1044028.00E	VTK R-109.5 / D35.6	SJ R-90.5 / D43.6
SJ (SINJON)	011321.34N 1035115.22E	-	-
SURGA	003657.00S 1063119.00E	VTK R-129.1 / D193.3	SJ R-124.6 / D194.3
TAROS	004200.00N 1021612.00E	VTK R-247.9 / D139.4	SJ R-251.9 / D100.2
TEBUN	011455.00N 1031557.00E	VTK R-257.7 / D46.5	SJ R-272.5 / D35.4
TOMAN	012147.00N 1054717.00E	VTK R-91.7 / D106.2	SJ R-85.9 / D116.5
UGEBO	003813.00N 1052432.00E	VTK R-119.1 / D95.4	SJR-110.5 / D99.8
UKIBO	011758.00N 1035924.00E	VTK R-195.7 / D7.2	SJ R-60.6 / D9.4
UPTEL	005925.00N 1040730.00E	VTK R-166.3 / D26.1	SJ R-130.5 / D21.4
VAMPO	005833.00N 1032525.00E	VTK R-233.9 / D44.5	SJ R-240.4 / D29.8
VANBU	010643.00N 1042740.00E	VTK R-124.5 / D32	SJ R-100.3 / D37.1

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Name	Coordinates	Radius/Distance from VTK	Radius/Distance from SJ
VASTI	004320.00N 1043406.00E	VTK R-141.6 / D52.8	SJ R-124.8 / D52.3
VEBMA	012030.00N 1045332.00E	VTK R-94.8 / D52.5	SJ R-83.5 / D57.8
VEXEL	005904.00N 1034254.00E	VTK R-215.7 / D31.7	SJ R-210.5 / D16.5
VIBOG	004310.00N 1034302.00E	VTK R-203.8 / D45.4	SJ R-195.3 / D31.2
VIGUD	011328.00N 1035730.00E	VTK R-198.6 / D69.7	SJ R-89 / D6.2
VIMAL	010942.00N 1042353.00E	VTK R-123.8 / D27.2	SJ R-96.4 / D22.9
VIRET	003940.00N 1043511.00E	VTK R-143 / D56.4	SJ R-127.3 / D55.3
VMR	022318.00N 1035218.00E	VTK R-351.2 / D58.8	SJ R-0.9 / D69.6
VOVOS	011123.00N 1032651.00E	VTK R-248.7 / D37.1	SJ R-265.4 / D24.5
VTK (TEKONG)	012455.36N 1040120.17E	-	-

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.

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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 SIDs/STARs which have been implemented to support the flow management procedures. The 'entry' and 'exit' gates are shown below:

Entry Gate	Coordinates
KEXAS	011019.00N 1044818.00E
PASPU	015915.00N 1040618.00E
REMES	004342.00N 1035735.00E
VAMPO	005833.00N 1032525.00E

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)

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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
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)"

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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 RUNWAY 02L/20R, RUNWAY 02C/20C AND RUNWAY 02R/20L AT WSSS	AD-2-WSSS-ADC-1
AERODROME CHART - ICAO	AD-2-WSSS-ADC-2
AERODROME ADVISORY CHART - ICAO	AD-2-WSSS-ADC-3
AERODROME OBSTACLE CHART - ICAO TYPE A (OPERATING LIMITATIONS)	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) SID - RWY 02C - ANITO 7A	AD-2-WSSS-SID-1
RNAV(GNSS) SID - RWY 20C - ANITO 8B	AD-2-WSSS-SID-2
RNAV(GNSS) SID - RWY 02R - ANITO 1C	AD-2-WSSS-SID-3

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RNAV (GNSS) SID - RWY 20L - ANITO 1D	AD-2-WSSS-SID-4
RNAV (GNSS) SID - RWY 02L - ANITO 7E	AD-2-WSSS-SID-5
RNAV (GNSS) SID - RWY 20R - ANITO 8F	AD-2-WSSS-SID-6
RNAV (GNSS) SID - RWY 02C - AROSO 3A	AD-2-WSSS-SID-7
RNAV (GNSS) SID - RWY 20C - AROSO 5B	AD-2-WSSS-SID-8
RNAV (GNSS) SID - RWY 02R - AROSO 1C	AD-2-WSSS-SID-9
RNAV (GNSS) SID - RWY 20L - AROSO 1D	AD-2-WSSS-SID-10
RNAV (GNSS) SID - RWY 02L - AROSO 3E	AD-2-WSSS-SID-11
RNAV (GNSS) SID - RWY 20R - AROSO 5F	AD-2-WSSS-SID-12
RNAV (GNSS) SID - RWY 02C - DODSO 1A	AD-2-WSSS-SID-13
RNAV(GNSS) SID - RWY 20C - DODSO 1B	AD-2-WSSS-SID-14
RNAV (GNSS) SID - RWY 02R - DODSO 1C	AD-2-WSSS-SID-15
RNAV (GNSS) SID - RWY 20L - DODSO 1D	AD-2-WSSS-SID-16
RNAV (GNSS) SID - RWY 02L - DODSO 1E	AD-2-WSSS-SID-17
RNAV (GNSS) SID - RWY 20R - DODSO 1F	AD-2-WSSS-SID-18
RNAV (GNSS) SID - RWY 02C - IDBUD 1A	AD-2-WSSS-SID-19
RNAV (GNSS) SID - RWY 20C - IDBUD 1B	AD-2-WSSS-SID-20
RNAV (GNSS) SID - RWY 02R - IDBUD 1C	AD-2-WSSS-SID-21
RNAV (GNSS) SID - RWY 20L - IDBUD 1D	AD-2-WSSS-SID-22
RNAV (GNSS) SID - RWY 02L - IDBUD 1E	AD-2-WSSS-SID-23
RNAV (GNSS) SID - RWY 20R - IDBUD 1F	AD-2-WSSS-SID-24
RNAV (GNSS) SID - RWY 02C - KIRDA 1A	AD-2-WSSS-SID-25
RNAV (GNSS) SID - RWY 20C - KIRDA 1B	AD-2-WSSS-SID-26
RNAV (GNSS) SID - RWY 02R - KIRDA 1C	AD-2-WSSS-SID-27
RNAV (GNSS) SID - RWY 20L - KIRDA 1D	AD-2-WSSS-SID-28
RNAV (GNSS) SID - RWY 02L - KIRDA 1E	AD-2-WSSS-SID-29
RNAV (GNSS) SID - RWY 20R - KIRDA 1F	AD-2-WSSS-SID-30
RNAV (GNSS) SID - RWY 02C - MASBO 3A	AD-2-WSSS-SID-31
RNAV (GNSS) SID - RWY 20C - MASBO 5B	AD-2-WSSS-SID-32
RNAV (GNSS) SID - RWY 02R - MASBO 1C	AD-2-WSSS-SID-33
RNAV (GNSS) SID - RWY 20L - MASBO 1D	AD-2-WSSS-SID-34
RNAV (GNSS) SID - RWY 02L - MASBO 3E	AD-2-WSSS-SID-35
RNAV (GNSS) SID - RWY 20R - MASBO 5F	AD-2-WSSS-SID-36
RNAV (GNSS) SID - RWY 02C - VMR 6A	AD-2-WSSS-SID-37
RNAV (GNSS) SID - RWY 20C - VMR 9B	AD-2-WSSS-SID-38
RNAV (GNSS) SID - RWY 02R - VMR 1C	AD-2-WSSS-SID-39
RNAV (GNSS) SID - RWY 20L - VMR 1D	AD-2-WSSS-SID-40
RNAV (GNSS) SID - RWY 02L - VMR 6E	AD-2-WSSS-SID-41
RNAV (GNSS) SID - RWY 02R - VMR 9F	AD-2-WSSS-SID-42
RNAV (GNSS) SID - RWY 02C - MIBEL 1A	AD-2-WSSS-SID-43
RNAV (GNSS) SID - RWY 20C - MIBEL 1B	AD-2-WSSS-SID-44
RNAV (GNSS) SID - RWY 02R - MIBEL 1C	AD-2-WSSS-SID-45
RNAV (GNSS) SID - RWY 20L - MIBEL 1D	AD-2-WSSS-SID-46
RNAV (GNSS) SID - RWY 02L - MIBEL 1E	AD-2-WSSS-SID-47
RNAV (GNSS) SID - RWY 20R - MIBEL 1F	AD-2-WSSS-SID-48
RNAV (GNSS) SID - RWY 02C - TAROS 1A	AD-2-WSSS-SID-49
RNAV (GNSS) SID - RWY 20C - TAROS 1B	AD-2-WSSS-SID-50
RNAV (GNSS) SID - RWY 02R - TAROS 1C	AD-2-WSSS-SID-51
RNAV (GNSS) SID - RWY 20L - TAROS 1D	AD-2-WSSS-SID-52
RNAV (GNSS) SID - RWY 02L - TAROS 1E	AD-2-WSSS-SID-53
RNAV (GNSS) SID - RWY 20R - TAROS 1F	AD-2-WSSS-SID-54
RNAV (GNSS) SID - RWY 02C - TOMAN 3A	AD-2-WSSS-SID-55
RNAV (GNSS) SID - RWY 20C - TOMAN 5B	AD-2-WSSS-SID-56
RNAV (GNSS) SID - RWY 02R - TOMAN 1C	AD-2-WSSS-SID-57
RNAV (GNSS) SID - RWY 20L - TOMAN 1D	AD-2-WSSS-SID-58
RNAV (GNSS) SID - RWY 02L - TOMAN 3E	AD-2-WSSS-SID-59
RNAV (GNSS) SID - RWY 20R - TOMAN 5F	AD-2-WSSS-SID-60
RNAV (GNSS) SID - RWY 20C - VOVOS 1B	AD-2-WSSS-SID-61
RNAV (GNSS) SID - RWY 20L - VOVOS 1D	AD-2-WSSS-SID-62
RNAV (GNSS) SID - RWY 20R - VOVOS 1F	AD-2-WSSS-SID-63
RNAV (GNSS) SID - RWY 02R/20L - CHA 1C / CHA 1D	AD-2-WSSS-SID-64
RNAV(GNSS) STAR - RWY 02L/02C/02R - ARAMA 1A	AD-2-WSSS-STAR-1
RNAV(GNSS) STAR - RWY 20R/20C/20L - ARAMA 1B	AD-2-WSSS-STAR-2
RNAV(GNSS) STAR - RWY 02L/02C/02R - ASUNA 2A	AD-2-WSSS-STAR-3

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RNAV(GNSS) STAR - RWY 20R/20C/20L - ASUNA 2B AD-2-WSSS-STAR-4
RNAV(GNSS) STAR - RWY 02L/02C/02R - ELALO 1A AD-2-WSSS-STAR-5
RNAV(GNSS) STAR - RWY 20R/20C/20L - ELALO 1B AD-2-WSSS-STAR-6
RNAV(GNSS) STAR - RWY 02L/02C/02R- KARTO 2A AD-2-WSSS-STAR-7
RNAV(GNSS) STAR - RWY 20R/20C/20L - KARTO 2B AD-2-WSSS-STAR-8
RNAV(GNSS) STAR - RWY 02L/02C/02R - LEBAR 2A AD-2-WSSS-STAR-9
RNAV(GNSS) STAR - RWY 20R/20C/20L - LEBAR 3B AD-2-WSSS-STAR-10
RNAV(GNSS) STAR - RWY 20R/20C/20L - LELIB 3B AD-2-WSSS-STAR-11
RNAV(GNSS) STAR - RWY 02L/02C/02R - MABAL 2A AD-2-WSSS-STAR-12
RNAV(GNSS) STAR - RWY 20R/20C/20L - MABAL 2B AD-2-WSSS-STAR-13
RNAV(GNSS) STAR - RWY 02L/02C/02R - REPOV 2A AD-2-WSSS-STAR-14
RNAV(GNSS) STAR - RWY 20R/20C/20L - REPOV 2B AD-2-WSSS-STAR-15
RNAV(GNSS) STAR - RWY 02L/02C/02R - TEBUN 1A AD-2-WSSS-STAR-16
RNAV(GNSS) STAR - RWY 20R/20C/20L - TEBUN 1B AD-2-WSSS-STAR-17
RNAV(GNSS) STAR - RWY 02L/02C/02R - UGEBO 1A AD-2-WSSS-STAR-18
RNAV(GNSS) STAR - RWY 20R/20C/20L - UGEBO 1B AD-2-WSSS-STAR-19
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
Instrument Approach Chart - ICAO - RWY 02C - RNP AD-2-WSSS-IAC-10
Instrument Approach Chart - ICAO - RWY 20R - RNP AD-2-WSSS-IAC-11
Instrument Approach Chart - ICAO - RWY 20C - RNP AD-2-WSSS-IAC-12
Instrument Approach Chart - ICAO - RWY 02R - RNP AD-2-WSSS-IAC-13
Instrument Approach Chart - ICAO - RWY 20L - RNP AD-2-WSSS-IAC-14
Visual Approach Chart - ICAO AD-2-WSSS-VAC-1

WSSS AD 2.25 VISUAL SEGMENT SURFACE (VSS) PENETRATION

NIL (not applicable).

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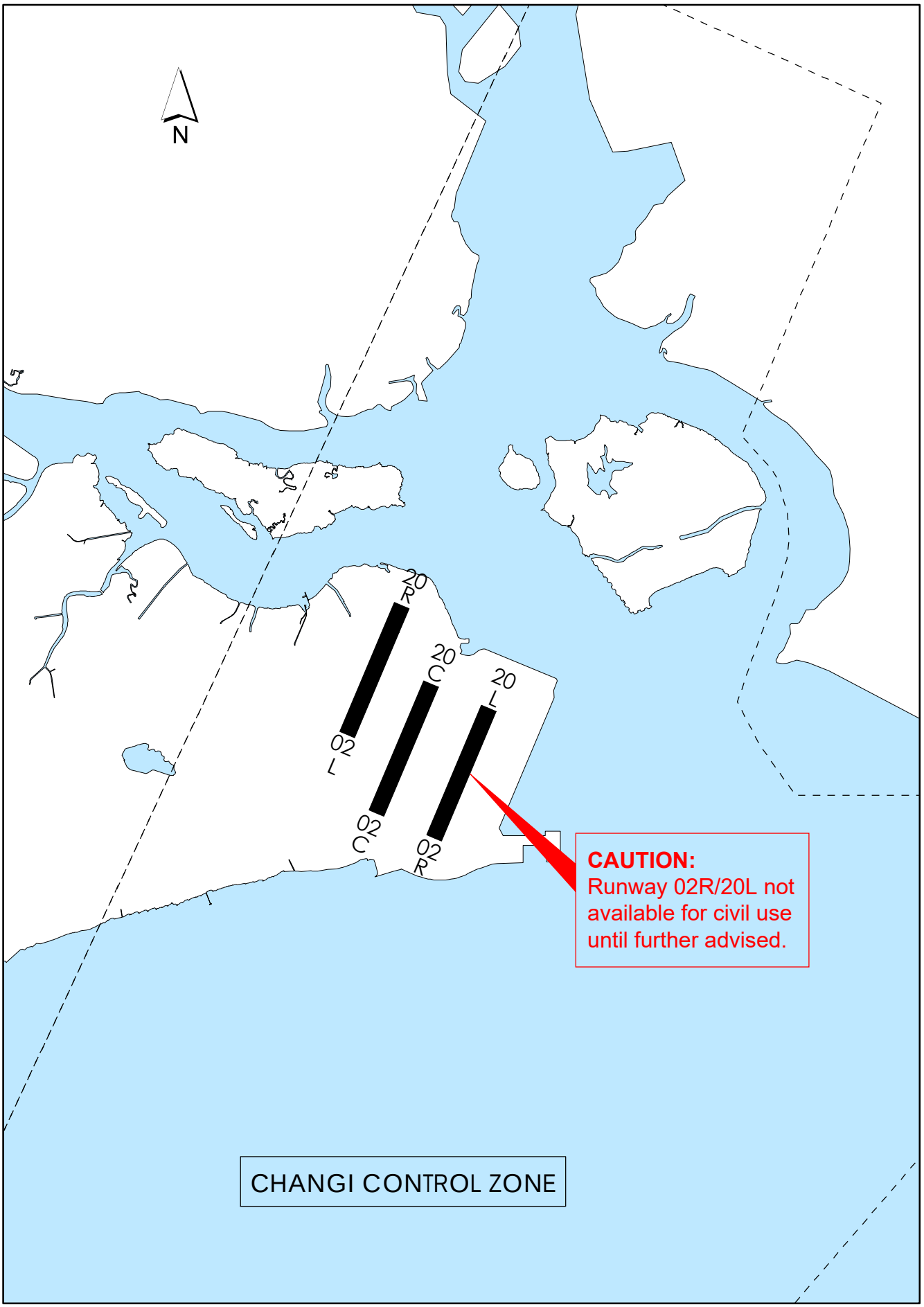
LOCATIONS OF RUNWAY 02L/20R, RUNWAY 02C/20C AND RUNWAY 02R/20L AT WSSS



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CHANGES: Updated caution text

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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	
GND	122.55 (GMC 4 EAST)
	125.65 (GMC 4 WEST)

SINGAPORE/SINGAPORE CHANGI

PAPI 3° (MEHT) *

Pilot's eye height over the threshold when the following PAPI lights come into view.	RUNWAY					
	02L	20R	02C	20C	02R	20L
2 White lights and 2 red lights	20.0m	19.5m	19.8m	19.8m	19.7m	19.7m
3 White lights and 1 red light	24.0m	23.3m	23.7m	23.7m	23.6m	23.6m
4 White lights	26.4m	25.7m	26.2m	26.2m	26.0m	26.0m

* MEHT Minimum Eye Height Over the Threshold.

Note Aircraft with eye-to-wheel height greater than 8 metres are advisable to fly with 2 white lights and 2 red lights visible so as to achieve sufficient wheel clearance.

RWY	DIRECTION	THR	GEOID UNDULATION	BEARING STRENGTH
02L	023°	01 20 56.27N 103 58 38.82E	10.23m	PCR 710/F/B/X/U
20R (DISP THR)	203°	01 22 34.02N 103 59 20.09E	10.26m	
02C	023°	01 19 43.51N 103 59 05.86E	10.27m	
20C	203°	01 21 43.37N 103 59 56.46E	10.30m	
02R	023°	01 19 20.59N 103 59 59.45E	10.32m	
20L	203°	01 21 20.45N 104 00 50.05E	10.36m	

TAXIWAYS

BEARING STRENGTH

PCR 1006/R/B/W/U - TWY A1, A2, A11, A12, A (between A1 and A2, and between A11 and A12), B1, B2, B13, B14, B (between B1 and B2, and between B13 and B14), C1, C2, C13, C14, C (between C1 and C2) and L (between C13 and C14), D1, D2, D13, D14, D (between D1 and D2, and between D13 and D14), T1, T2, T4, T12, T13, T (between T11 and T13), U12, U13, U (between U12 and U13), W1, W9

PCR 530/F/B/X/U - TXL U2, TWY U7 (between TWY U and TXL U2), TWY U8 (between TWY U and TXL U2), TWY U9 (between TWY U and TXL U2), TXL S6, S8, S9, TWY S7

PCR 710/F/B/X/U - All other taxiways.

APRONS

BEARING STRENGTH

PCR 680/R/B/W/U - Aircraft stands C11, C16, C19, D30, D35, D38, E2, E6, E7, E10, F32, F36, F37, 301, 303, 304, 305, 307, 308, 309, 402, 403, 404, 605, 952, G1 to G17 and 471 to 487

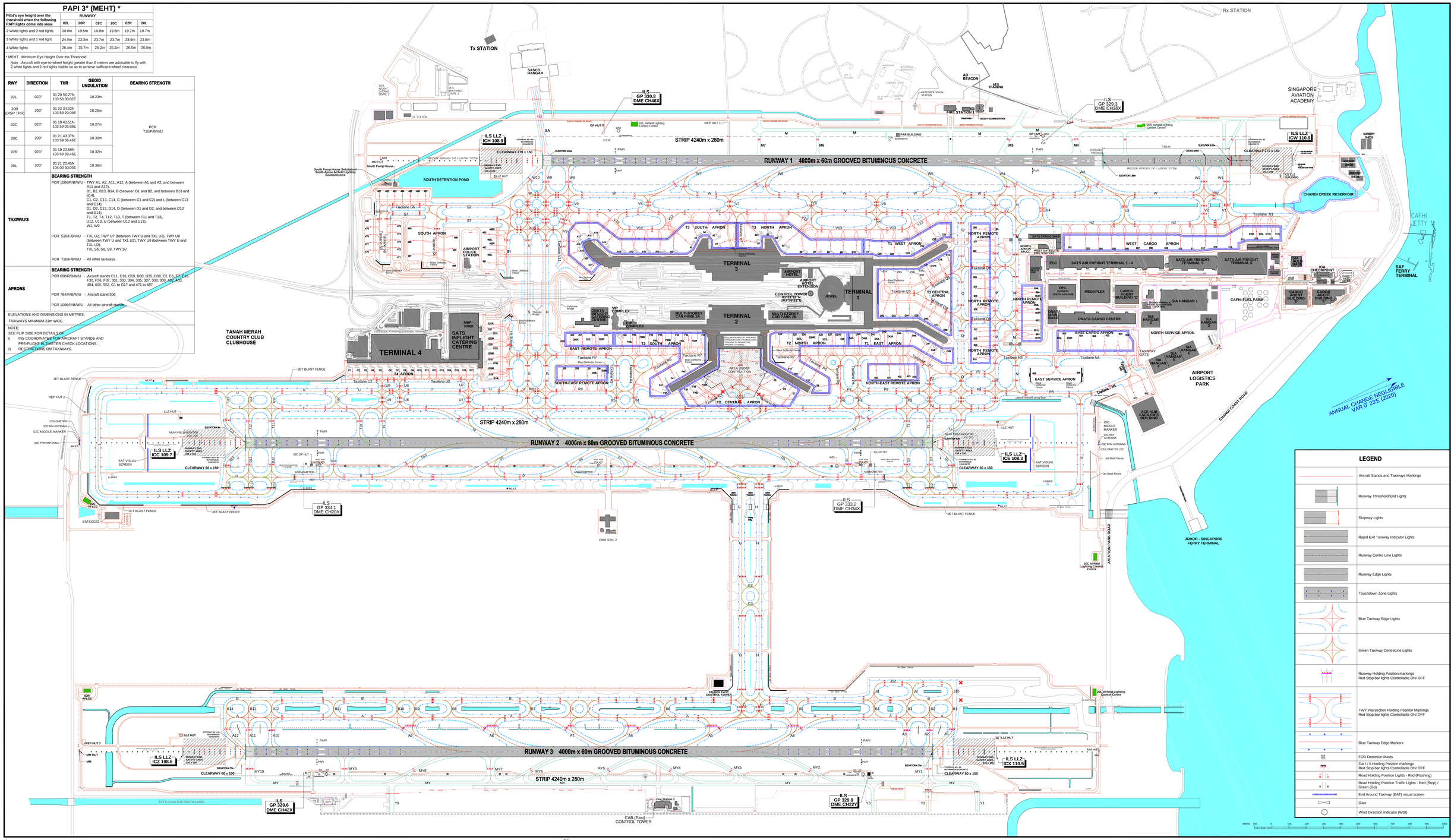
PCR 784/R/B/W/U - Aircraft stand 306

PCR 1006/R/B/W/U - All other aircraft stands.

ELEVATIONS AND DIMENSIONS IN METRES.

TAXIWAYS MINIMUM 23m WIDE.

NOTE:
SEE FLIP SIDE FOR DETAILS OF:
i) INS COORDINATES FOR AIRCRAFT STANDS AND PRE-FLIGHT ALTIMETER CHECK LOCATIONS.
ii) RESTRICTIONS ON TAXIWAYS.



LEGEND

- Aircraft Stands and Taxiways Markings
- Runway Threshold/End Lights
- Stopway Lights
- Rapid Exit Taxiway Indicator Lights
- Runway Centre Line Lights
- Runway Edge Lights
- Touchdown Zone Lights
- Blue Taxiway Edge Lights
- Green Taxiway CentreLine Lights
- Runway Holding Position markings Red Stop bar lights Controllable ON/ OFF
- TWY intersection Holding Position Markings Red Stop bar lights Controllable ON/ OFF
- Blue Taxiway Edge Markers
- FOD Detection Masts
- Cat I / II Holding Position markings Red Stop bar lights Controllable ON/ OFF
- Road Holding Position Lights - Red (Flashing)
- Road Holding Position Traffic Lights - Red (Stop) / Green (Go)
- End Around Taxiway (EAT) visual screen
- Gate
- Wind Direction Indicator (WDI)

Metres 100 0 100 200 300 400 500 600 700 800 900 1000

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Changes : Addition of SATS BUP Centre near SATS Airfreight Terminal 6
Updated aircraft stand A5 and A9 lead-in lines.

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	4.66m (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	5.48m (17.98ft)
	A14	01 21 01.66	103 58 57.59	5.57m (18.27ft)
	A15	01 21 00.77	103 58 55.41	5.46m (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 55.67	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	4.68m (15.35ft)
	B3	01 21 30.33	103 59 07.30	4.65m (15.26ft)
	B4	01 21 32.03	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	5.08m (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 59.12	103 59 20.59	4.99m (16.37ft)
	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	5.06m (16.60ft)
	C16	01 21 53.47	103 59 26.62	4.86m (15.94ft)
	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 34.62	5.06m (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 24.12	103 59 32.64	4.75m (15.58ft)
	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	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)
	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 28.96	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 05.62	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 08.51	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	5.49m (18.01ft)
	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 59.93	103 59 16.78	5.60m (18.37ft)
	F60	01 20 59.91	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	6.29m (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	5.16m (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	4.84m (15.88ft)
	954L	01 22 12.02	103 59 36.99	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 43.54	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)
	516L	01 22 56.24	103 59 43.80	3.96m (12.98ft)
	516R	01 22 54.93	103 59 43.25	3.95m (12.97ft)
	517	01 22 58.02	103 59 45.08	4.05m (13.27ft)
	517L	01 22 58.83	103 59 44.99	3.98m (13.05ft)
	517R	01 22 57.55	103 59 44.35	3.96m (12.98ft)
EAST CARGO APRON	600	01 22 14.12	103 59 48.10	4.25m (13.94ft)
	600L	01 22 13.28	103 59 48.27	4.22m (13.83ft)
	600R	01 22 14.58	103 59 48.81	4.15m (13.60ft)
	601	01 22 16.52	103 59 49.27	4.27m (14.01ft)
	602	01 22 18.80	103 59 50.23	4.30m (14.11ft)
	603	01 22 21.15	103 59 51.02	4.29m (14.07ft)
	604	01 22 23.46	103 59 51.99	4.31m (14.14ft)
	605	01 22 25.19	103 59 52.75	4.27m (14.01ft)
EAST SERVICE APRON	606	01 22 07.00	103 59 52.53	2.41m (7.91ft)
	609	01 22 12.95	103 59 55.04	2.85m (9.35ft)
ACEHUB	611	01 22 22.14	104 00 02.87	4.01m (13.16ft)
	612	01 22 24.50	104 00 02.87	3.91m (12.83ft)
SOUTH APRON	461	01 20 39.67	103 58 52.75	5.28m (17.32ft)
	462	01 20 40.69	103 58 50.37	5.75m (18.86ft)
	462L	01 20 40.41	103 58 51.02	5.48m (17.98ft)
	462R	01 20 40.97	103 58 49.71	5.71m (18.73ft)
	463	01 20 41.80	103 58 47.76	5.97m (19.59ft)
	463L	01 20 41.52	103 58 48.42	5.82m (19.10ft)
	463R	01 20 42.06	103 58 47.17	5.82m (19.10ft)
	464	01 20 32.33	103 58 49.39	4.98m (16.34ft)
	465	01 20 33.81	103 58 47.20	5.01m (16.44ft)
	466	01 20 34.53	103 58 45.05	5.01m (16.44ft)
	467	01 20 37.32	103 58 45.73	5.01m (16.44ft)
	468	01 20 28.34	103 58 43.34	5.00m (16.41ft)
	469	01 20 29.36	103 58 40.96	5.02m (16.47ft)
	471	01 20 23.76	103 58 44.49	5.16m (16.93ft)
	472	01 20 24.55	103 58 43.24	5.16m (16.93ft)
	473	01 20 25.12	103 58 41.90	5.16m (16.93ft)
	474	01 20 25.70	103 58 40.56	5.16m (16.93ft)
	475	01 20 26.27	103 58 39.22	5.16m (16.93ft)
	476	01 20 19.16	103 58 41.47	5.16m (16.93ft)
	477	01 20 19.74	103 58 40.13	5.16m (16.93ft)
	478	01 20 20.31	103 58 38.79	5.16m (16.93ft)
	479	01 20 20.88	103 58 37.45	5.16m (16.93ft)
	480	01 20 21.45	103 58 36.11	5.16m (16.93ft)
	481	01 20 25.27	103 58 32.56	5.22m (17.13ft)
	482	01 20 26.62	103 58 33.13	5.22m (17.13ft)
	483	01 20 27.96	103 58 33.70	5.22m (17.13ft)
	484	01 20 29.31	103 58 34.27	5.22m (17.13ft)
	485	01 20 30.66	103 58 34.84	5.22m (17.13ft)
	486	01 20 32.01	103 58 35.41	5.22m (17.13ft)
	487	01 20 33.36	103 58 35.98	5.22m (17.13ft)
T4 APRON	G1	01 20 07.58	103 59 00.97	3.95m (12.96ft)
	G2	01 20 08.88	103 59 01.52	3.95m (12.96ft)
	G3	01 20 10.18	103 59 02.07	3.95m (12.96ft)
	G4	01 20 11.48	103 59 02.62	3.94m (12.93ft)
	G5	01 20 12.77	103 59 03.17	3.94m (12.93ft)
	G6	01 20 14.49	103 59 03.89	3.93m (12.89ft)
	G7	01 20 15.70	103 59 04.57	3.89m (12.76ft)
	G8	01 20 17.01	103 59 05.12	3.85m (12.63ft)
	G9	01 20 18.31	103 59 05.67	3.85m (12.63ft)
	G10	01 20 19.60	103 59 06.22	3.86m (12.66ft)
	G11	01 20 20.90	103 59 06.77	3.84m (12.60ft)
	G12	01 20 22.20	103 59 07.31	3.83m (12.57ft)
	G13	01 20 23.50	103 59 07.86	3.82m (12.53ft)
	G14	01 20 24.79	103 59 08.41	3.83m (12.57ft)
	G15	01 20 26.09	103 59 08.96	3.88m (12.73ft)
	G16	01 20 27.39	103 59 09.50	4.05m (13.29ft)
	G17	01 20 28.69	103 59 10.05	4.00m (13.12ft)
	G18	01 20 31.53	103 59 11.86	4.36m (14.30ft)
	G18L	01 20 32.05	103 59 12.85	4.34m (14.24ft)
	G18R	01 20 31.65	103 59 11.26	4.43m (14.53ft)
	G19	01 20 32.64	103 59 09.25	4.56m (14.96ft)
	G19L	01 20 33.17	103 59 10.25	4.47m (14.67ft)
	G19R	01 20 32.77	103 59 08.66	4.56m (14.96ft)
	G20	01 20 33.75	103 59 06.65	4.52m (14.83ft)
	G20L	01 20 34.13	103 59 07.58	4.44m (14.57ft)
	G20R	01 20 33.99	103 59 06.10	4.52m (14.83ft)
	G21	01 20 34.87	103 59 04.04	4.51m (14.80ft)
	G21L	01 20 35.24	103 59 04.98	4.52m (14.83ft)
	G21R	01 20 35.10	103 59 03.49	4.55m (14.93ft)

RESTRICTIONS ON TAXIWAYS

1) Pilots are advised to apply minimum thrust when
   i) turning into TWY P2, P4, P5 and Taxilane P6 while taxiing either northwards or southwards on Taxilane P7, and
   ii) thereafter when taxiing along TWY P2 up to and including the TWY P8/P2 junction.
   This is in view of apron activities at aircraft stands D40, D41, D47, D48, D49, E22, E24, E27 and E28.

2) TWY SA can only be used by aircraft with maximum wingspan 65m. TWY SA is a one-way live TWY for aircraft taxiing into SASCO hangar via RWY 02L. Only tow-out operation is allowed from SASCO hangar into TWY SA and RWY 02L.

3) Taxiway Q (between TWY V and TWY P7) can only be used by aircraft with maximum wingspan 65m.

4) Taxiway centreline along TWY T between TWY R1 and R3 offset eastward by 2.5m away from aircraft stands E7 and F36

5) Pilots are advised to apply minimum thrust when turning into Taxiway V from Taxilane V7.

6) Taxilane V11 (behind aircraft stands A18 to A21) can only be used by aircraft with maximum wingspan 61m.

7) Taxilane Q1 (behind aircraft stands C16 to C19 and between TWY P and TWY Q),
   Taxilane Q2 and Taxilane Q3 (behind aircraft stands D35 to D38 and between TWY P and TWY Q)
   can only be used by aircraft with maximum wingspan 65m.

8) Taxilane P7 (behind aircraft stands E20 to E22) and Taxilane R7 (behind aircraft stands F50 to F54) can only be used by aircraft with maximum wingspan 65m (towing and pushback exempted).

9) Taxilane U2 can only be used by aircraft with maximum wingspan 36m.

10) Taxiway U7 (between Taxilane U2 and Taxiway U), Taxiway U8 (between Taxilane U2 and Taxiway U) and Taxiway U9 (between Taxilane U2 and Taxiway U) can only be used by aircraft with maximum wingspan 36m.

11) Pilots are advised to exercise caution when taxiing near Taxilane U2, Taxiway U, U7, U8 and U9.

12) Pilots are advised to apply speed limit of 20 knots when taxiing along TWY R and TWY S.

13) Pilots turning aircraft into aircraft stand A2 or aircraft stand B2 are advised to wait for any aircraft holding at Taxilane V7, at the inner cul-de-sac portion of the terminal building to vacate this portion before turning into aircraft stand A2 or aircraft stand B2.

14) TWY M, M4, M5, M6 and M7, located western side of RWY 02L/20R, are solely for use by Republic of Singapore Air Force (RSAF) aircraft.

15) TWY MY, MY1, MY2, MY3, MY4, MY5, MY6, MY7, MY8, MY9 and MY10, located eastern side of RWY 02R/20L, are solely for use by Republic of Singapore Air Force (RSAF) aircraft.

16) Taxiway S2, S3 and Taxilane S4 can only be used by aircraft with maximum wingspan 65m.

17) Taxilane S6, S8, S9 and Taxiway S7 can only be used by aircraft with maximum wingspan 36m.

18) Pilots are advised to apply minimum thrust when taxiing on Taxilane N4 turning into Taxilane N5 (and vice versa), due to potential jet blast issues affecting Bays 603, 604, 611 and 612. Aircraft shall not stop on TXL N5 between aircraft stands 604 and 611.

NOTE:
Pilots to follow stand lead-in line and taxi through white hatched apron markings of the following aircraft stands:
A5, A9, B5, B6, C17, D40, D42, E24, E27, F35, F52, F56, F59, G18, G19, G20, G21, 200, 202, 208, 462, 463, 600, 516, 517, 951, 953, 954.

RADIO ALTIMETER OPERATIONS AREA

A radio altimeter operating area is established in the pre-threshold area of Runway 02L/20R, Runway 02C/20C and Runway 02R/20L.
The size of the radio altimeter operating area is 300m length and 120m width.

AIRCRAFT STANDS WITH SAFEGATE AIRCRAFT DOCKING GUIDANCE SYSTEM.

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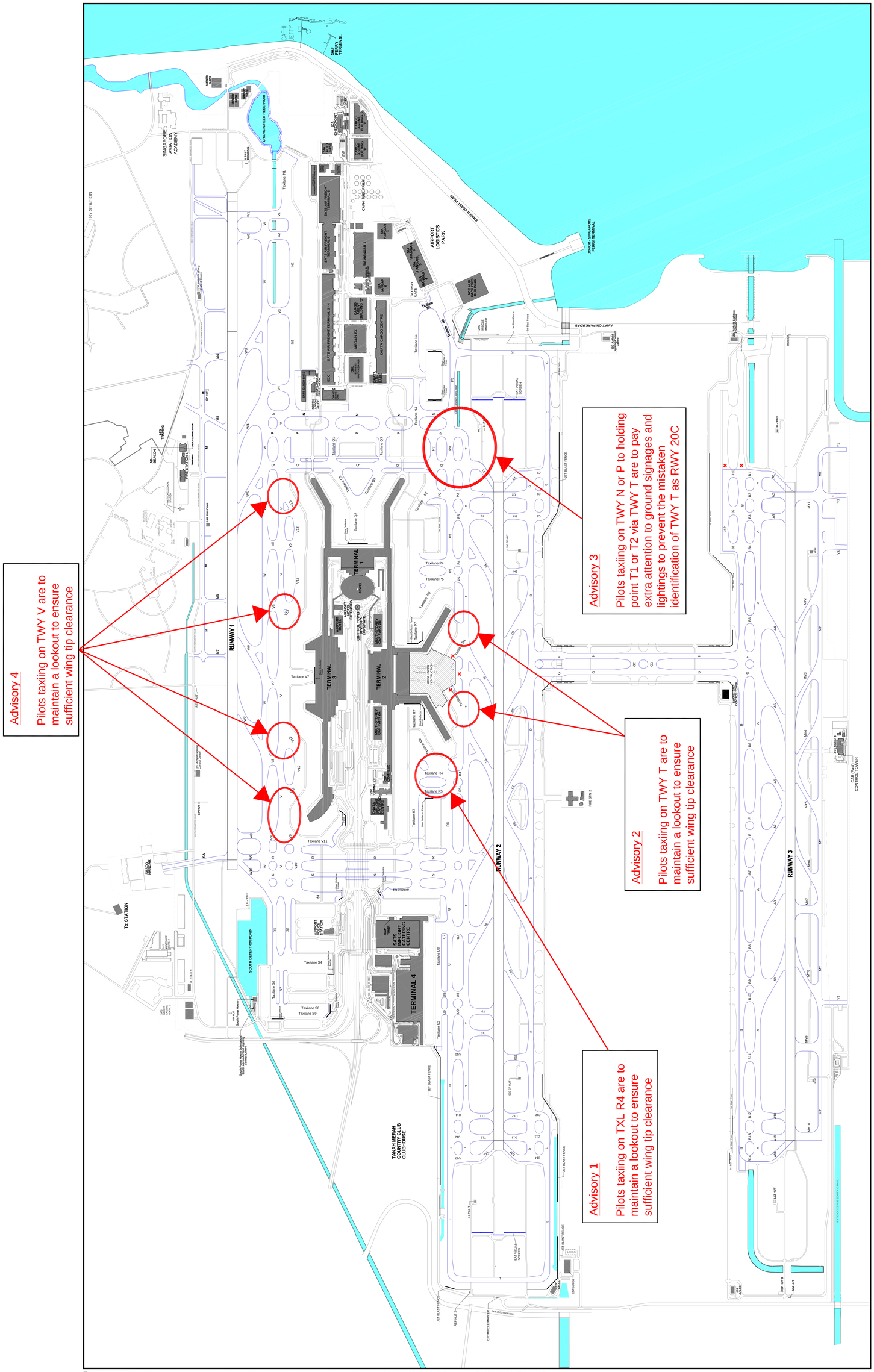
Changes : NIL.

AERODROME ADVISORY CHART



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Changes : Addition of SATS BUP Centre near SATS Airfreight Terminal 6

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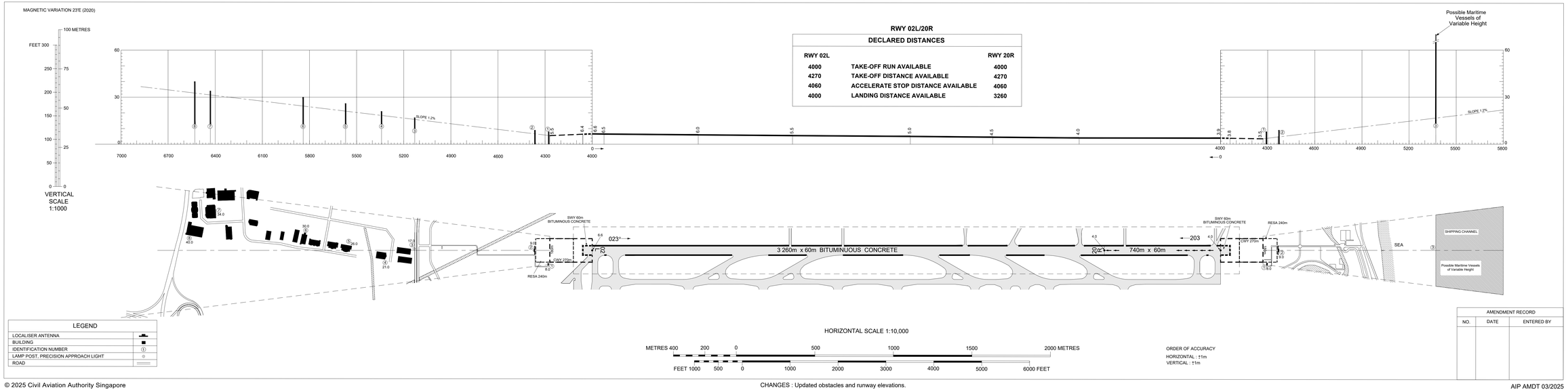
DIMENSIONS AND ELEVATIONS IN METRES

AERODROME OBSTACLE CHART - ICAO
TYPE A (OPERATING LIMITATIONS)

SINGAPORE/Singapore Changi



LEGEND

LOCALISER ANTENNA	
BUILDING	
IDENTIFICATION NUMBER	①
LAMP POST, PRECISION APPROACH LIGHT	○
ROAD	

ORDER OF ACCURACY
HORIZONTAL : ±1m
VERTICAL : ±1m

AMENDMENT RECORD

NO.	DATE	ENTERED BY

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CHANGES : Updated obstacles and runway elevations.

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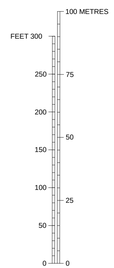
DIMENSIONS AND ELEVATIONS IN METRES

AERODROME OBSTACLE CHART - ICAO
TYPE A (OPERATING LIMITATIONS)

SINGAPORE/Singapore Changi

MAGNETIC VARIATION 23°E (2020)

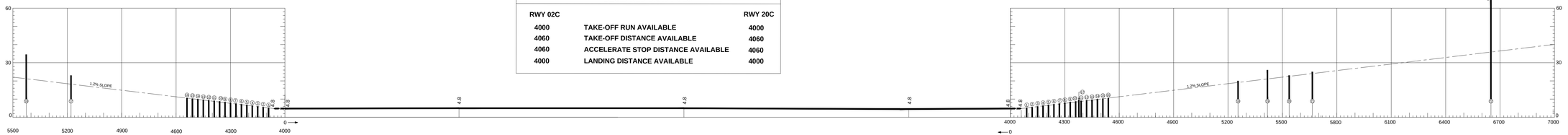


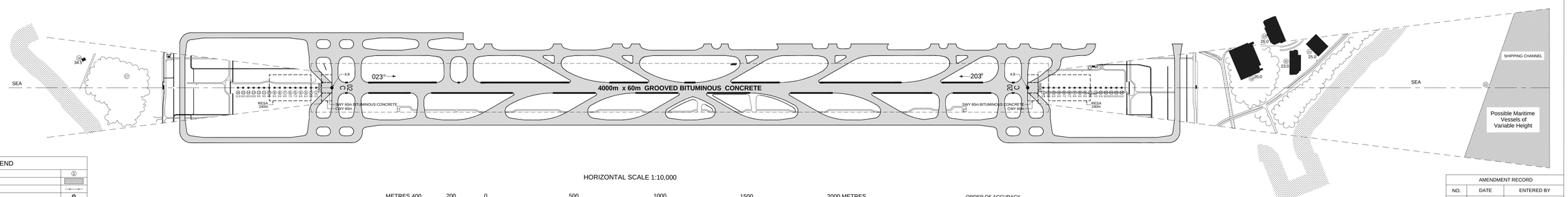
VERTICAL SCALE 1:1000

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





HORIZONTAL SCALE 1:10,000

METRES 400 200 0 500 1000 1500 2000 METRES

FEET 1000 500 0 1000 2000 3000 4000 5000 6000 FEET

LEGEND	
IDENTIFICATION NUMBER	①
DRAIN	
FENCE	
PRECISION APPROACH LIGHT	
ROAD	
BUILDING	
EAT VISUAL SCREEN	

ORDER OF ACCURACY

HORIZONTAL : ±1m
VERTICAL : ±1m

AMENDMENT RECORD		
NO.	DATE	ENTERED BY

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CHANGES: Revised aerodrome layout

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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)

103°56'E 103°57'E 103°58'E 103°59'E 104°0'E 104°1'E 104°2'E 104°3'E 104°4'E

1°27'N 1°26'N 1°25'N 1°24'N 1°23'N 1°22'N 1°21'N 1°20'N 1°19'N 1°18'N 1°17'N

JOHOR STRAIT

FIR KUALA LUMPUR
FIR SINGAPORE

APPROACH SURFACE SLOPE 1:40

TAKE-OFF CLIMB SURFACE SLOPE 1:50

Pulau Ubin

Pulau Tekong Kechil

Pulau Tekong Reservoir

Pulau Tekong

WSD34
GND - 500 ft ALT

Possible Maritime Vessels of Variable Height

CENTRE-LINE OF SHIPPING CHANNEL

CAFHI Jetty

Jetty

Displaced Threshold

Changi Ferry Terminal

TRANSITIONAL SURFACE SLOPE 1:7

RESA 240m

CWY 270m

CWY 60m

SWY 60m BITUMINOUS CONCRETE

SWY 60m GROOVED BITUMINOUS CONCRETE

TWR 81m

MRT

CONICAL SURFACE Slope 1:20

Bedok Reservoir

Bedok Jetty

Tanah Merah Ferry Terminal

INNER HORIZONTAL SURFACE 49m

Restricted Waters
(Prior permission required
for vessels over 15m AMSL)

Restricted Waters
(Prior permission required
for vessels over 30m AMSL)

Restricted Waters
(Prior permission required
for vessels over 49m AMSL)

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.

VAR 0°23' E (2020)
ANNUAL CHANGE
NEGLIGIBLE

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

HORIZONTAL SCALE 1 : 20,000

Meters 1000 500 0 1000 2000 3000 4000 5000

Feet 1000 0 5000 10000 15000 19000

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CHANGES : Hatched area markings near end of RWY 20C removed.

GRID : Grid lines and co-ordinates shown are based on WGS-84 datum.

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DIMENSIONS AND ELEVATIONS IN METRES

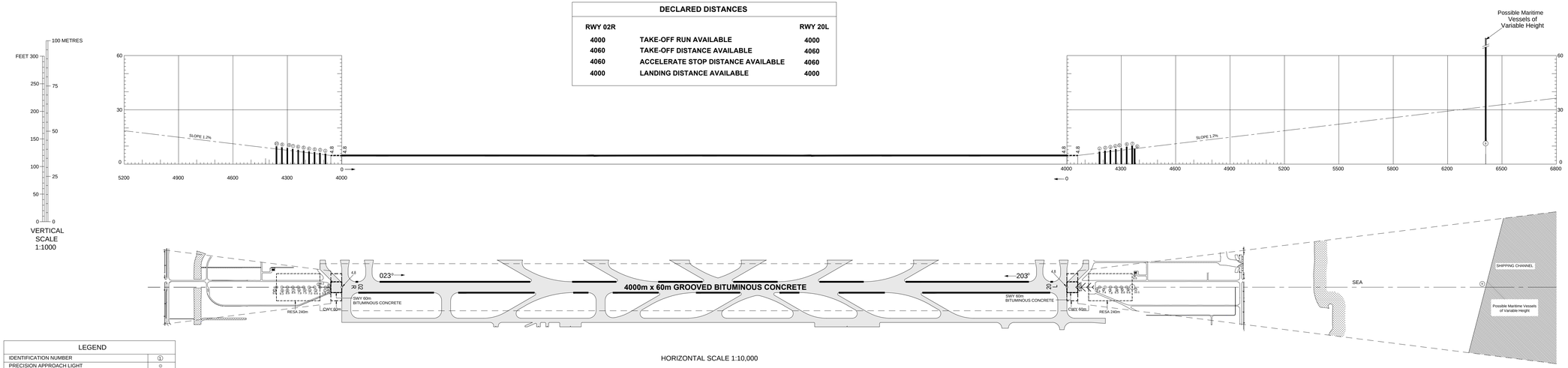
AERODROME OBSTACLE CHART - ICAO
TYPE A (OPERATING LIMITATIONS)

SINGAPORE/Singapore Changi

MAGNETIC VARIATION 0°23'E (2020)

RWY 02R/20L

DECLARED DISTANCES		
RWY 02R		**RWY 20L**
4000	**TAKE-OFF RUN AVAILABLE**	**4000**
4060	**TAKE-OFF DISTANCE AVAILABLE**	**4060**
4060	**ACCELERATE STOP DISTANCE AVAILABLE**	**4060**
4000	**LANDING DISTANCE AVAILABLE**	**4000**



HORIZONTAL SCALE 1:10,000

METRES 400 200 0 500 1000 1500 2000 METRES

FEET 1000 500 0 1000 2000 3000 4000 5000 6000 FEET

LEGEND	
IDENTIFICATION NUMBER	①
PRECISION APPROACH LIGHT	○
ANTENNA	⊙
ROAD	
FENCE	
DRAIN	
BUILDING	

ORDER OF ACCURACY
HORIZONTAL : ±1m
VERTICAL : ±1m

AMENDMENT RECORD		
NO.	DATE	ENTERED BY

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CHANGES : Reprint.

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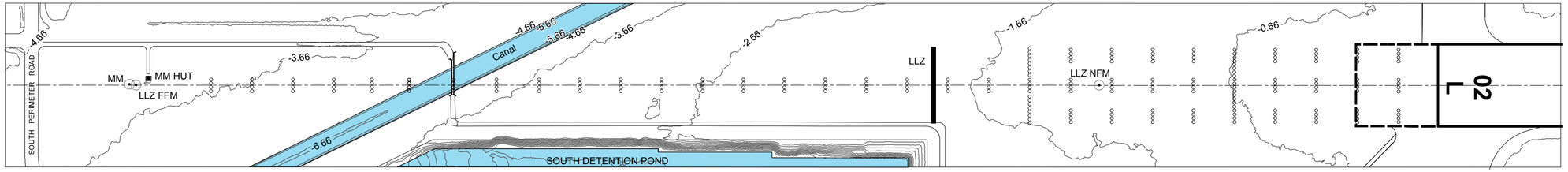
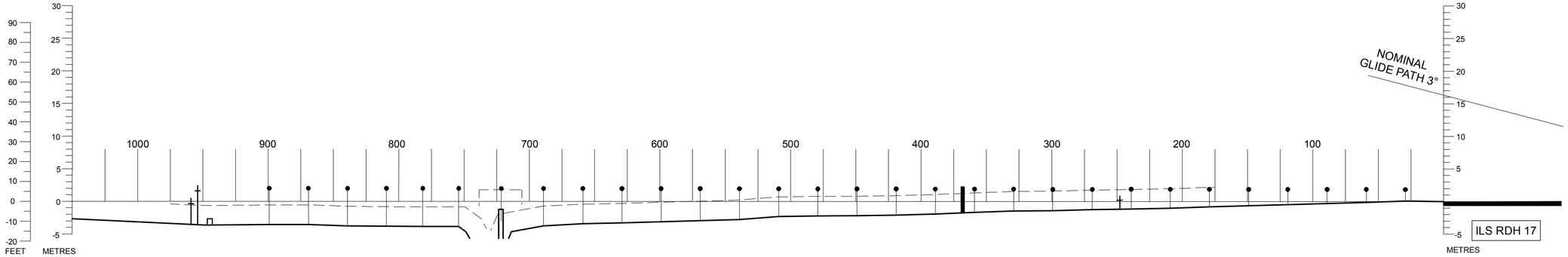
PRECISION APPROACH TERRAIN CHART - ICAO

SINGAPORE/Singapore Changi
RWY 02L

DISTANCES AND HEIGHTS IN METRES





SCALE 1 : 2,500

0 50 100 200 300 Meters

0 50 100 200 300 400 500 600 700 800 900 1,000 Feet

HORIZONTAL SCALE 1 : 2,500

VERTICAL SCALE 1 : 500

CONTOUR AND HEIGHTS ARE RELATED TO ELEVATION OF RWY THR

LEGEND	
BUILDING	
ROAD	
CONTOUR	
BRIDGE	
ANTENNA	
LOCALISER	LLZ
APPROACH LIGHTS	
CENTRE-LINE PROFILE	
DEVIATION AT LEAST +/- 3m FROM CENTERLINE PROFILE	

AMENDMENT RECORD

NO.	DATE	ENTERED BY

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CHANGES : ILS RDH amended.

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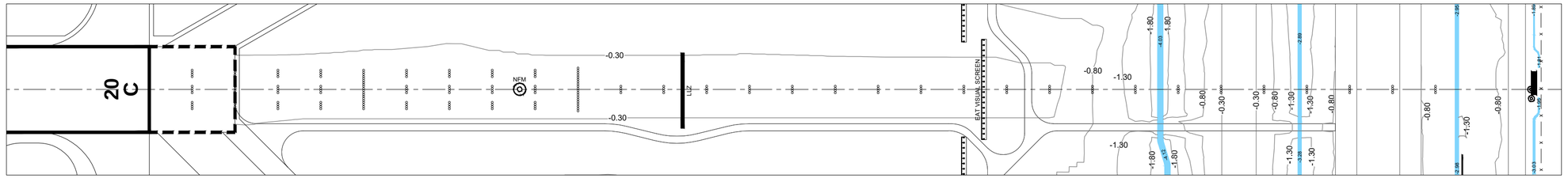
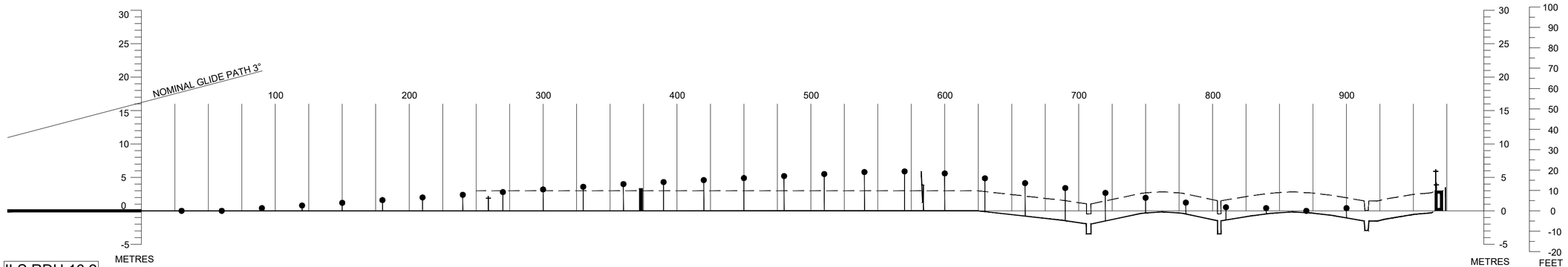
DISTANCES AND HEIGHTS IN METRES

PRECISION APPROACH TERRAIN CHART - ICAO

SINGAPORE/Singapore Changi
RWY 20C





ILS RDH 16.2

SCALE 1: 2500

0 50 100 200 300 METRES

0 50 100 200 300 400 500 600 700 800 900 1000 FEET

HORIZONTAL SCALE 1 : 2500

VERTICAL SCALE 1 : 500

CONTOUR AND HEIGHTS ARE RELATED TO ELEVATION OF RWY THR

LEGEND	
LOCALISER	LLZ
ANTENNA	
DRAIN	
FENCE	
CONTOUR	-1.30
PRECISION APPROACH LIGHT	
ROAD	
EAT VISUAL SCREEN	
BUILDING	
CENTRE-LINE PROFILE	
DEVIATION AT LEAST +/- 3M FROM CENTRE-LINE PROFILE	
JET BLAST FENCE	

AMENDMENT RECORD		
NO.	DATE	ENTERED BY

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CHANGES: Revised plan, profile and legend

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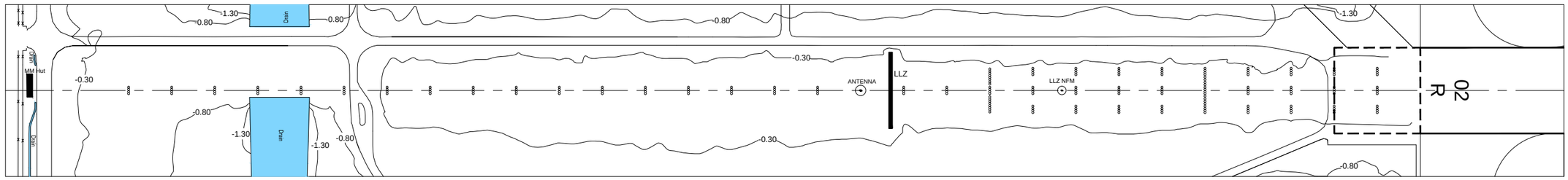
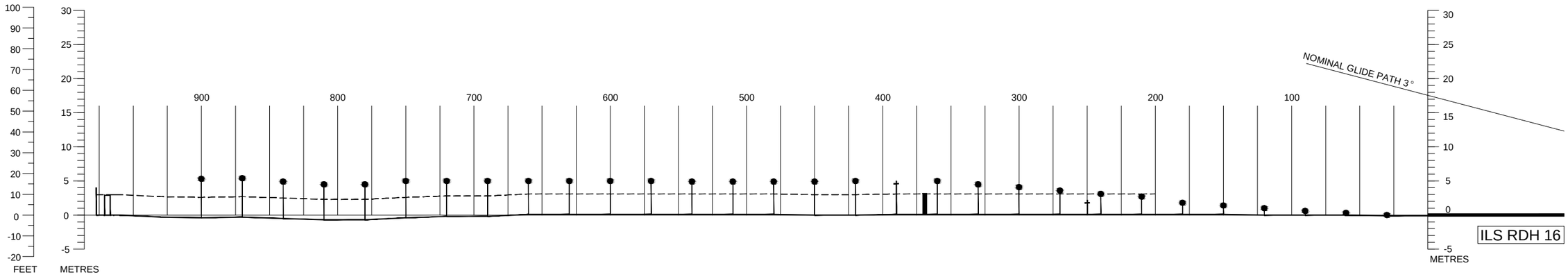
DISTANCES AND HEIGHTS IN METRES

PRECISION APPROACH TERRAIN CHART - ICAO

SINGAPORE/Singapore Changi
RWY 02R





SCALE 1: 2500

0 50 100 200 300 METRES

0 50 100 200 300 400 500 600 700 800 900 1000 FEET

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED

HORIZONTAL SCALE 1 : 2500

VERTICAL SCALE 1 : 500

CONTOUR AND HEIGHTS ARE RELATED TO ELEVATION OF RWY THR

LEGEND	
ANTENNA	
LOCALISER	LLZ
DRAIN	
FENCE	
CONTOUR	1.30
PRECISION APPROACH LIGHT	
ROAD	
BUILDING	
CENTRE-LINE PROFILE	
DEVIATION AT LEAST +/- 3M FROM CENTRE-LINE PROFILE	

AMENDMENT RECORD		
NO.	DATE	ENTERED BY

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CHANGES: Updated caution text.

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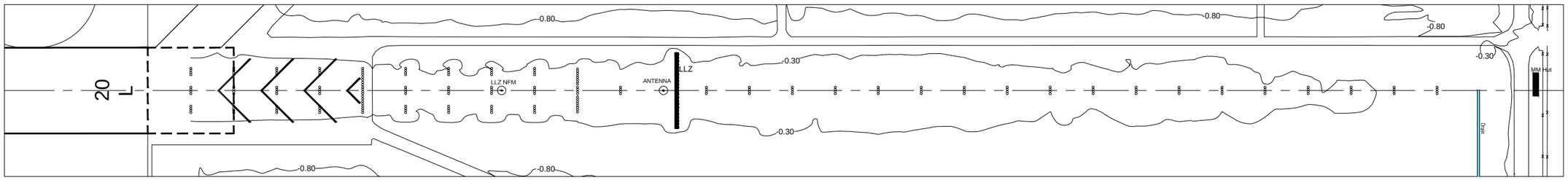
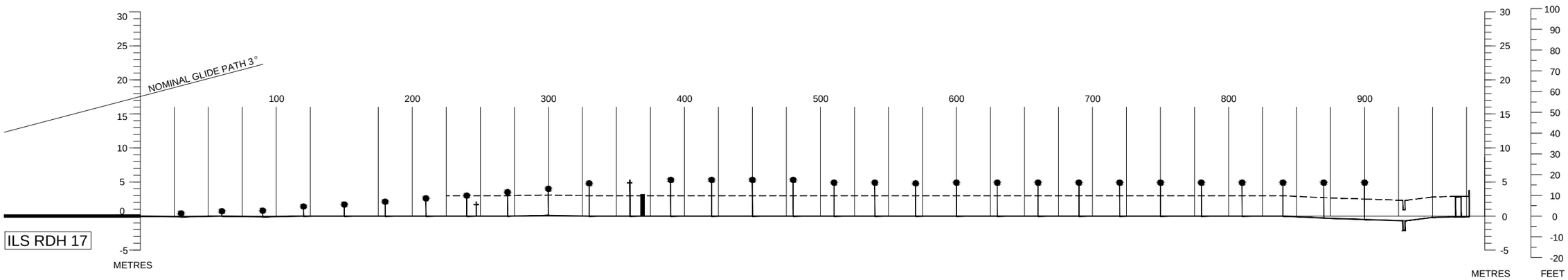
DISTANCES AND HEIGHTS IN METRES

PRECISION APPROACH TERRAIN CHART - ICAO

SINGAPORE/Singapore Changi
RWY 20L





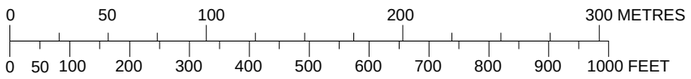
CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED

HORIZONTAL SCALE 1 : 2500

VERTICAL SCALE 1 : 500

CONTOUR AND HEIGHTS ARE RELATED TO ELEVATION OF RWY THR

SCALE 1: 2500



LEGEND	
ANTENNA	
LOCALISER	LLZ
BUILDING	
DRAIN	
FENCE	
CONTOUR	0.80
APPROACH LIGHT	
ROAD	
CENTRE-LINE PROFILE	
DEVIATION AT LEAST +/- 3M FROM CENTRE-LINE PROFILE	

AMENDMENT RECORD

NO.	DATE	ENTERED BY

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CHANGES: Updated caution text.

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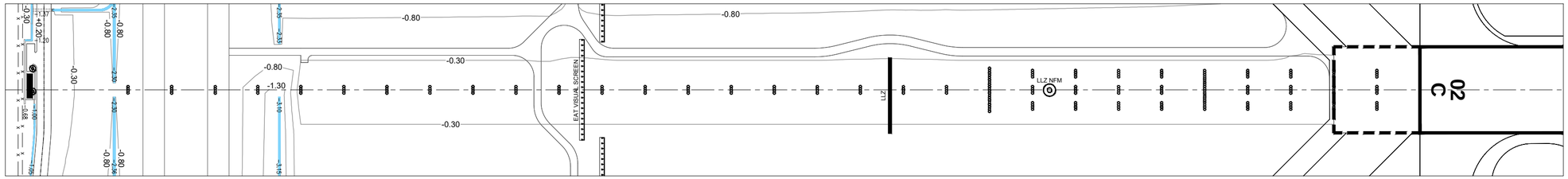
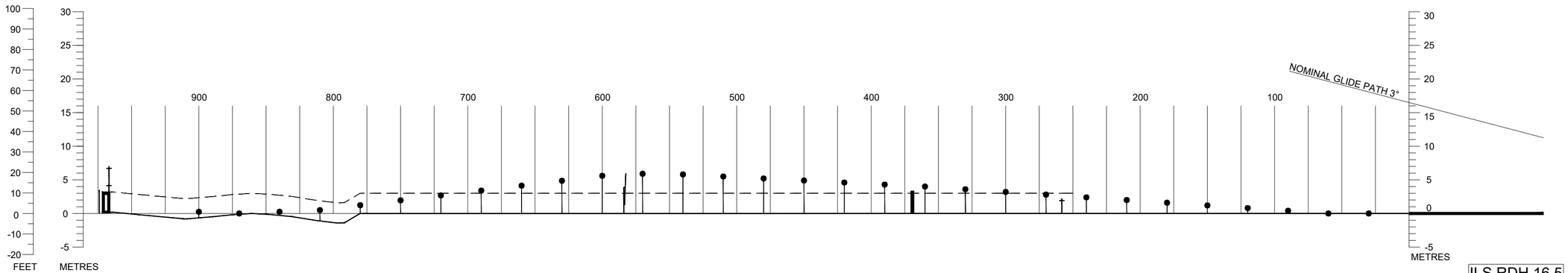
DISTANCES AND HEIGHTS IN METRES

PRECISION APPROACH TERRAIN CHART - ICAO

SINGAPORE/Singapore Changi
RWY 02C





ILS RDH 16.5

SCALE 1: 2500

0 50 100 200 300 METRES

0 50 100 200 300 400 500 600 700 800 900 1000 FEET

HORIZONTAL SCALE 1 : 2500

VERTICAL SCALE 1 : 500

CONTOUR AND HEIGHTS ARE RELATED TO ELEVATION OF RWY THR

LEGEND	
LOCALISER	LLZ
ANTENNA	
DRAIN	
FENCE	
CONTOUR	1.30
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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CHANGES: Revised legend

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

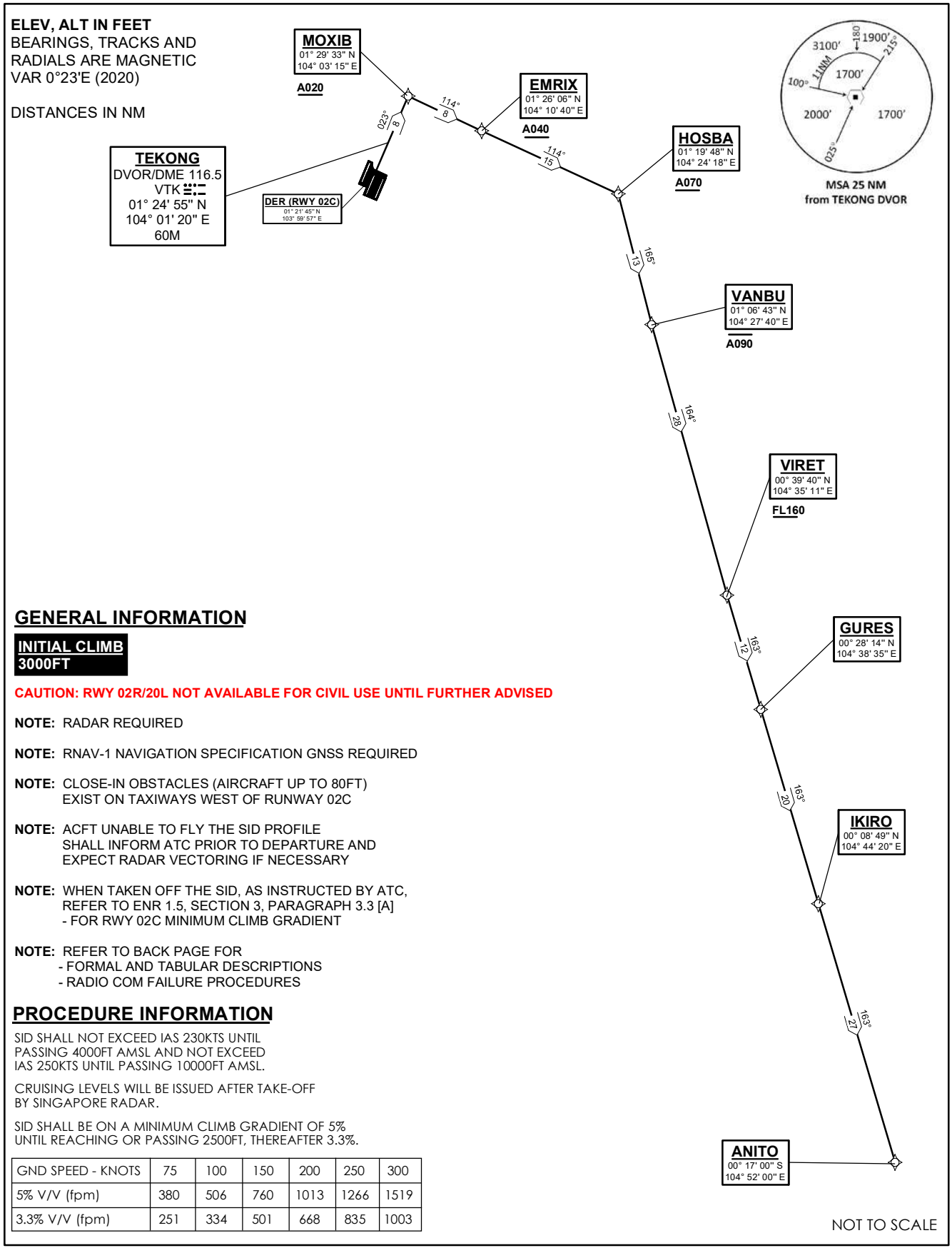
TRANSITION ALTITUDE
11 000ft

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



GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Amended last waypoint KIRDA to ANITO in tabular description on flip-page

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(163.4)	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 NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

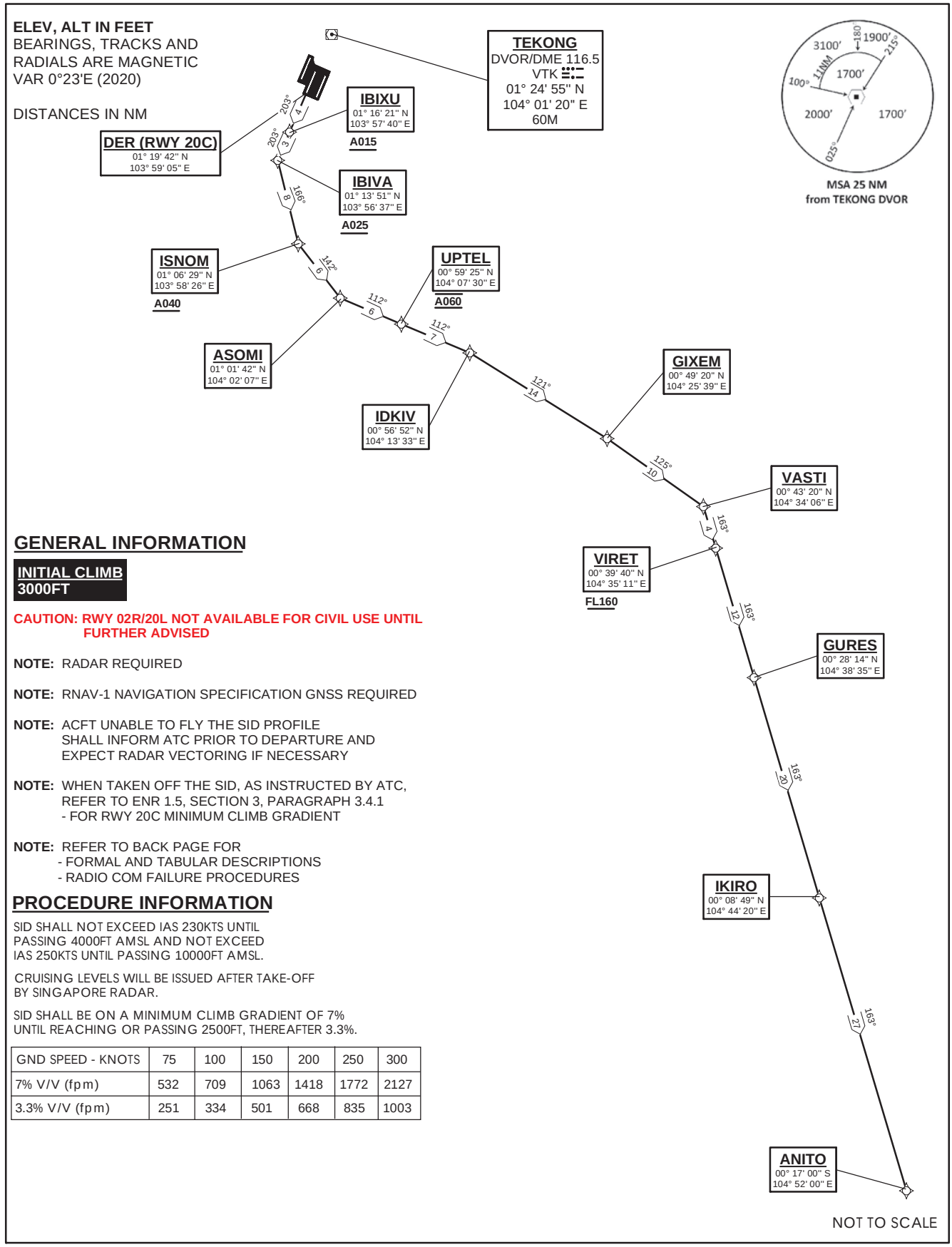
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20C
ANITO DEPARTURES
ANITO 8B

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 NOT AVAILABLE FOR CIVIL USE 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

NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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 UPTEL at 6000ft.	UPTEL [@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	UPTEL	-	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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

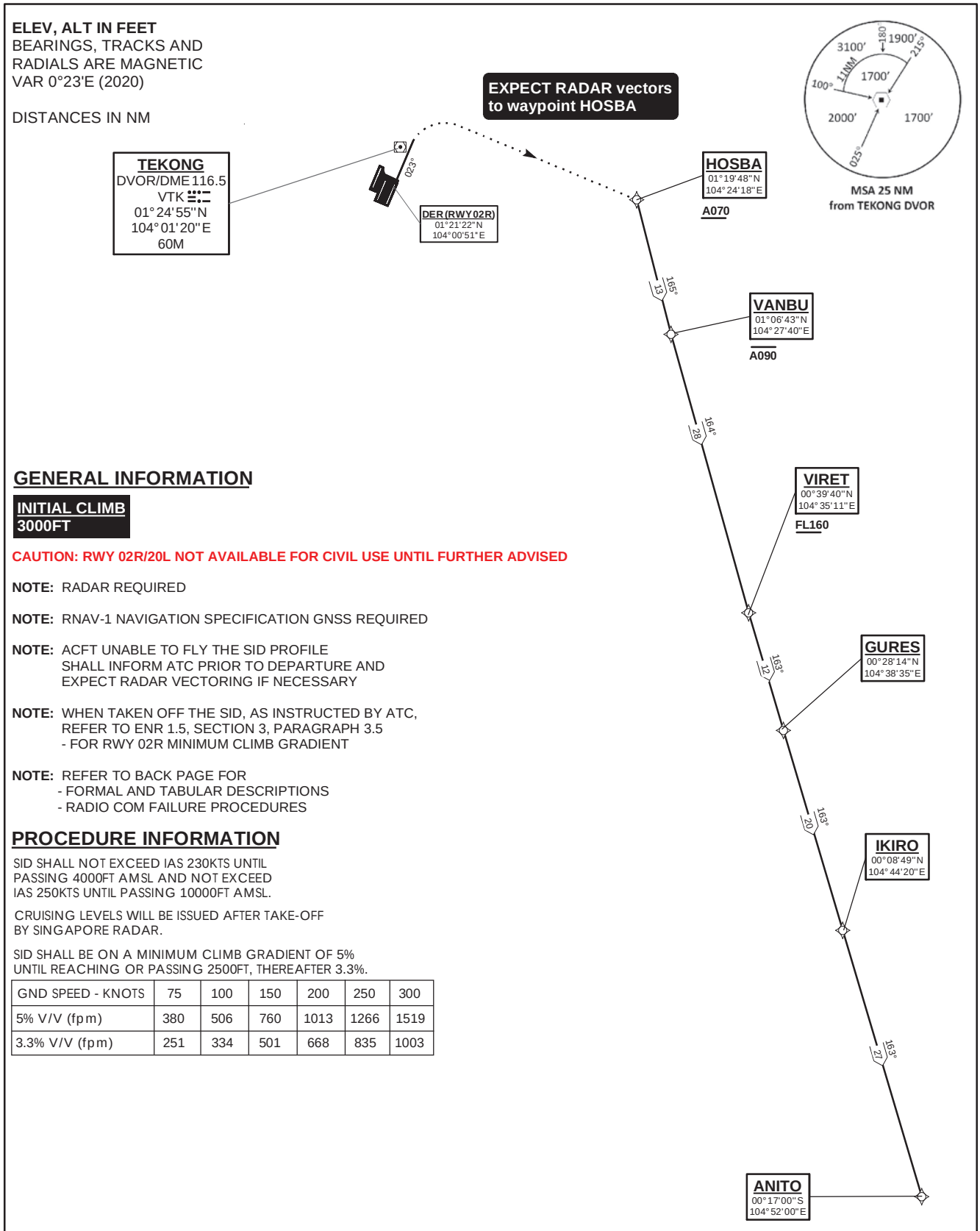
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02R
ANITO DEPARTURES (RADAR)
ANITO 1C

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 NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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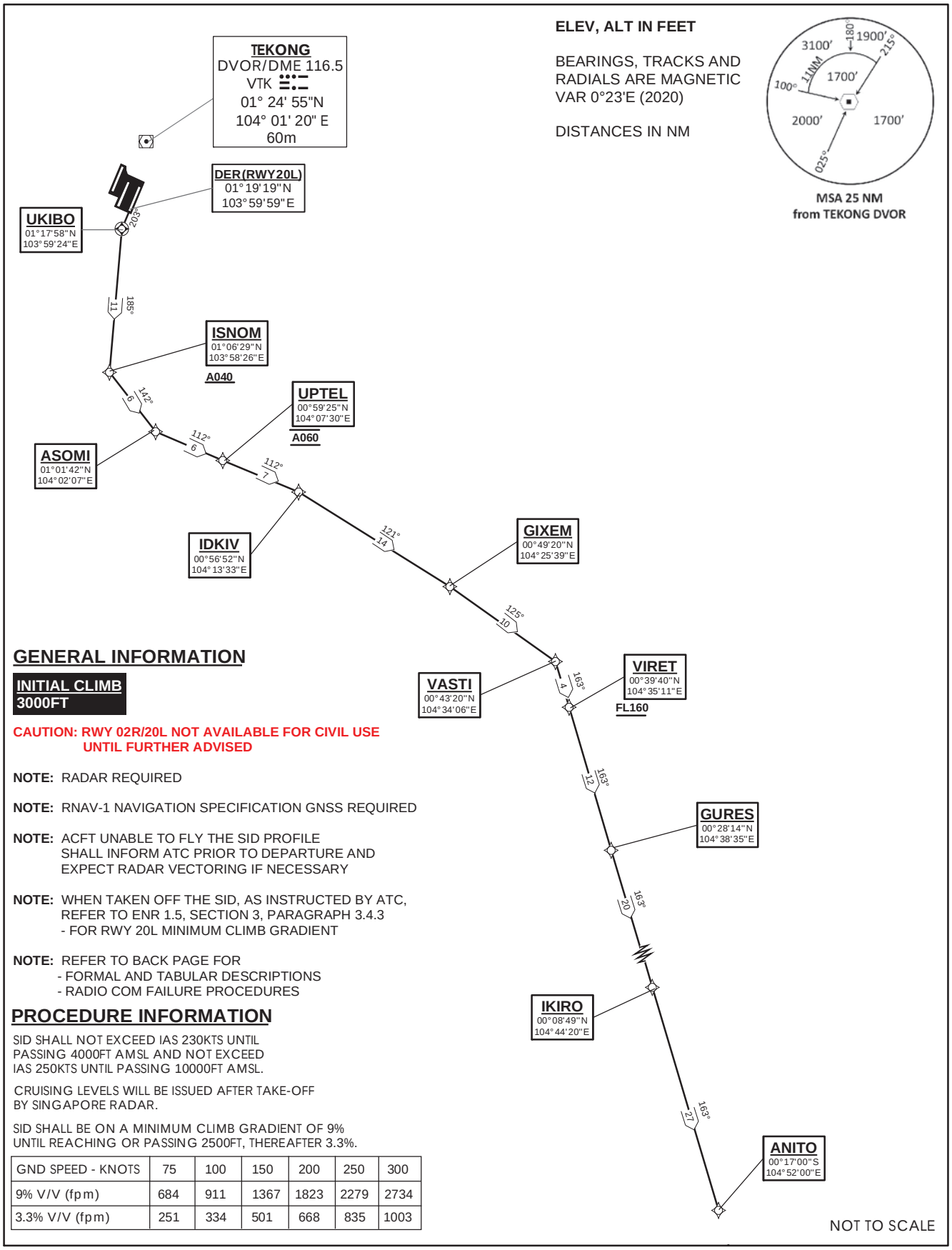
STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

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 20L
ANITO DEPARTURES
ANITO 1D



GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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 UPTEL at 6000ft.	UPTEL [@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	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	UPTEL	-	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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

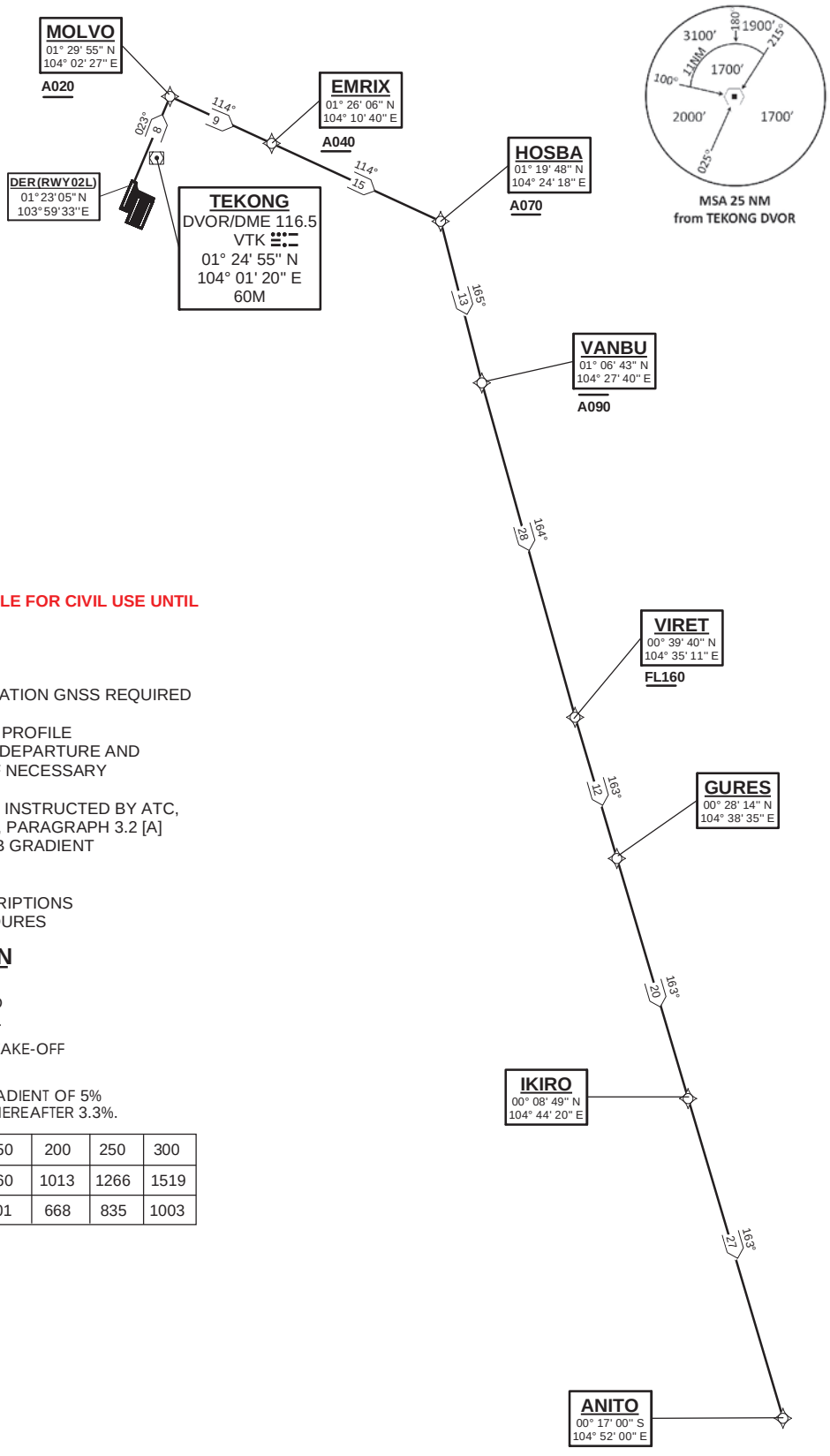
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02L
ANITO DEPARTURES
ANITO 7E

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 NOT AVAILABLE FOR CIVIL USE 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

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

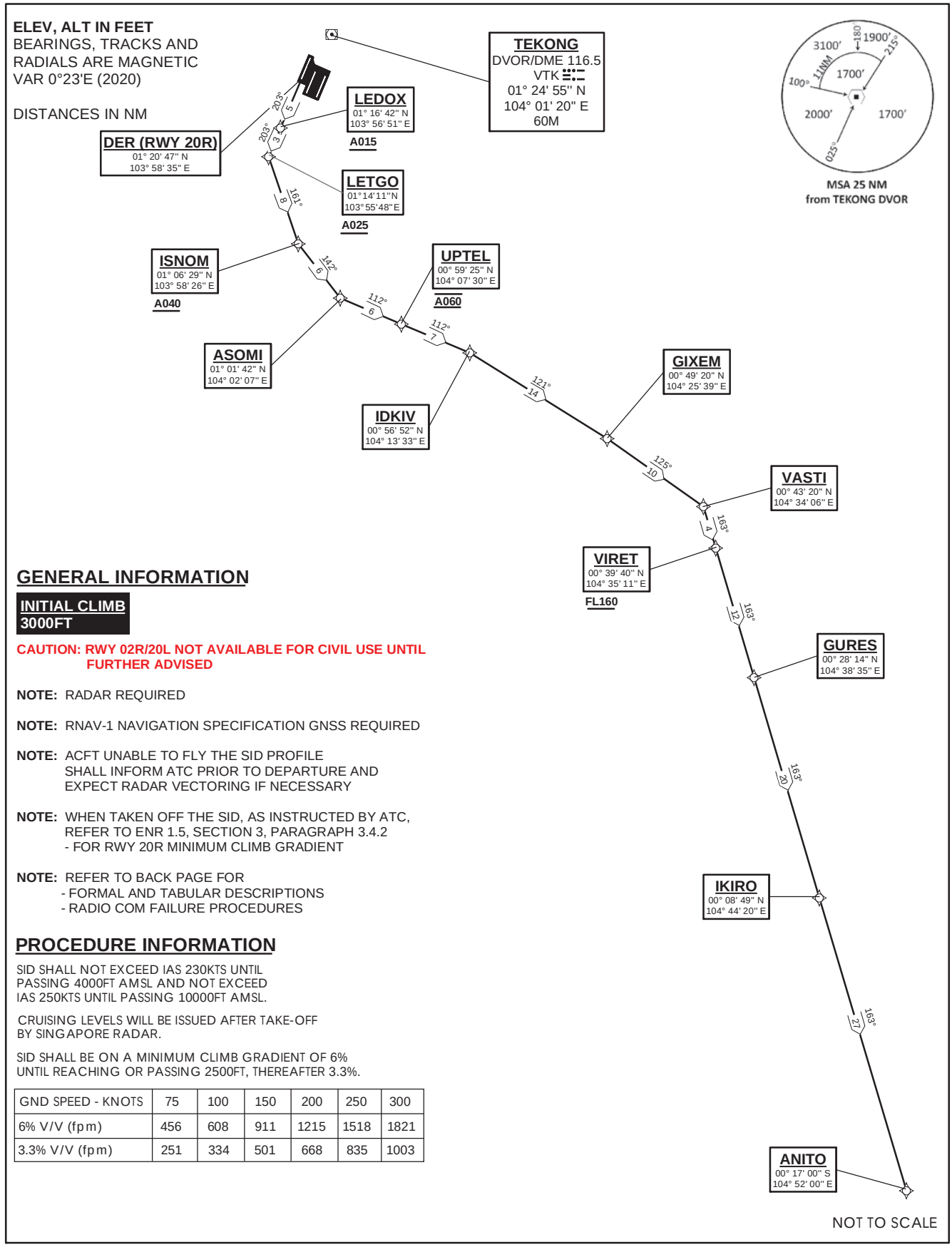
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20R
ANITO DEPARTURES
ANITO 8F

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 NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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 UPTEL at 6000ft.	UPTEL [@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	UPTEL	-	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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

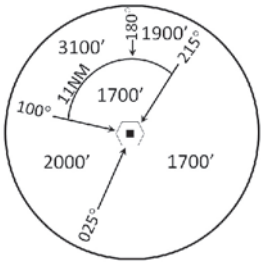
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

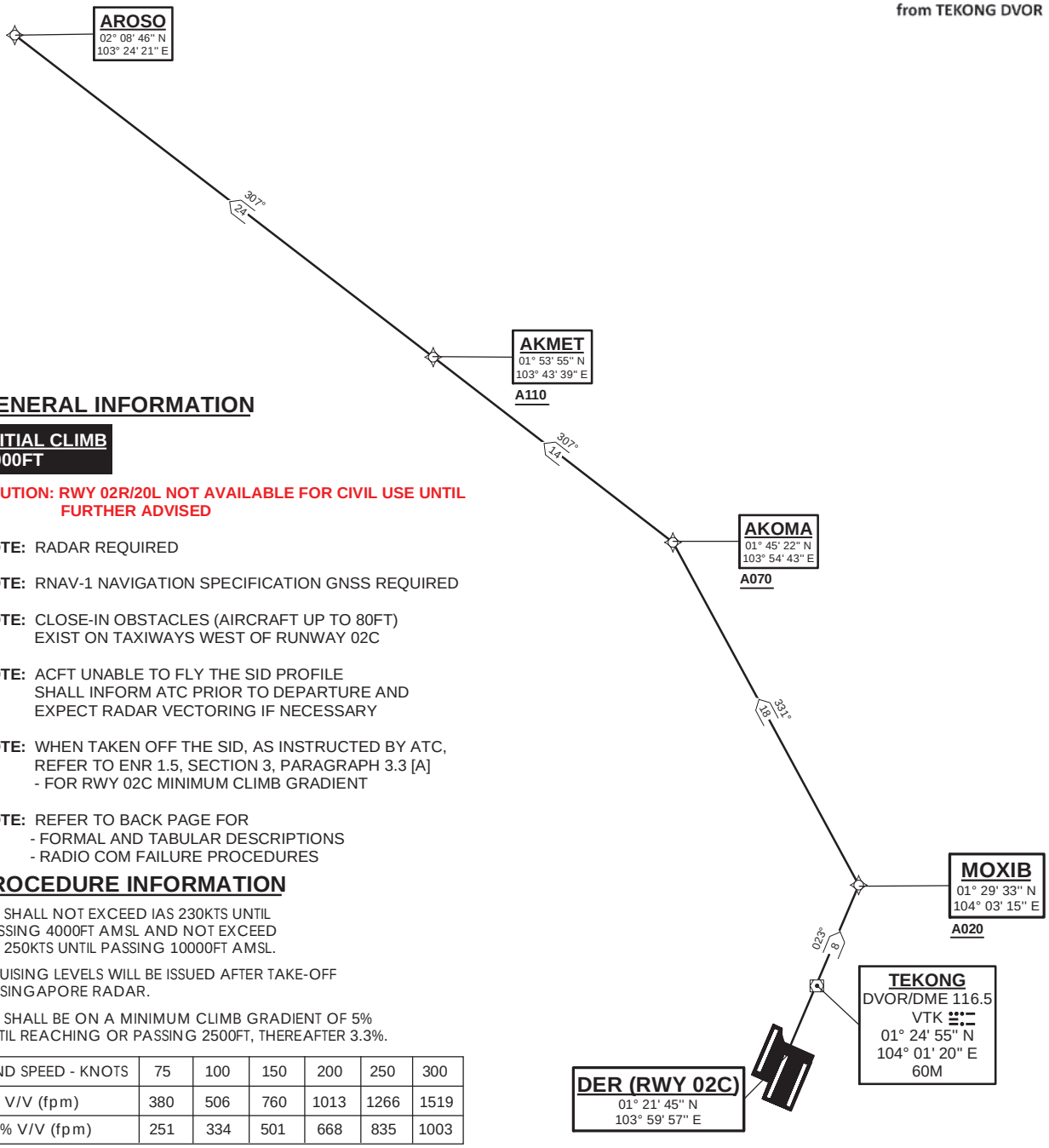
SINGAPORE/Singapore Changi
RWY 02C
AROSO DEPARTURES
AROSO 3A

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM
from TEKONG DVOR



GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

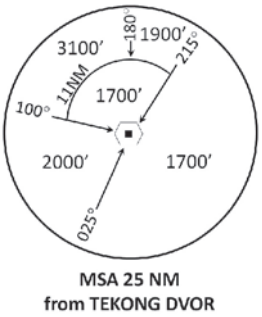
D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20C
AROSO DEPARTURES
AROSO 5B

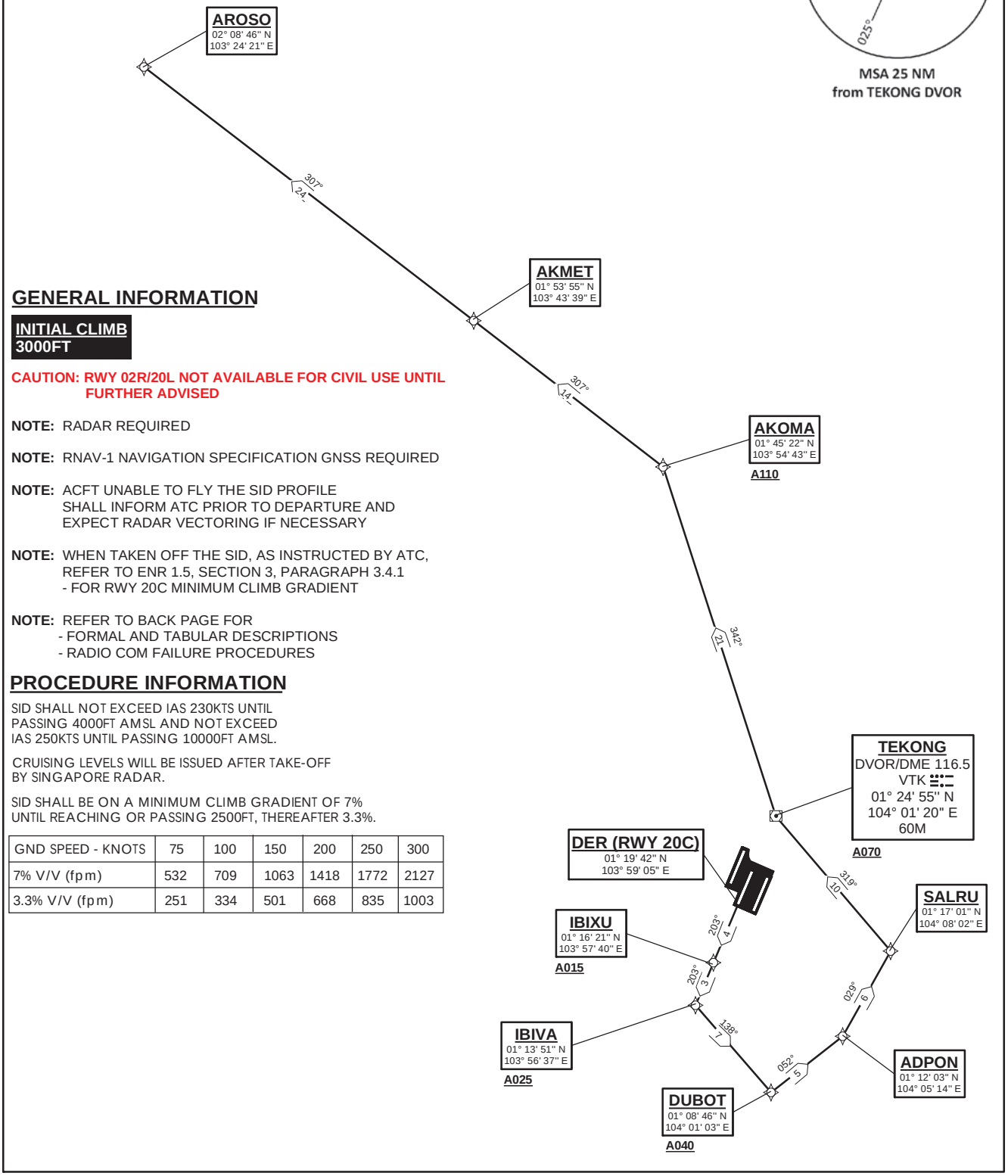
ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

DISTANCES IN NM

NOT TO SCALE



MSA 25 NM
from TEKONG DVOR



GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

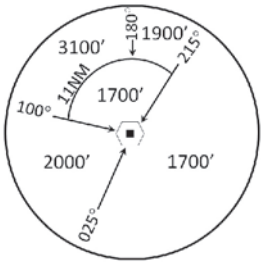
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

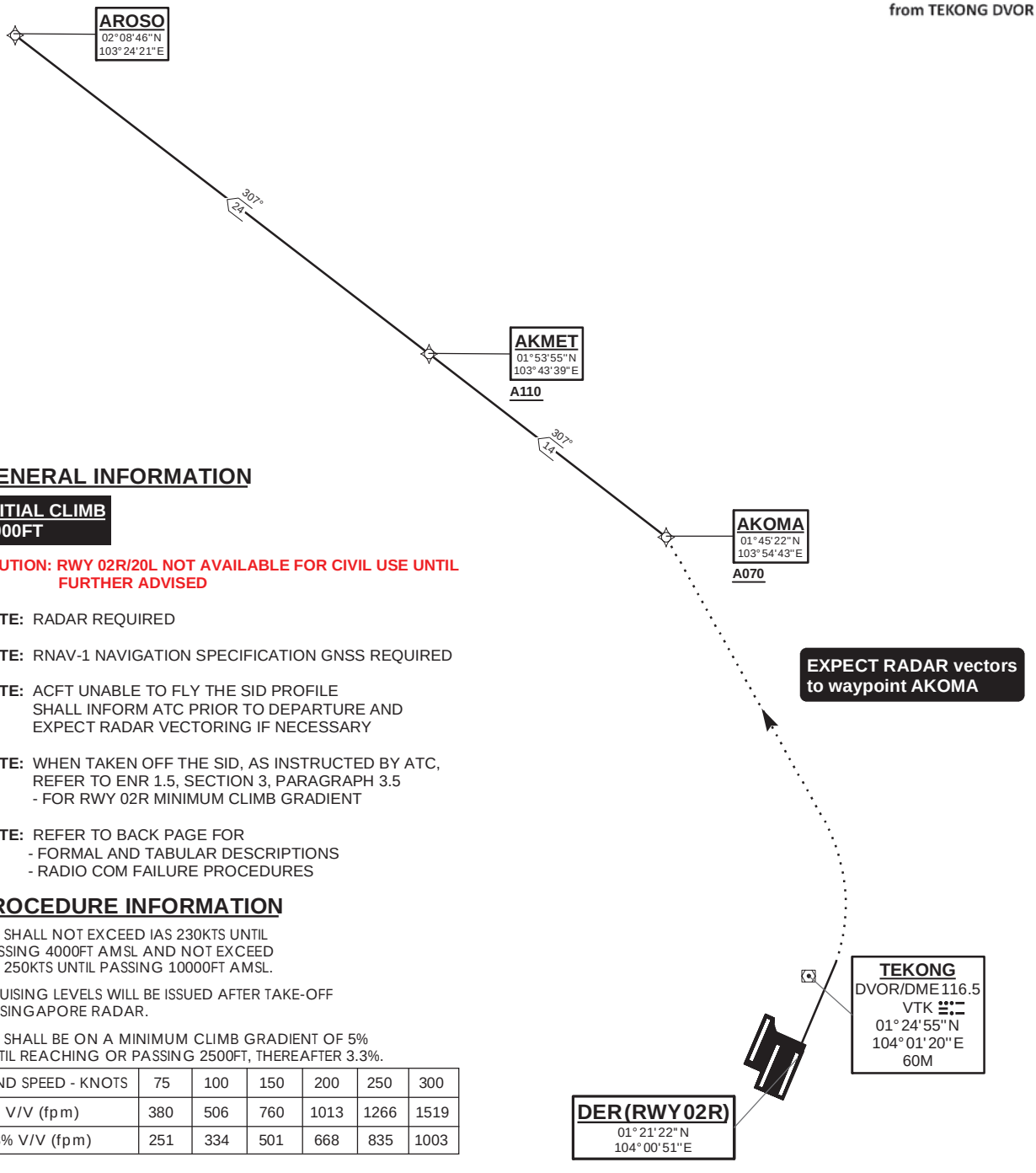
SINGAPORE/Singapore Changi
RWY 02R
AROSO DEPARTURES (RADAR)
AROSO 1C

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 NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

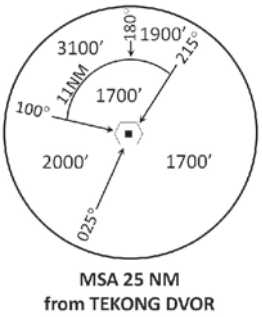
D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20L
AROSO DEPARTURES
AROSO 1D

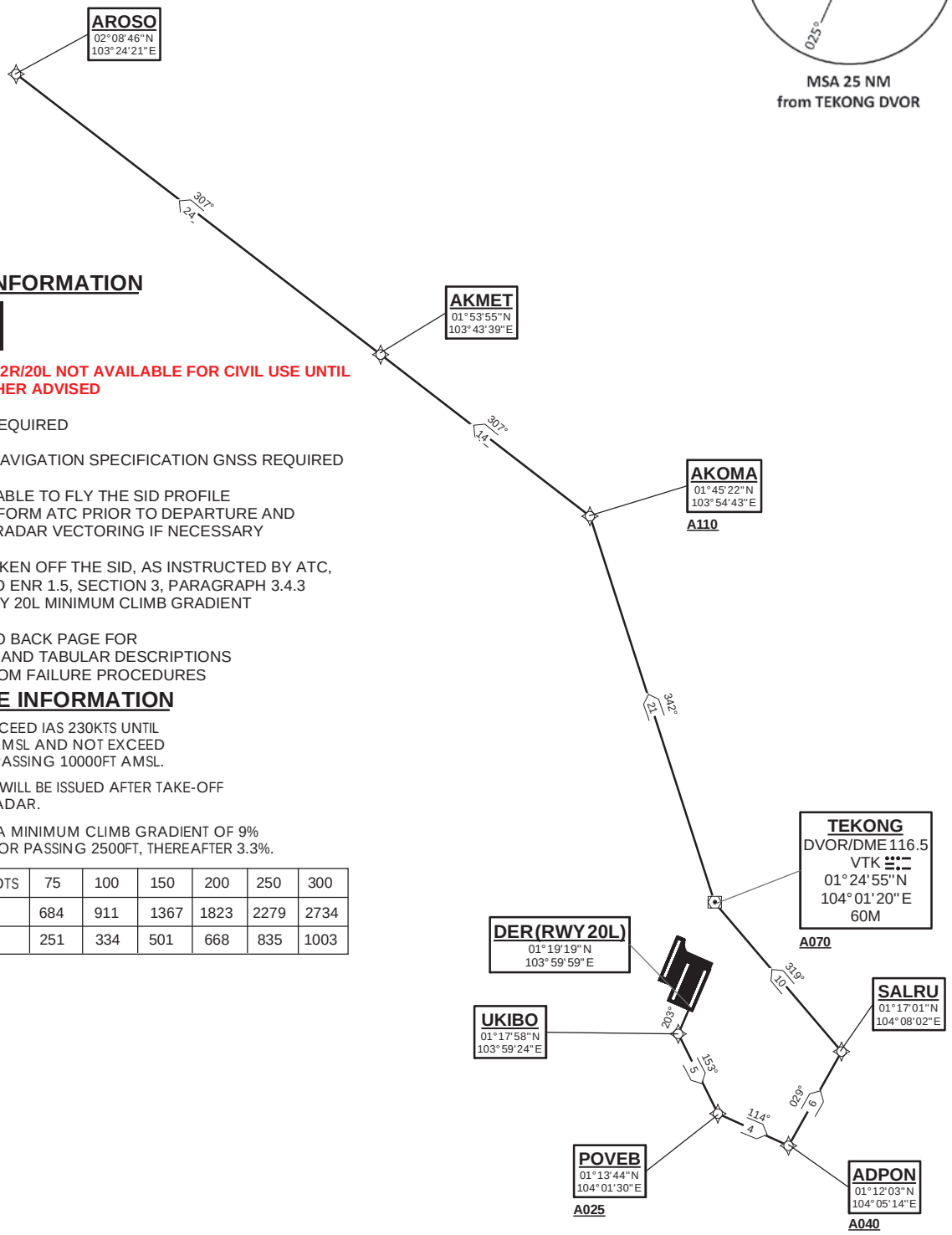
ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

DISTANCES IN NM

NOT TO SCALE



MSA 25 NM
from TEKONG DVOR



GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

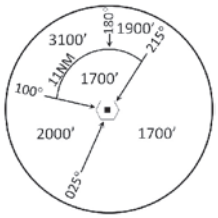
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

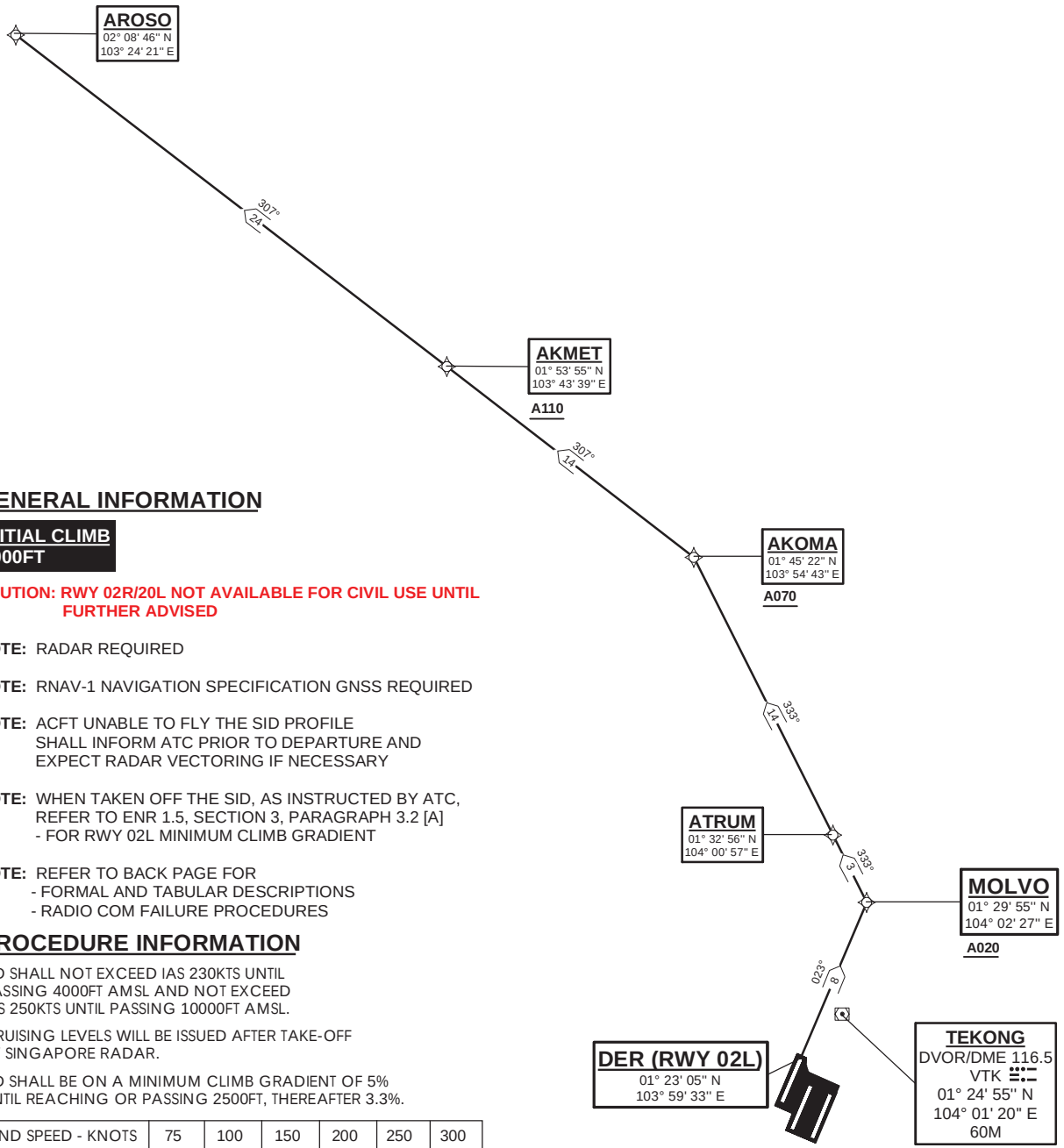
SINGAPORE/Singapore Changi
RWY 02L
AROSO DEPARTURES
AROSO 3E

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

DISTANCES IN NM



MSA 25 NM
from TEKONG DVOR



GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

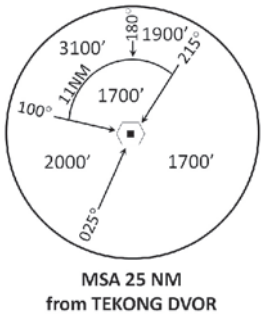
D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20R
AROSO DEPARTURES
AROSO 5F

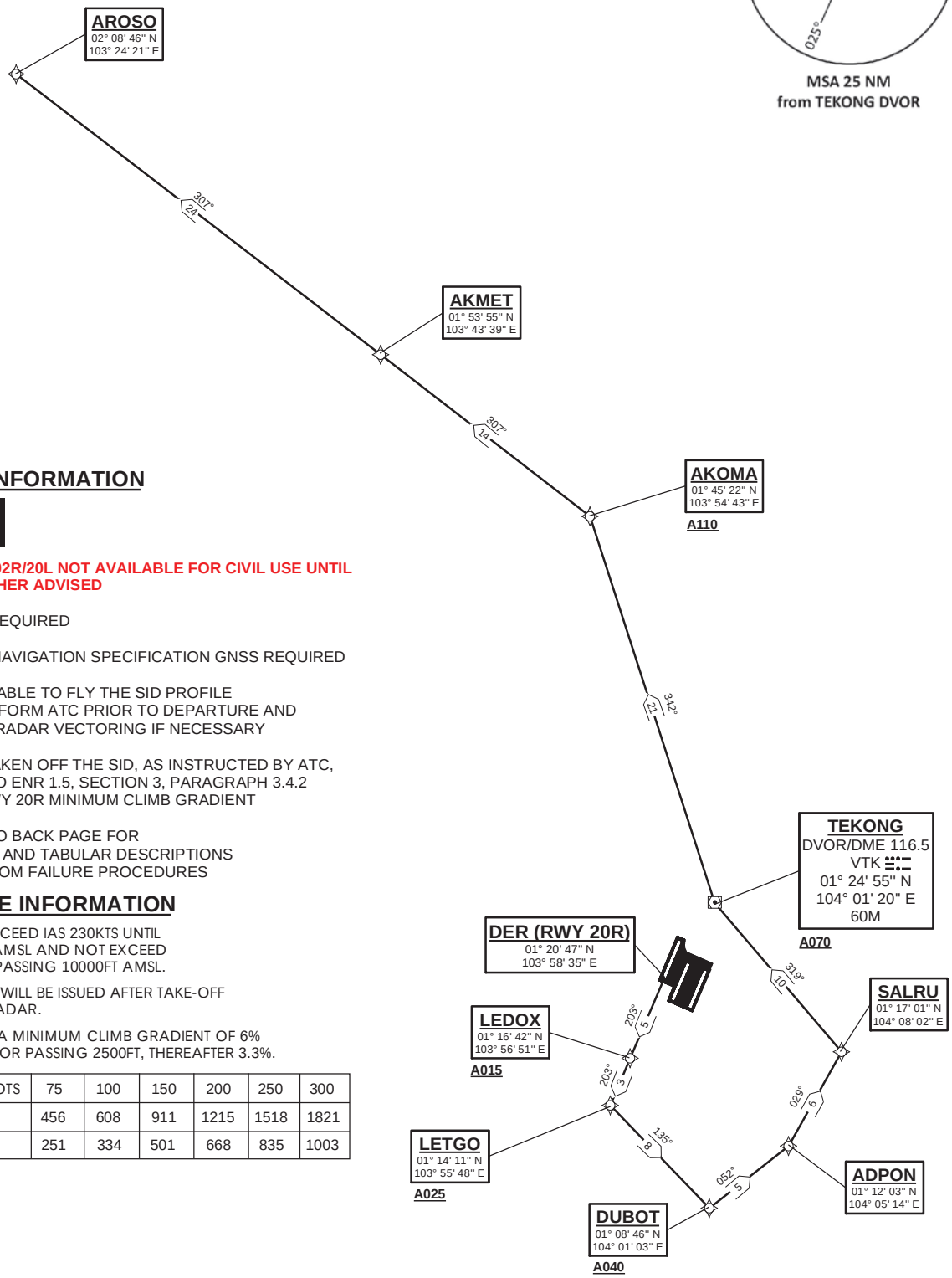
ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

DISTANCES IN NM

NOT TO SCALE



MSA 25 NM
from TEKONG DVOR



GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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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 NOT AVAILABLE FOR CIVIL USE 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

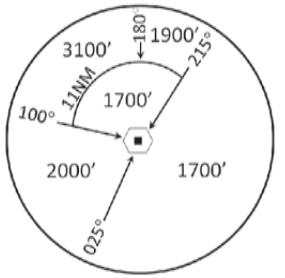
NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

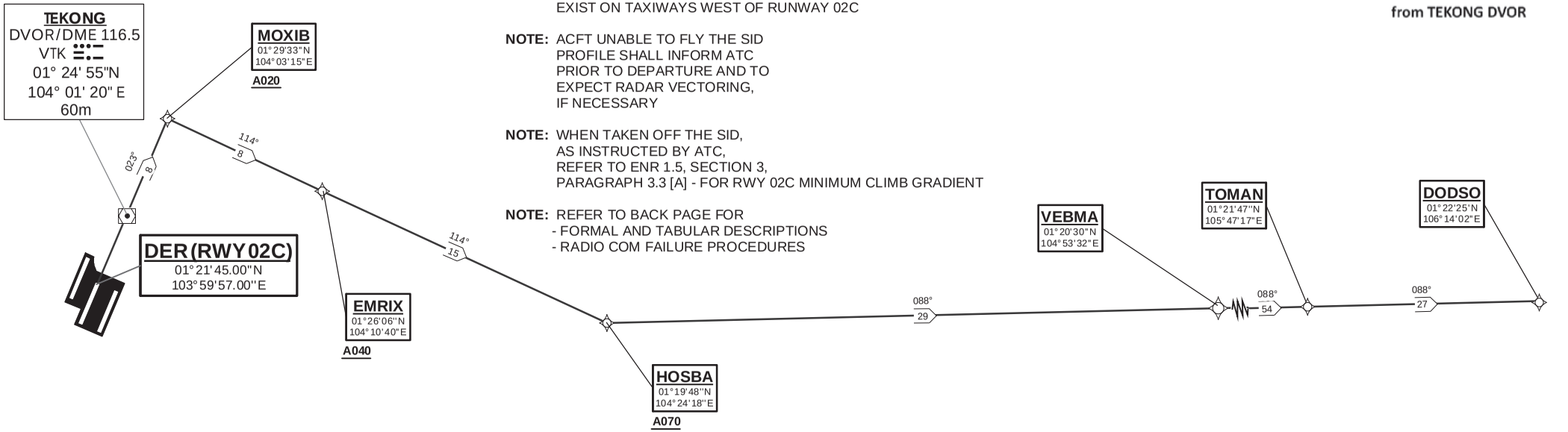
ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM from TEKONG DVOR



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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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 NOT AVAILABLE FOR CIVIL USE 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.

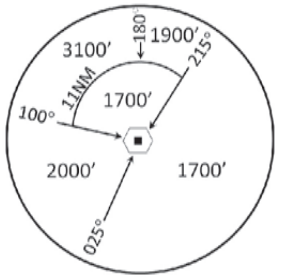
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 7% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

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

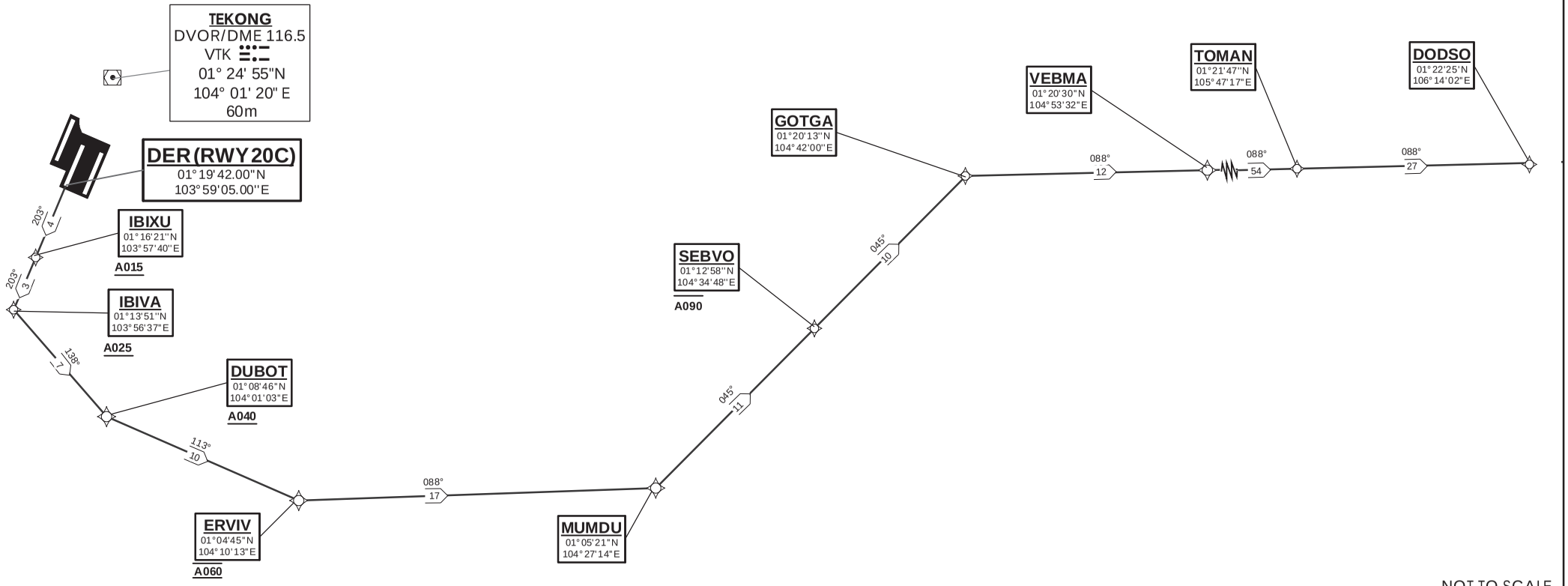
ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM from TEKONG DVOR



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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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 NOT AVAILABLE FOR CIVIL USE 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

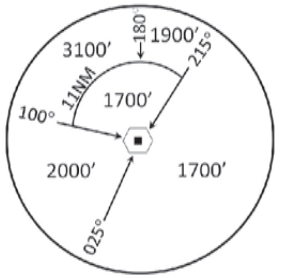
NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.5 - FOR RWY 02R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

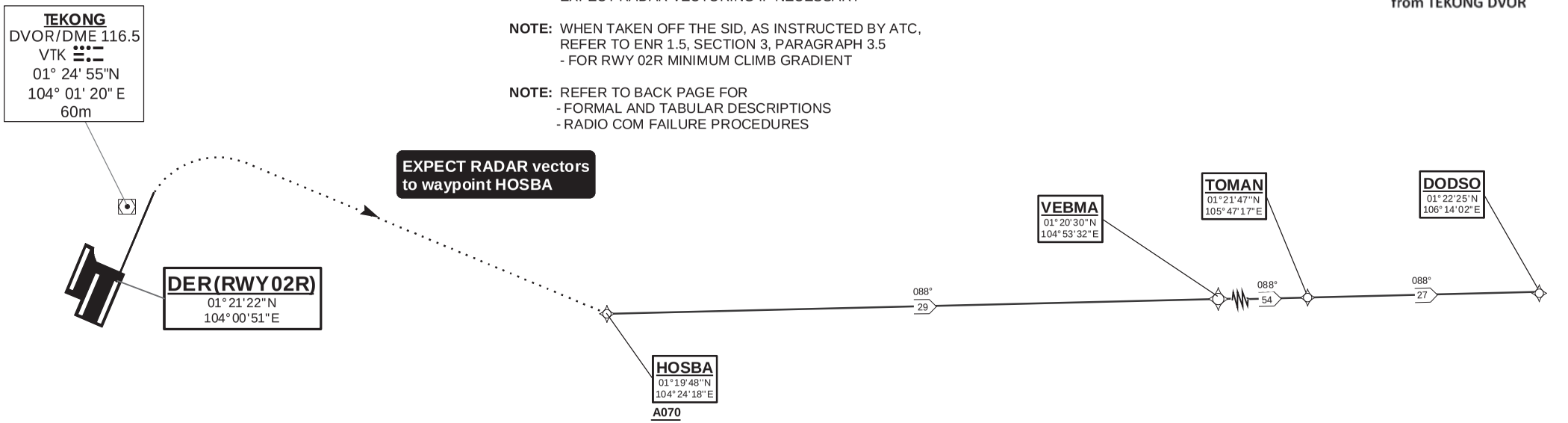
ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM
from TEKONG DVOR



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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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 NOT AVAILABLE FOR CIVIL USE 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.

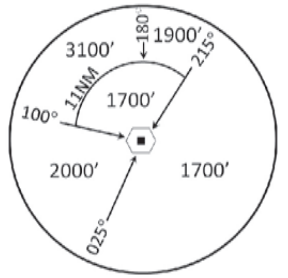
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 9% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

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

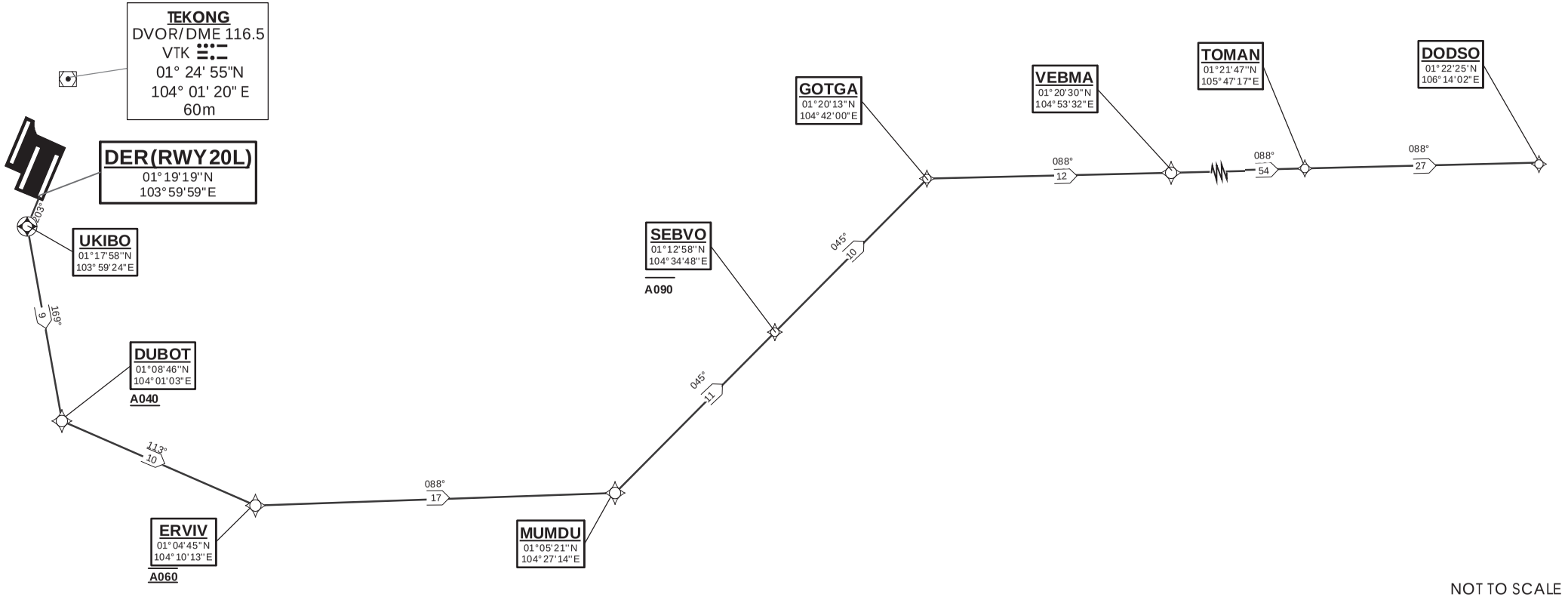
ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM from TEKONG DVOR



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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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 NOT AVAILABLE FOR CIVIL USE 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

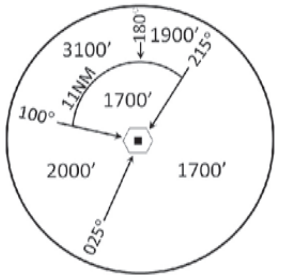
NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A] - FOR RWY 02L MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

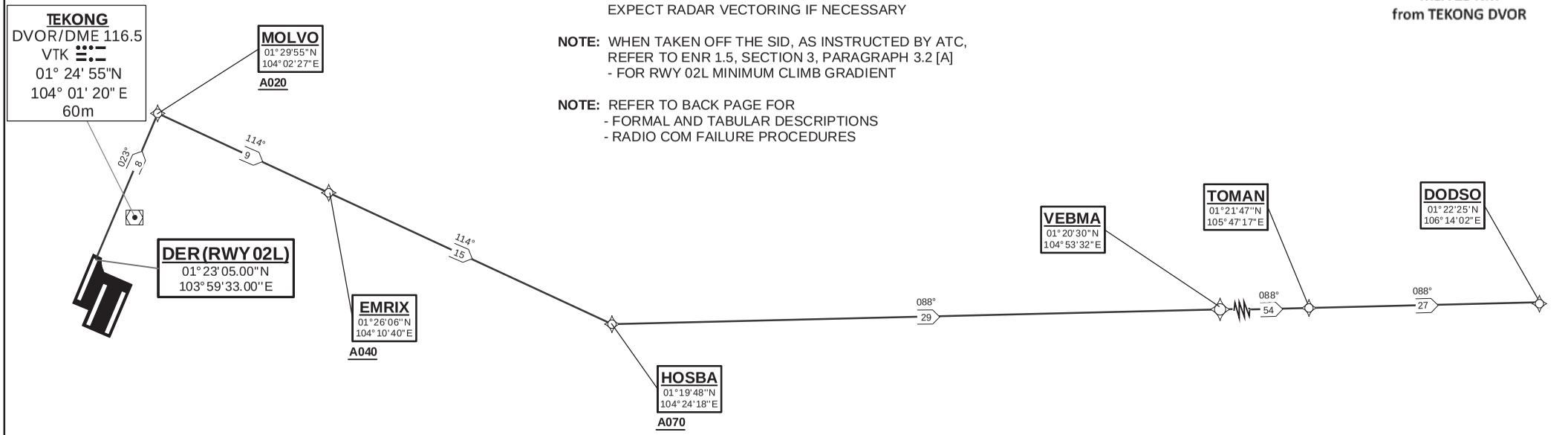
ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM from TEKONG DVOR



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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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 NOT AVAILABLE FOR CIVIL USE 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.

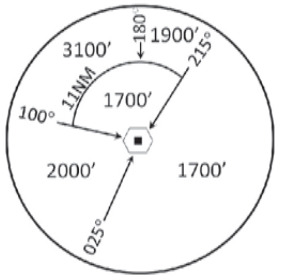
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 6% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

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

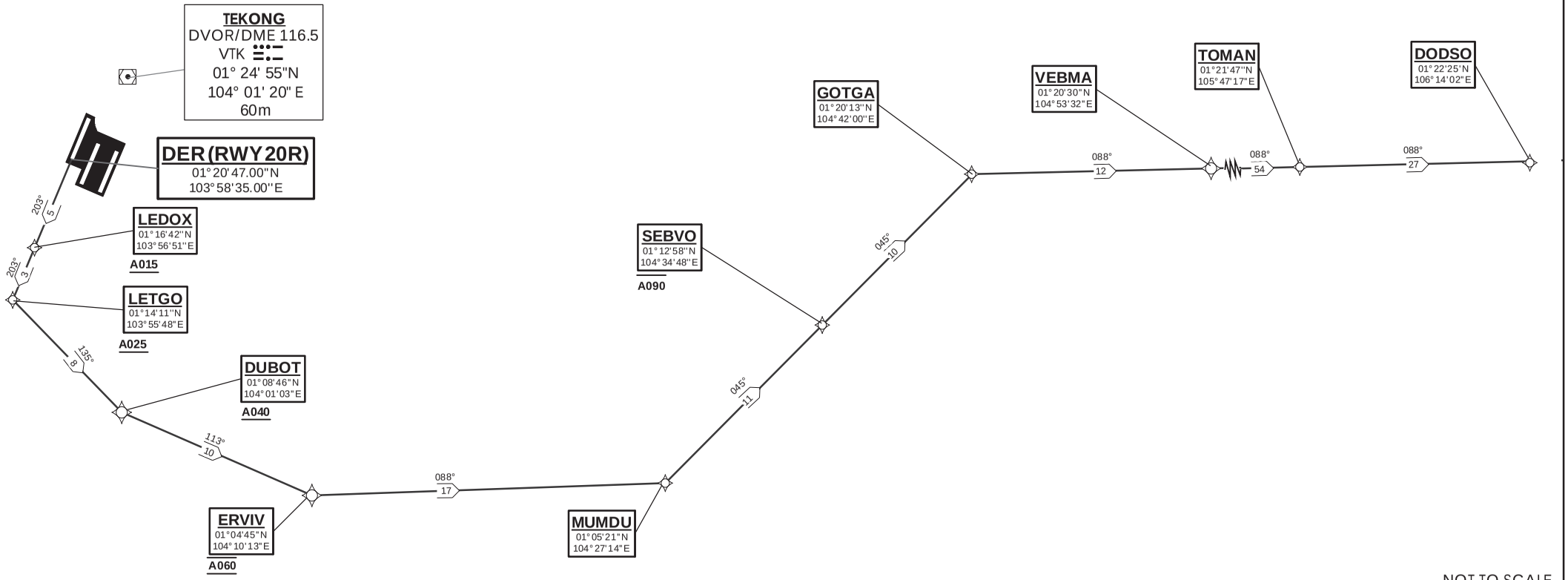
ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM from TEKONG DVOR



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

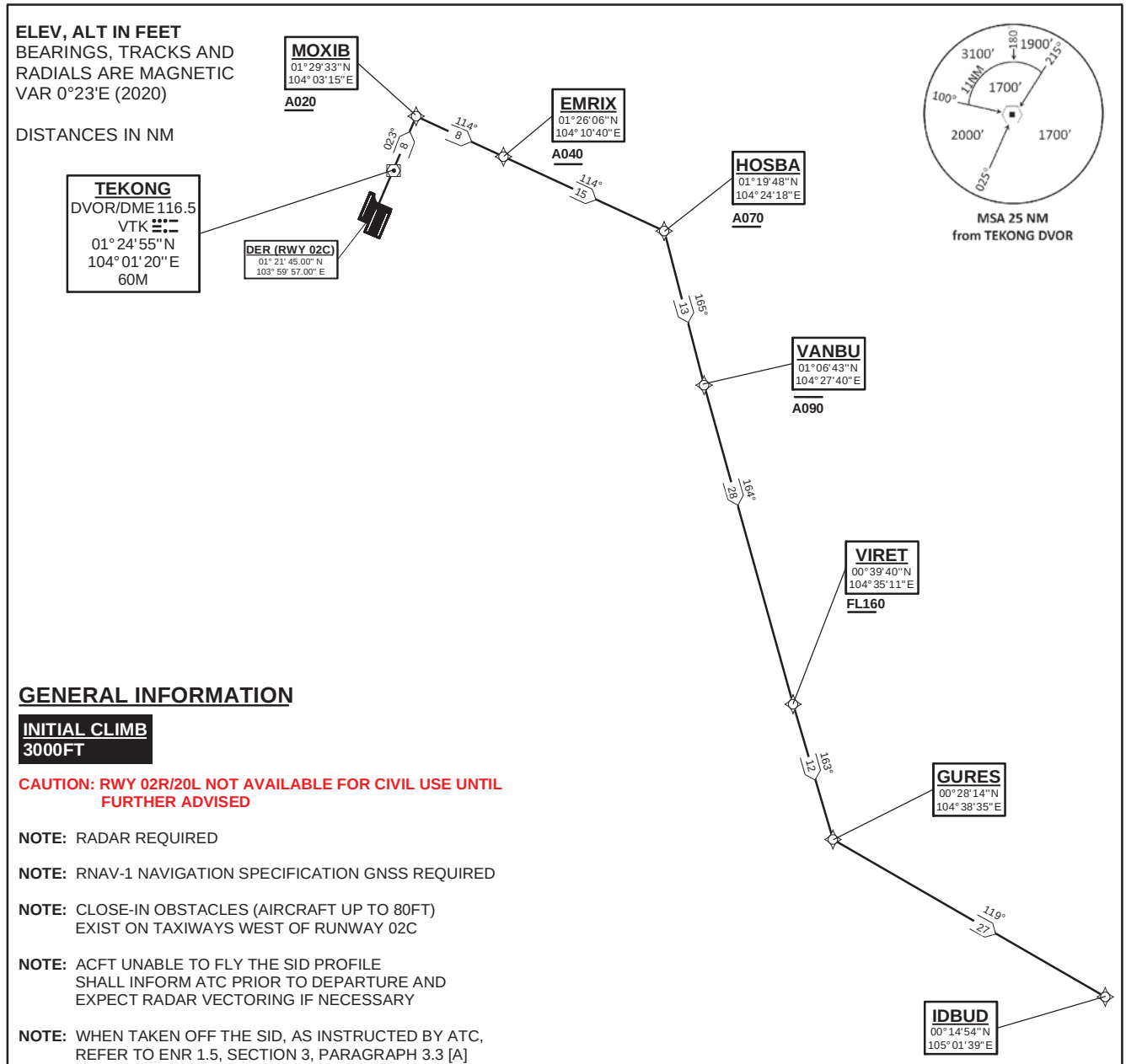
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C
IDBUD DEPARTURES
IDBUD 1A

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 NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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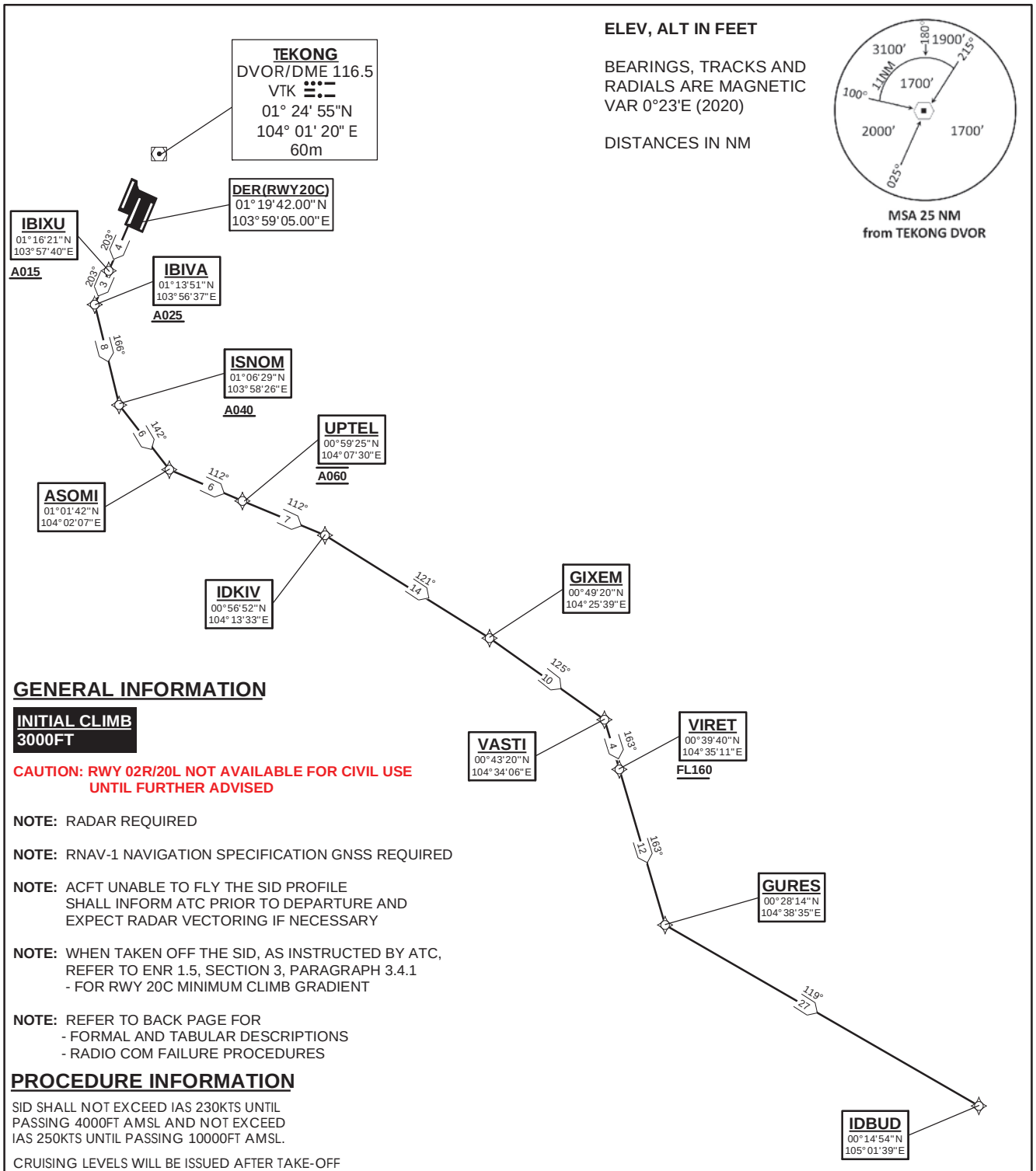
STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

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 20C
IDBUD DEPARTURES
IDBUD 1B



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 NOT AVAILABLE FOR CIVIL USE 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

NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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 UPTEL at 6000ft.	UPTEL [@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	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	UPTEL	-	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	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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	134.4

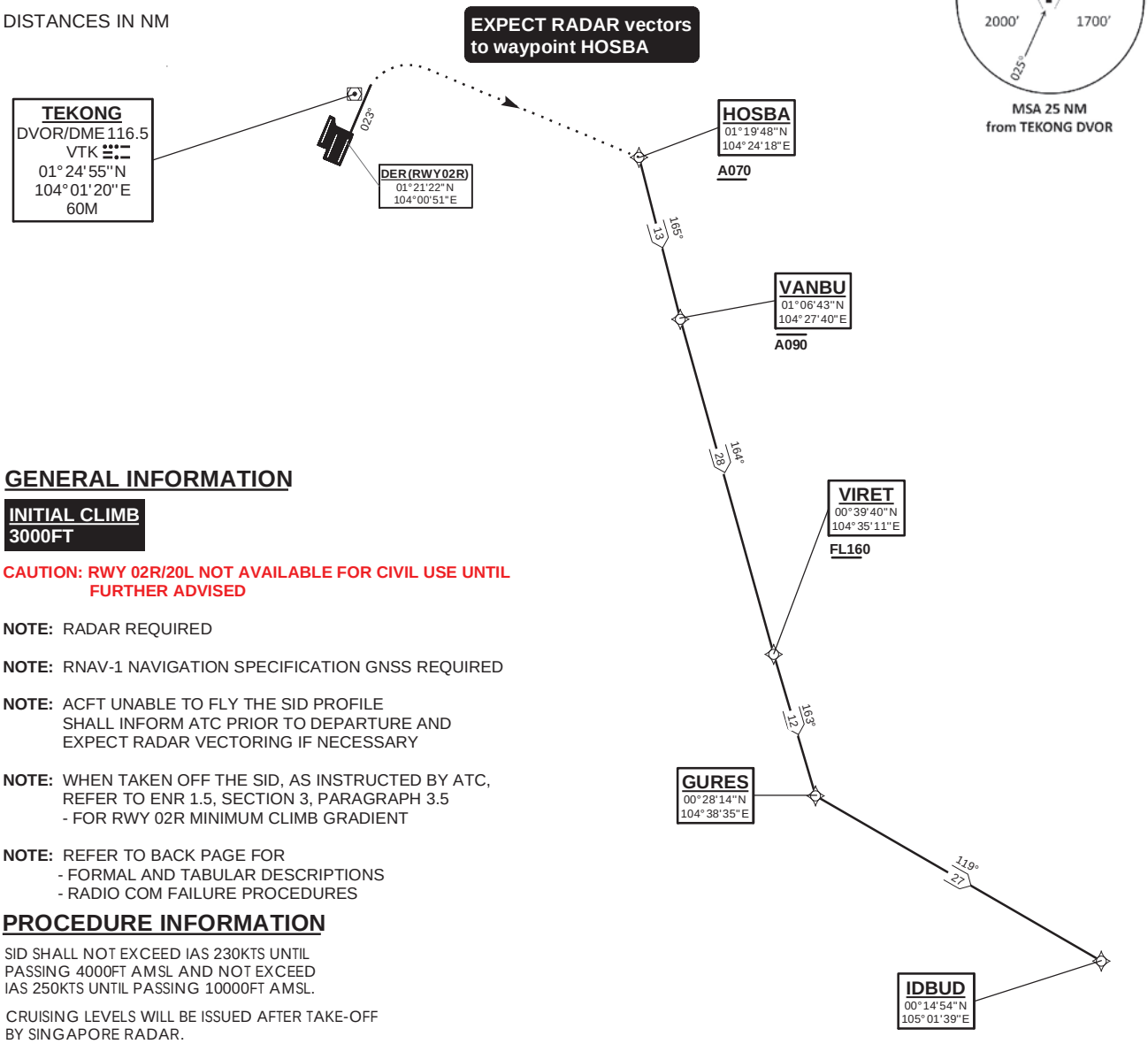
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02R
IDBUD DEPARTURES (RADAR)
IDBUD 1C

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 NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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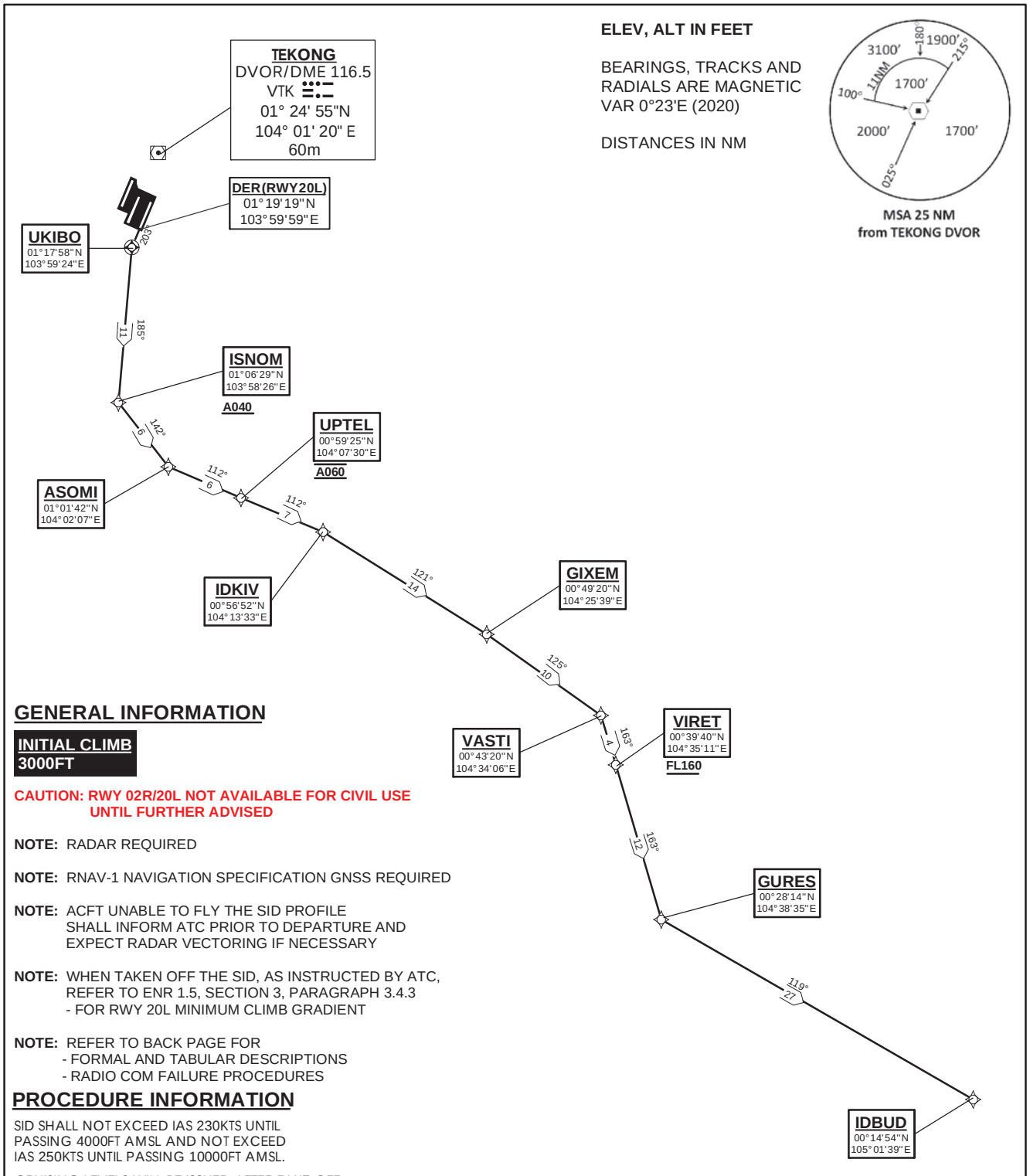
STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

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 20L
IDBUD DEPARTURES
IDBUD 1D



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 NOT AVAILABLE FOR CIVIL USE 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

NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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 UPTEL at 6000ft.	UPTEL [@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	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	UPTEL	-	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	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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

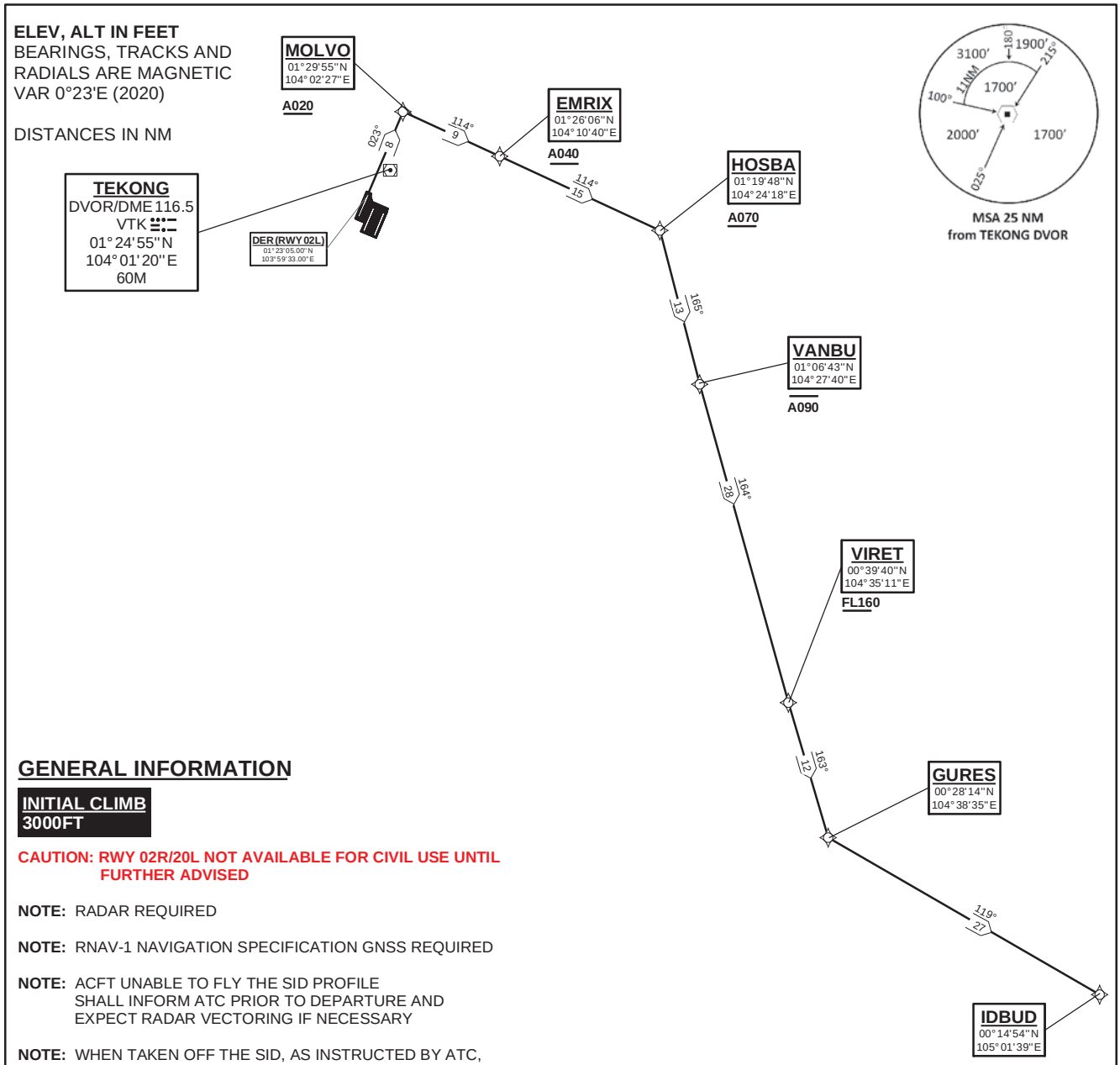
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02L
IDBUD DEPARTURES
IDBUD 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 NOT AVAILABLE FOR CIVIL USE 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

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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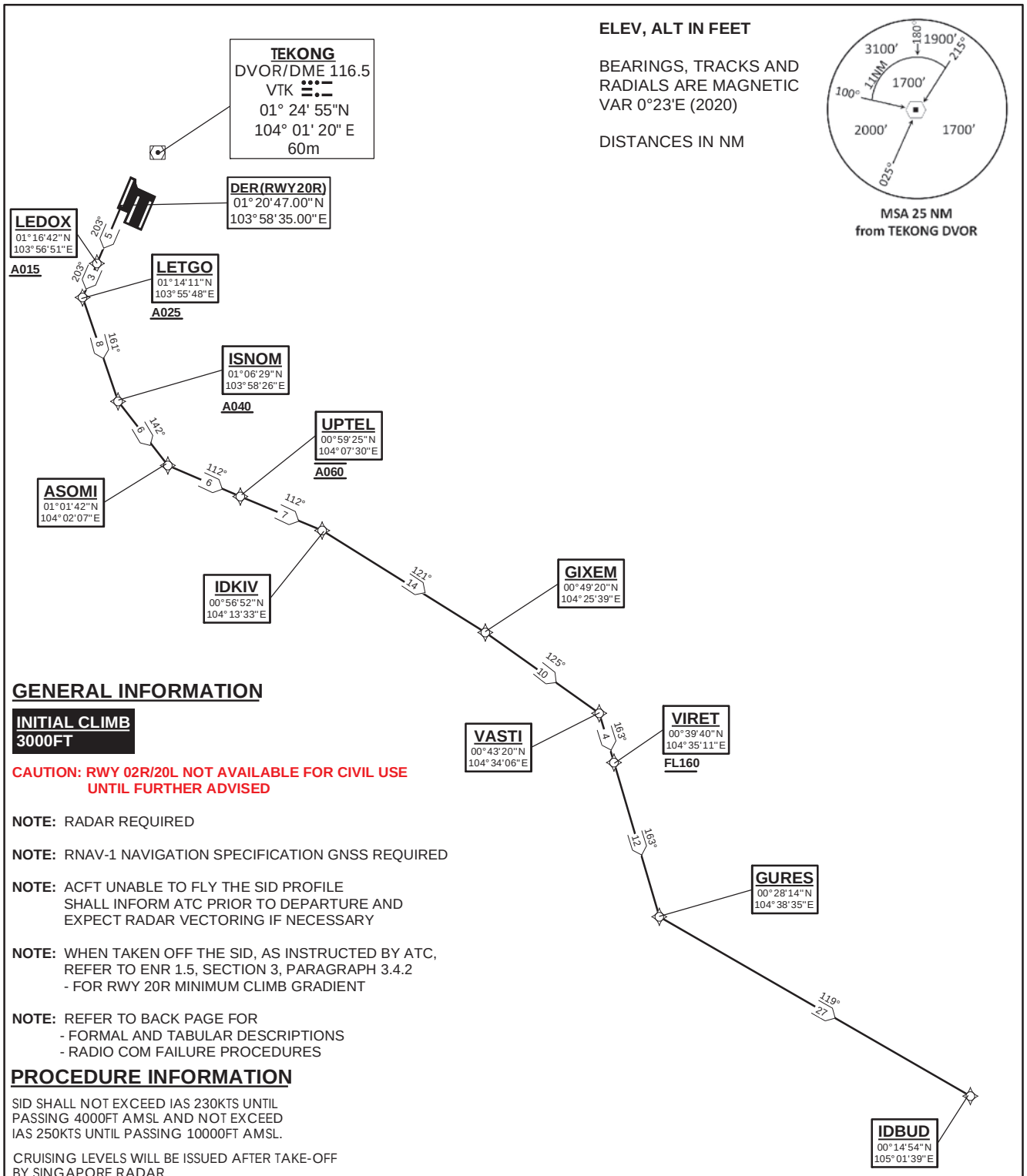
STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

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 20R
IDBUD DEPARTURES
IDBUD 1F



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 NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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 UPTEL at 6000ft.	UPTEL [@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	UPTEL	-	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	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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.4

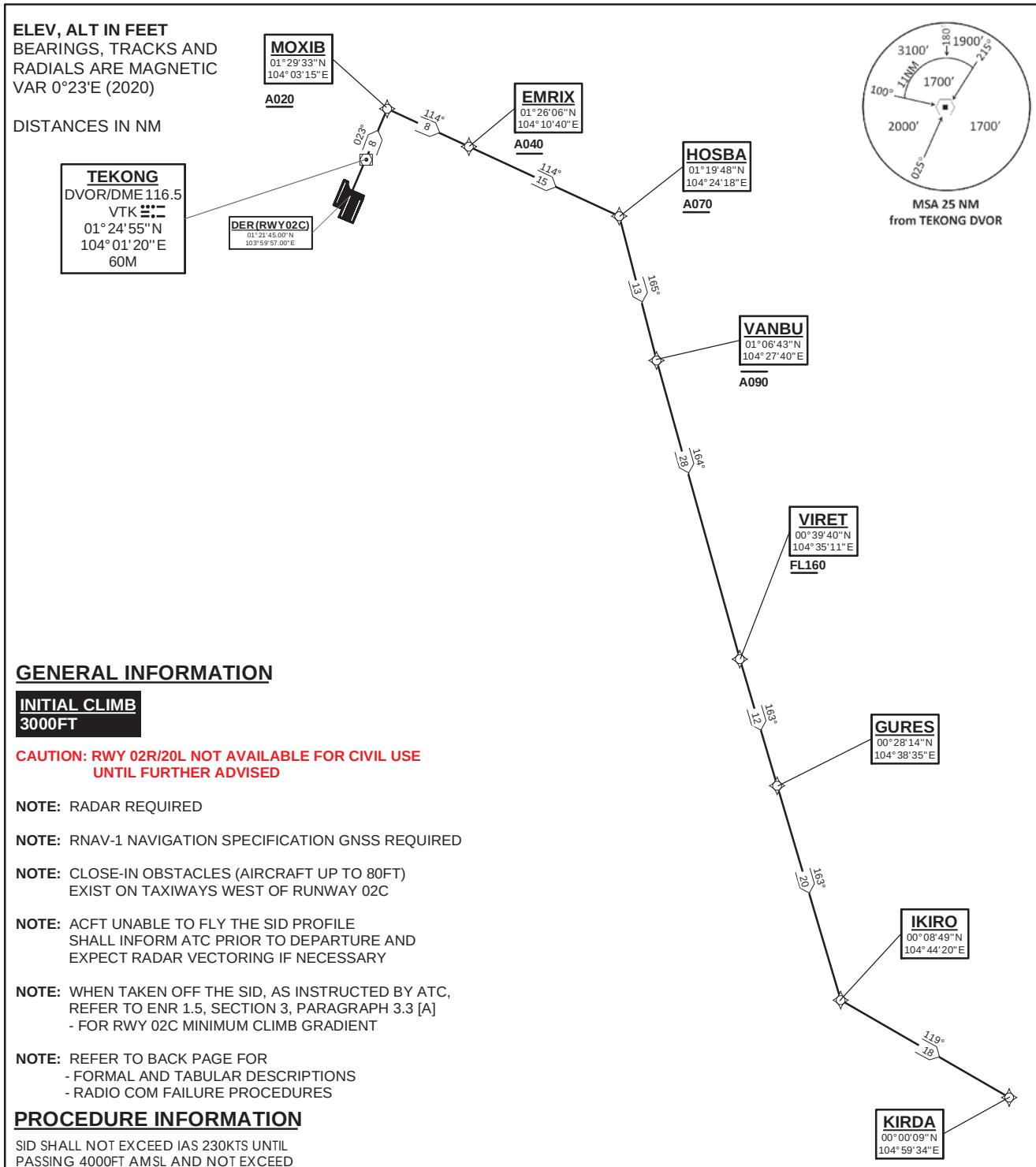
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C
KIRDA DEPARTURES
KIRDA 1A

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 NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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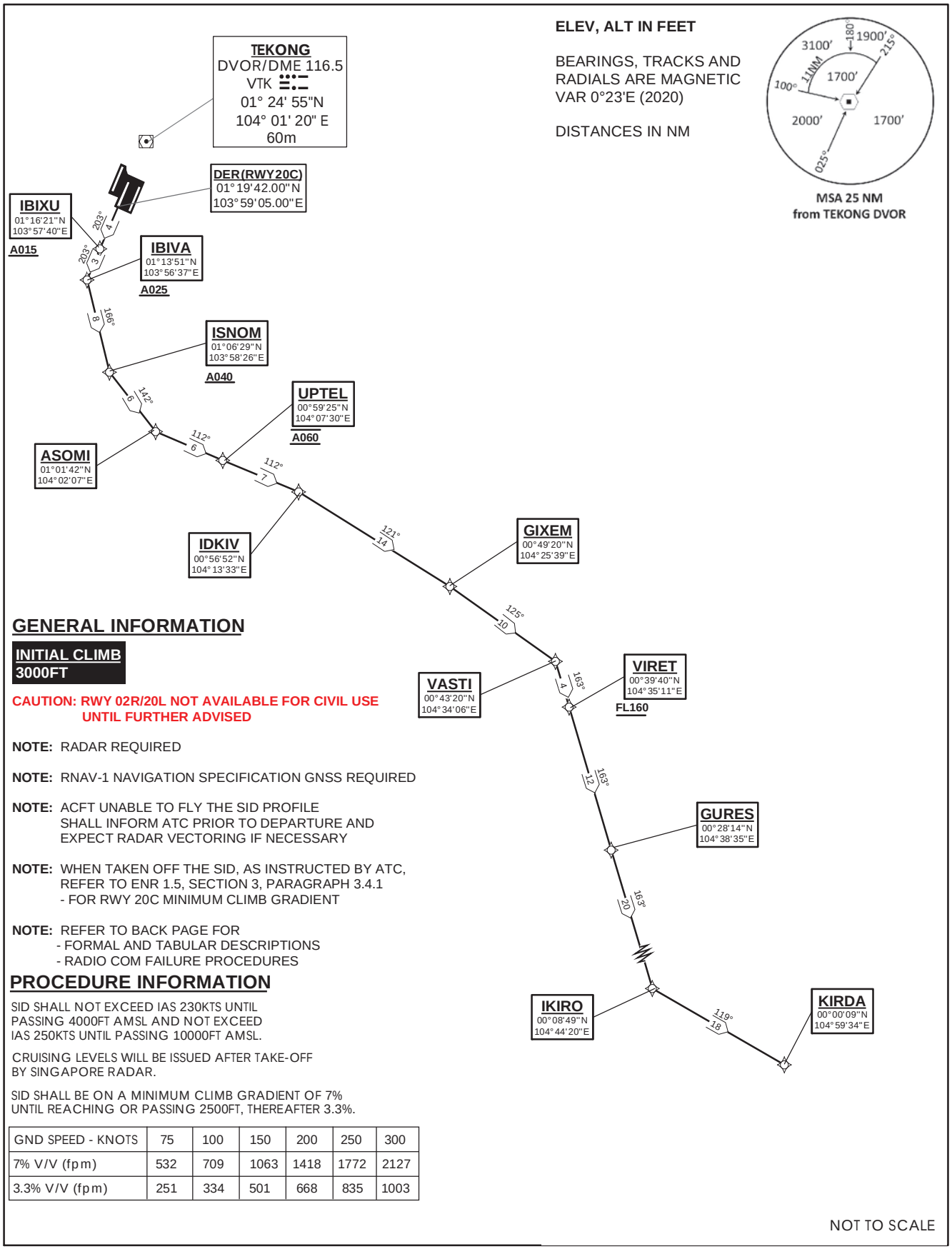
STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

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 20C
KIRDA DEPARTURES
KIRDA 1B



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 NOT AVAILABLE FOR CIVIL USE 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

NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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 UPTEL at 6000ft.	UPTEL [@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	UPTEL	-	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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	134.4

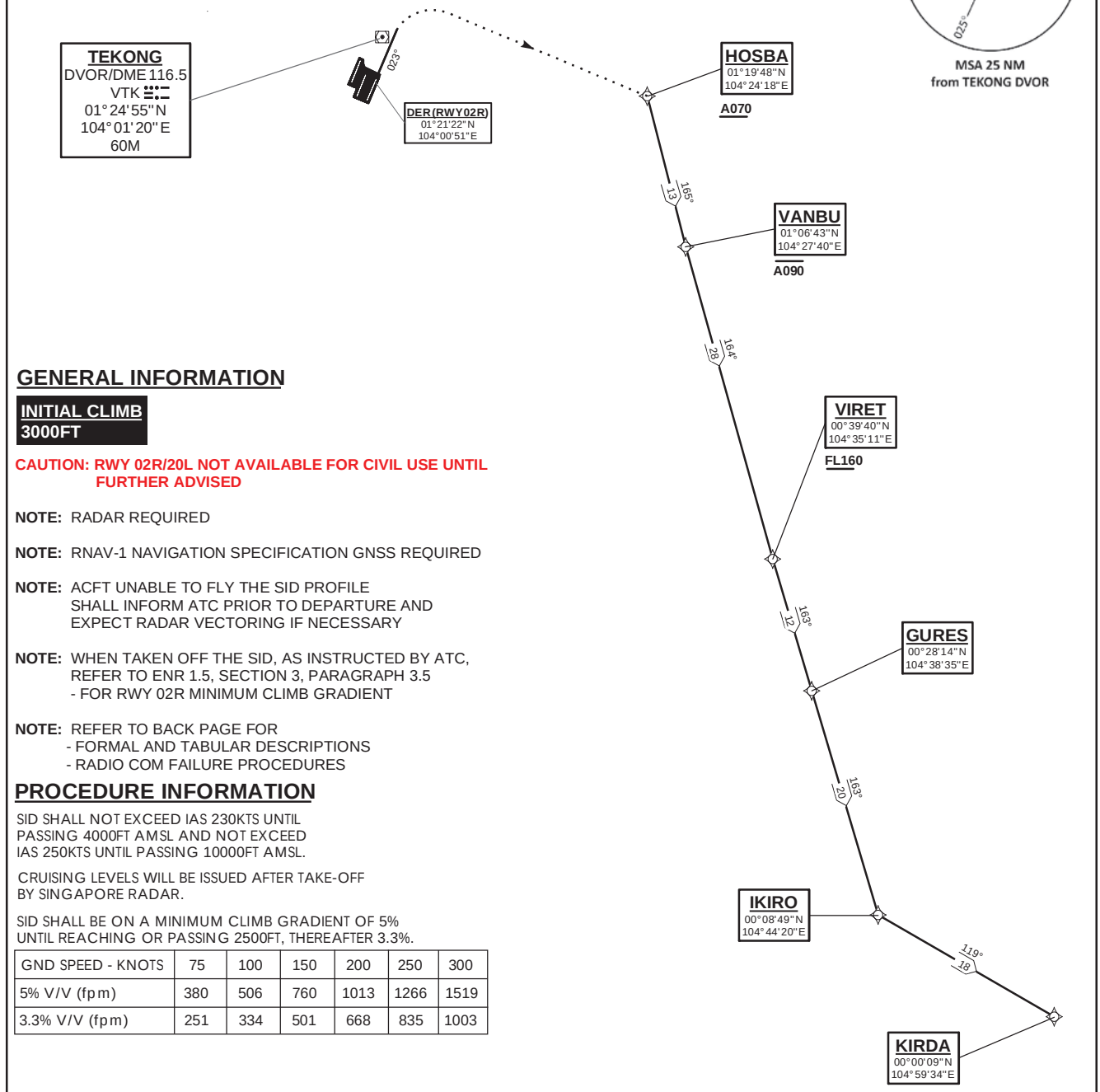
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02R
KIRDA DEPARTURES (RADAR)
KIRDA 1C

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 NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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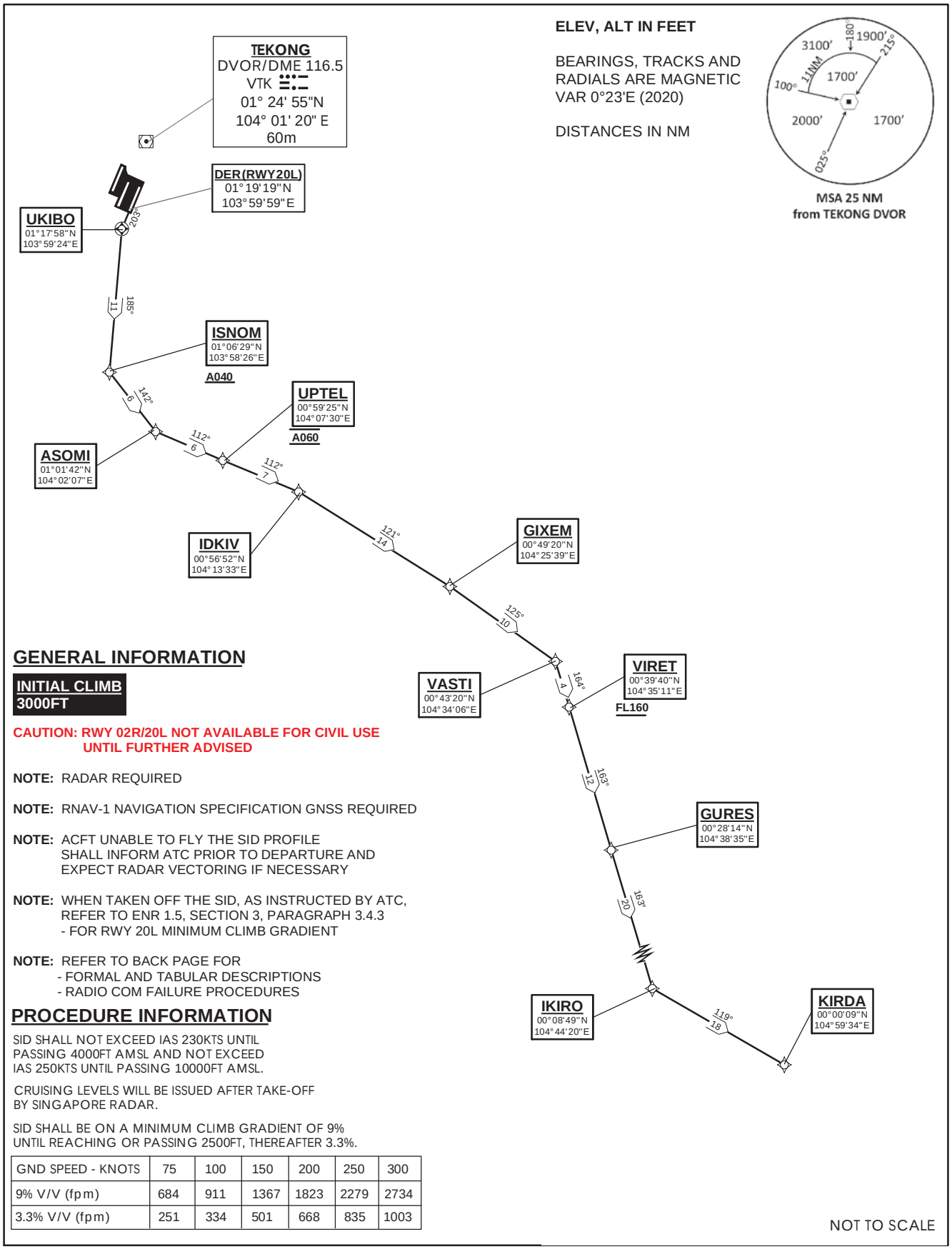
STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

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 20L
KIRDA DEPARTURES
KIRDA 1D



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 NOT AVAILABLE FOR CIVIL USE 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

NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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 UPTEL at 6000ft.	UPTEL [@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	UPTEL	-	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.

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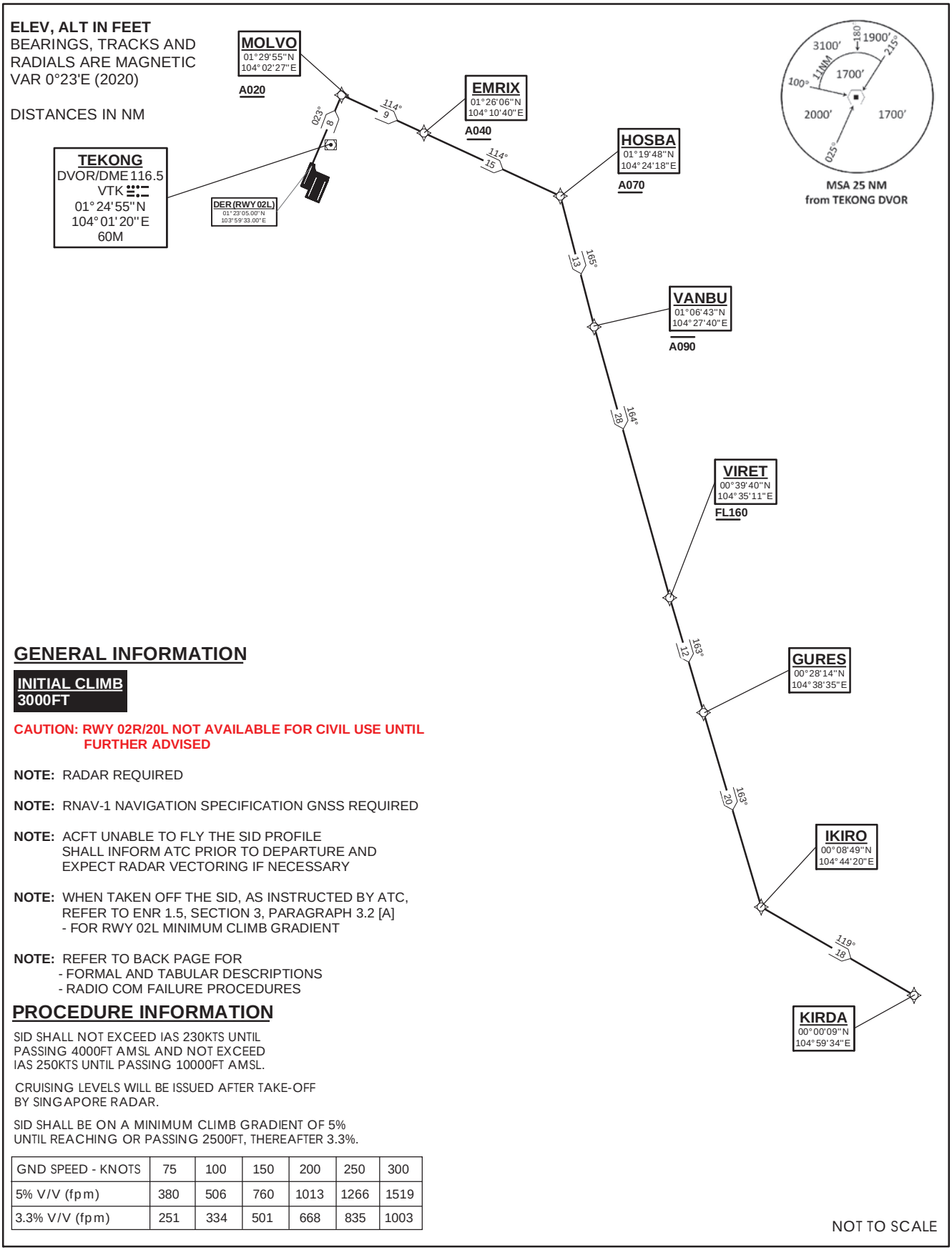
STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

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 02L
KIRDA DEPARTURES
KIRDA 1E



GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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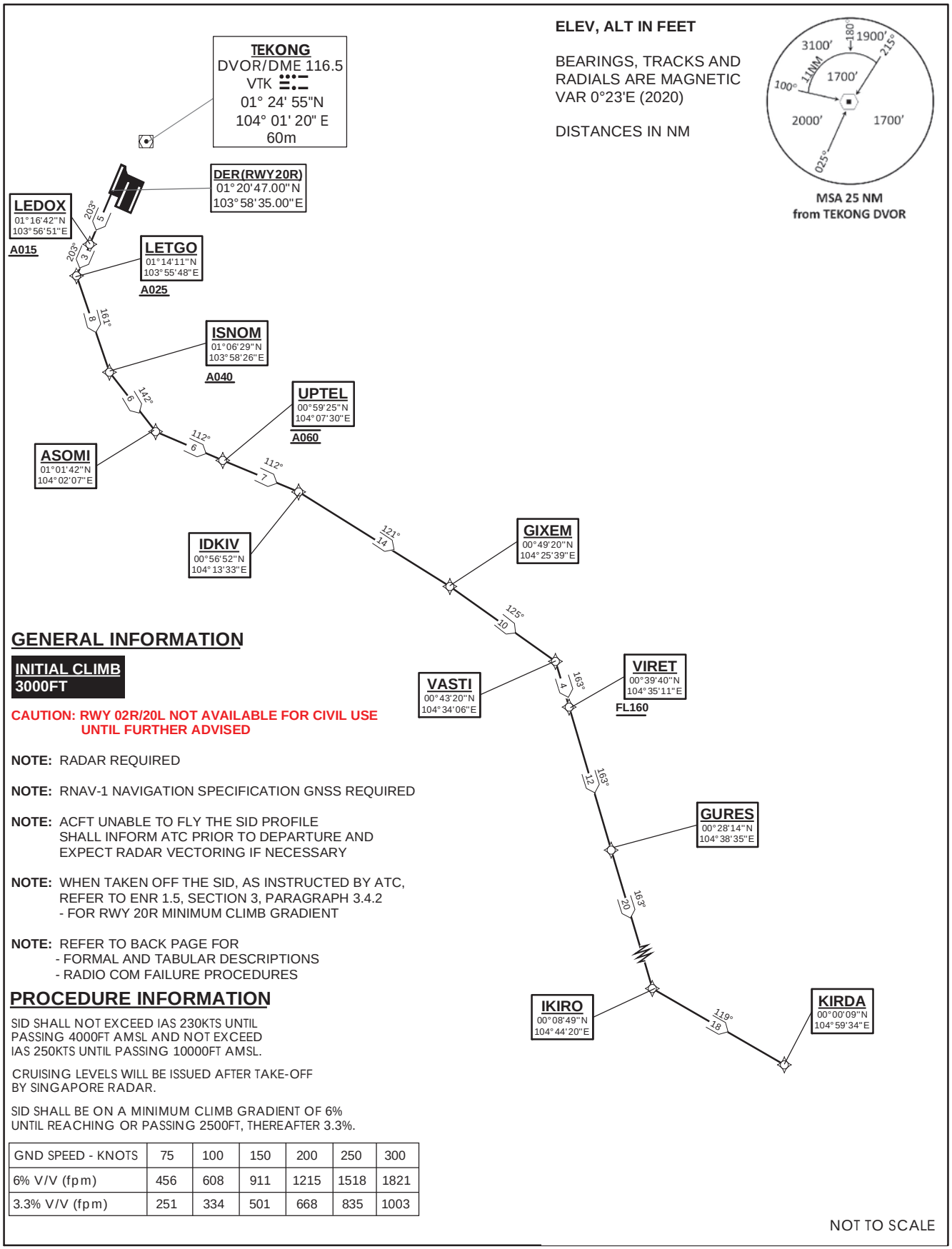
STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

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 20R
KIRDA DEPARTURES
KIRDA 1F



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 NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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 UPTEL at 6000ft.	UPTEL [@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	UPTEL	-	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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

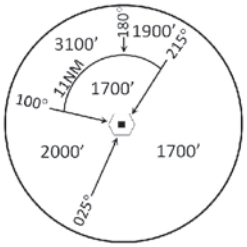
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

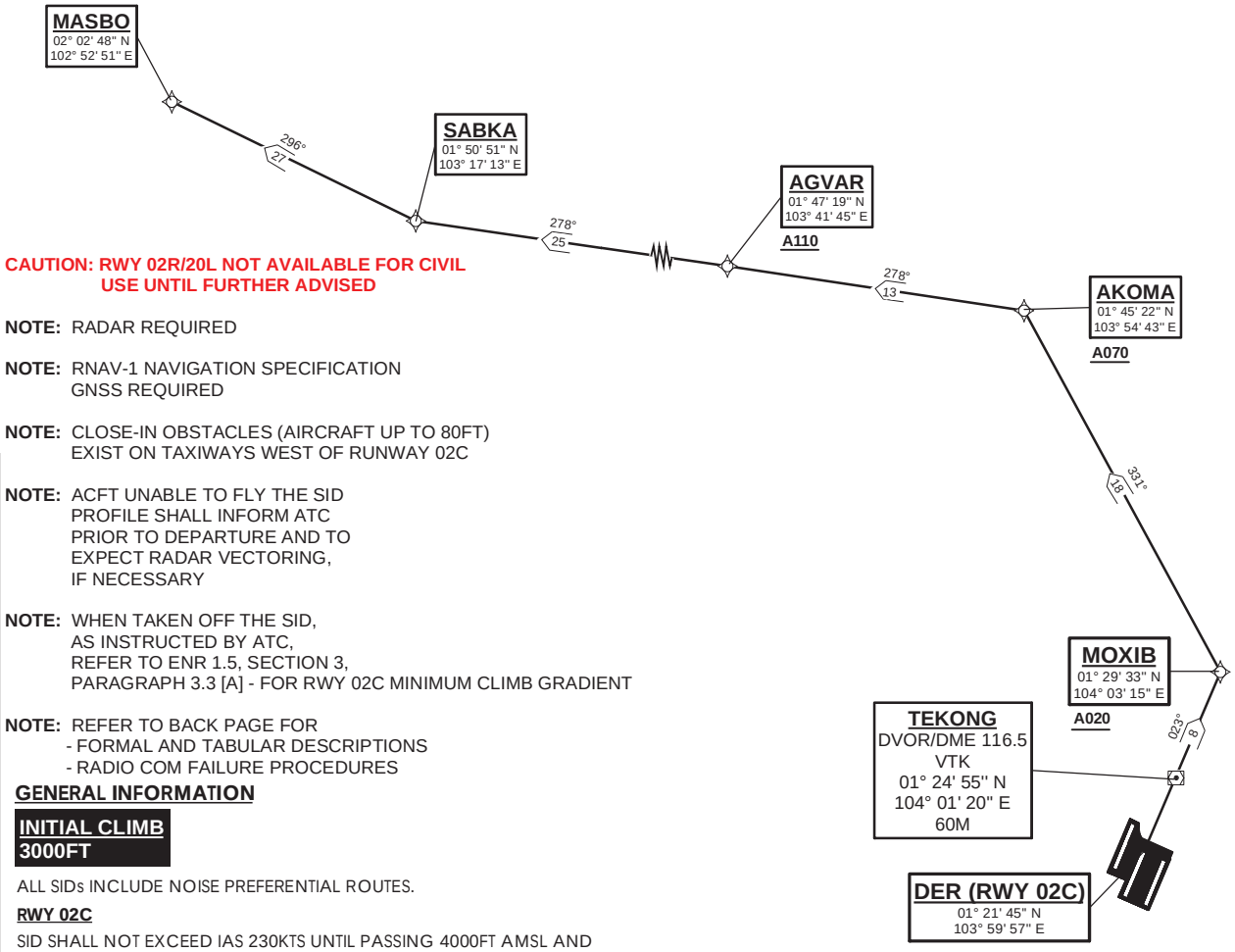
SINGAPORE/Singapore Changi
RWY 02C
MASBO DEPARTURES
MASBO 3A

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM
from TEKONG DVOR



CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

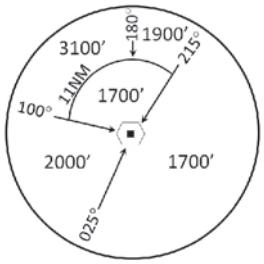
D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20C
MASBO DEPARTURES
MASBO 5B

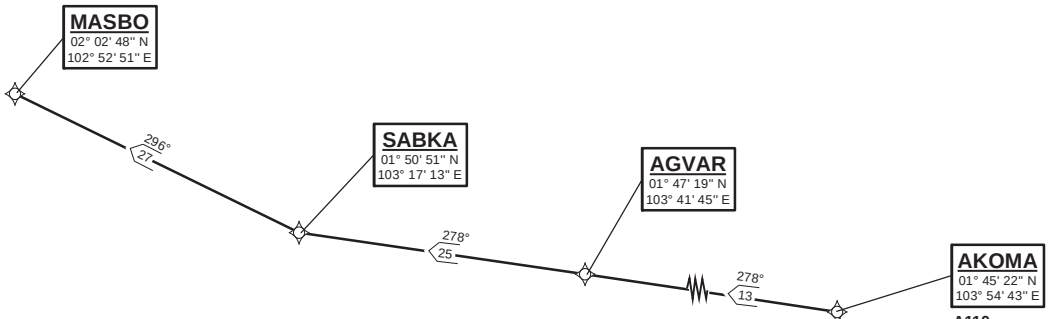
ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

DISTANCES IN NM

NOT TO SCALE



MSA 25 NM
from TEKONG DVOR



GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

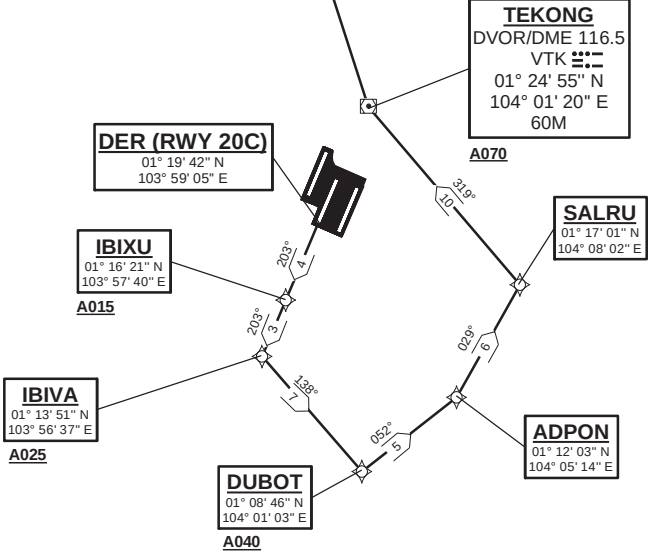
PROCEDURE INFORMATION

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



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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

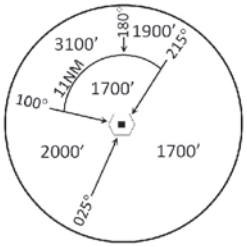
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

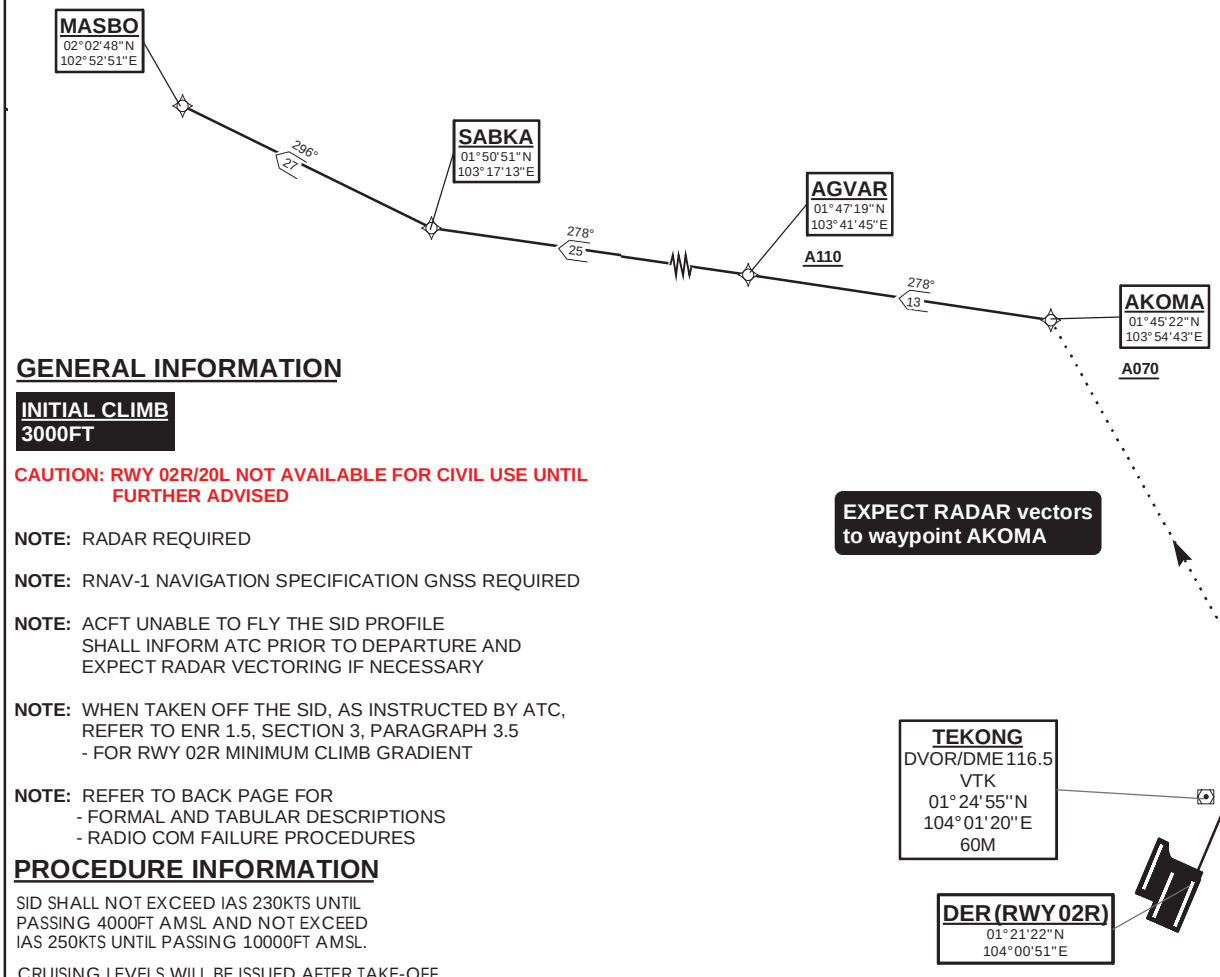
SINGAPORE/Singapore Changi
RWY 02R
MASBO DEPARTURES (RADAR)
MASBO 1C

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM
from TEKONG DVOR



GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

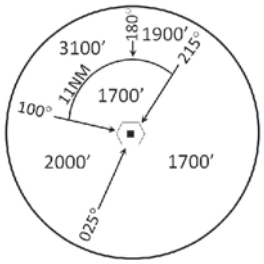
D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20L
MASBO DEPARTURES
MASBO 1D

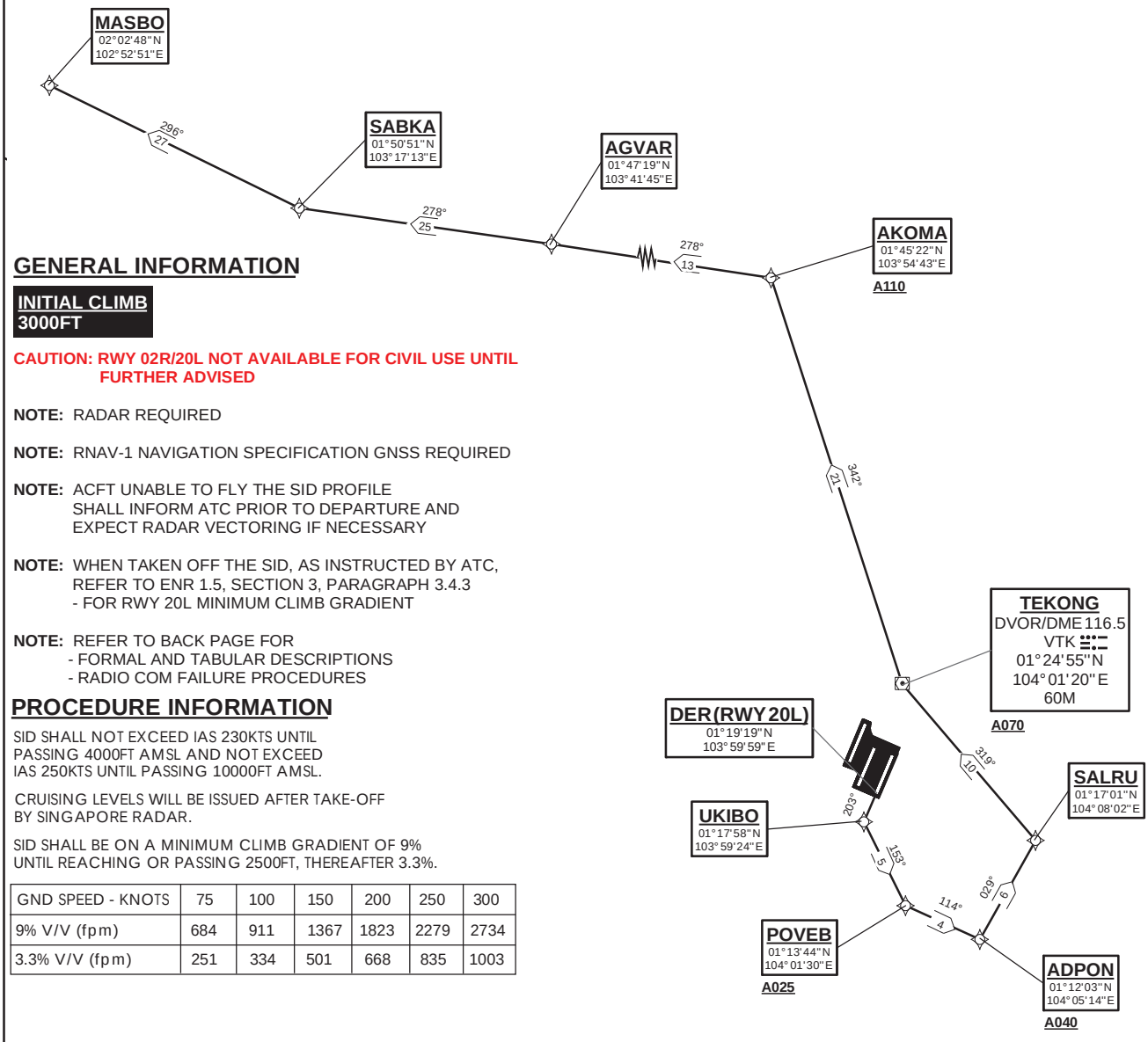
ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

DISTANCES IN NM

NOT TO SCALE



MSA 25 NM
from TEKONG DVOR



GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

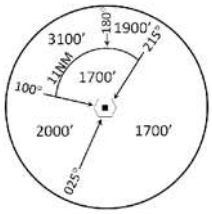
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

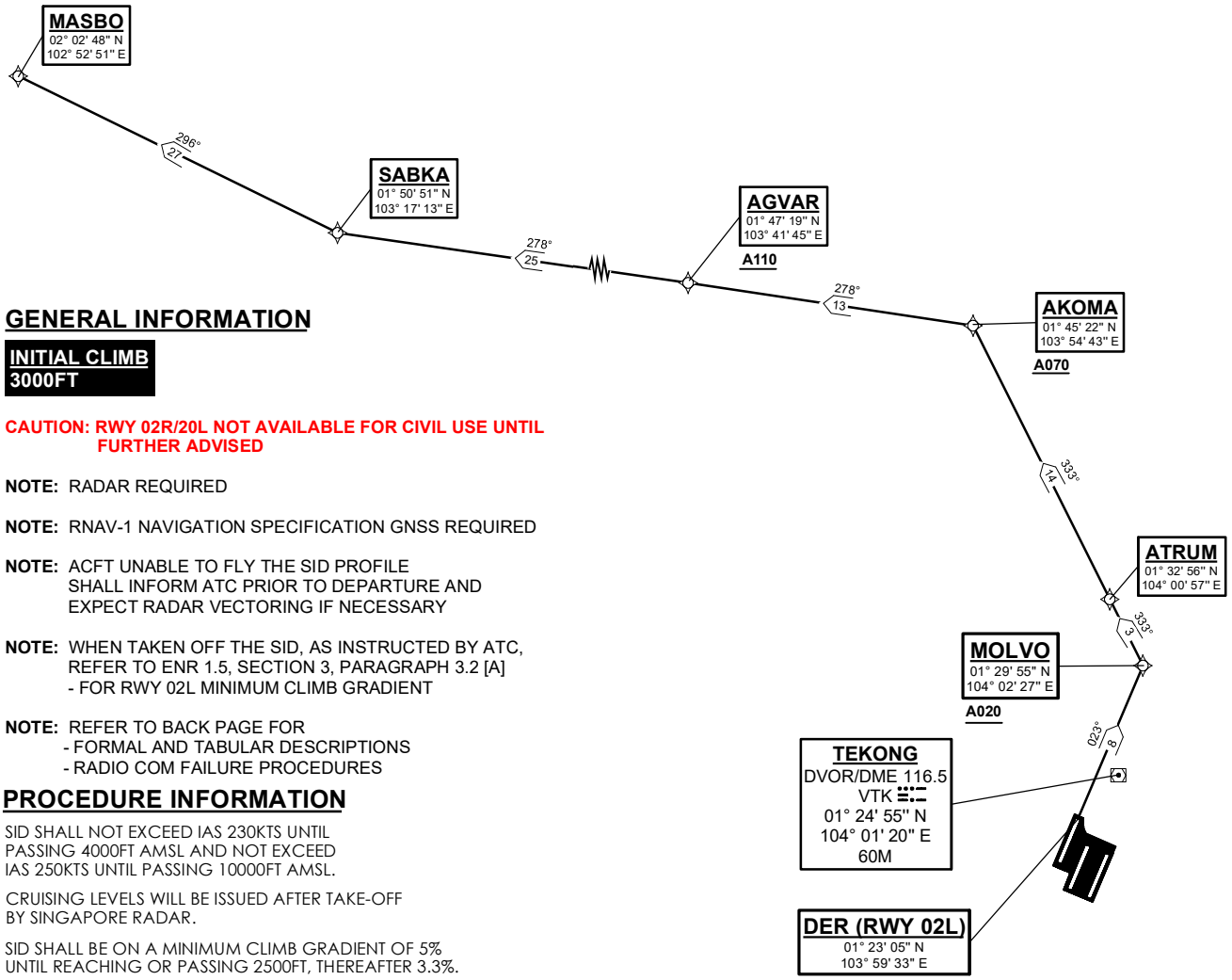
SINGAPORE/Singapore Changi
RWY 02L
MASBO DEPARTURES
MASBO 3E

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

DISTANCES IN NM



MSA 25 NM
from TEKONG DVOR



GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

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

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CHANGES : 1. Amended last waypoint AROSO to MASBO in Formal and Abbreviated Description on flip-page

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 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	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	**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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

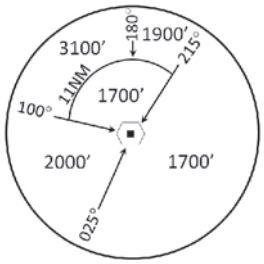
D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 20R
MASBO DEPARTURES
MASBO 5F

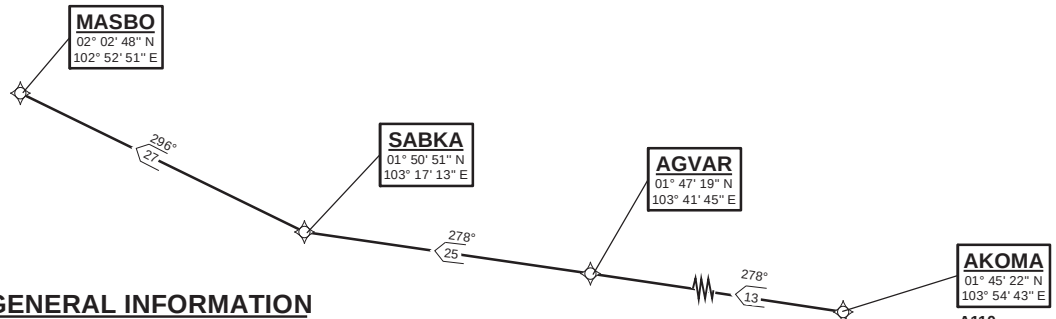
ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2022)

DISTANCES IN NM

NOT TO SCALE



MSA 25 NM
from TEKONG DVOR



GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

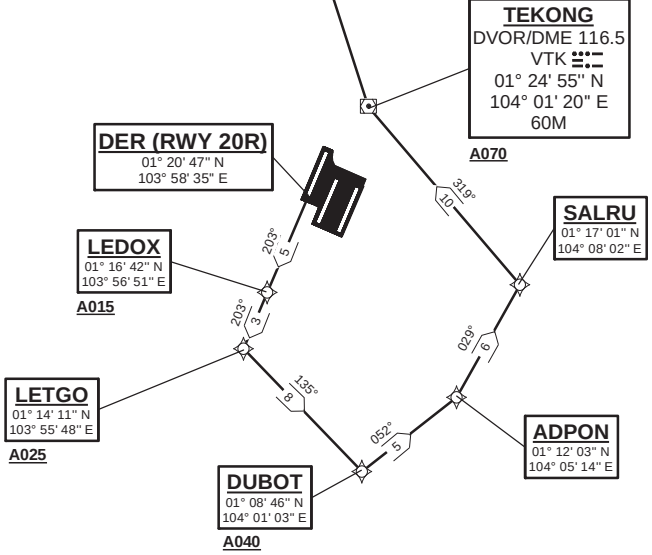
PROCEDURE INFORMATION

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



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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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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

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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.

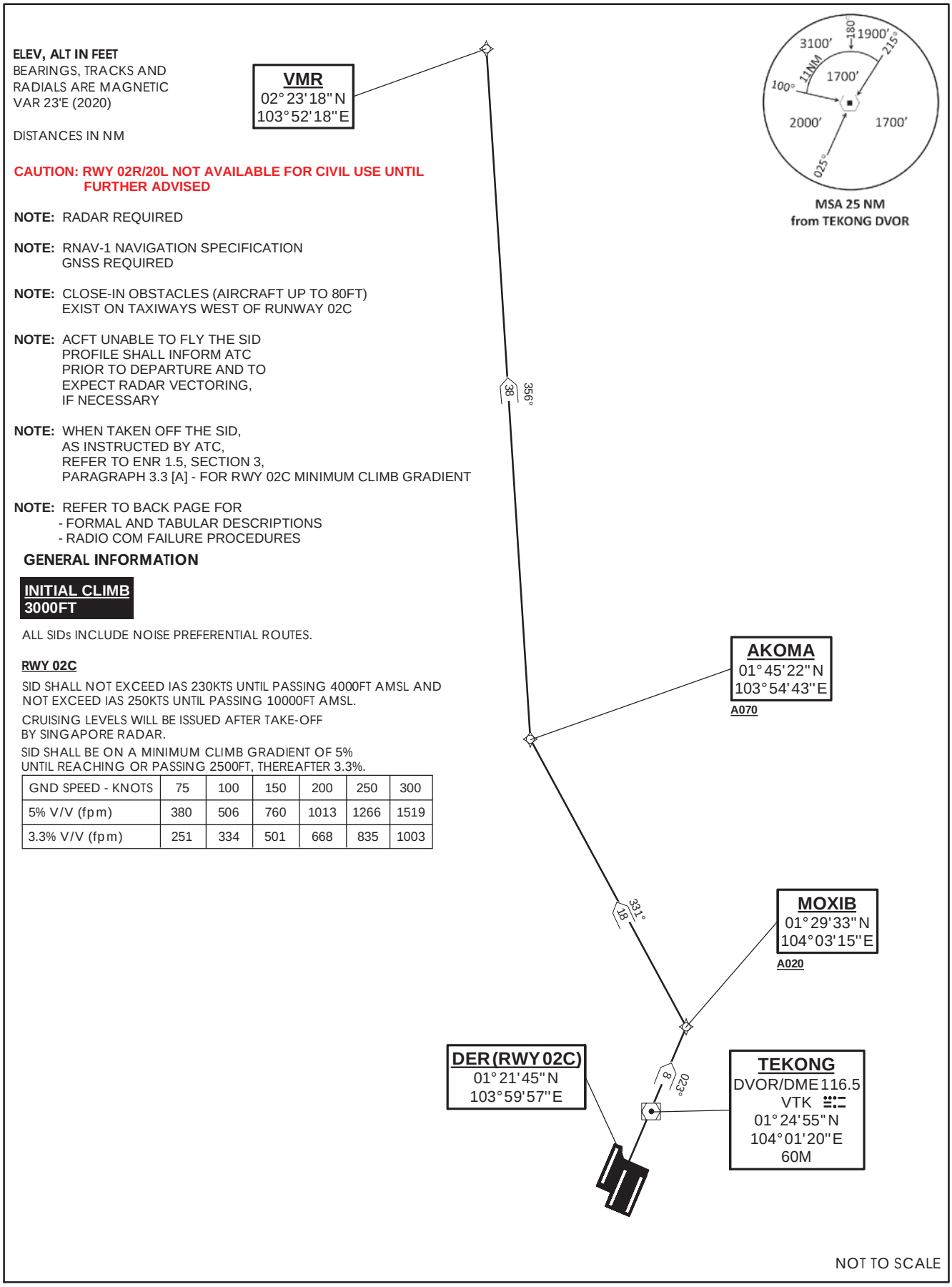
RWY 02C

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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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 NOT AVAILABLE FOR CIVIL USE 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

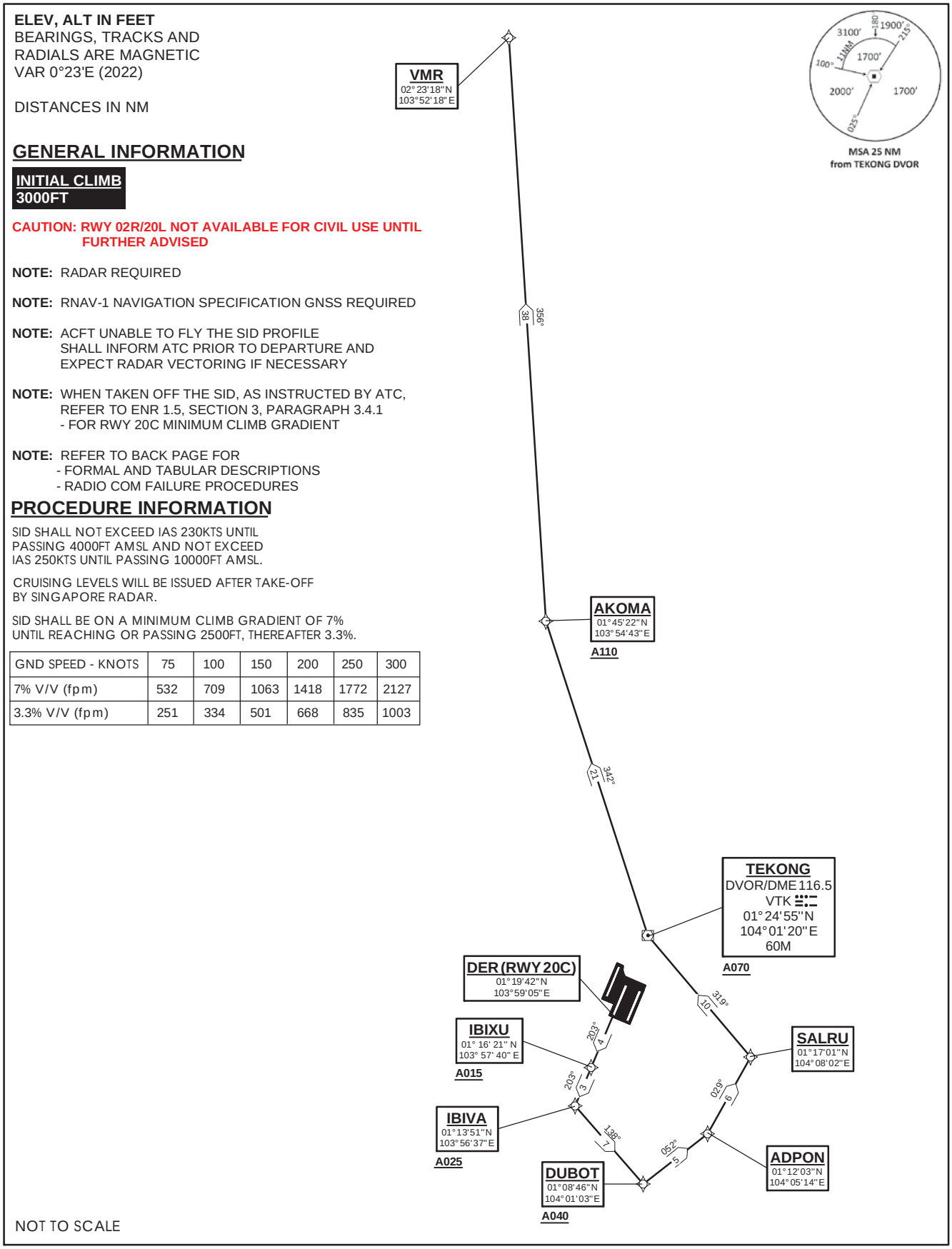
PROCEDURE INFORMATION

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



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.8

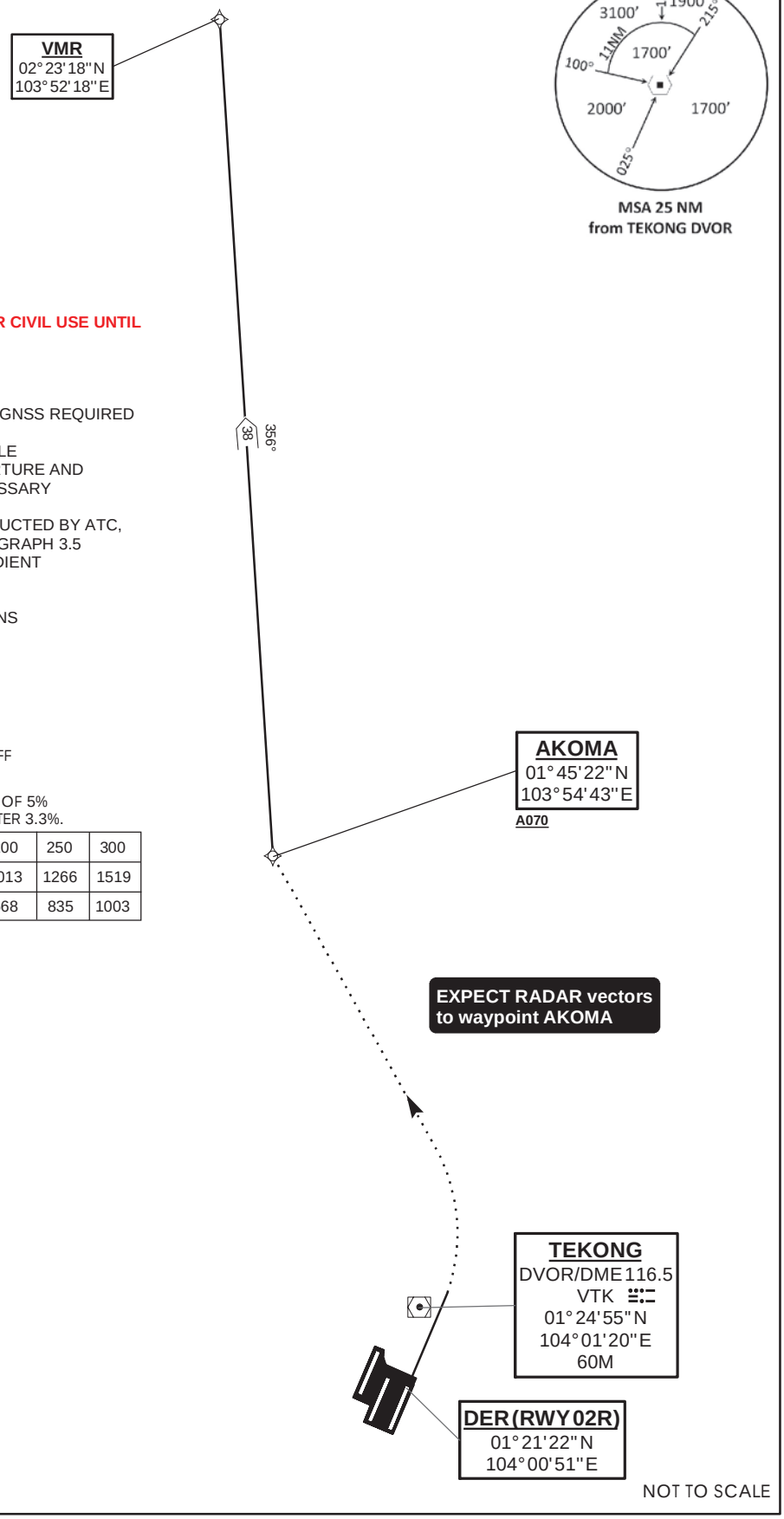
TRANSITION ALTITUDE
11 000ft

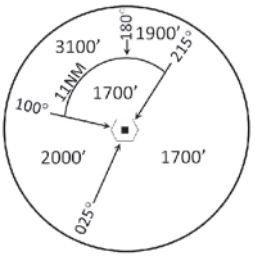
D-ATIS AP ID-WSSS
128.6

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





MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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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 NOT AVAILABLE FOR CIVIL USE 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

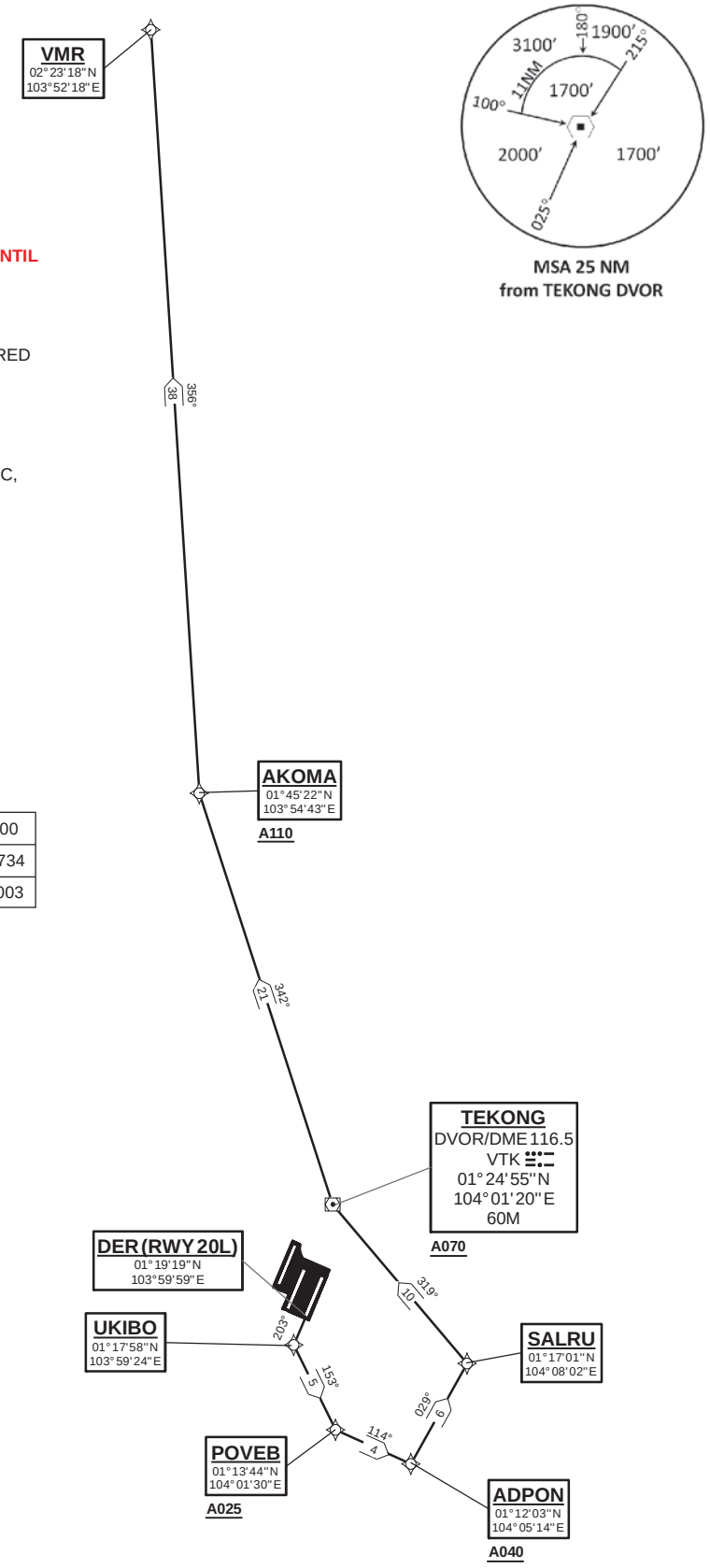
PROCEDURE INFORMATION

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



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.8

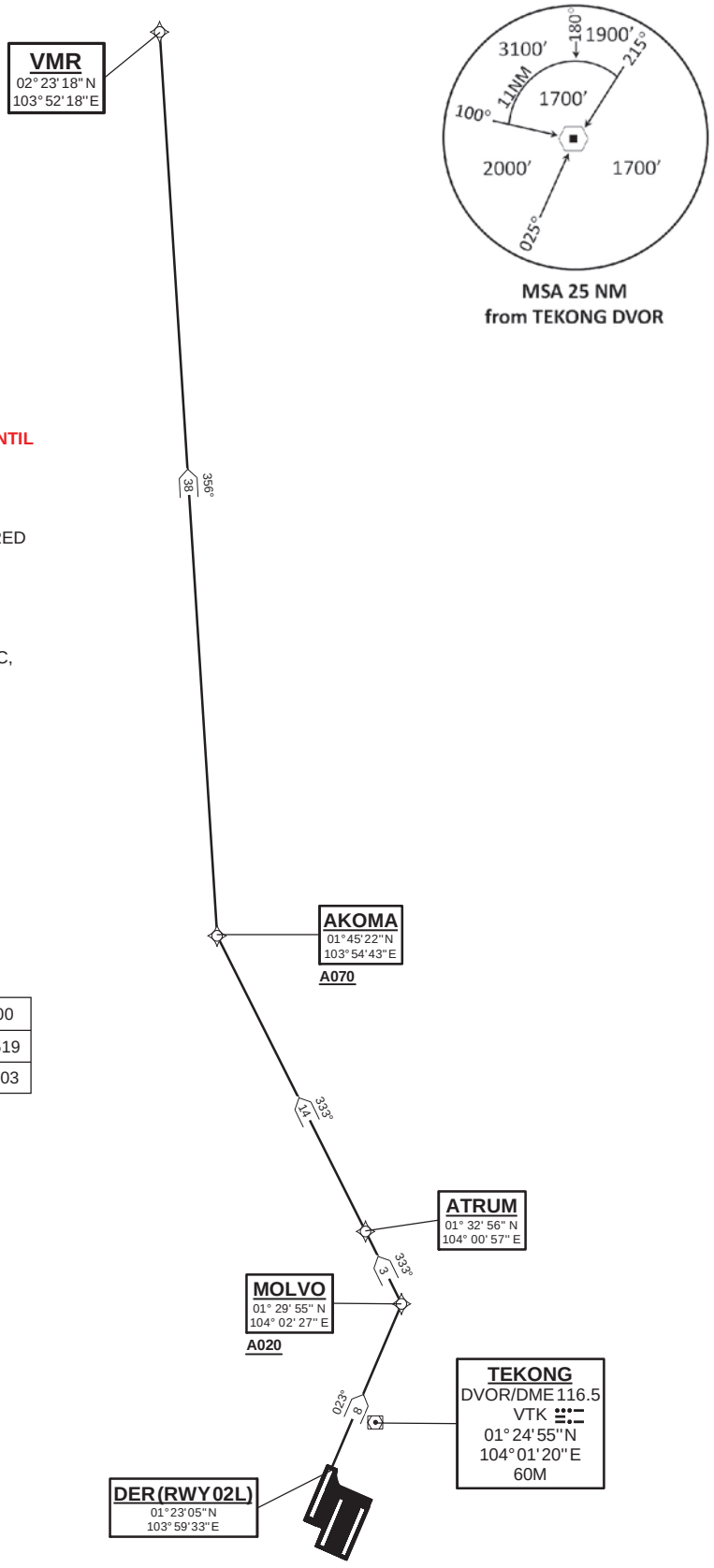
TRANSITION ALTITUDE
11 000ft

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



GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.8

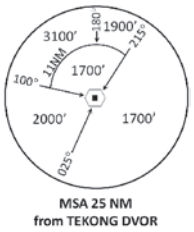
TRANSITION ALTITUDE
11 000ft

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

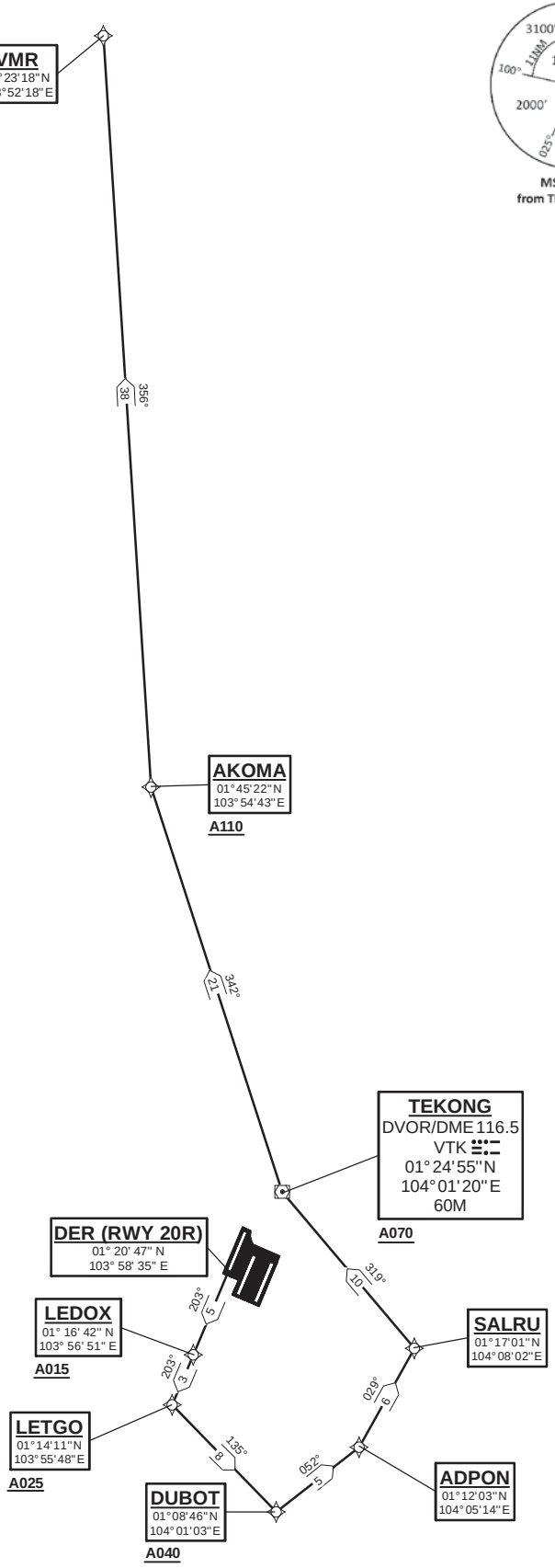
PROCEDURE INFORMATION

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

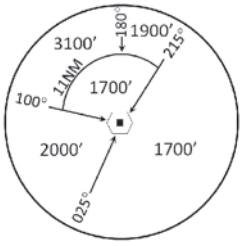
D-ATIS AP ID-WSSS
128.6

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

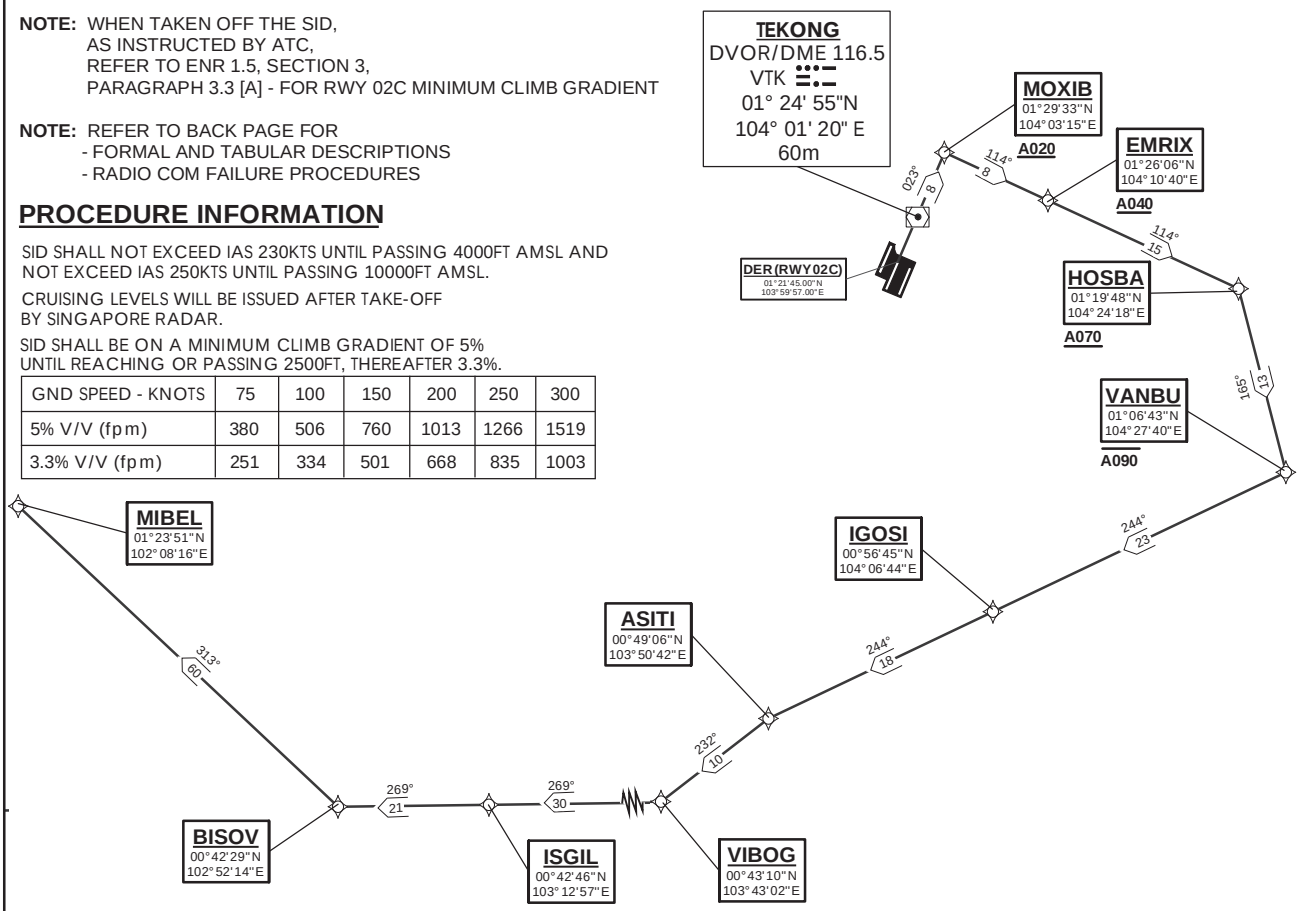
PROCEDURE INFORMATION

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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(232.4)	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.

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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 NOT AVAILABLE FOR CIVIL USE 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

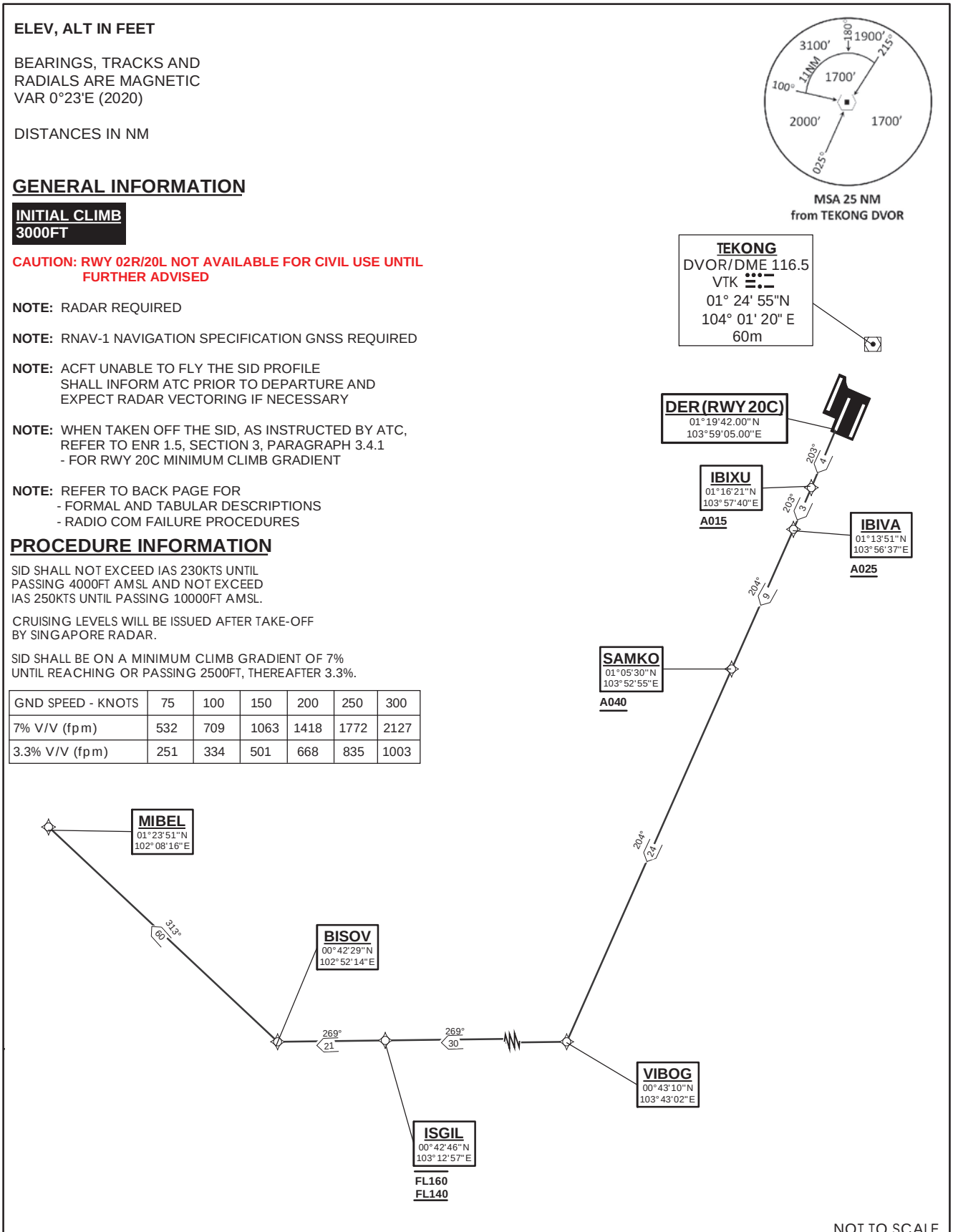
SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

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

MSA 25 NM
from TEKONG DVOR



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

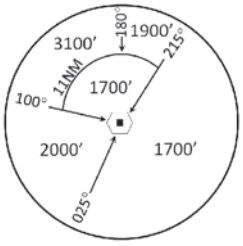
D-ATIS AP ID-WSSS
128.6

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 NOT AVAILABLE FOR CIVIL USE 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

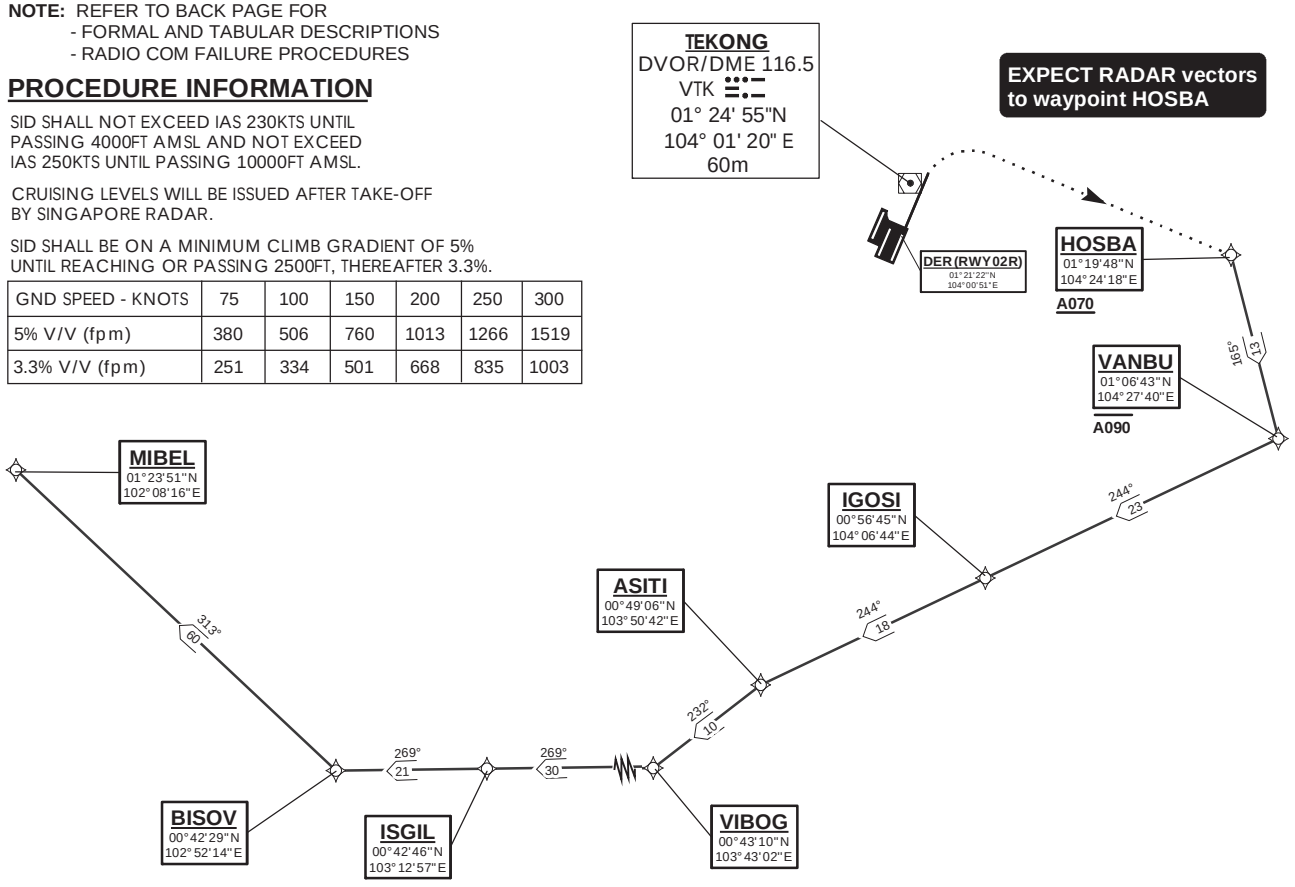
PROCEDURE INFORMATION

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

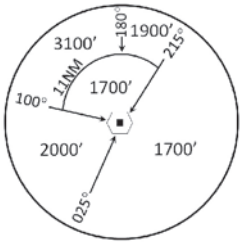
D-ATIS AP ID-WSSS
128.6

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

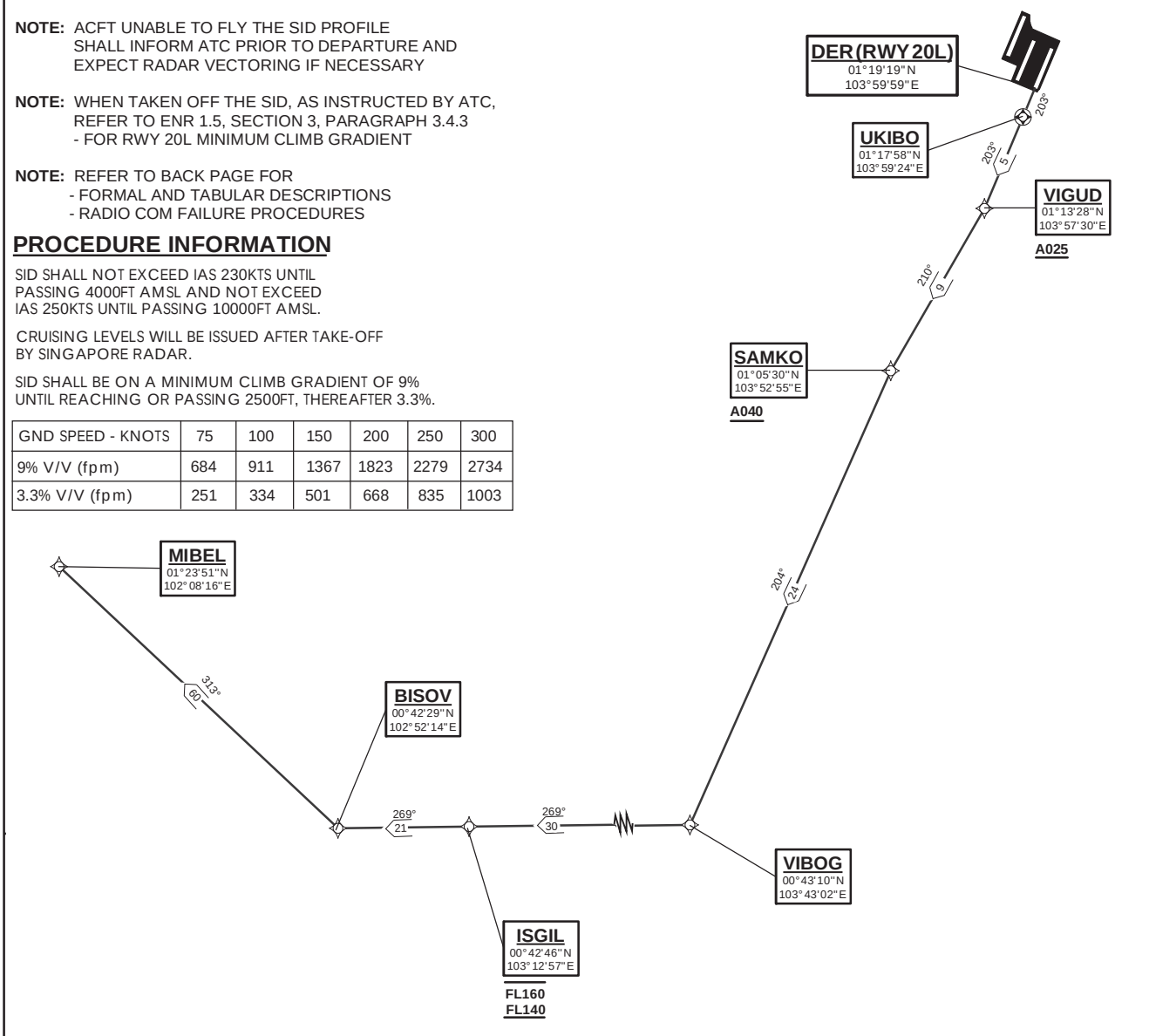
PROCEDURE INFORMATION

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



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

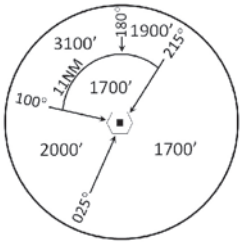
D-ATIS AP ID-WSSS
128.6

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

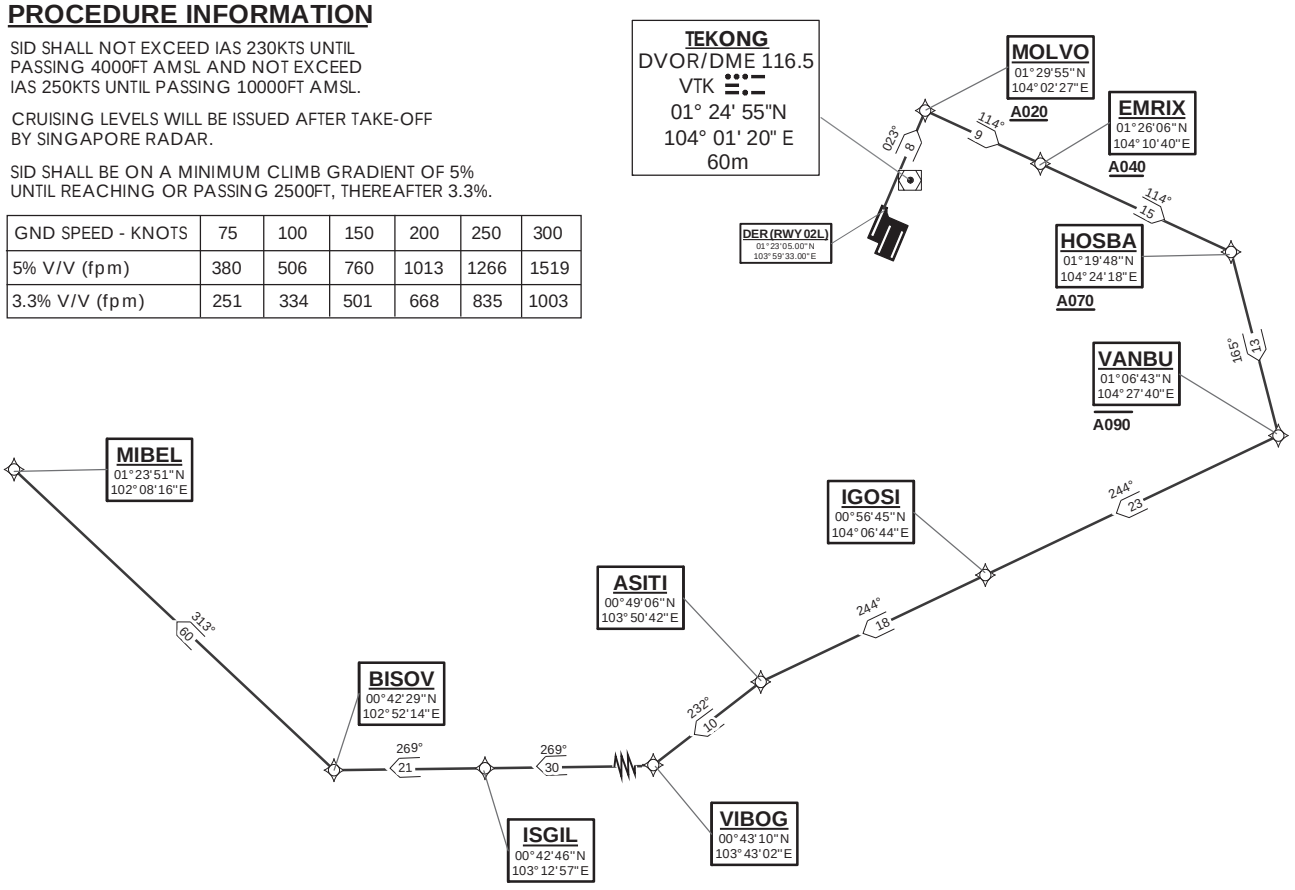
PROCEDURE INFORMATION

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

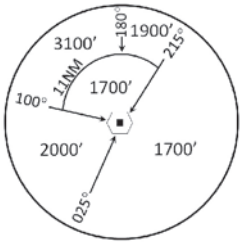
D-ATIS AP ID-WSSS
128.6

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

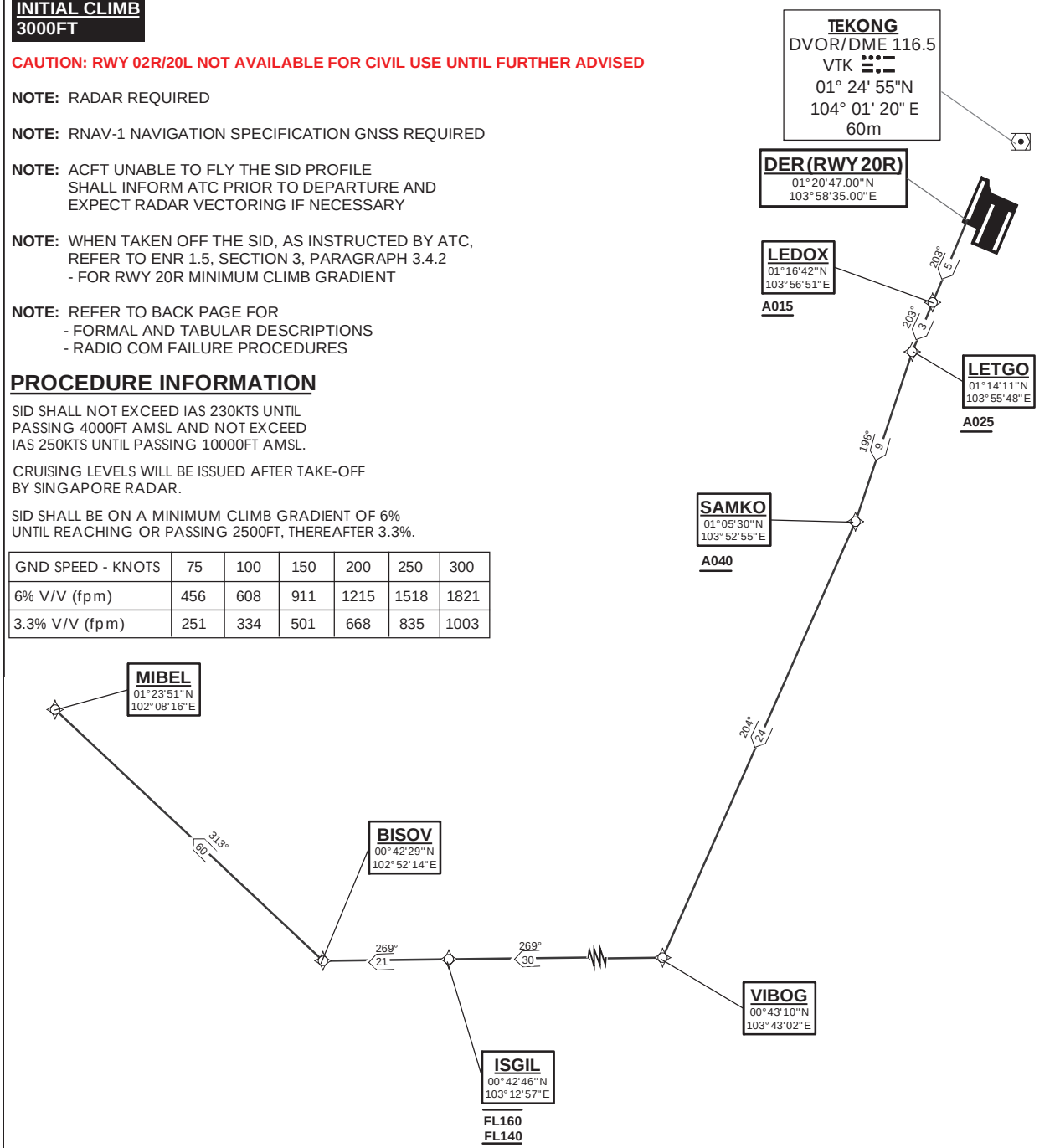
PROCEDURE INFORMATION

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

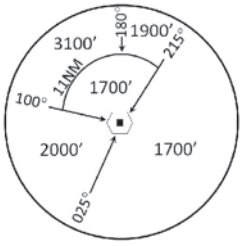
D-ATIS AP ID-WSSS
128.6

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

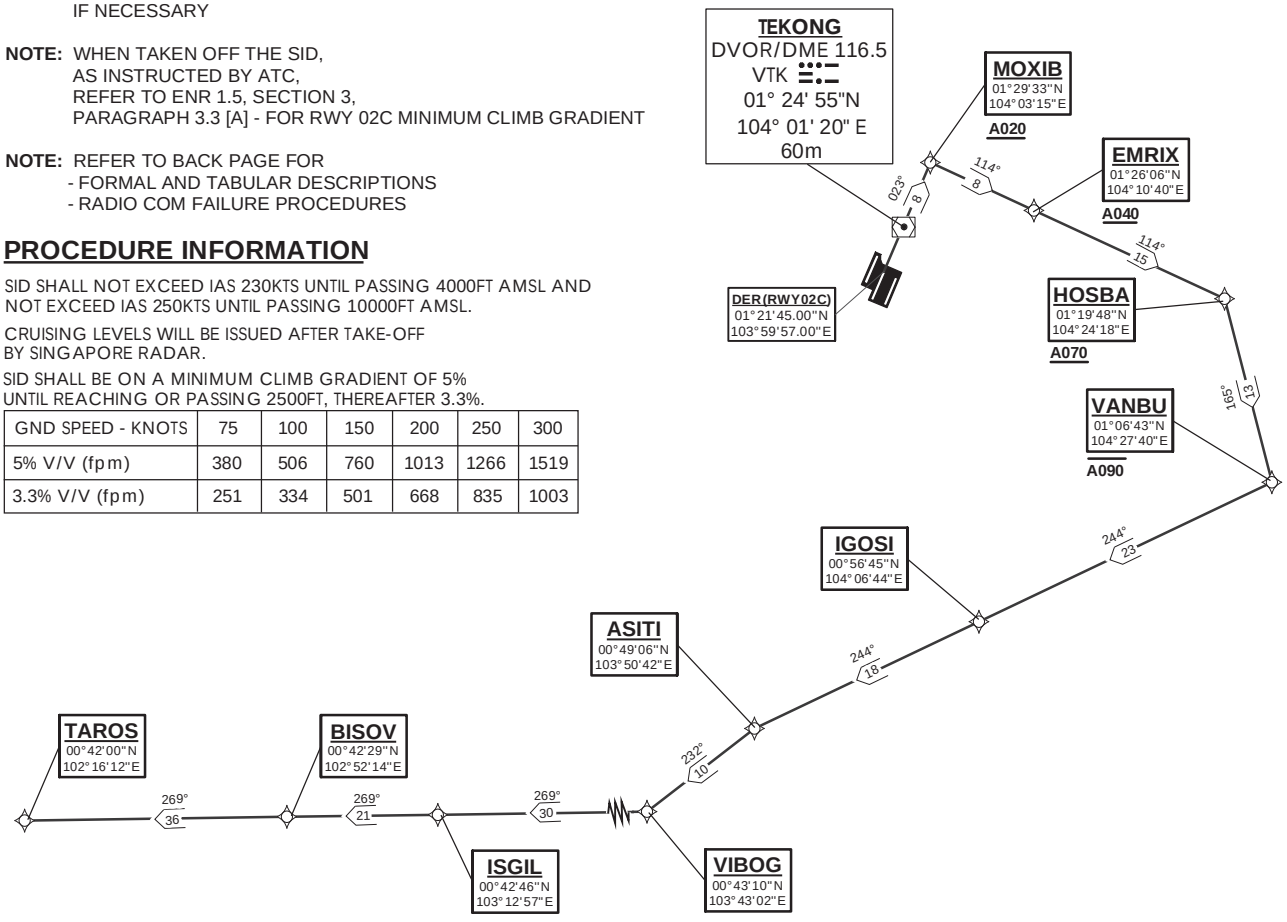
PROCEDURE INFORMATION

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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(232.4)	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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

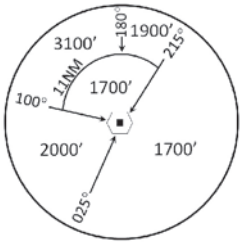
D-ATIS AP ID-WSSS
128.6

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

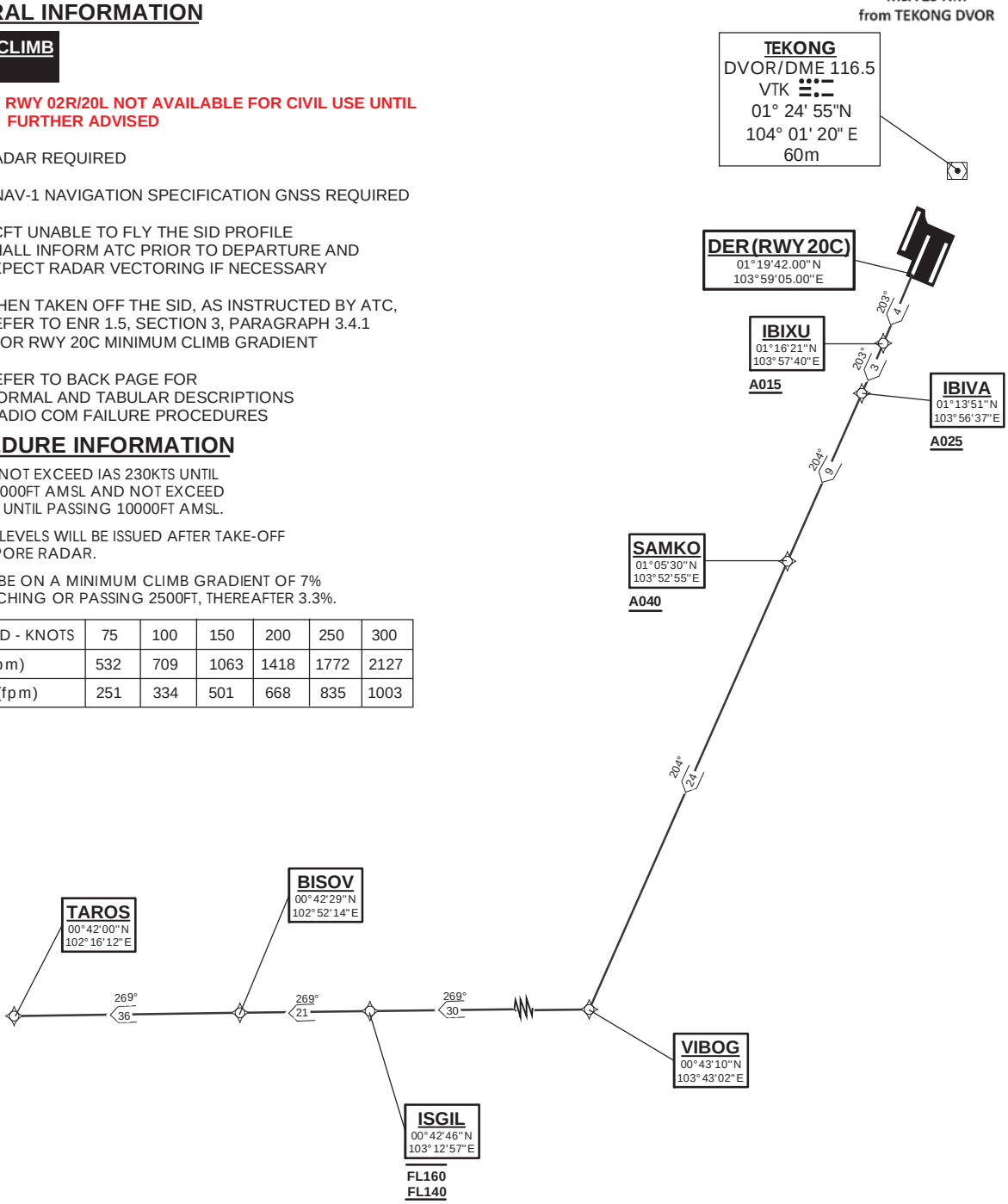
PROCEDURE INFORMATION

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



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

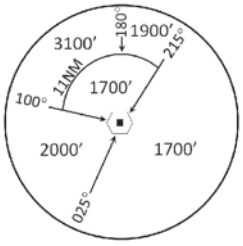
D-ATIS AP ID-WSSS
128.6

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 NOT AVAILABLE FOR CIVIL USE 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

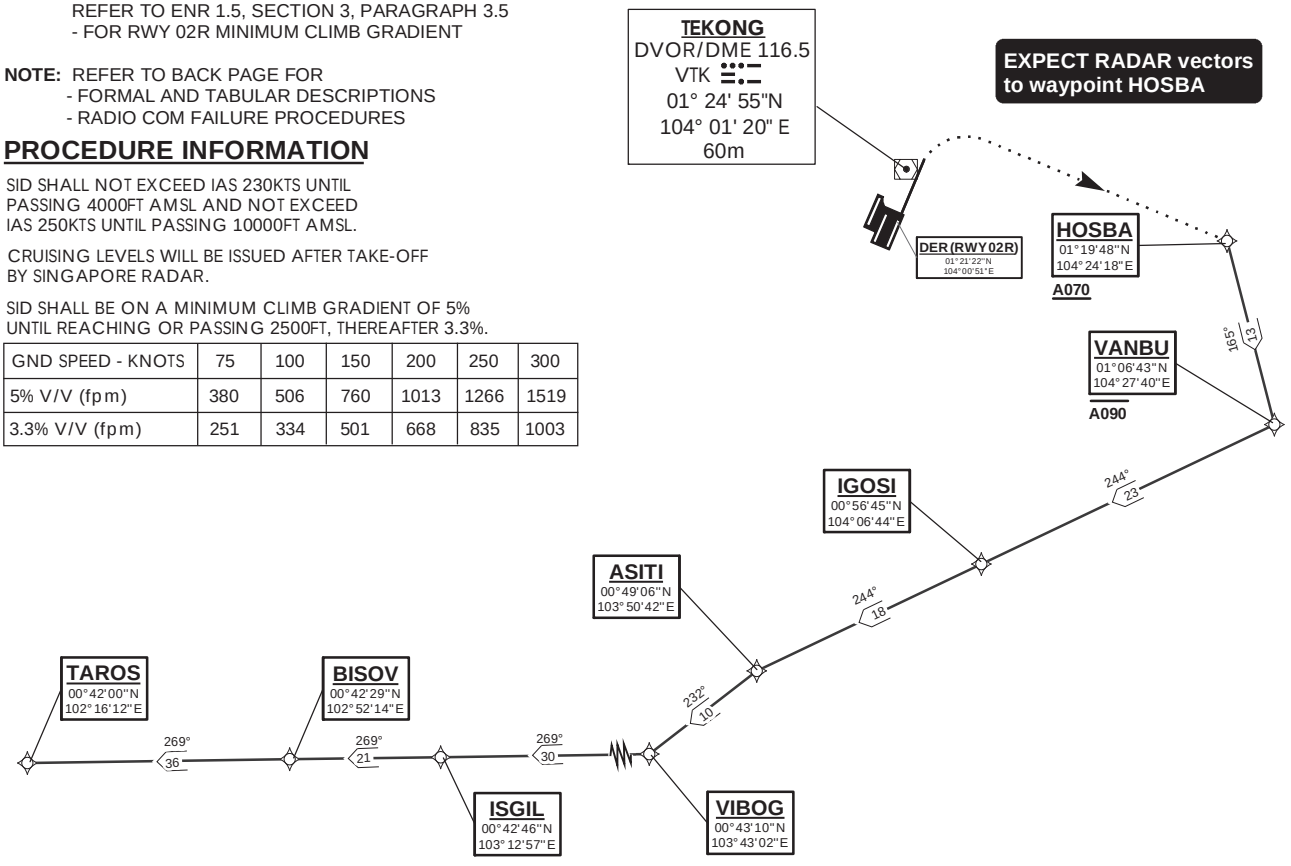
PROCEDURE INFORMATION

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

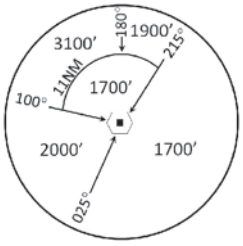
D-ATIS AP ID-WSSS
128.6

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

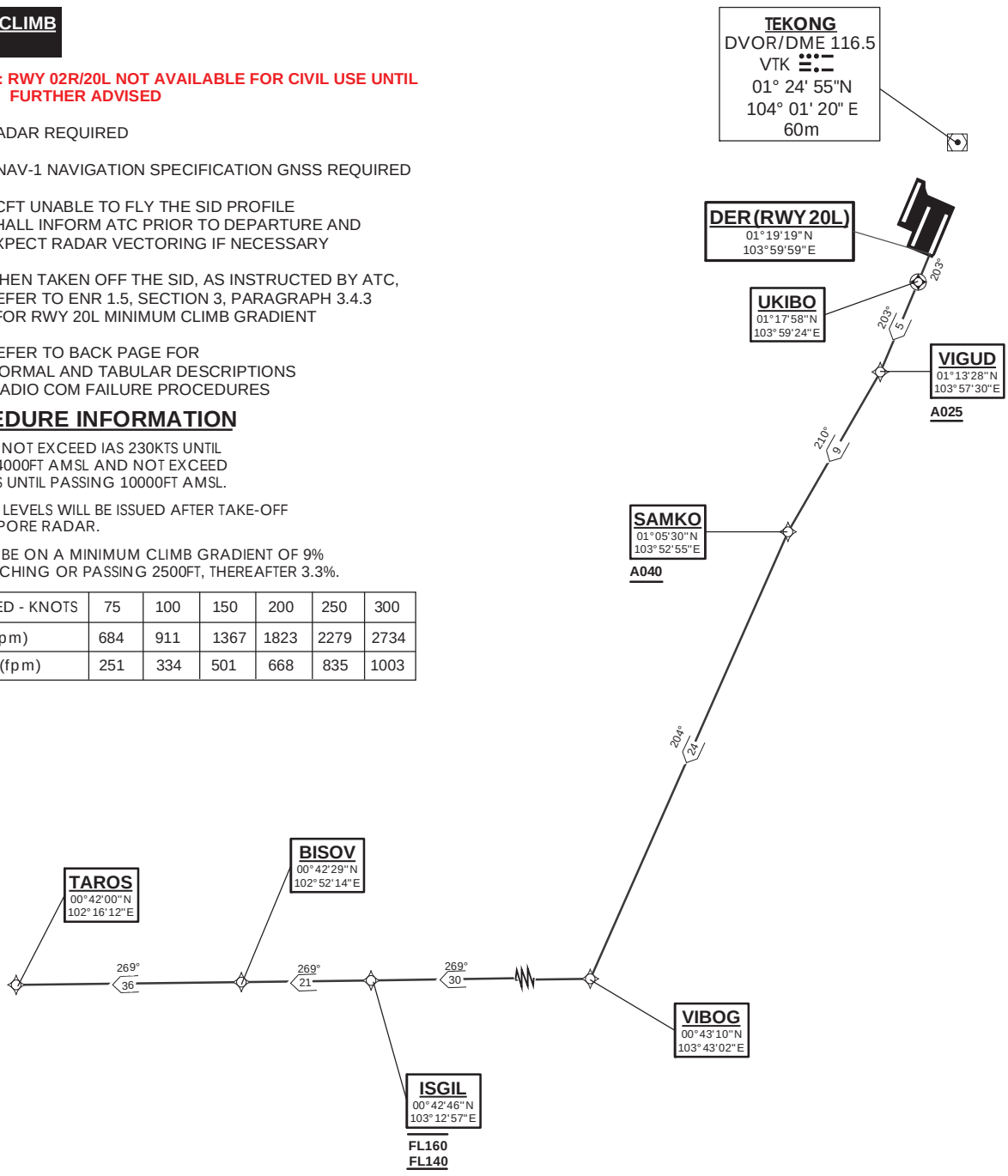
PROCEDURE INFORMATION

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



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

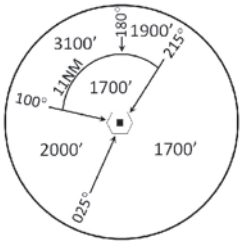
D-ATIS AP ID-WSSS
128.6

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

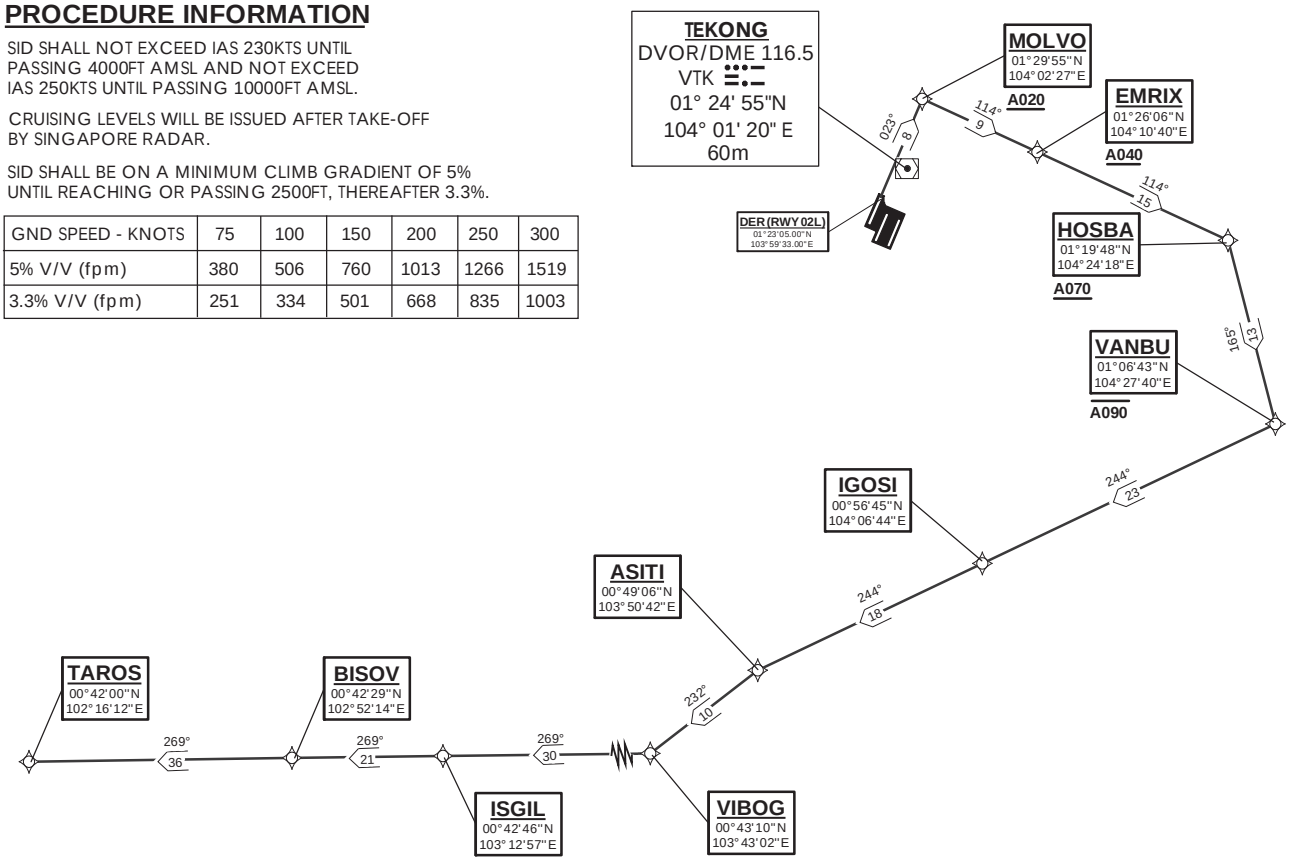
PROCEDURE INFORMATION

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

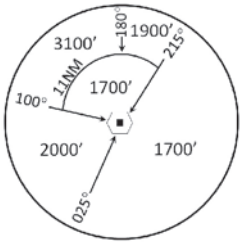
D-ATIS AP ID-WSSS
128.6

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

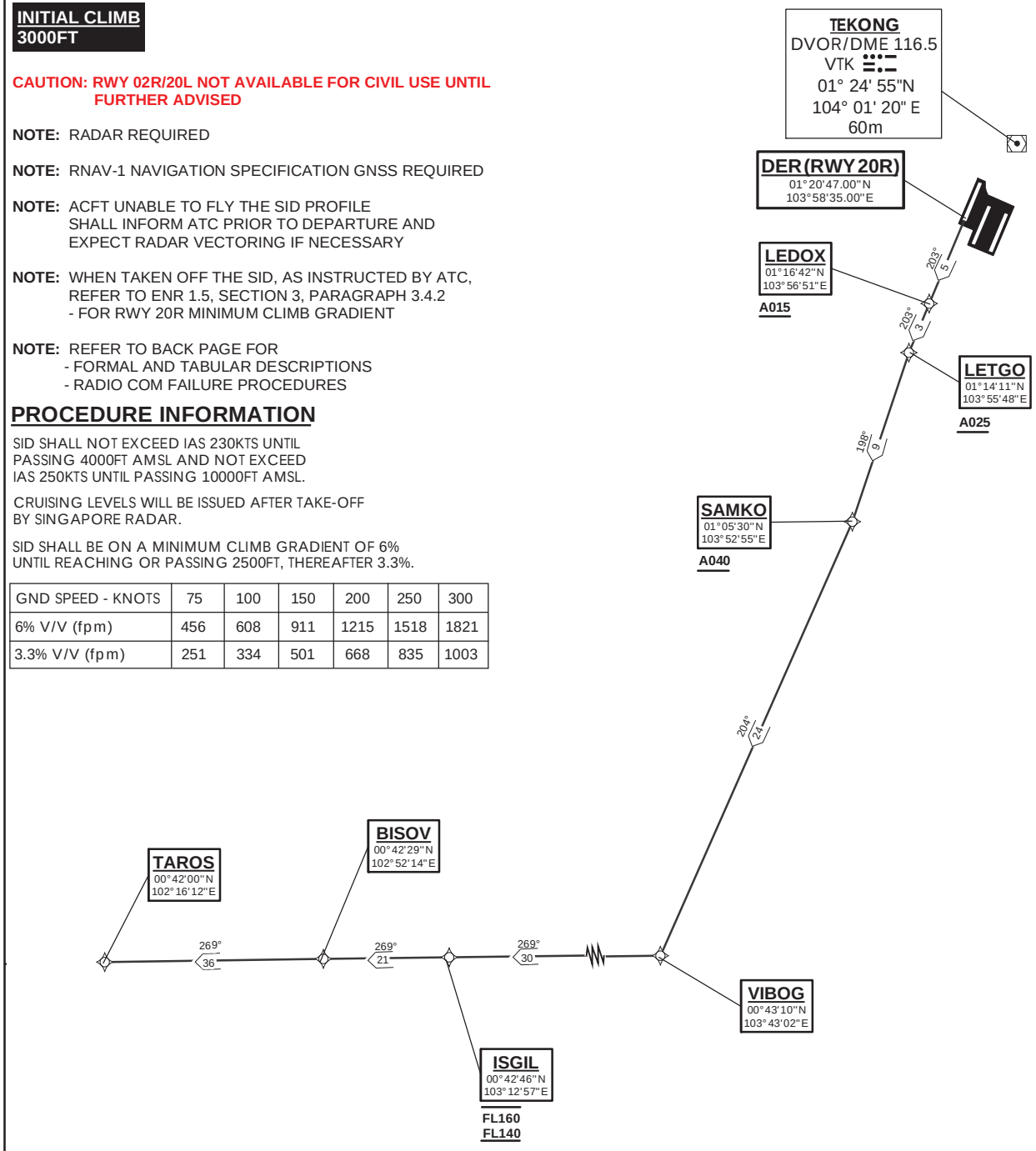
PROCEDURE INFORMATION

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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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 NOT AVAILABLE FOR CIVIL USE 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.

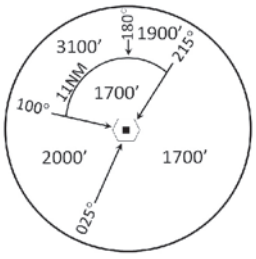
RWY 02C

SID SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.

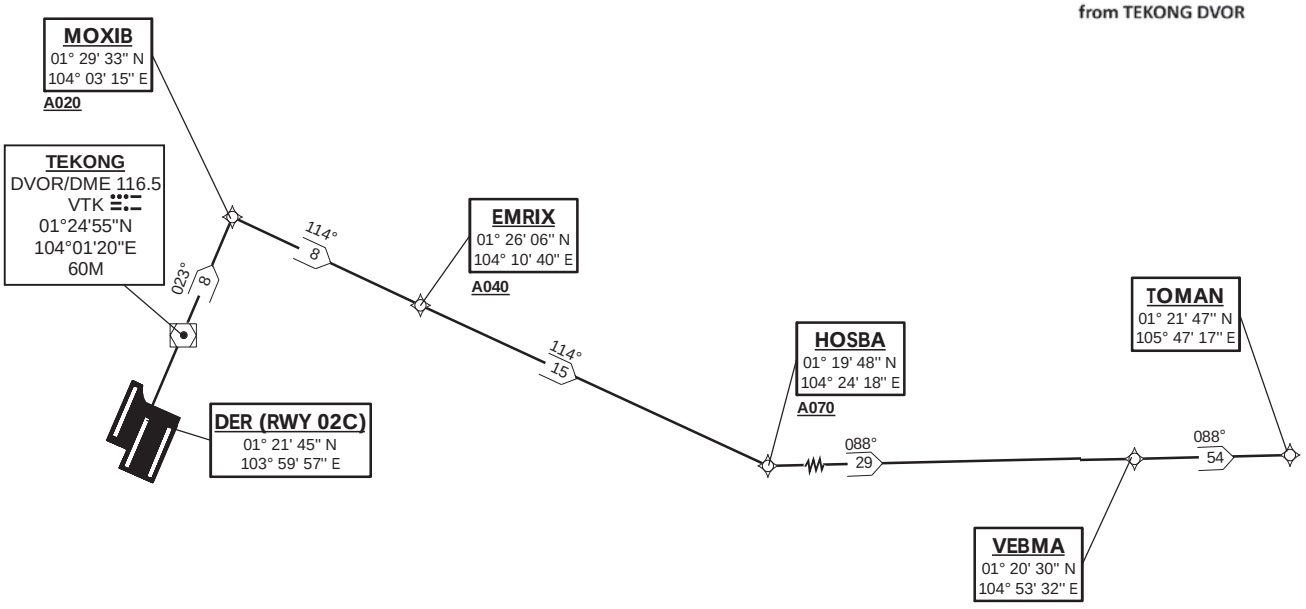
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3 124.05
ACC	134.2

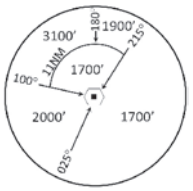
TRANSITION ALTITUDE
11 000ft

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

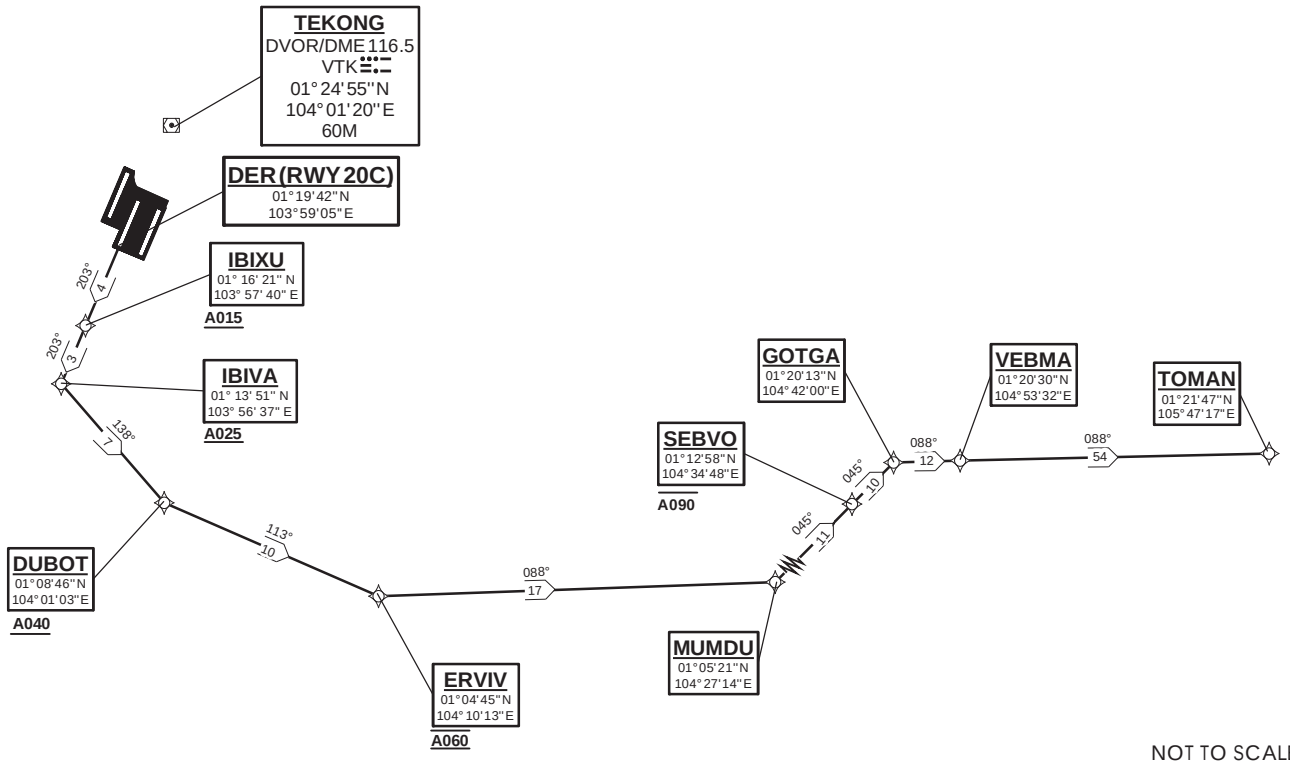
PROCEDURE INFORMATION

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



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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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
TOMAN DEPARTURES (RADAR)
TOMAN 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 NOT AVAILABLE FOR CIVIL USE 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

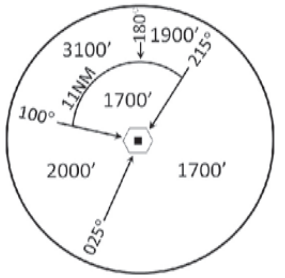
NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.5 - FOR RWY 02R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

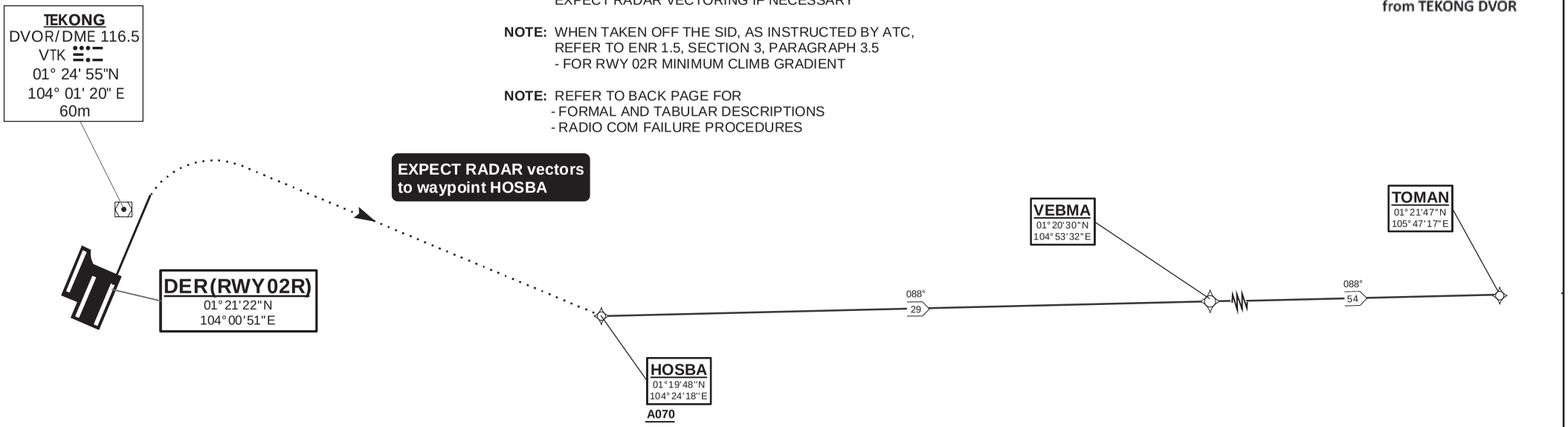
ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM from TEKONG DVOR



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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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 NOT AVAILABLE FOR CIVIL USE 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.

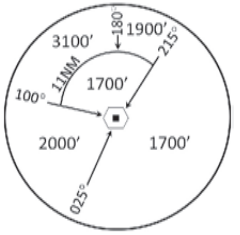
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 9% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

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

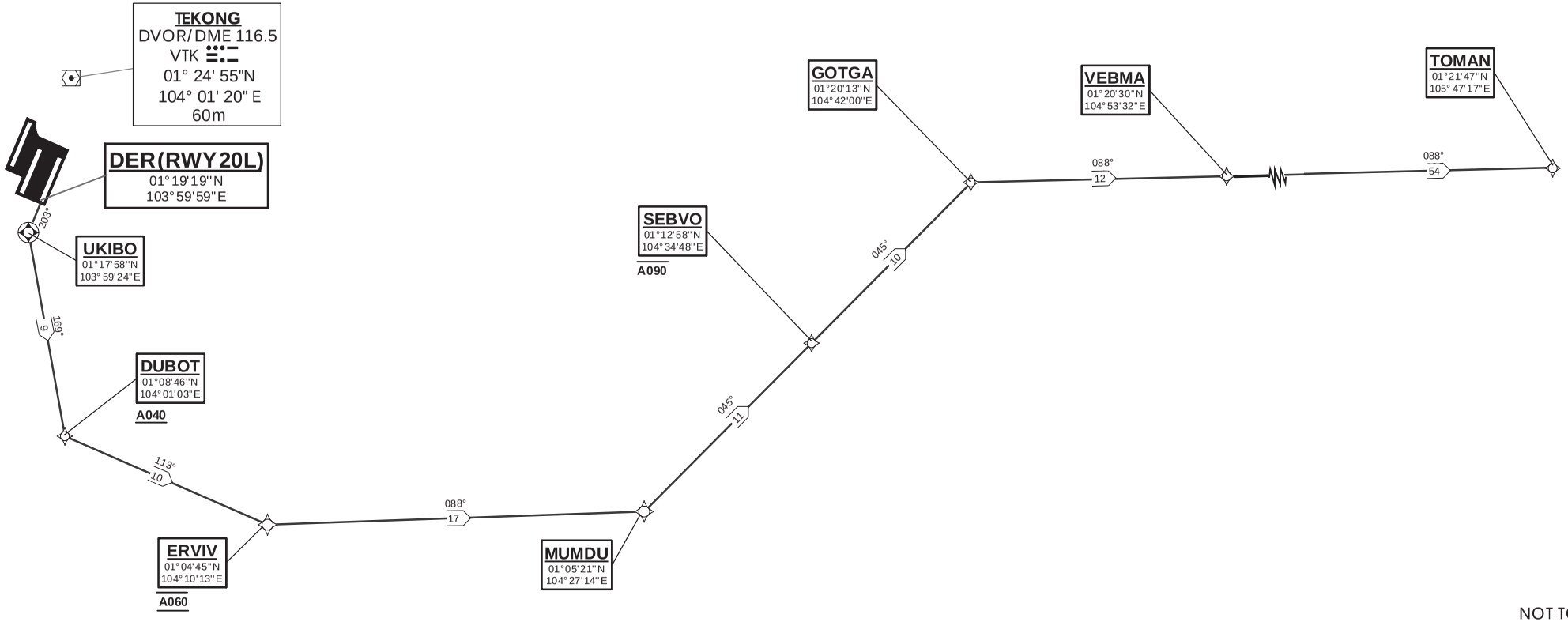
ELEV, ALT IN FEET

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC VAR 0°23'E (2020)

DISTANCES IN NM



MSA 25 NM
from TEKONG DVOR



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3 124.05
ACC	134.2

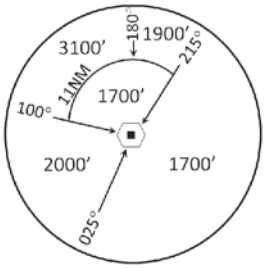
TRANSITION ALTITUDE
11 000ft

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

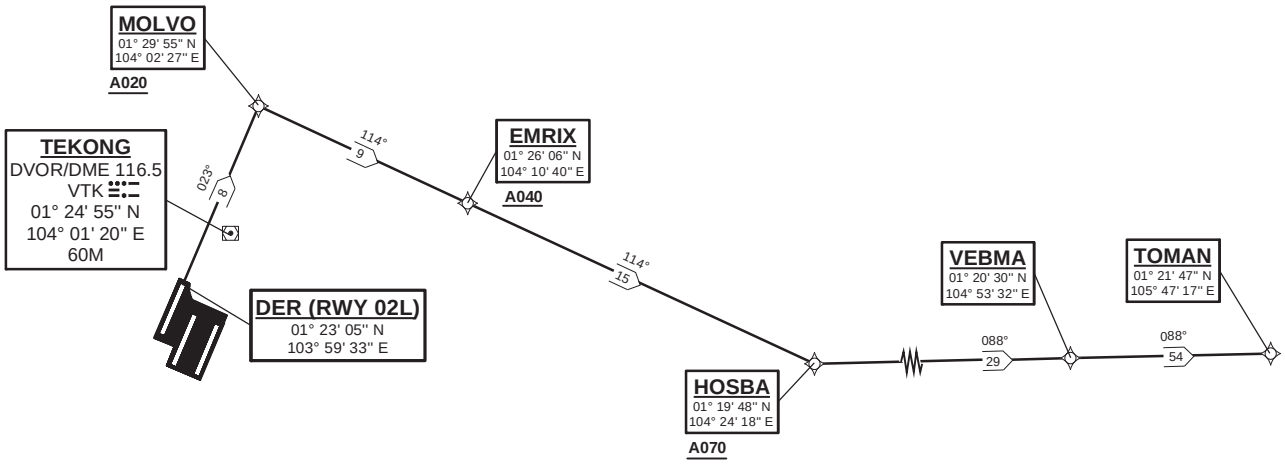
PROCEDURE INFORMATION

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3 124.05
ACC	134.2

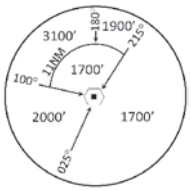
TRANSITION ALTITUDE
11 000ft

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

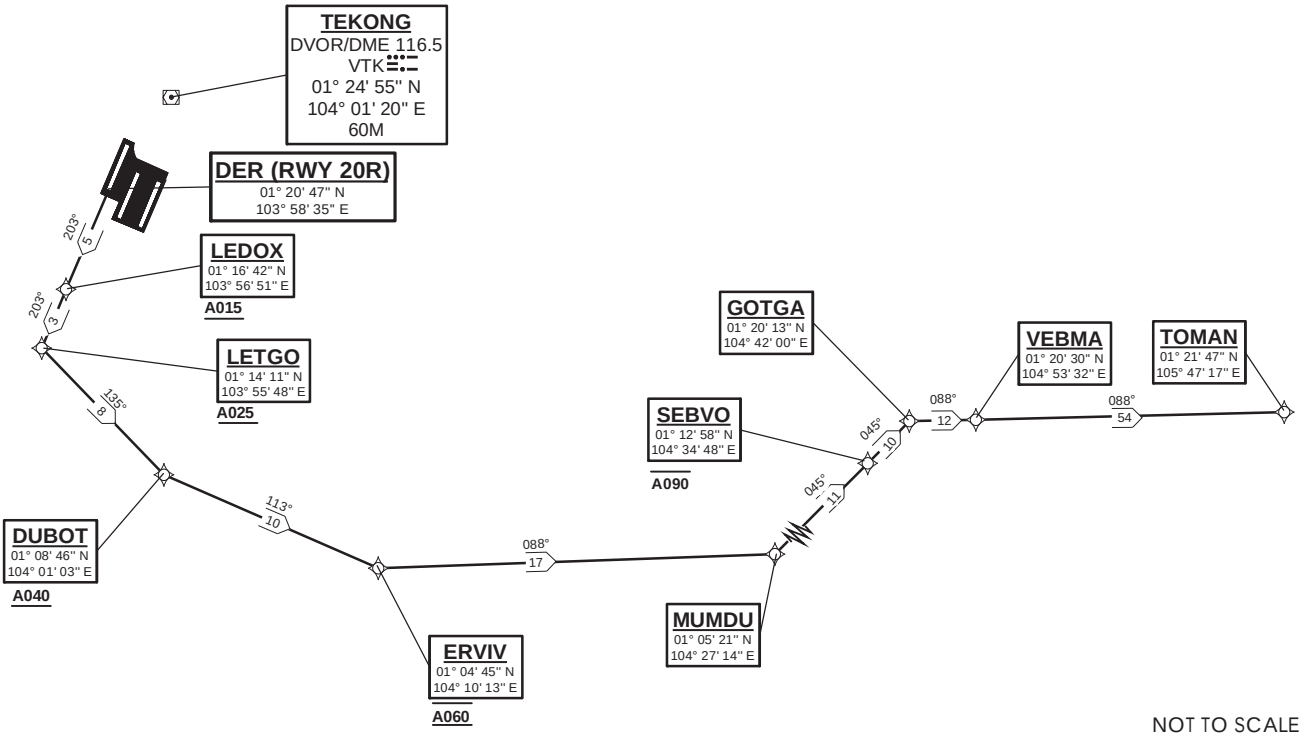
PROCEDURE INFORMATION

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

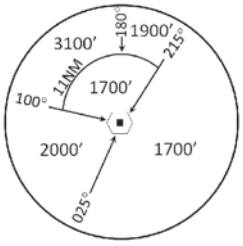
D-ATIS AP ID-WSSS
128.6

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

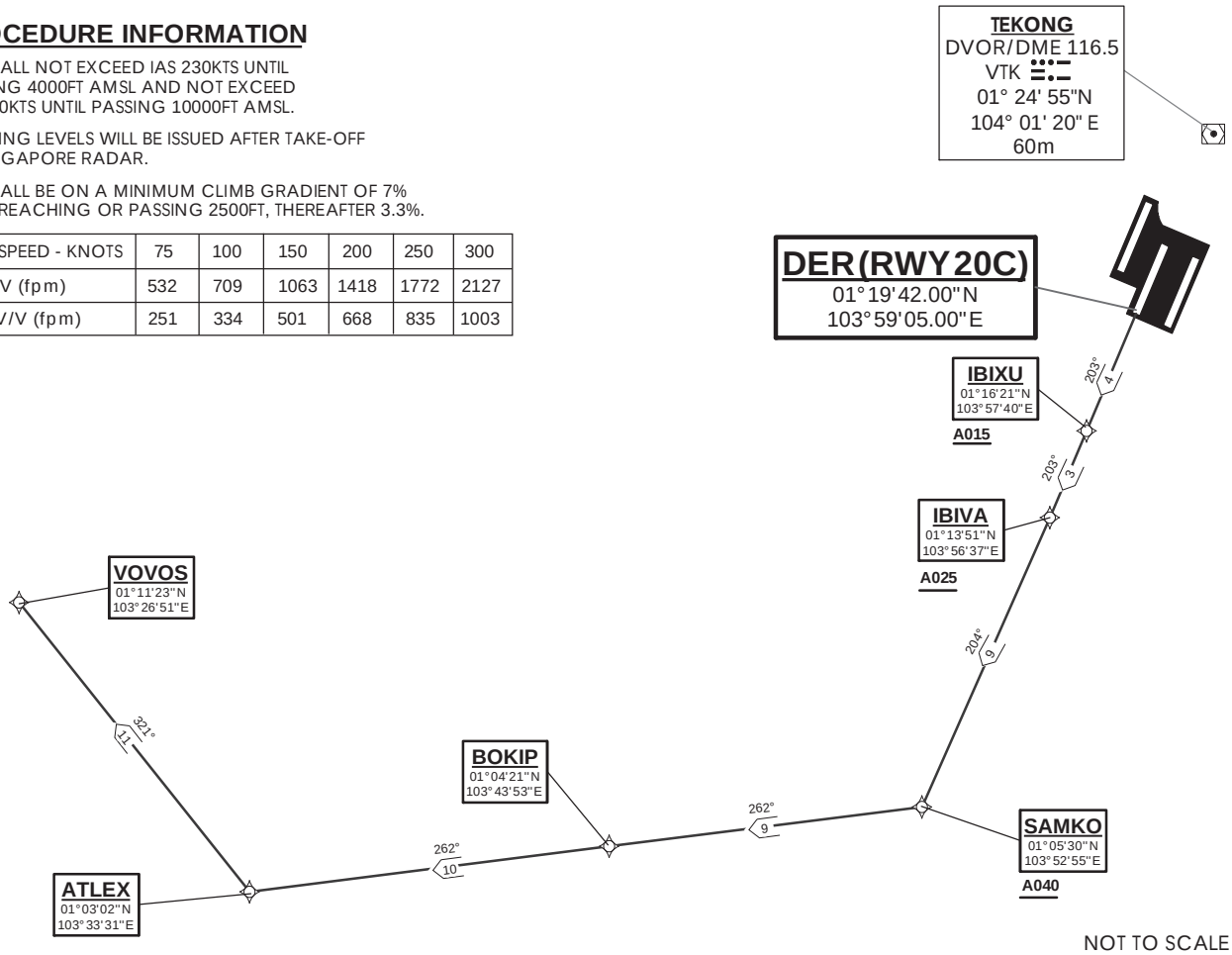
PROCEDURE INFORMATION

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

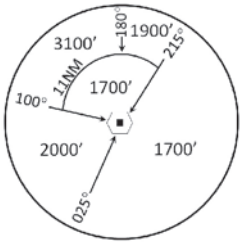
D-ATIS AP ID-WSSS
128.6

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB
3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

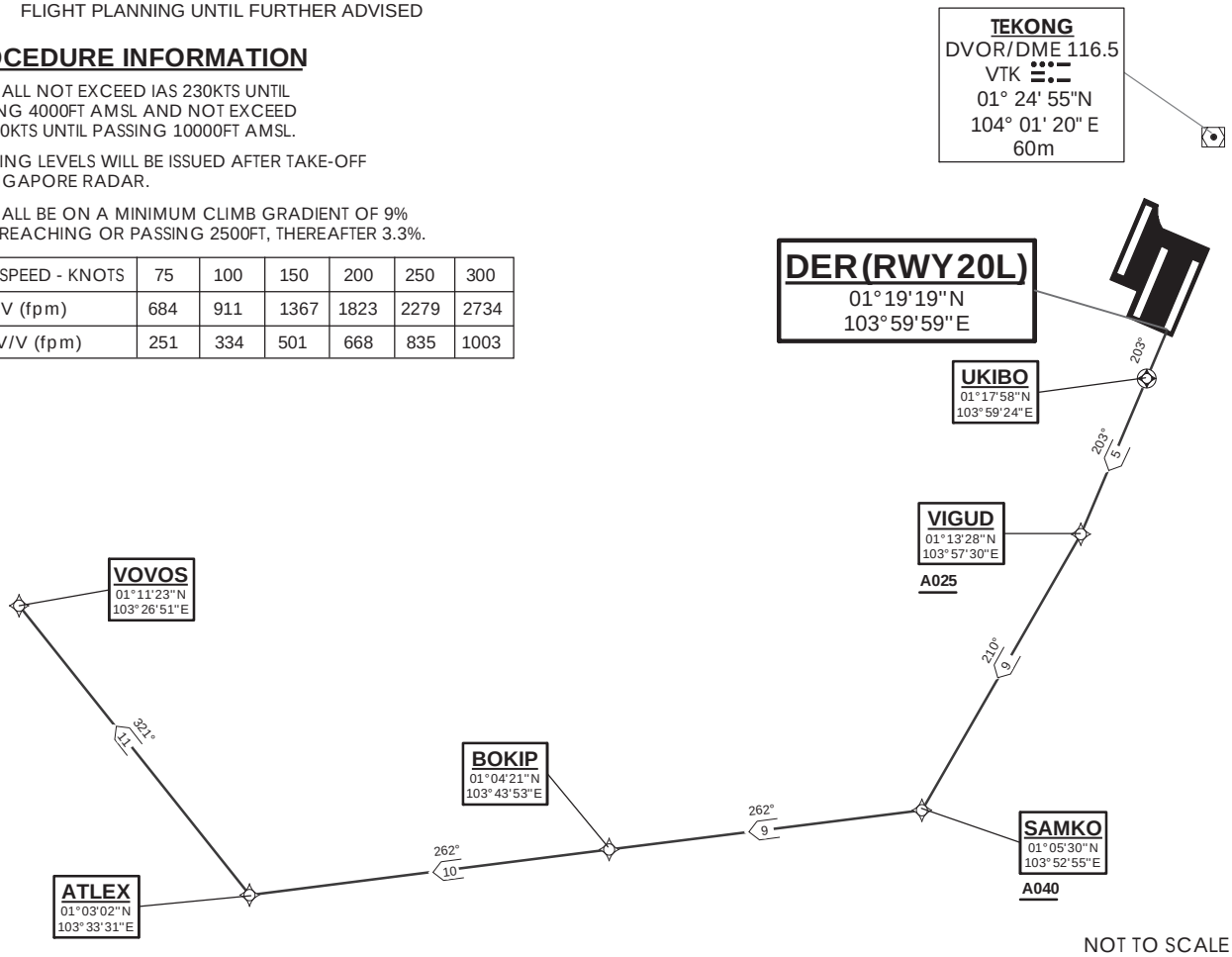
PROCEDURE INFORMATION

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



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6 / 118.25
APP	120.3
	124.05
ACC	133.25

TRANSITION ALTITUDE
11 000ft

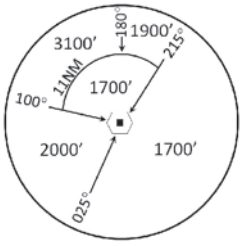
D-ATIS AP ID-WSSS
128.6

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



MSA 25 NM
from TEKONG DVOR

GENERAL INFORMATION

INITIAL CLIMB 3000FT

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

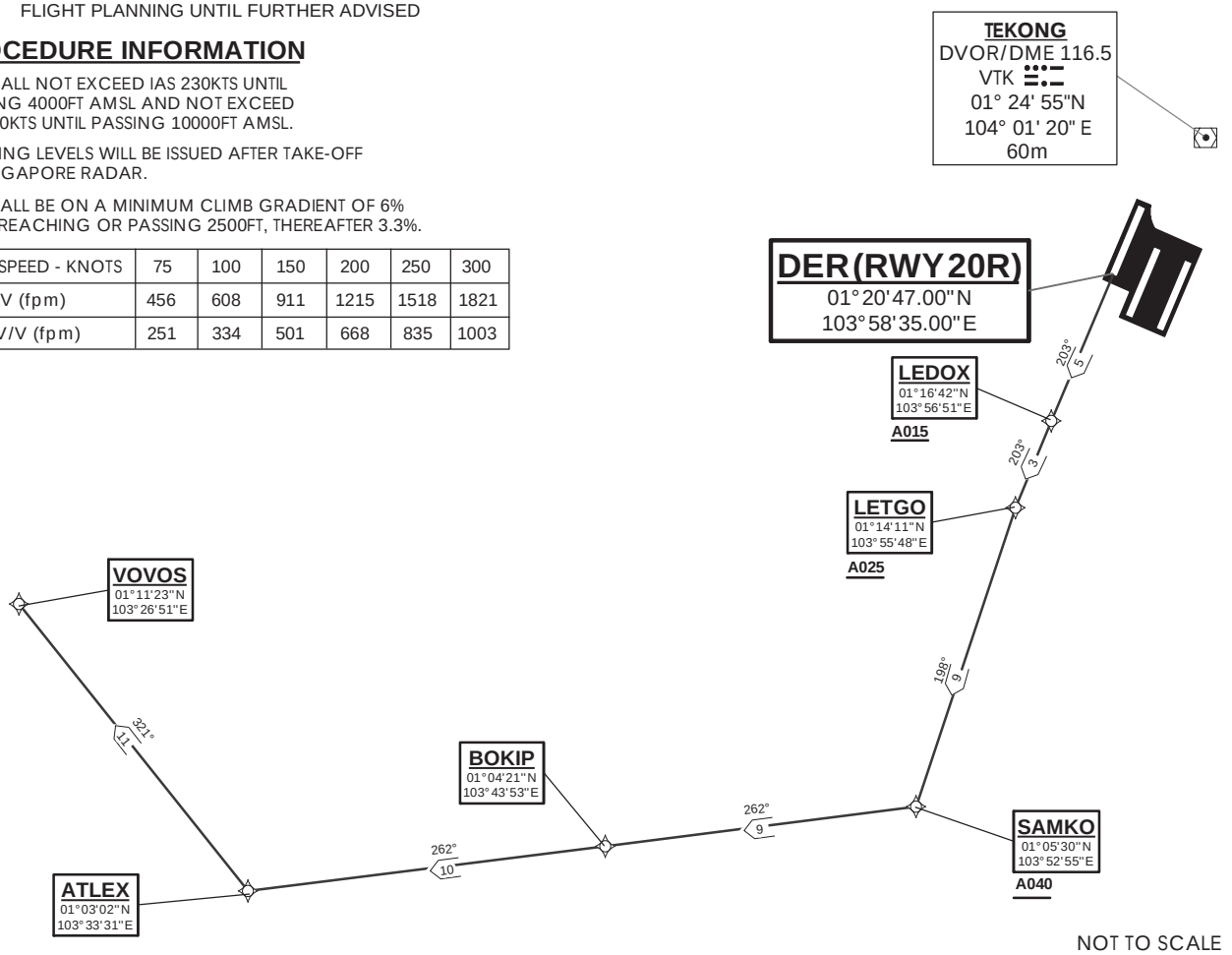
PROCEDURE INFORMATION

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**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.

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STANDARD INSTRUMENT DEPARTURES (SID) CHART

TRANSITION ALTITUDE
11 000ft

TWR 131.4
APP 120.3
ACC 133.8/134.4/133.25/
134.2

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)

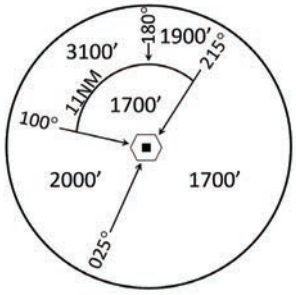
DISTANCES IN NM

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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.

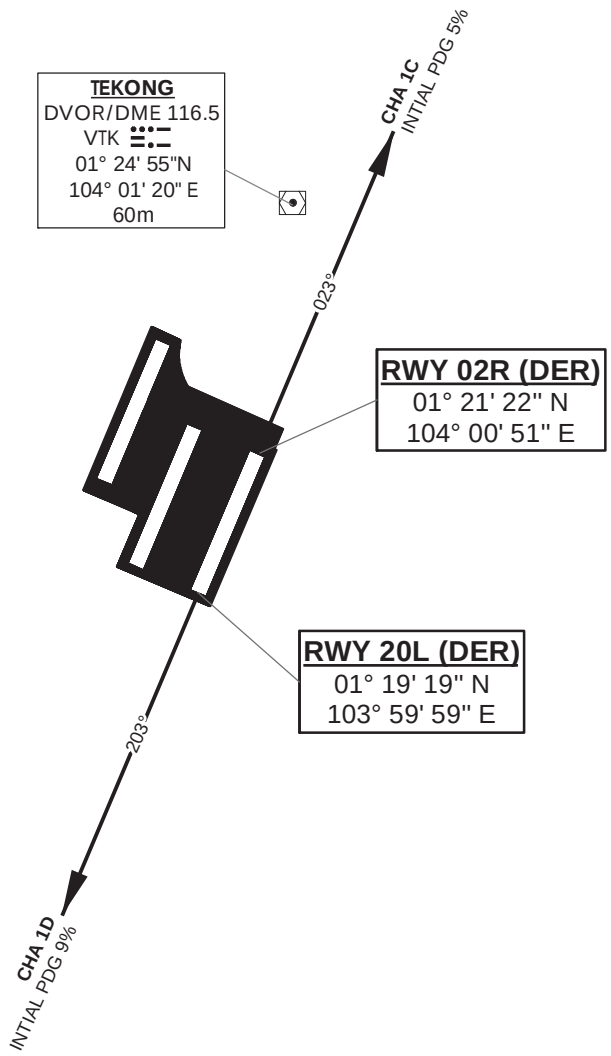
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

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



NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **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. **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.

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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
ARAMA ONE ALPHA ARRIVAL
ARAMA 1A

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

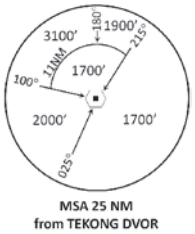
DISTANCES IN NM

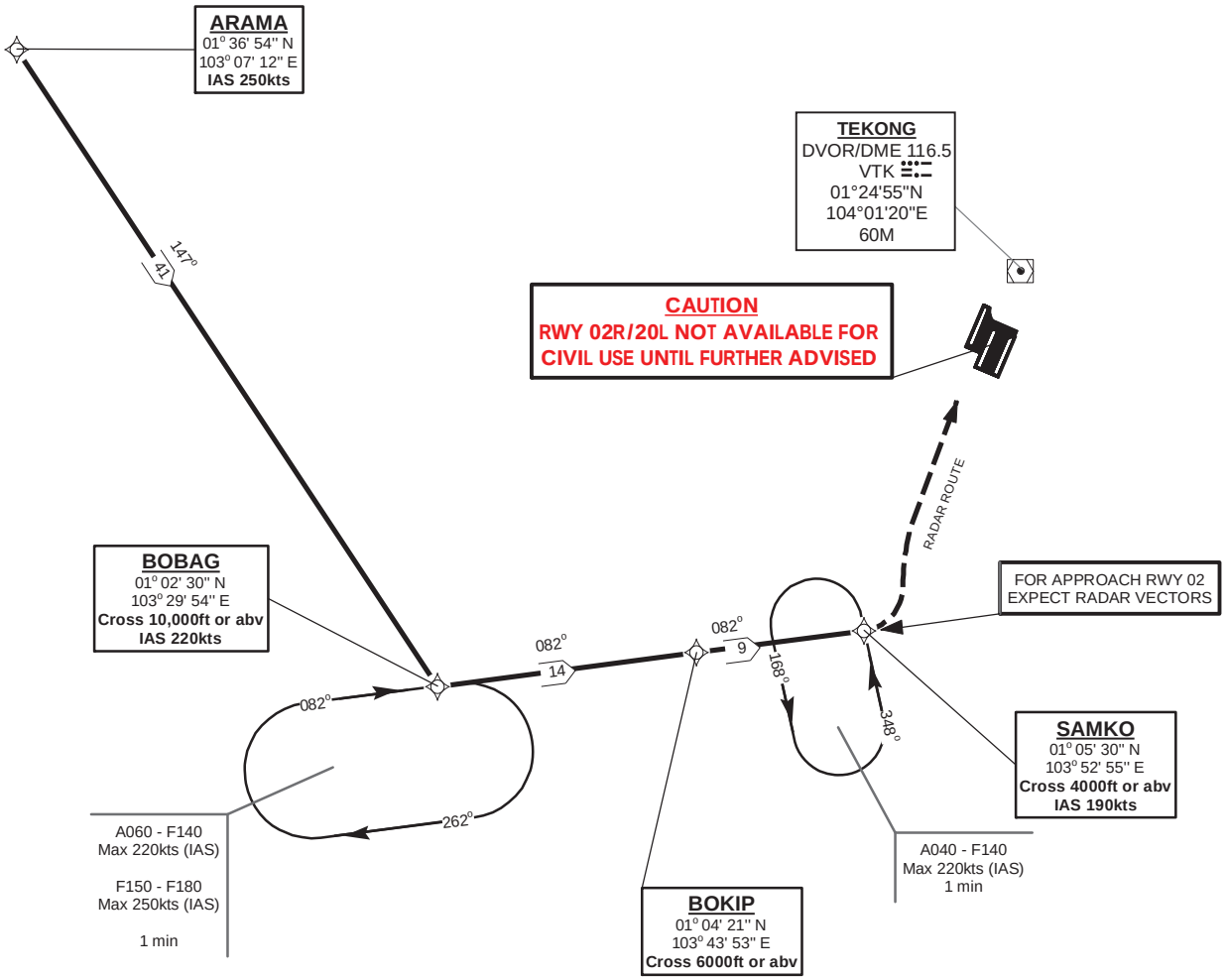
CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via ARAMA 1A by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on ARAMA 1A to SAMKO **(b)** From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** - Refer to Singapore AIP for radio communications failure procedure

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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
ARAMA ONE BRAVO ARRIVAL
ARAMA 1B

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

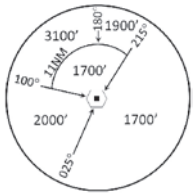
DISTANCES IN NM

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

A030 - F140
Max 220kts (IAS)
1 min

ARAMA
01° 36' 54" N
103° 07' 12" E
IAS 250kts

NYLON
01° 36' 57" N
104° 06' 24" E

FOR APPROACH RWY 20
EXPECT RADAR VECTORS

TEKONG
DVOR/DME 116.5
VTK
01°24'55"N
104°01'20"E
60M

RADAR ROUTE

BIPOP
01° 31' 22" N
104° 10' 18" E
Cross 3000ft or abv
IAS 190kts

CAUTION
RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED

DOVAN
01° 19' 38" N
104° 12' 49" E
Cross 4000ft or abv

BOBAG
01° 02' 30" N
103° 29' 54" E
Cross 10,000ft or abv
IAS 220kts

BITAM
01° 08' 13" N
104° 07' 57" E
Cross 7000ft or abv
IAS 220kts

SAMKO
01° 05' 30" N
103° 52' 55" E

A060 - F140
Max 220kts (IAS)

F150 - F180
Max 250kts (IAS)

1 min

NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via ARAMA 1B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on ARAMA 1B to BIPOP, then direct to NYLON **(b)** From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** - Refer to Singapore AIP for radio communications failure procedure

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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)

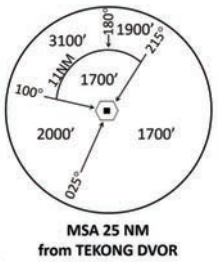
DISTANCES IN NM

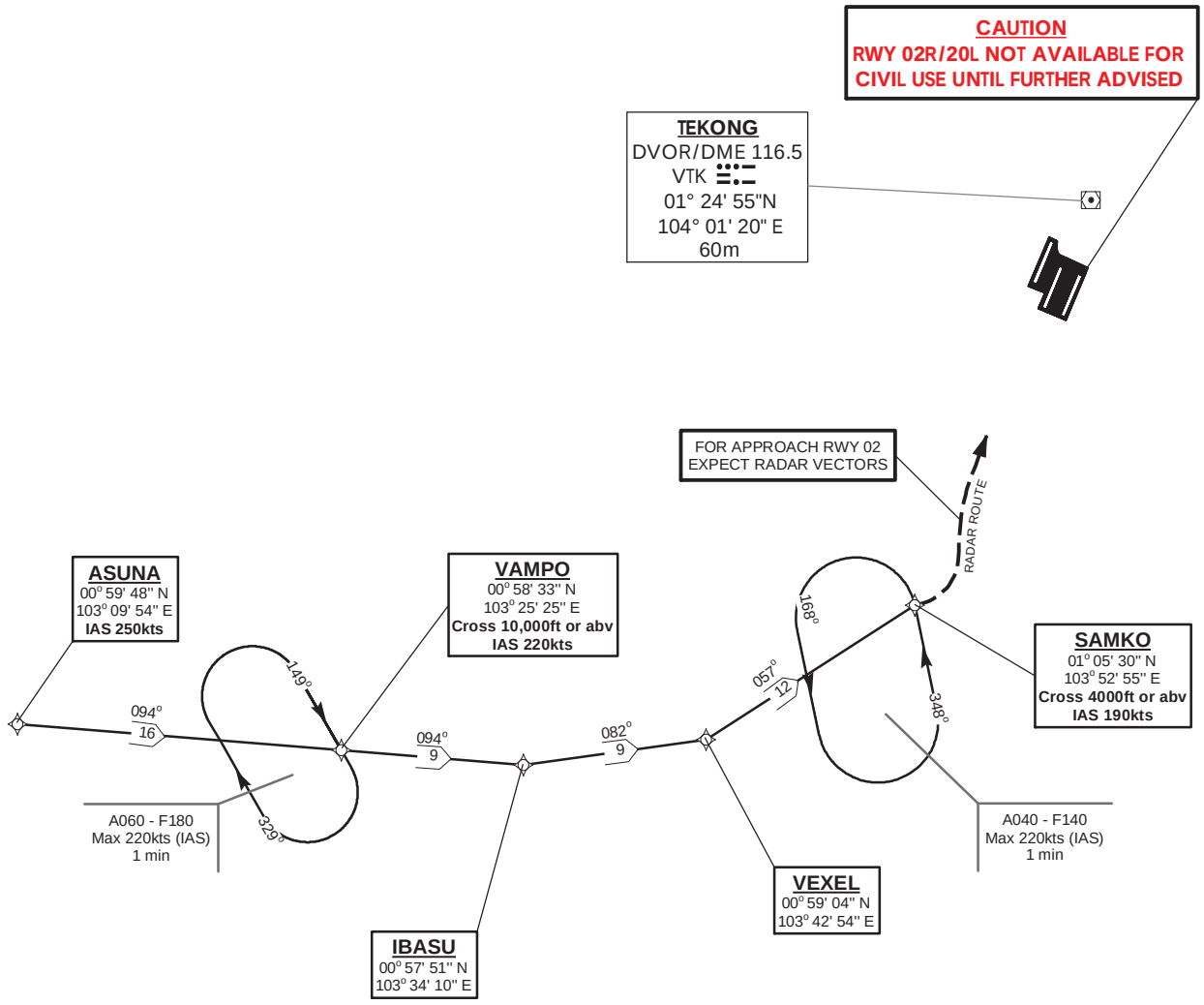
CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via ASUNA 2A by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on ASUNA 2A to SAMKO **(b)** From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** **-** Refer to Singapore AIP for radio communications failure procedure

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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)

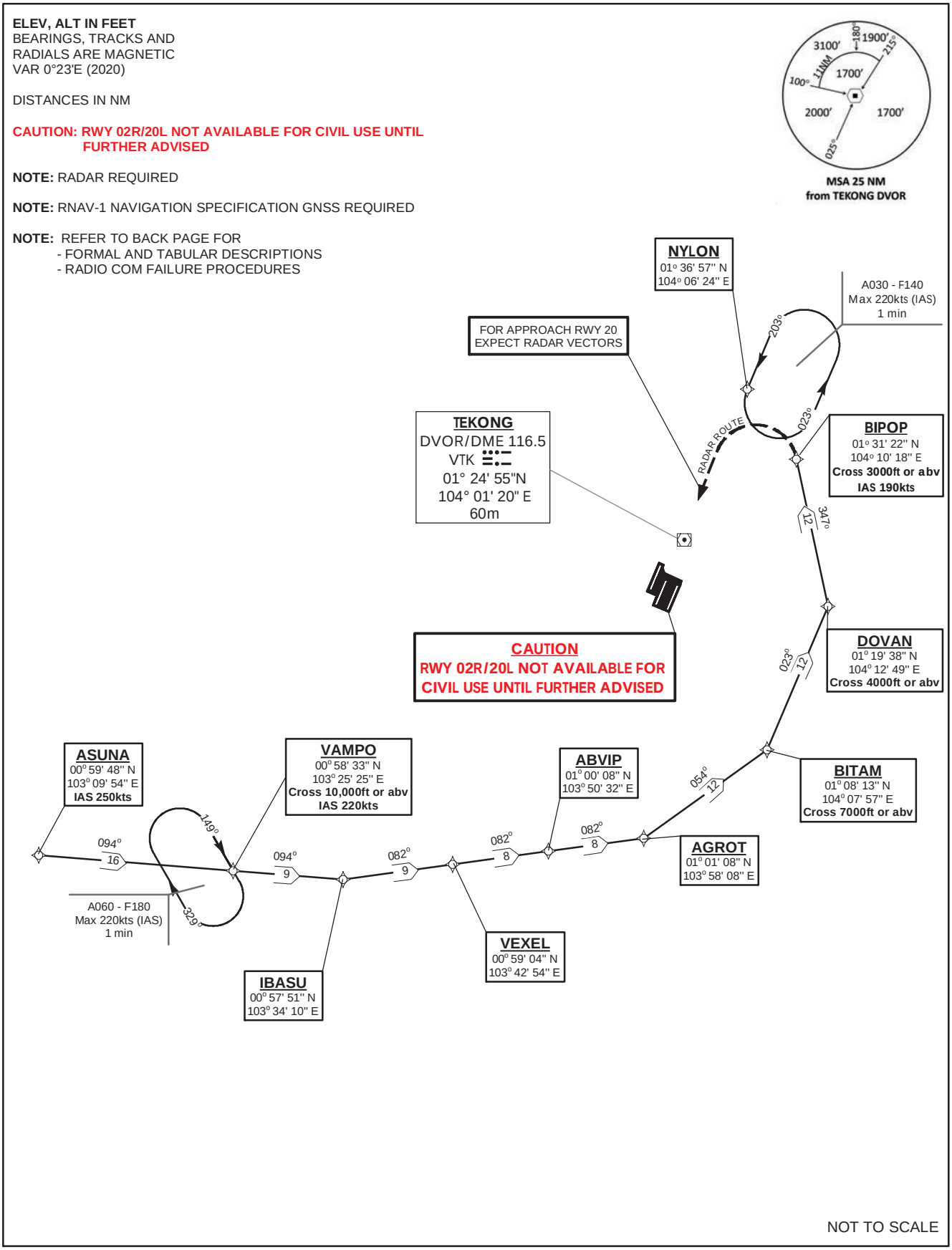
DISTANCES IN NM

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via ASUNA 2B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on ASUNA 2B to BIPOP, then direct to NYLON **(b)** From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** **-** Refer to Singapore AIP for radio communications failure procedure

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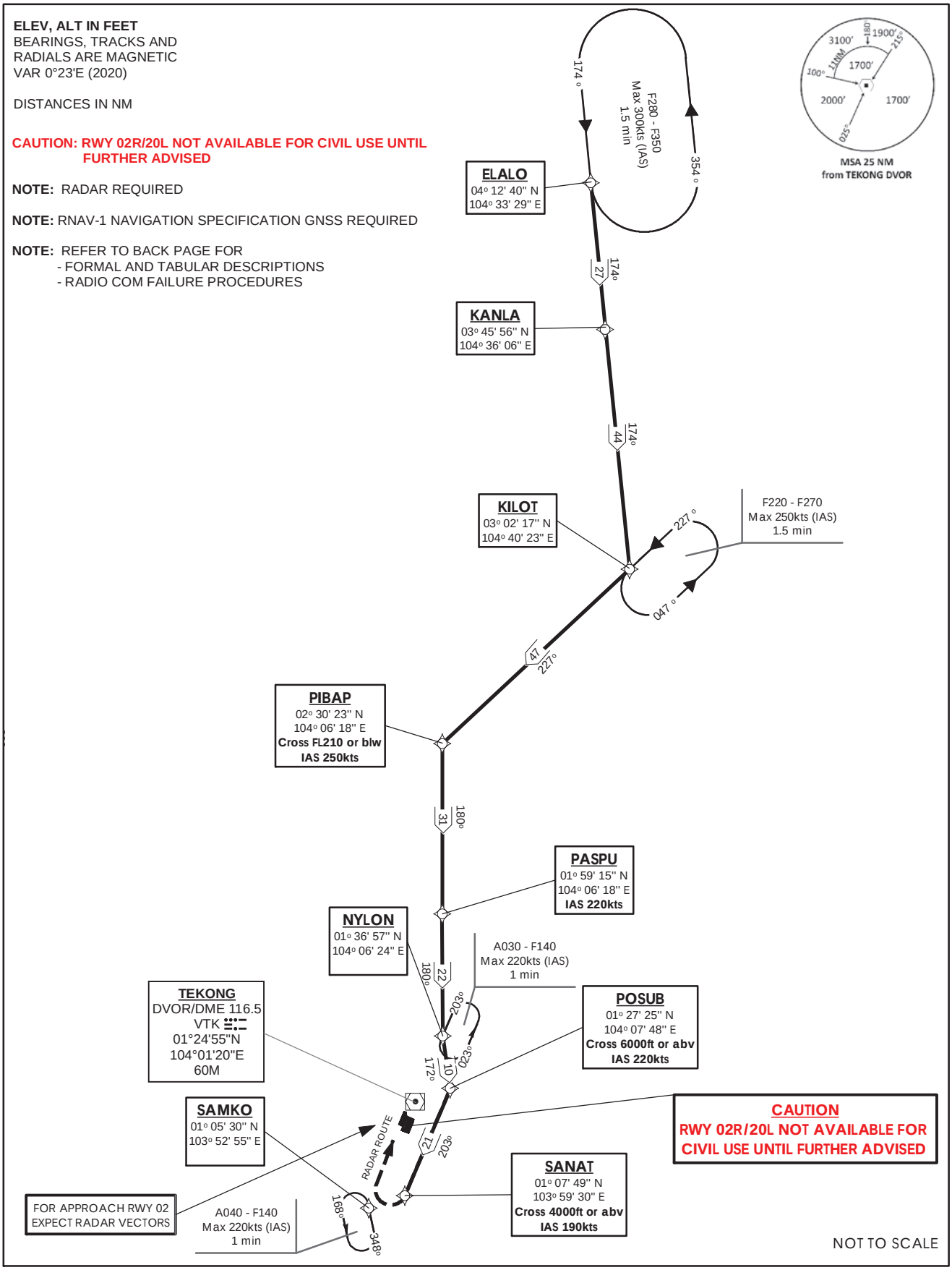
STANDARD ARRIVAL CHART RNAV (GNSS) - INSTRUMENT (STAR)

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



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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via ELALO 1A by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on ELALO 1A to SANAT, then direct to SAMKO **(b)** From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** - Refer to Singapore AIP for radio communications failure procedure

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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)

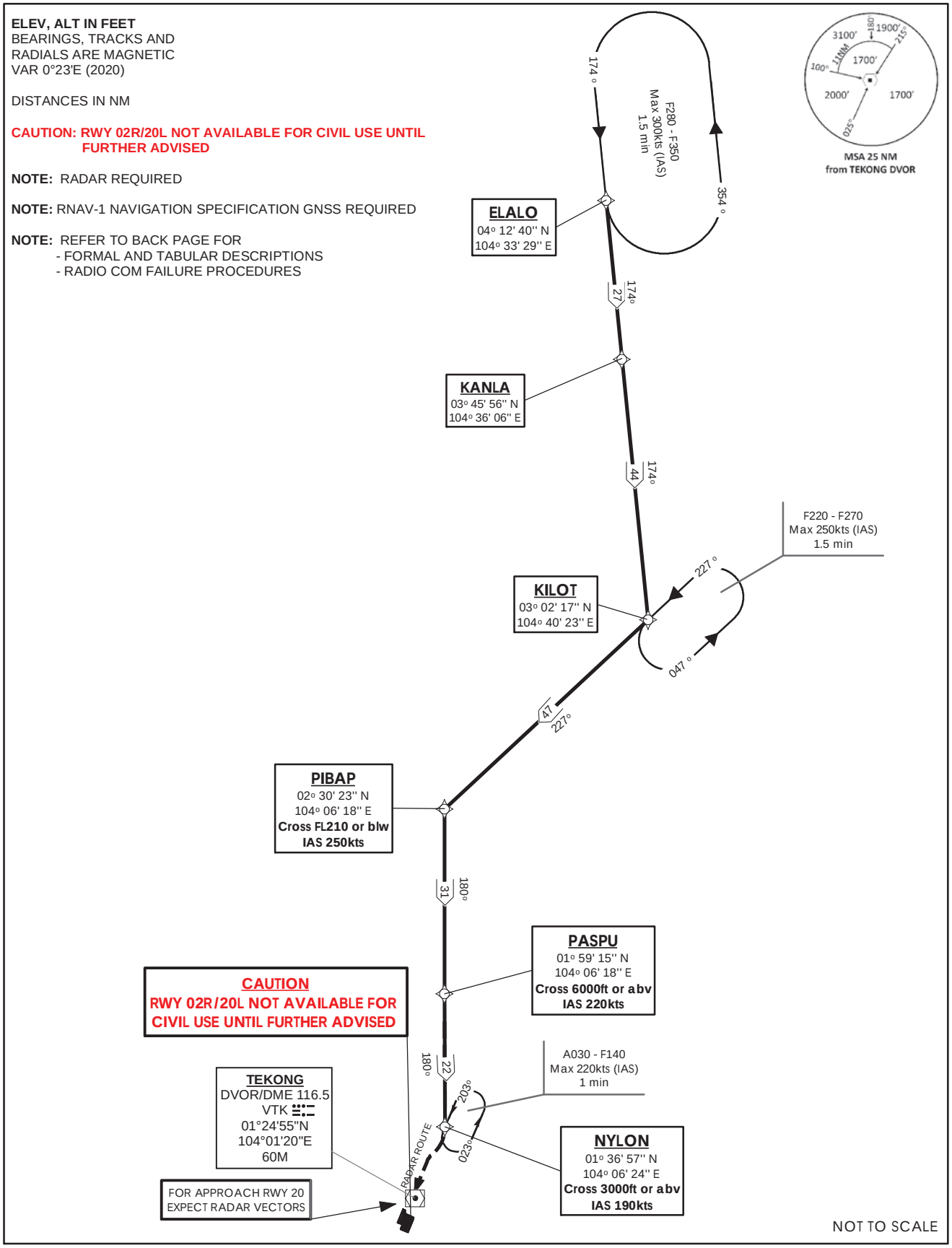
DISTANCES IN NM

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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



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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via ELALO 1B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on ELALO 1B to NYLON **(b)** From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** - Refer to Singapore AIP for radio communications failure procedure

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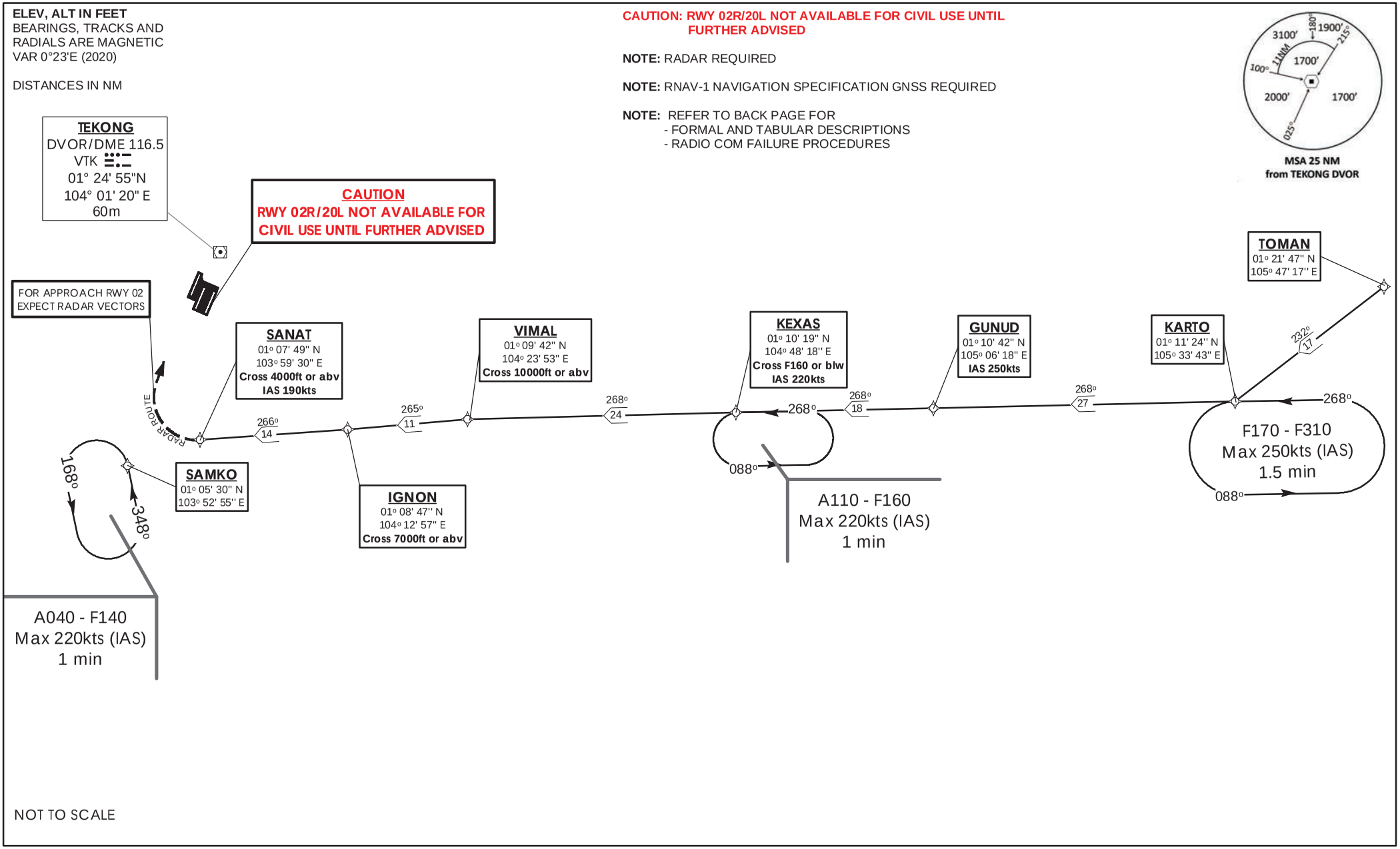
STANDARD ARRIVAL CHART RNAV (GNSS) - INSTRUMENT (STAR)

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



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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via KARTO 2A by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on KARTO 2A to SANAT, then direct to SAMKO **(b)** From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** **-** Refer to Singapore AIP for radio communications failure procedure

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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)

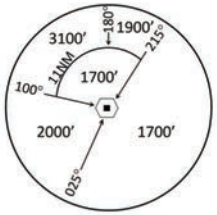
DISTANCES IN NM

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED

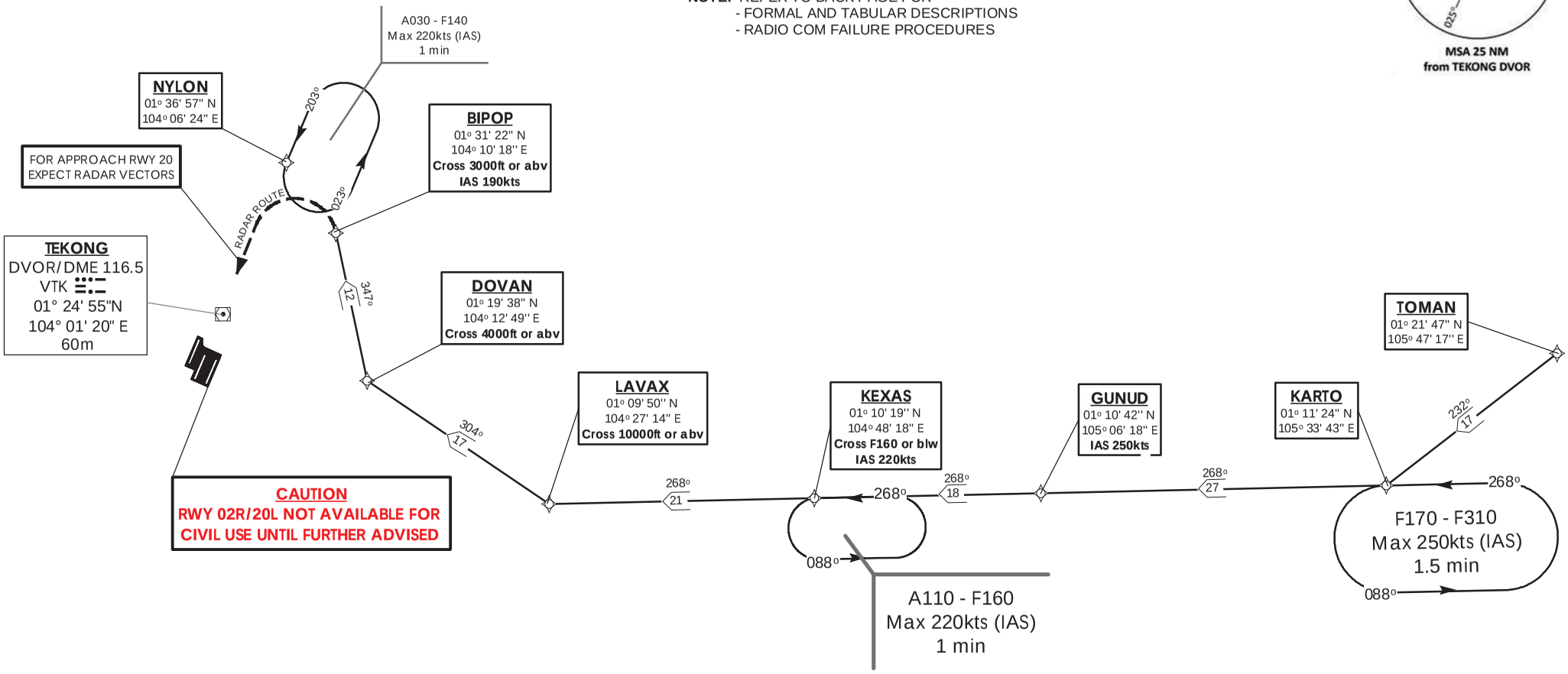
NOTE: RADAR REQUIRED

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via KARTO 2B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on KARTO 2B to BIPOP, then direct to NYLON **(b)** From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** **-** Refer to Singapore AIP for radio communications failure procedure

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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)

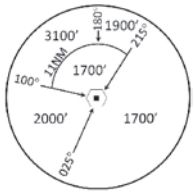
DISTANCES IN NM

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

PASPU
01° 59' 15" N
104° 06' 18" E
IAS 220kts

197° 35

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

202° 13

CAUTION
RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED

WSR38
10,000ft ALT
GND

SINJON
DVOR/DME 113.5
SJ
01° 13' 21.34" N
103° 51' 15.22" E
58M
Cross 7,000ft or abv

234° 4

RADAR ROUTE

PALGA
01° 10' 59" N
103° 47' 59" E
IAS 220kts

173° 6

PAMSI
01° 04' 59" N
103° 48' 45" E

082° 4

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via LEBAR 2A by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on LEBAR 2A to SAMKO **(b)** From SAMKO commence descent and carry out appropriate landing procedure for RWY 02L as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** - Refer to Singapore AIP for radio communications failure procedure

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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)

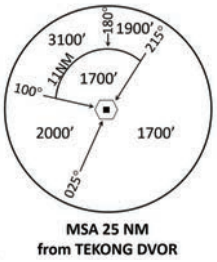
DISTANCES IN NM

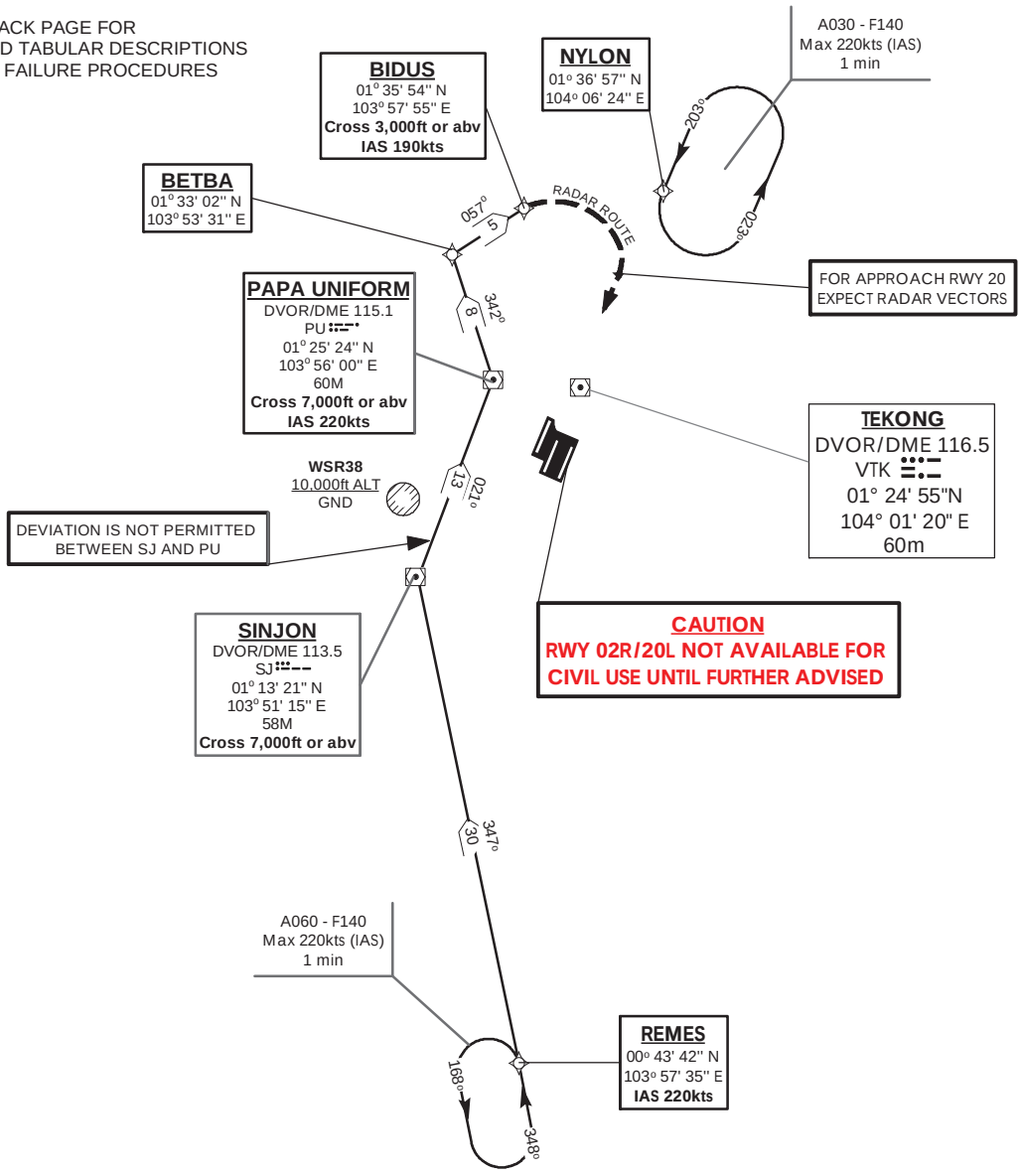
CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via LEBAR 3B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on LEBAR 3B to BIDUS, then direct to NYLON **(b)** From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** **-** Refer to Singapore AIP for radio communications failure procedure

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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)

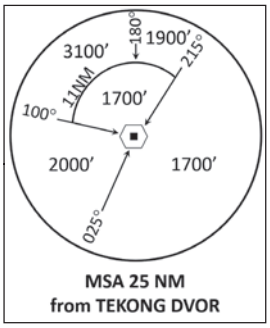
DISTANCES IN NM

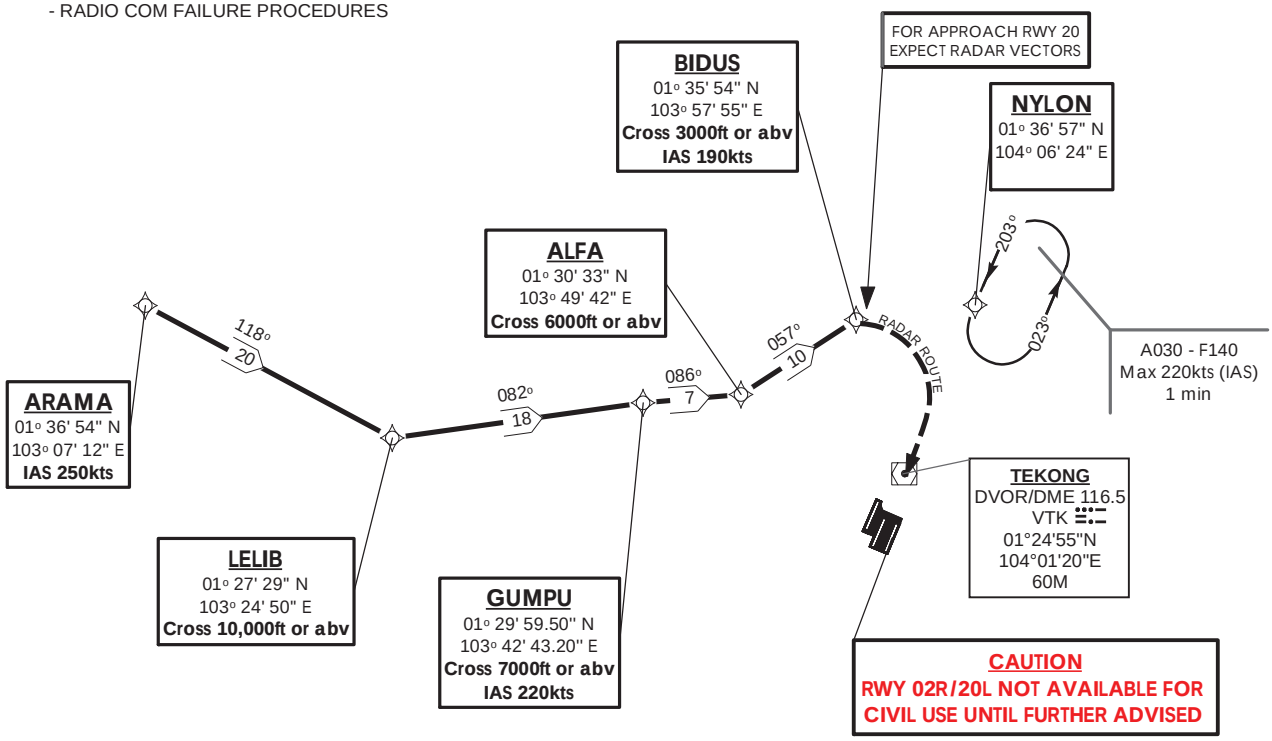
CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED

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

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via LELIB 3B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on LELIB 3B to BIDUS, then direct to NYLON **(b)** From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** - Refer to Singapore AIP for radio communications failure procedure

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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)

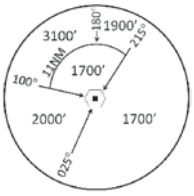
DISTANCES IN NM

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

MABAL
03° 28' 26" N
105° 12' 36" E

231°
F280 - F350
Max 300kts (IAS)
1.5 min
051°
231°
42

KILOT
03° 02' 17" N
104° 40' 23" E

227°
047°
F220 - F270
Max 250kts (IAS)
1.5 min

227°
47

PIBAP
02° 30' 23" N
104° 06' 18" E
Cross FL210 or blw
IAS 250kts

180°
31

PASPU
01° 59' 15" N
104° 06' 18" E
IAS 220kts

NYLON
01° 36' 57" N
104° 06' 24" E

180°
22

A030 - F140
Max 220kts (IAS)
1 min

TEKONG
DVOR/DME 116.5
VTK
01°24'55"N
104°01'20"E
60M

203°
023°

POSUB
01° 27' 25" N
104° 07' 48" E
Cross 6000ft or abv
IAS 220kts

172°
10

CAUTION
RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED

SAMKO
01° 05' 30" N
103° 52' 55" E

RADAR ROUTE
21
203°

FOR APPROACH RWY 02
EXPECT RADAR VECTORS

168°
348°

A040 - F140
Max 220kts (IAS)
1 min

SANAT
01° 07' 49" N
103° 59' 30" E
Cross 4000ft or abv
IAS 190kts

NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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.	MABAL -	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	**When cleared via MABAL 2A by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on MABAL 2A to SANAT, then direct to SAMKO **(b)** From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** - Refer to Singapore AIP for radio communications failure procedure

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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)

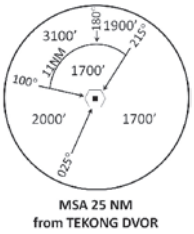
DISTANCES IN NM

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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

MABAL
03° 28' 26" N
105° 12' 36" E

231°
F280 - F350
Max 300kts (IAS)
1.5 min
051°

231°
42

KILOT
03° 02' 17" N
104° 40' 23" E

227°
047°
F220 - F270
Max 250kts (IAS)
1.5 min

227°
47

PIBAP
02° 30' 23" N
104° 06' 18" E
Cross FL210 or blw
IAS 250kts

31
180°

PASPU
01° 59' 15" N
104° 06' 18" E
Cross 6000ft or abv
IAS 220kts

FOR APPROACH RWY 20
EXPECT RADAR VECTORS

180°
22

A030 - F140
Max 220kts (IAS)
1 min

203°
023°

TEKONG
DVOR/DME 116.5
VTK
01°24'55"N
104°01'20"E
60M

RADAR ROUTE

NYLON
01° 36' 57" N
104° 06' 24" E
Cross 3000ft or abv
IAS 190kts

CAUTION
RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED

NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via MABAL 2B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on MABAL 2B to NYLON **(b)** From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** - Refer to Singapore AIP for radio communications failure procedure

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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)

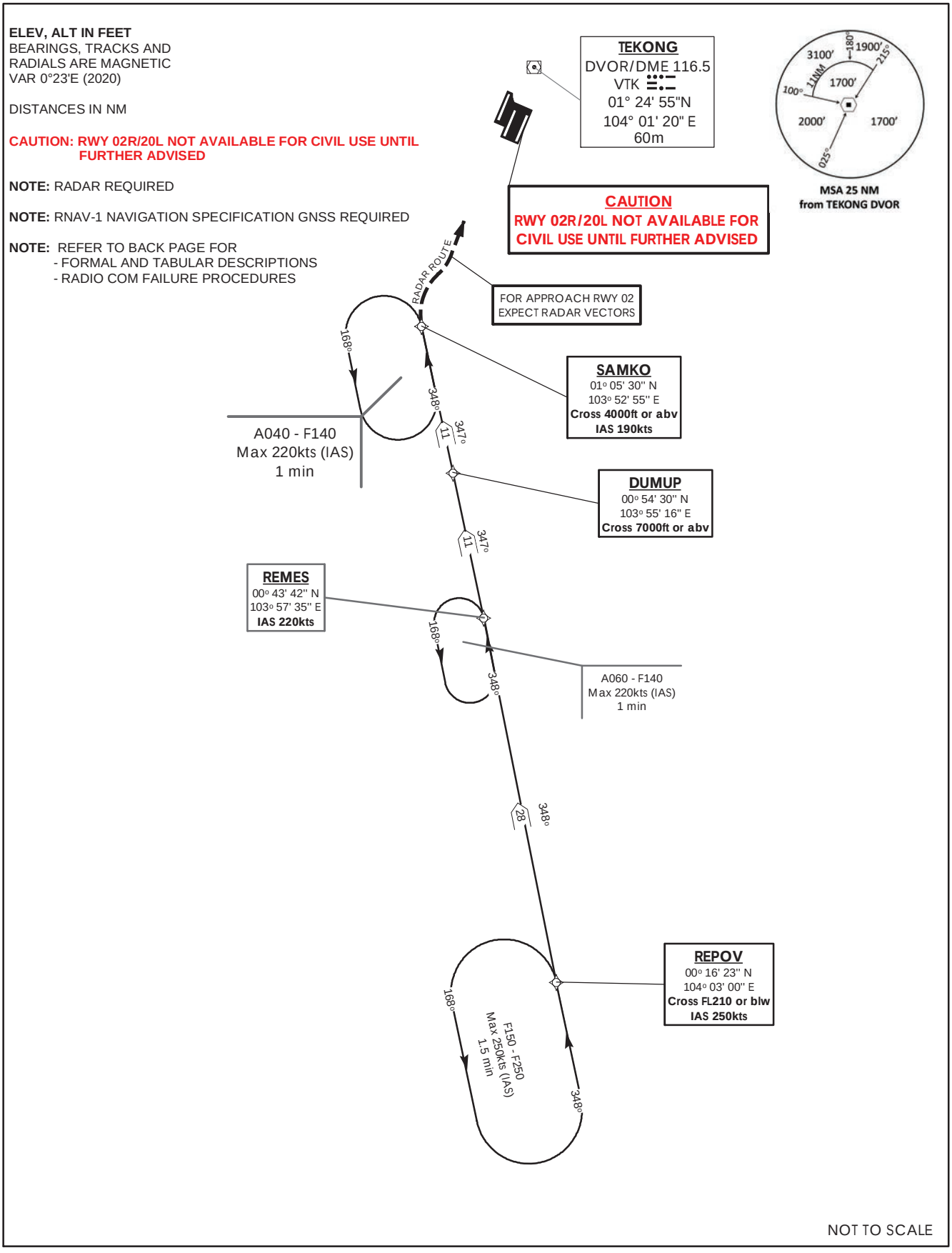
DISTANCES IN NM

CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE 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



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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via REPOV 2A by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on REPOV 2A to SAMKO **(b)** From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** **-** Refer to Singapore AIP for radio communications failure procedure

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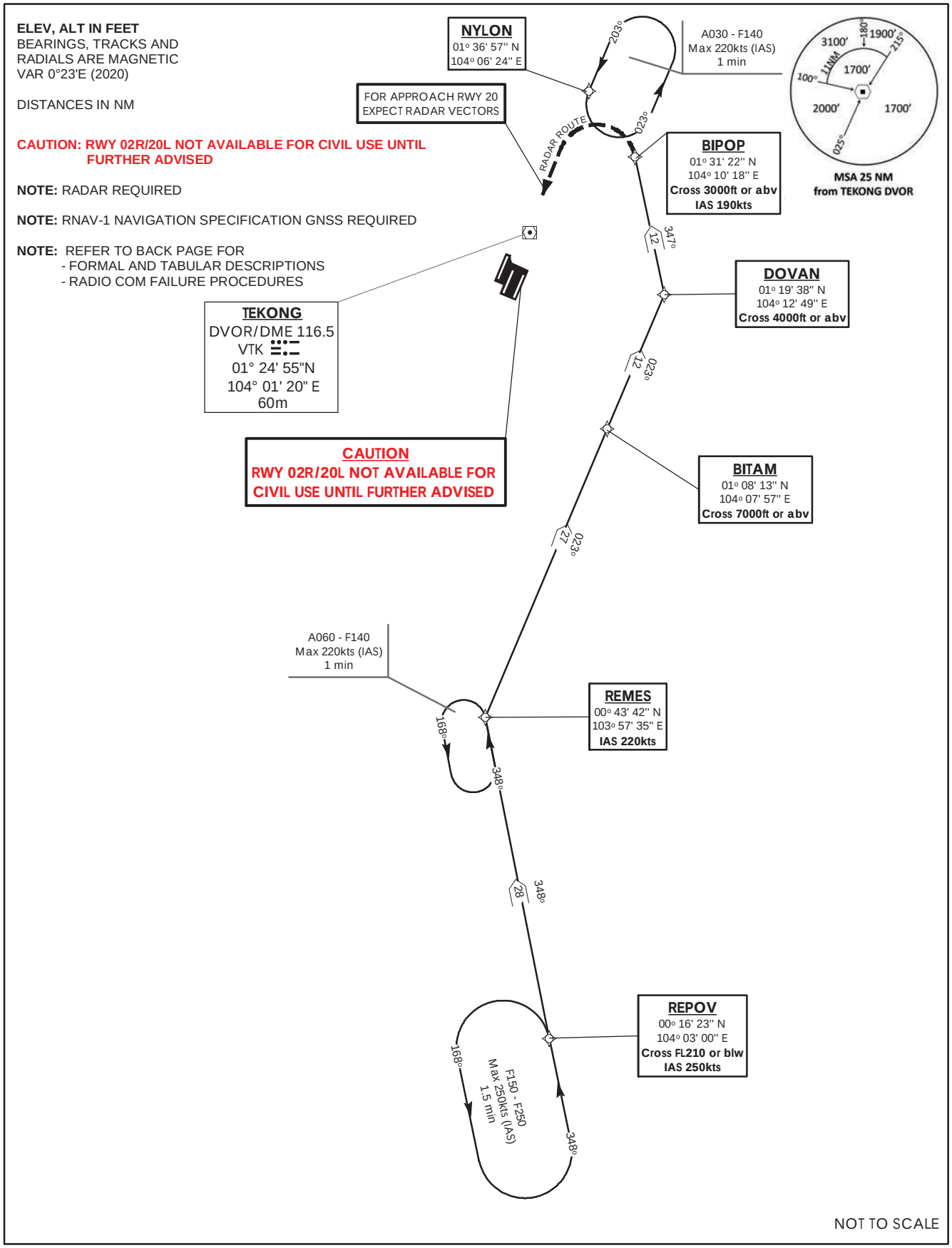
STANDARD ARRIVAL CHART RNAV (GNSS) - INSTRUMENT (STAR)

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



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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via REPOV 2B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on REPOV 2B to BIPOP, then direct to NYLON **(b)** From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** **-** Refer to Singapore AIP for radio communications failure procedure

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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

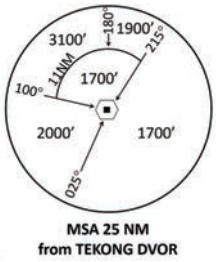
CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED

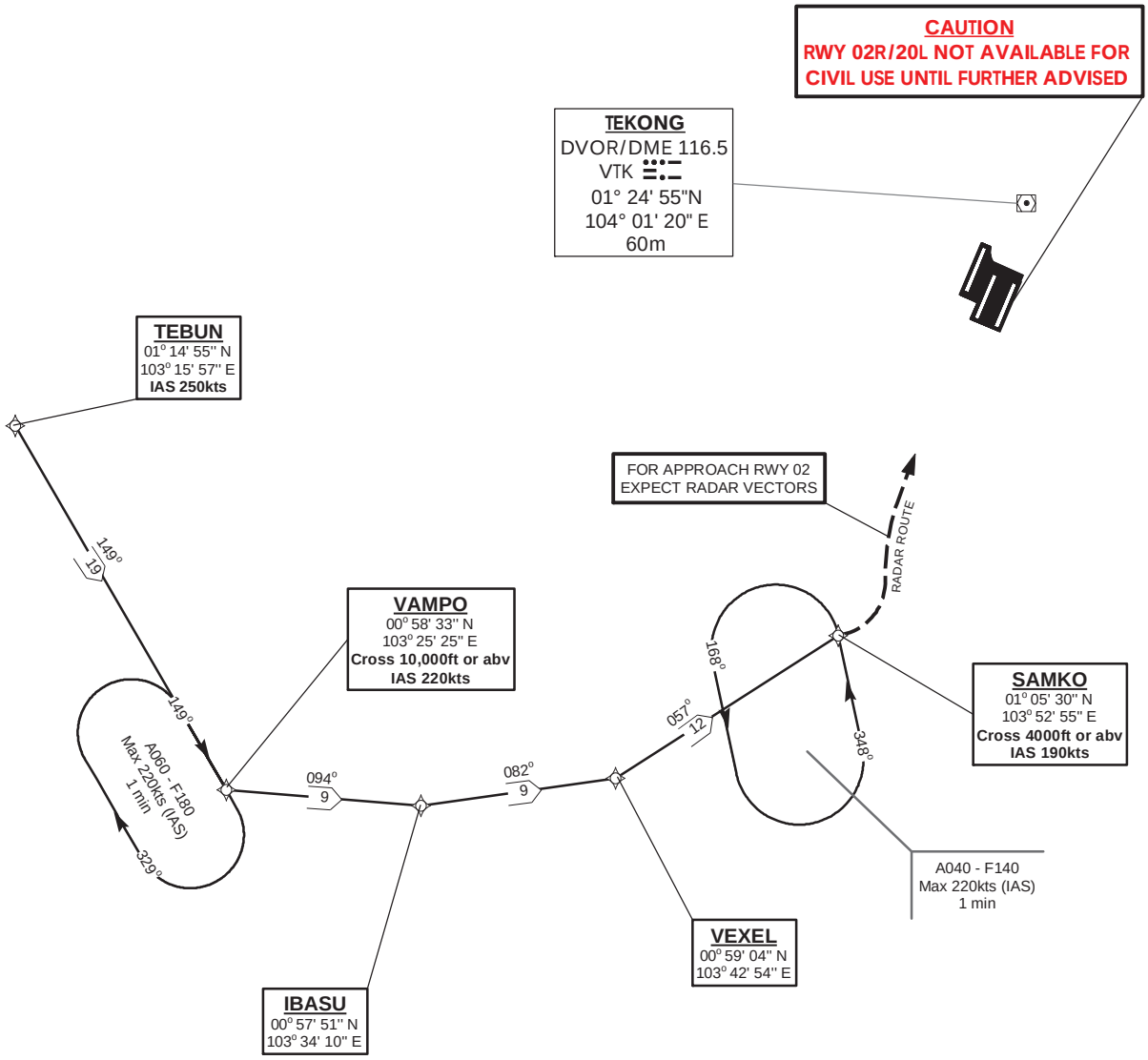
NOTE: RADAR REQUIRED

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





NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via TEBUN 1A by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on TEBUN 1A to SAMKO **(b)** From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** **-** Refer to Singapore AIP for radio communications failure procedure

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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

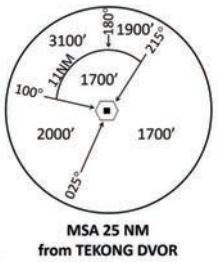
CAUTION: RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED

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



MSA 25 NM
from TEKONG DVOR

NYLON
01° 36' 57" N
104° 06' 24" E

A030 - F140
Max 220kts (IAS)
1 min

FOR APPROACH RWY 20
EXPECT RADAR VECTORS

203°

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

RADAR ROUTE

023°

BIPOP
01° 31' 22" N
104° 10' 18" E
Cross 3000ft or abv
IAS 190kts

12
347°

DOVAN
01° 19' 38" N
104° 12' 49" E
Cross 4000ft or abv

023°
12

CAUTION
RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED

TEBUN
01° 14' 55" N
103° 15' 57" E
IAS 250kts

19
149°

VAMPO
00° 58' 33" N
103° 25' 25" E
Cross 10,000ft or abv
IAS 220kts

ABVIP
01° 00' 08" N
103° 50' 32" E

054°
12

BITAM
01° 08' 13" N
104° 07' 57" E
Cross 7000ft or abv

149°

082°
8

AGROT
01° 01' 08" N
103° 58' 08" E

094°
9

082°
9

082°
8

A060 - F180
Max 220kts (IAS)
1 min

329°

VEXEL
00° 59' 04" N
103° 42' 54" E

IBASU
00° 57' 51" N
103° 34' 10" E

NOT TO SCALE

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	**When cleared via TEBUN 1B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on TEBUN 1B to BIPOP, then direct to NYLON **(b)** From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC**
	- Refer to Singapore AIP for radio communications failure procedure

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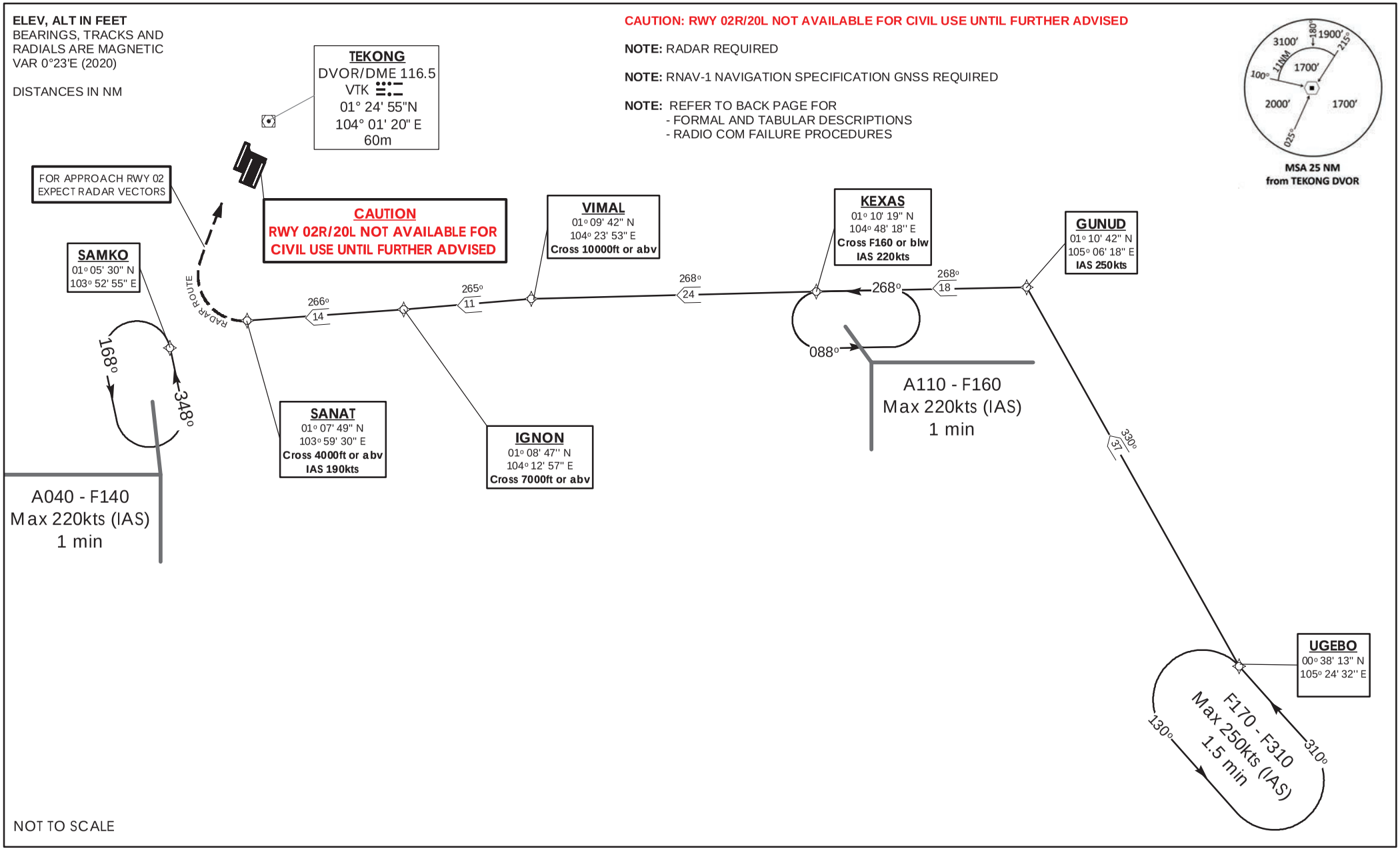
STANDARD ARRIVAL CHART RNAV (GNSS) - INSTRUMENT (STAR)

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



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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

UGEBO 1A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From UGEBO.	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	**When cleared via UGEBO 1A by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on UGEBO 1A to SANAT, then direct to SAMKO **(b)** From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** **-** Refer to Singapore AIP for radio communications failure procedure

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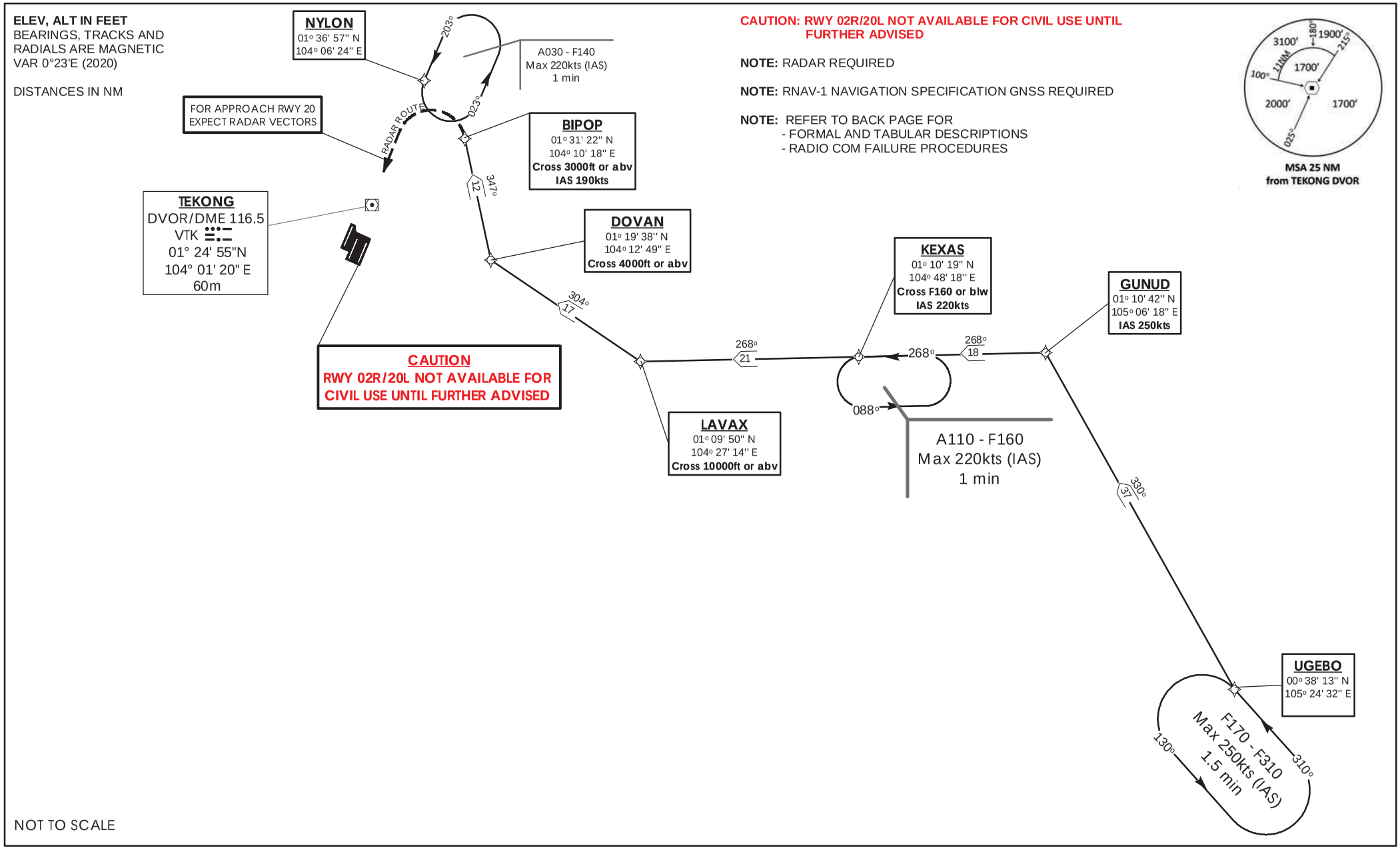
STANDARD ARRIVAL CHART
RNAV (GNSS) - INSTRUMENT (STAR)

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



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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

UGEBO 1B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From UGEBO.	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	**When cleared via UGEBO 1B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on UGEBO 1B to BIPOP, then direct to NYLON **(b)** From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore AIP for missed approach procedure
3	**No clearance or instruction received from Singapore ATC** **-** Refer to Singapore AIP for radio communications failure procedure

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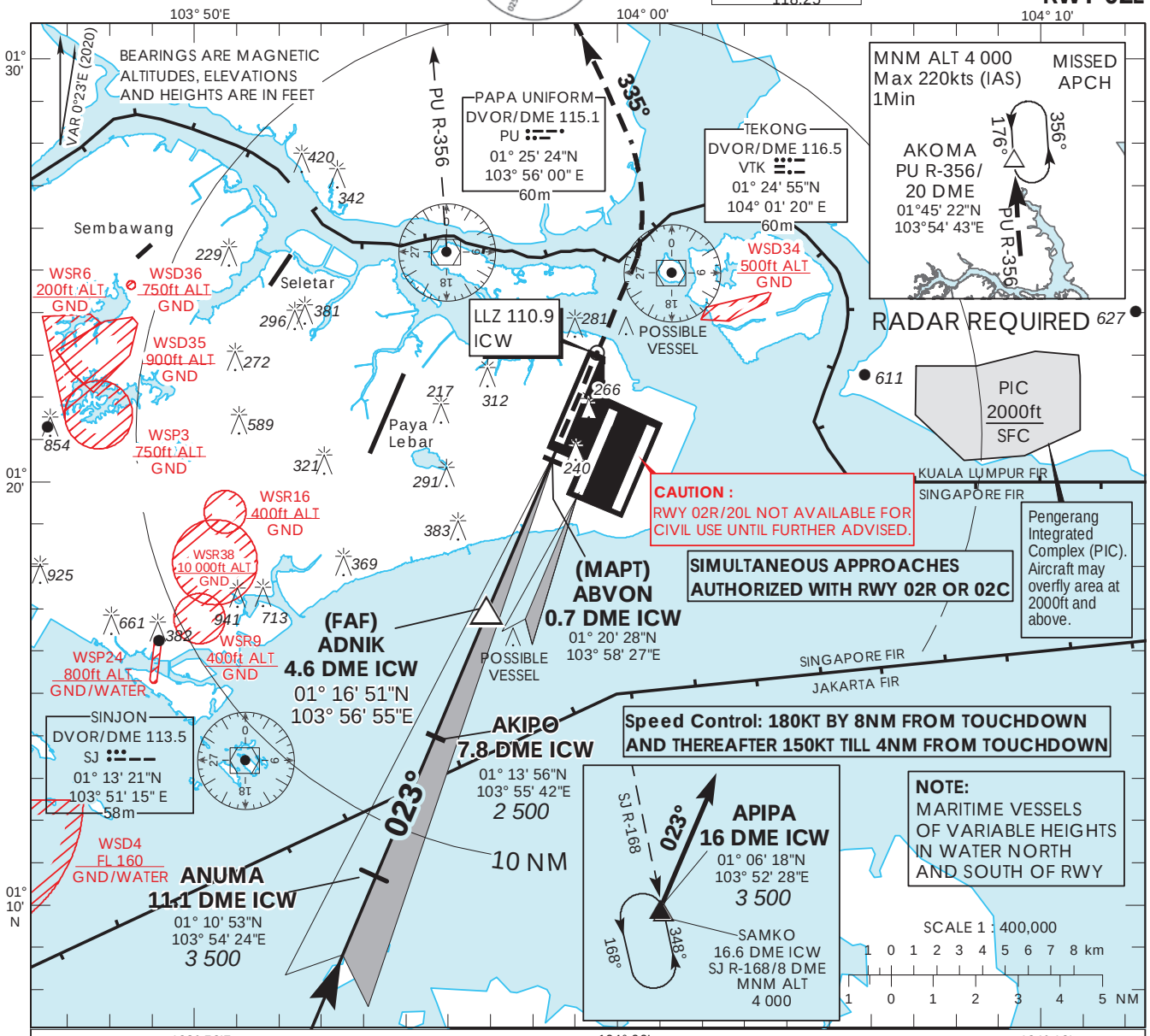
INSTRUMENT APPROACH CHART - ICAO

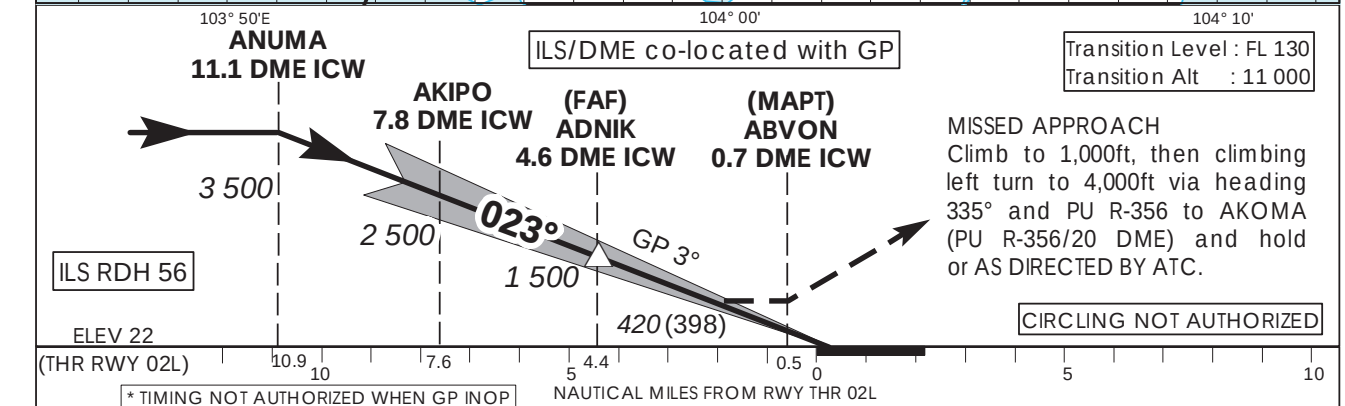
AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 02L - ELEV 22ft

MSA 25 NM from TEKONG DVOR

D-ATIS	AP ID WSSS
	128.025
APP	124.05
	119.3
TWR	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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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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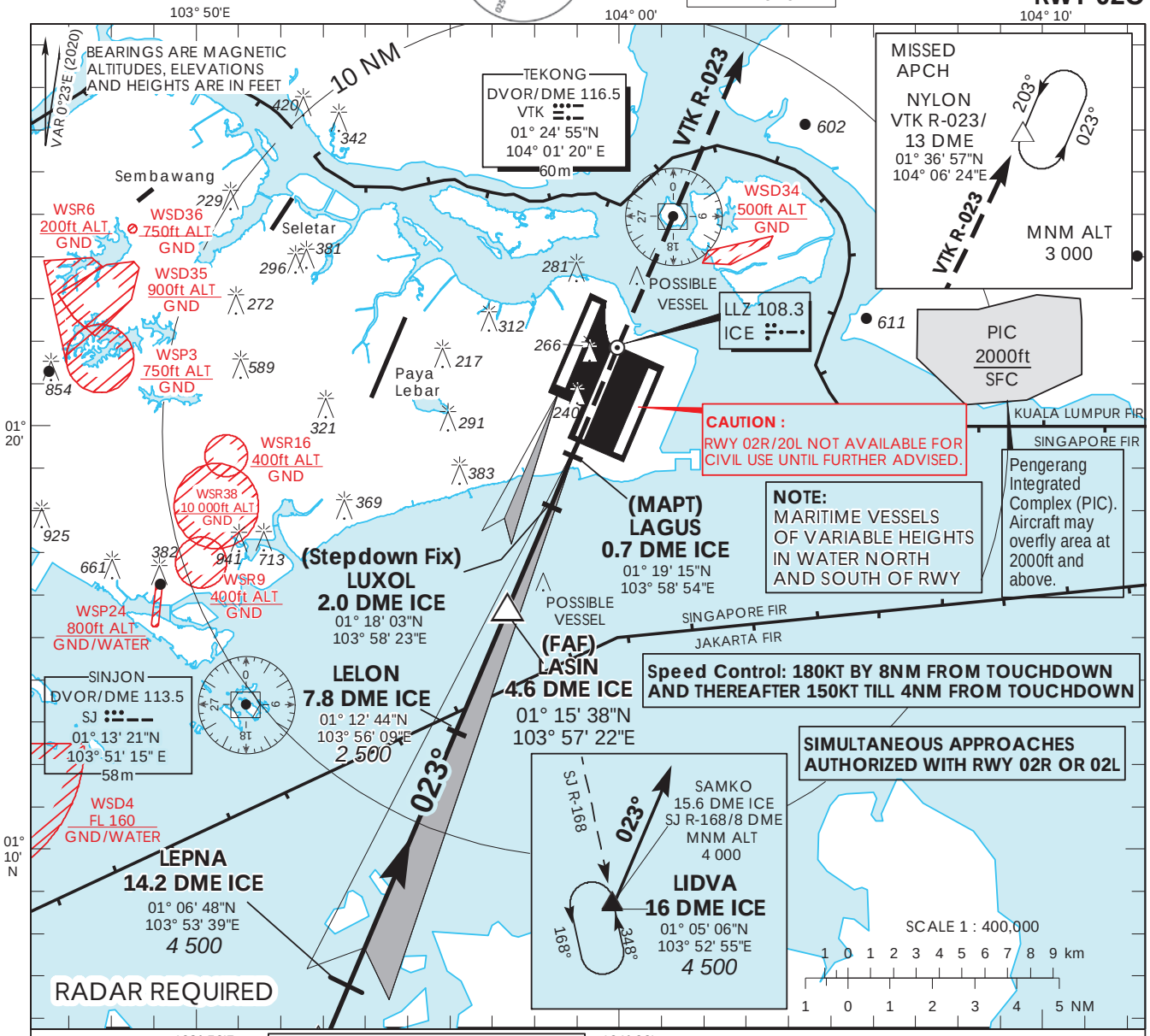
INSTRUMENT APPROACH CHART - ICAO

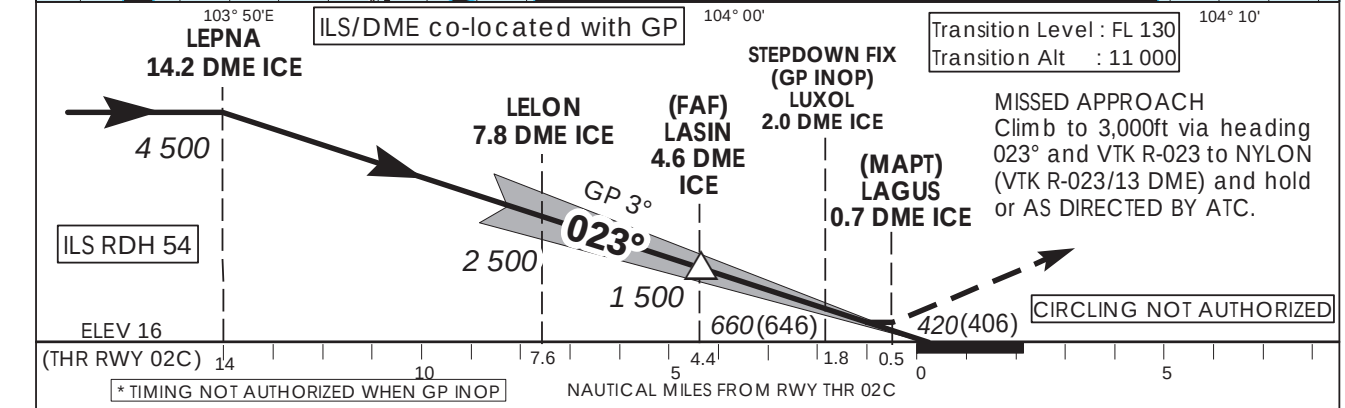
AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 02C - ELEV 16ft

MSA 25 NM from TEKONG DVOR

D-ATIS	AP ID WSSS
	128.025
APP	124.05
	119.3
TWR	118.6
	118.25

SINGAPORE/ SINGAPORE CHANGI
ICE ILS/DME RWY 02C





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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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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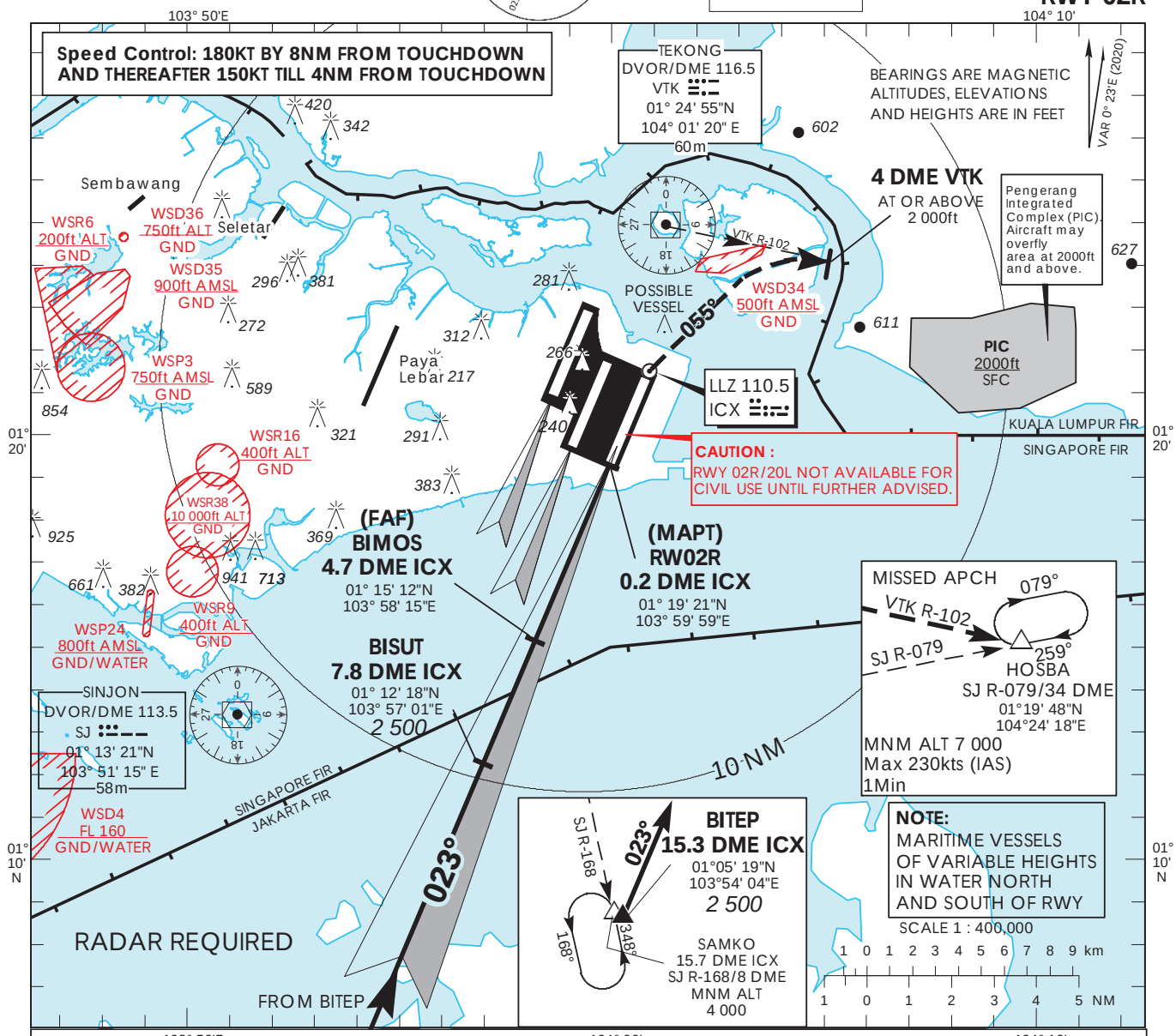
INSTRUMENT APPROACH CHART

AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 02R - ELEV 16ft

MSA 25 NM from TEKONG DVOR

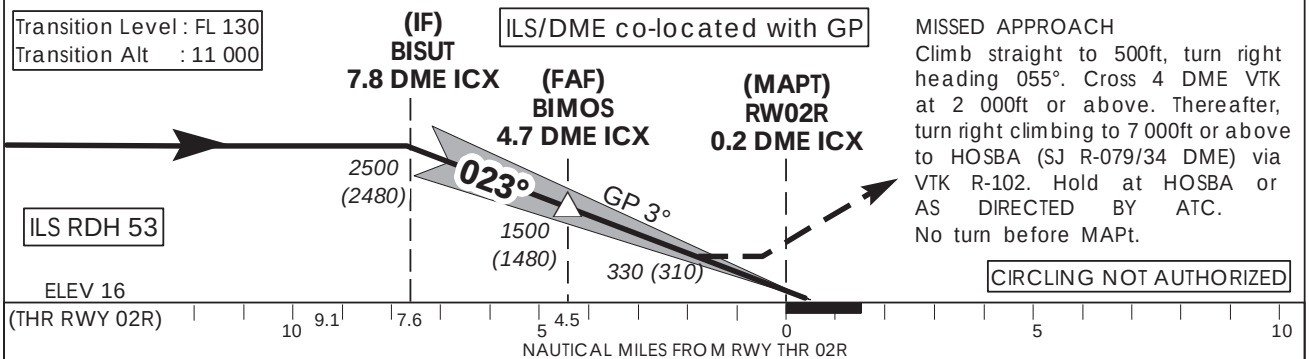
D-ATIS	AP ID WSSS
	128.025
APP	124.05
	119.3
TWR	131.4

SINGAPORE/ SINGAPORE CHANGI
ICX ILS/DME RWY 02R



1. This procedure requires a missed approach climb gradient of 5% (304 ft/NM) until passing 2,000ft. MAX IAS 185kts during turning missed approach.
2. 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



MISSED APPROACH
Climb straight to 500ft, turn right heading 055°. Cross 4 DME VTK at 2 000ft or above. Thereafter, turn right climbing to 7 000ft or above to HOSBA (SJ R-079/34 DME) via VTK R-102. Hold at HOSBA or AS DIRECTED BY ATC.
No turn before MAPt.

CIRCLING NOT AUTHORIZED

* TIMING NOT AUTHORIZED WHEN GP INOP

		OCA (OCH)			
Category of Aircraft		A	B	C	D
Straight-in	CAT I ILS	**220 (200)**			
	CAT II ILS	**120 (100)**			
	GP INOP	**330 (310)**			

Distance		4 DME	3 DME	2 DME	
Altitude (Height)		**1300 (1280)**	**980 (960)**	**660 (640)**	
Speed	knots	70	120	150	185
FAF - MAPT 4.5nm	min : s *	**3 : 52**	**2 : 15**	**1 : 48**	**1 : 28**
Rate of descent/GS	ft/min	**630**	**1080**	**1350**	**1665**

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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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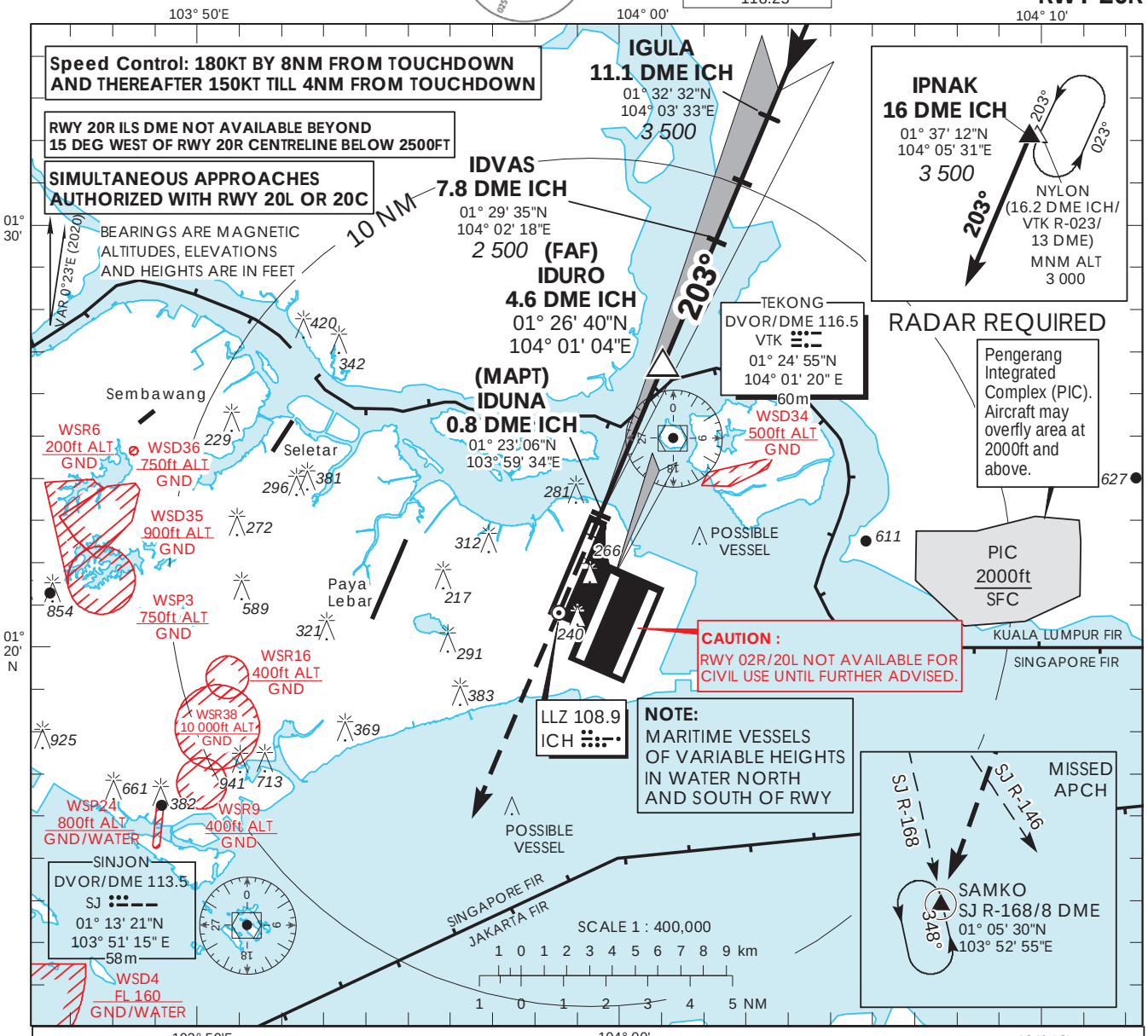
INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO
DTHR RWY 20R - ELEV 13ft

MSA 25 NM from TEKONG DVOR

D-ATIS	AP ID WSSS
	128.025
APP	124.05
	119.3
TWR	118.6
	118.25

SINGAPORE/ SINGAPORE CHANGI
ICH ILS/DME RWY 20R



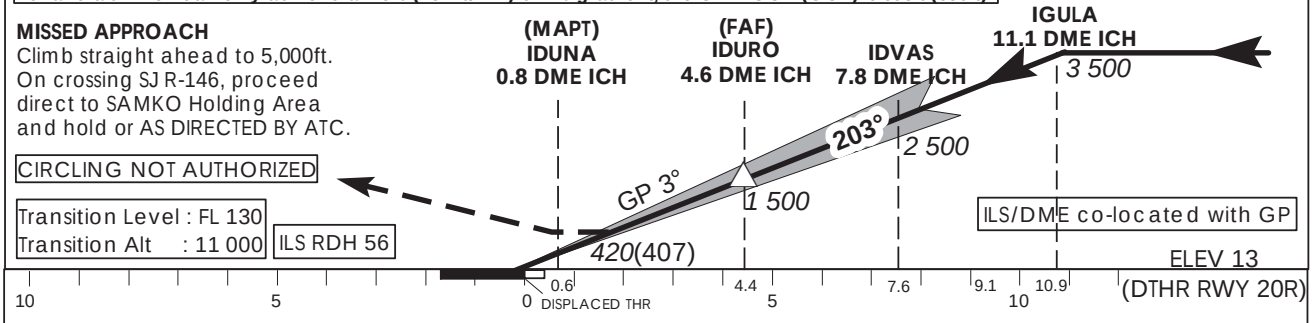
This procedure requires a missed approach climb gradient of 3.7% (225 ft/NM) until passing 2,500ft.
For aircraft which can only achieve a 2.5% (152 ft/NM) climb gradient, the CAT I OCA (OCH) is 693ft (680ft).

MISSED APPROACH
Climb straight ahead to 5,000ft.
On crossing SJ R-146, proceed direct to SAMKO Holding Area and hold or AS DIRECTED BY ATC.

CIRCLING NOT AUTHORIZED

Transition Level : FL 130
Transition Alt : 11 000

ILS RDH 56



* TIMING NOT AUTHORIZED WHEN GP INOP

OCA (OCH)						
Category of Aircraft		A	B	C	D	D_L
Straight-in	CAT I ILS	**152 (139)**	**159 (146)**	**179 (166)**	**192 (179)**	**195 (182)**
	GP INOP	**420 (407)**				

Distance	4 DME	3 DME	2 DME
Altitude (Height)	**1290 (1277)**	**970 (957)**	**650 (637)**

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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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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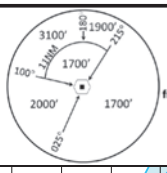
INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 20C - ELEV 16ft



D-ATIS	AP ID WSSS 128.025
APP	124.05
	119.3
TWR	118.6
	118.25

SINGAPORE/ SINGAPORE CHANGI
ICC ILS/DME RWY 20C

Speed Control: 180KT BY 8NM FROM TOUCHDOWN AND THEREAFTER 150KT TILL 4NM FROM TOUCHDOWN

RADAR REQUIRED

SIMULTANEOUS APPROACHES AUTHORIZED WITH RWY 20L OR 20R

VAR 0°23'E (2020)

BEARINGS ARE MAGNETIC
ALTITUDES, ELEVATIONS AND HEIGHTS ARE IN FEET

10 NM

ELALU
14.2 DME ICC
01° 34' 40"N
104° 05' 24"E
4 500

EGORA
16 DME ICC
01° 36' 21"N
104° 06' 07"E
4 500

NYLON
16.7 DME ICC
VTK R-023/
13 DME
MNM ALT
3 000

ELBEB
7.8 DME ICC
01° 28' 45"N
104° 02' 54"E
2 500

(FAF)
ELMIN
4.6 DME ICC
01° 25' 50"N
104° 01' 41"E

203°
023°

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

Pengerang Integrated Complex (PIC) Aircraft may overfly area at 2000ft and above.

PIC
2000ft
SFC

WSR6
200ft ALT
GND

WSD36
750ft ALT
GND

WSD35
900ft ALT
GND

WSP3
750ft ALT
GND

WSR16
400ft ALT
GND

WSR38
10 000ft ALT
GND

WSR9
400ft ALT
GND

WSP24
800ft ALT
GND/WATER

WSD34
500ft ALT
GND

WSD4
FL 160
GND/WATER

Sembawang
Seletar
Paya Lebar

POSSIBLE VESSEL

(MAPT)
ESBIT
0.7 DME ICC
01° 22' 12"N
104° 00' 09"E

KUALA LUMPUR FIR
SINGAPORE FIR

CAUTION :
RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED.

LLZ 109.7
ICC

130°

ESLUX
6.7 DME VTK
01° 18' 44"N
103° 58' 40"E

SINGAPORE FIR
JAKARTA FIR

NOTE:
MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

EXOMO
VTK R-158/
22 DME
01° 04' 25"N
104° 09' 33"E

VTK R-158°
158°
338°

MISSED APCH
MNM ALT 4 000
Max 220kts (IAS)
1 Min

SINJON
DVOR/DME 113.5
SJ
01° 13' 21"N
103° 51' 15" E
58m

SCALE 1 : 400,000
1 0 1 2 3 4 5 6 7 8 9 km
1 0 1 2 3 4 5 NM

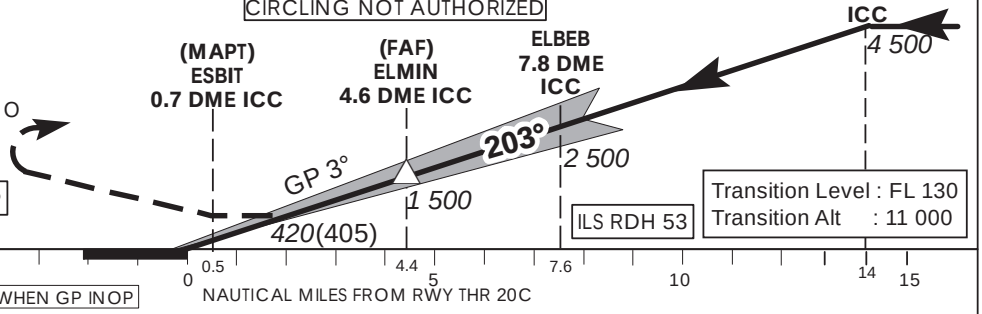
103° 50'E
104° 00'
104° 10'
01° 30'
01° 20' N

This procedure requires a missed approach climb gradient of 2.8% (171 ft/NM) until passing 2,000ft.
For aircraft which can only achieve a 2.5% (152 ft/NM) climb gradient, the CAT I OCA (OCH) is 315ft (300ft).

MISSED APPROACH
Climb to 4,000ft via VTK R-203 to ESLUX (6.7 DME VTK). At ESLUX turn left heading 130° to intercept VTK R-158 to EXOMO (VTK R-158/22 DME) and hold or AS DIRECTED BY ATC.

ILS/DME co-located with GP

CIRCLING NOT AUTHORIZED



Transition Level : FL 130
Transition Alt : 11 000

* TIMING NOT AUTHORIZED WHEN GP INOP

OCA (OCH)						
Category of Aircraft		A	B	C	D	D_L
Straight-in	CAT I ILS	**166 (151)**	**180 (165)**	**196 (181)**	**209 (194)**	**212 (197)**
	CAT II ILS	**71 (56)**	**78 (63)**	**91 (76)**	**101 (86)**	**107 (92)**
	GP INOP	**420 (405)**				

Distance	4 DME		3 DME		2 DME	
Altitude (Height)	**1290 (1275)**		**980 (965)**		**660 (645)**	
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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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO AD ELEV

MSA 25 NM from TEKONG DVOR

D-ATIS	AP ID WSSS	128.025
APP		124.05
		119.3
TWR		118.6
		118.25

SINGAPORE/ SINGAPORE CHANGI
VTK DVOR/DME RWY 20C

103° 50'E 104° 00' 104° 10'

Speed Control: 180KT BY 8NM FROM TOUCHDOWN AND THEREAFTER 150KT TILL 4NM FROM TOUCHDOWN

BEARINGS ARE MAGNETIC
ALTITUDES, ELEVATIONS AND HEIGHTS ARE IN FEET

VAR 0°23'E (2020)

10 NM

IF
9.1 DME VTK
2 000

203°

NYLON
(13 DME VTK-R-023 VTK)
203°
203°
MNM ALT 3 000

FAF
2.6 DME VTK
01° 27' 19"N
104° 02' 18"E

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

Pengerang Integrated Complex (PIC). Aircraft may overfly area at 2000ft and above.

PIC
2000ft
SFC

MAPT
3 DME VTK

POSSIBLE VESSEL

WSD34
500ft ALT
GND

WSR6
200ft ALT
GND

WSD36
750ft ALT
GND

WSD35
900ft ALT
GND

WSP3
750ft ALT
GND

WSR16
400ft ALT
GND

WSR38
10 000ft ALT
GND

WSP24
800ft ALT
GND/WATER

WSR9
400ft ALT
GND

WSD4
FL 160
GND/WATER

Sembawang
Seletar
Paya Lebar

420 342 229 381 296 272 589 854 321 291 312 217 266 281 240 602 611 630 383 369 925 661 382 941 713

01° 30'
01° 20' N

KUALA LUMPUR FIR
SINGAPORE FIR

CAUTION :
RWY 02R/20L NOT AVAILABLE FOR CIVIL USE UNTIL FURTHER ADVISED.

ESLUX
6.7 DME VTK
01° 18' 44"N
103° 58' 40"E

130°

POSSIBLE VESSEL

SINGAPORE FIR
JAKARTA FIR

NOTE:
MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

EXOMO
VTK R-158/
22 DME
01° 04' 25"N
104° 09' 33"E

VTK R-158°
158°
338°

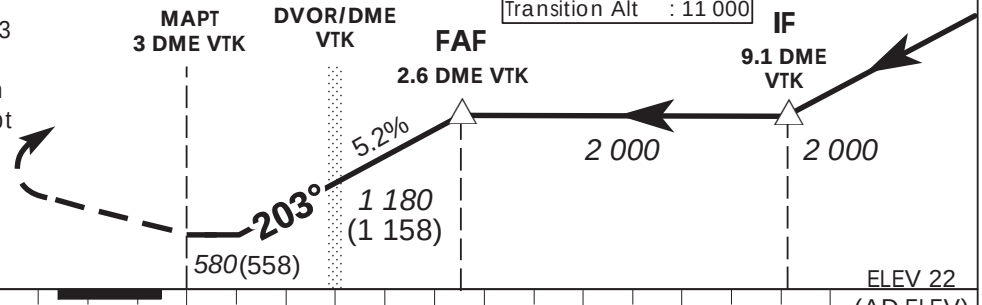
MISSED APCH
MNM ALT 4 000
Max 220kts (IAS)
1 Min

SINJON
DVOR/DME 113.5
SJ
01° 13' 21"N
103° 51' 15" E
58m

SCALE 1 : 400,000
1 0 1 2 3 4 5 6 7 8 9 km
1 0 1 2 3 4 5 NM

Transition Level : FL 130
Transition Alt : 11 000

MISSED APPROACH
Climb to 4,000ft via VTK R-203 to ESLUX (6.7 DME VTK). At ESLUX (1,000ft or above) turn left heading 130° to intercept VTK R-158 to EXOMO (VTK R-158/22 DME)and hold or AS DIRECTED BY ATC.



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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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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INSTRUMENT APPROACH CHART - ICAO

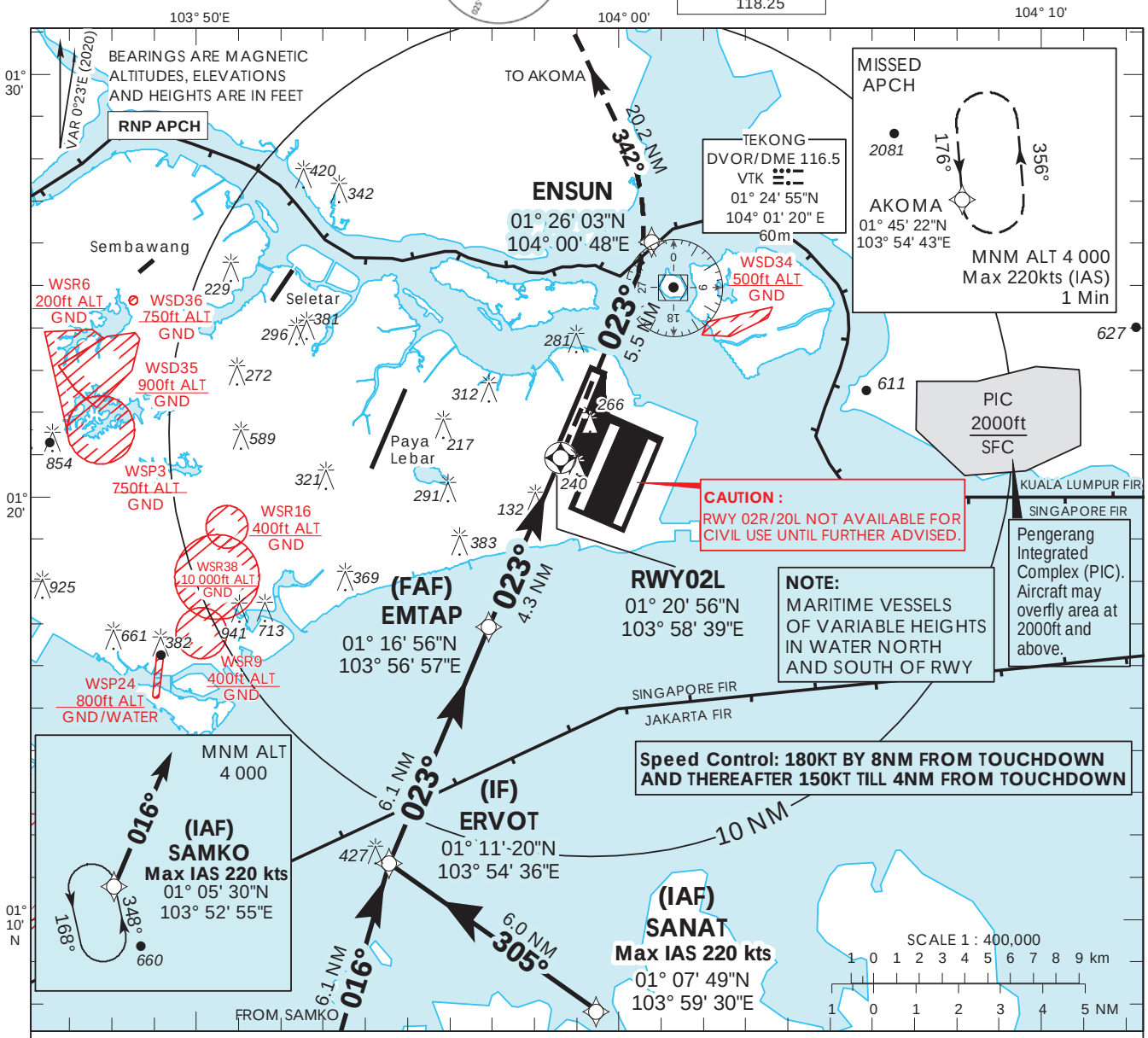
AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 02L - ELEV 22ft

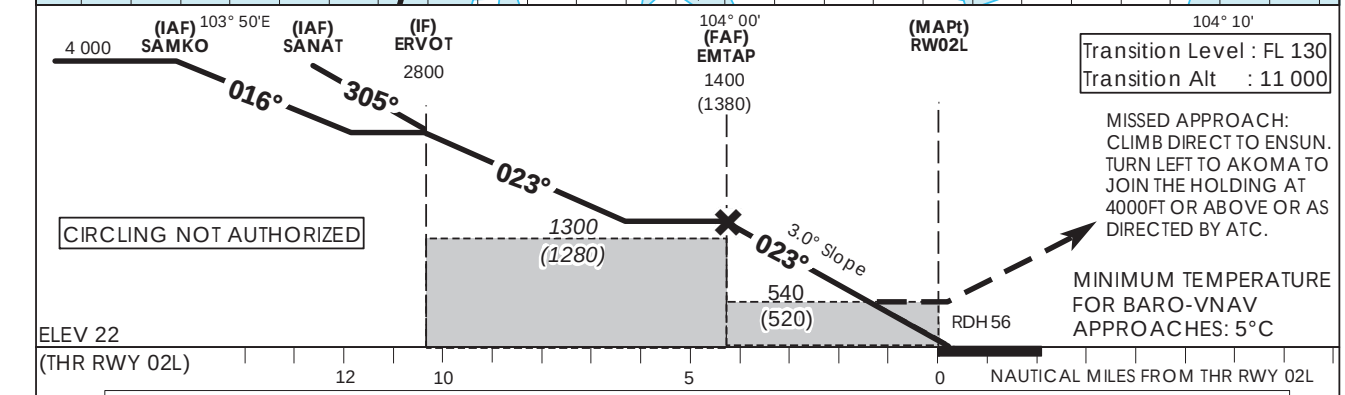
MSA 25 NM from TEKONG DVOR

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**

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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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

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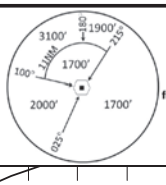
INSTRUMENT APPROACH CHART - ICAO

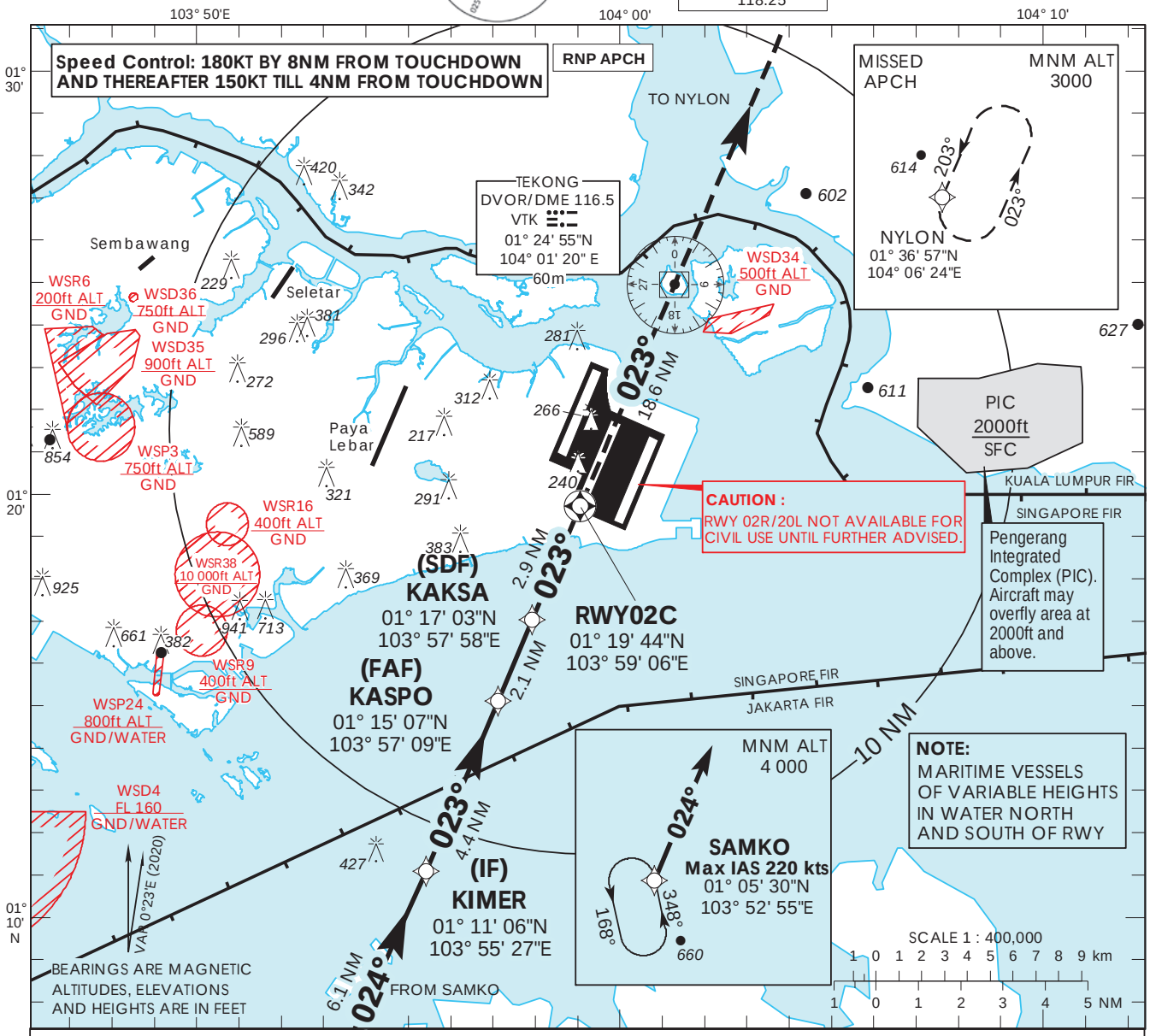
AERODROME ELEV 22ft
HEIGHT RELATED TO THR RWY 02C - ELEV 16ft

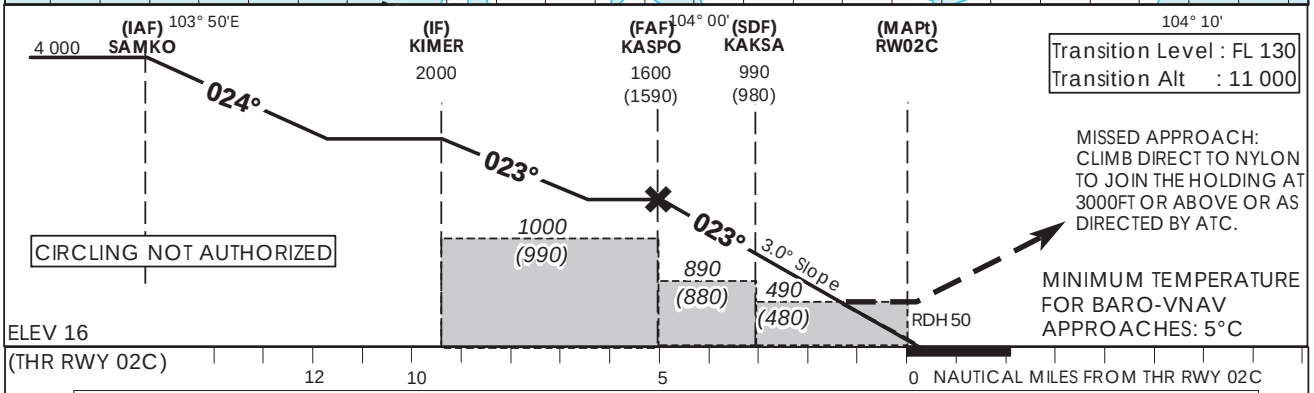


D-ATIS	AP ID WSSS
	128.025
APP	124.05
	119.3
TWR	118.6
	118.25

SINGAPORE/ SINGAPORE CHANGI

RNP RWY 02C





Category of Aircraft		OCA (OCH) A	B	C	D
LNAV	2.5%	**490 (480)**			
LNAV without SDF	2.5%	**890 (880)**			
LNAV/VNAV	2.5%	**360 (350)**			

Fix		SAMKO	KIMER	KASPO	KAKSA	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**

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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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

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INSTRUMENT APPROACH CHART - ICAO

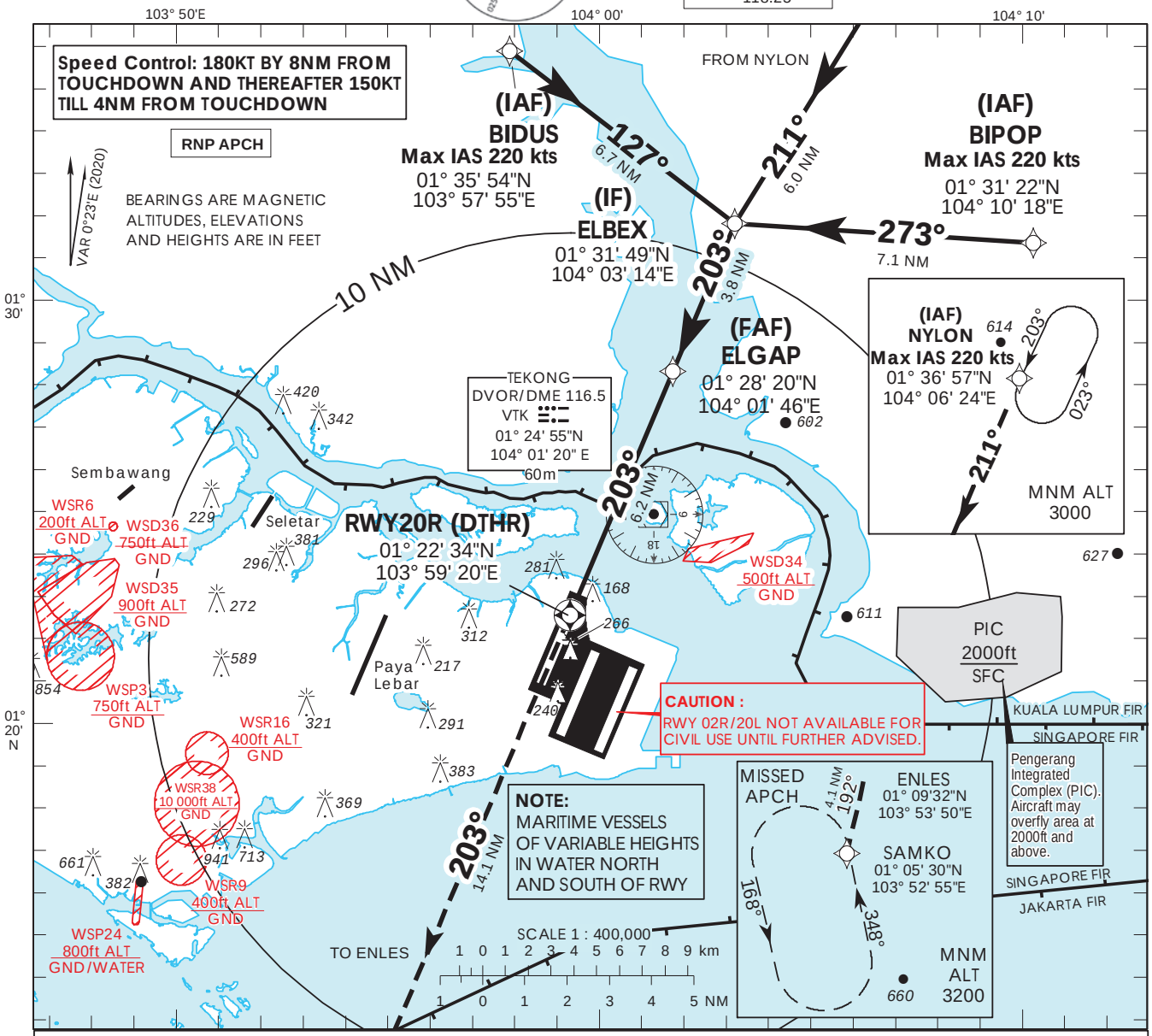
AERODROME ELEV 22ft
HEIGHT RELATED TO
DTHR RWY 20R - ELEV 13ft

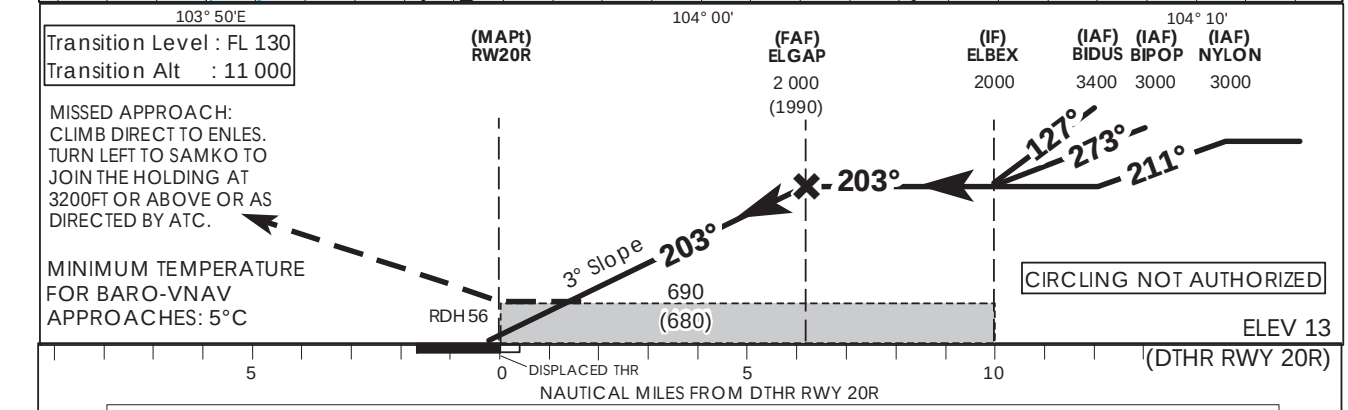
MSA 25 NM from TEKONG DVOR

D-ATIS	AP ID WSSS 128.025
APP	124.05 119.3
TWR	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**		

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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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

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INSTRUMENT APPROACH CHART - ICAO

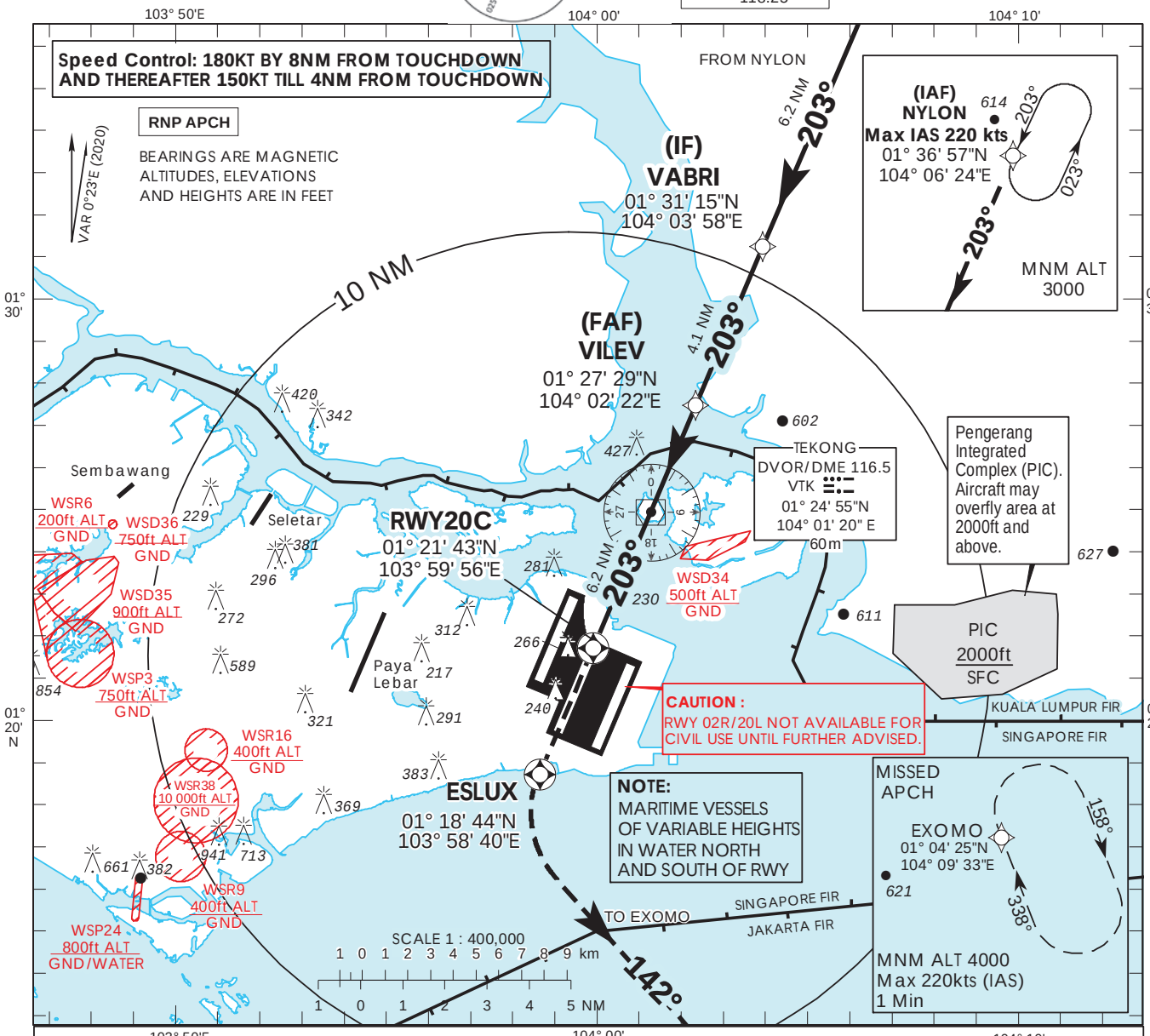
AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 20C - ELEV 16ft

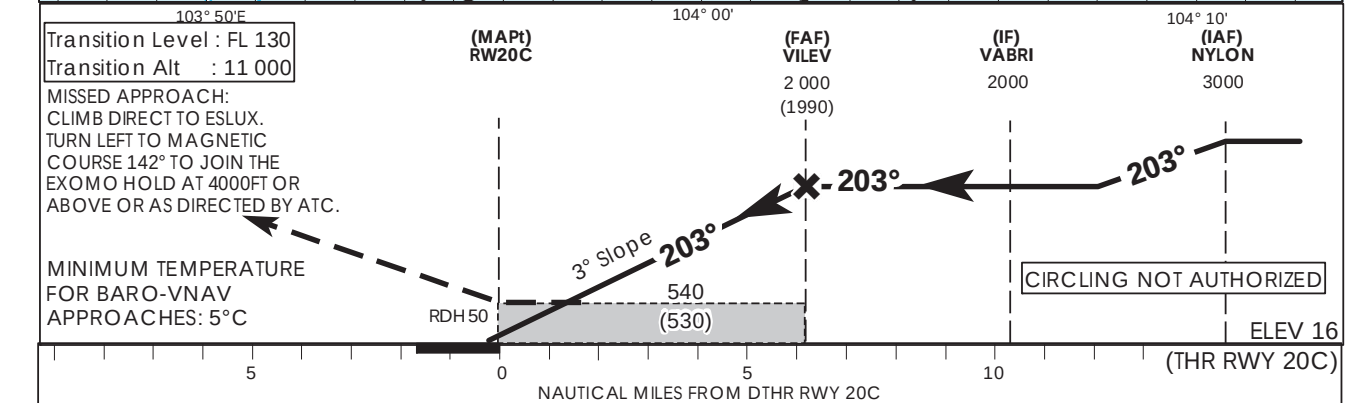
MSA 25 NM from TEKONG DVOR

D-ATIS	AP ID	WSSS
		128.025
APP		124.05
		119.3
TWR		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)**	**4000 (3985)**

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**

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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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	-	-	A040+	-	-	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

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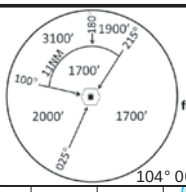
INSTRUMENT APPROACH CHART

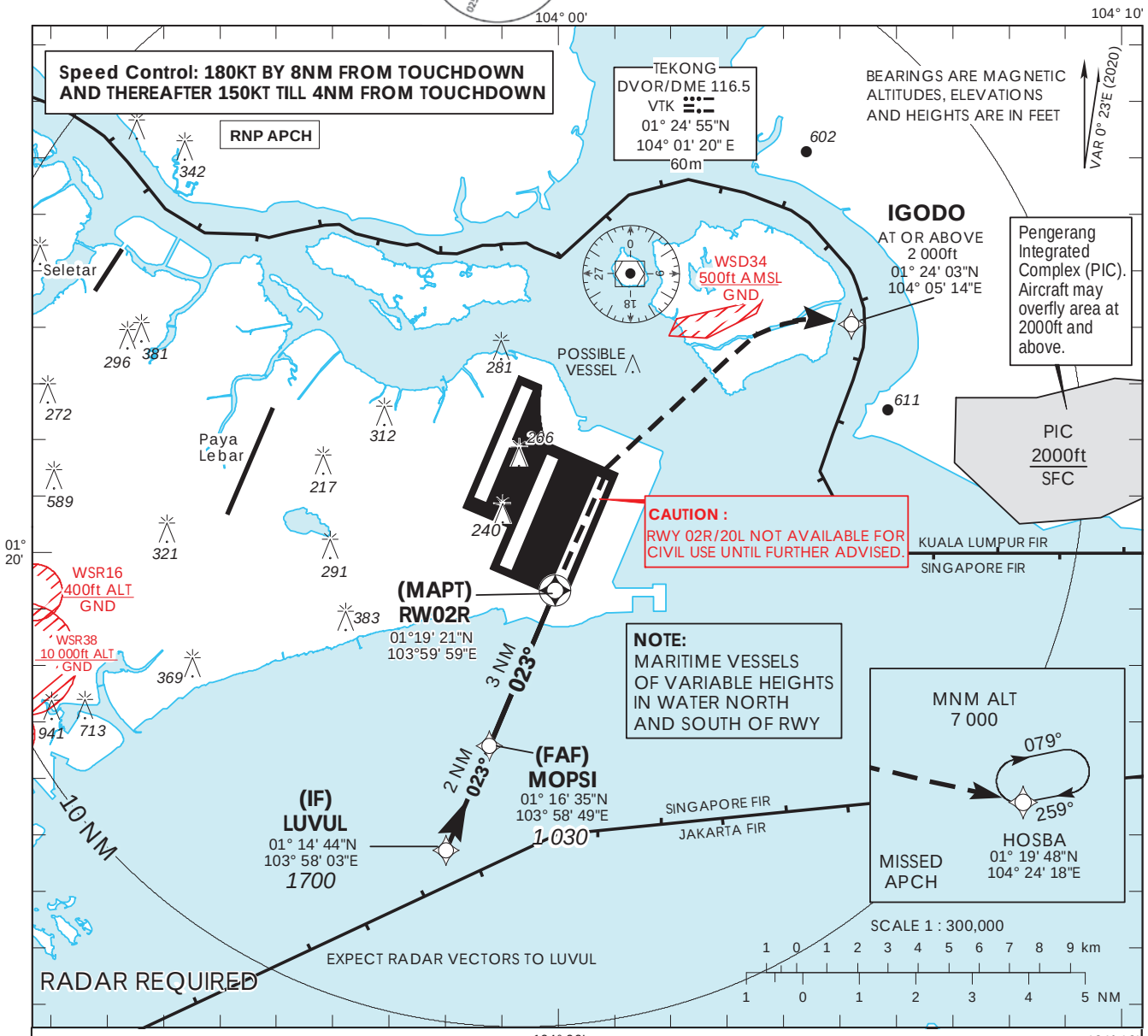
AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 02R - ELEV 16ft



D-ATIS	AP ID WSSS
APP	128.025 124.05 119.3
TWR	131.4

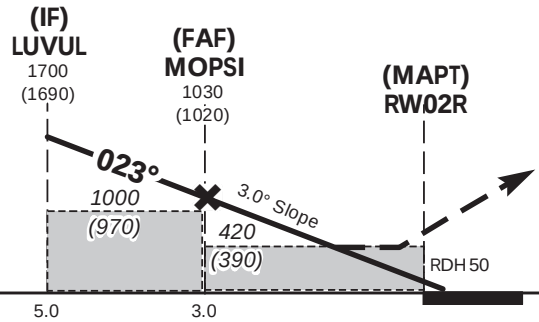
SINGAPORE/ SINGAPORE CHANGI

RNP RWY 02R



1. This procedure requires a missed approach climb gradient of 5% (304 ft/NM) until passing 2,000ft. MAX IAS 185kts during turning missed approach.
2. 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



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

MINIMUM TEMPERATURE FOR BARO-VNAV APPROACHES: 5°C

ELEV 16
(THR RWY 02R)

		OCA (OCH)			
Category of Aircraft		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**	

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CHANGES : Revision to Restricted Area WSR16

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

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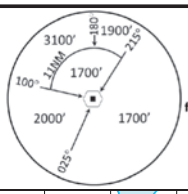
INSTRUMENT APPROACH CHART

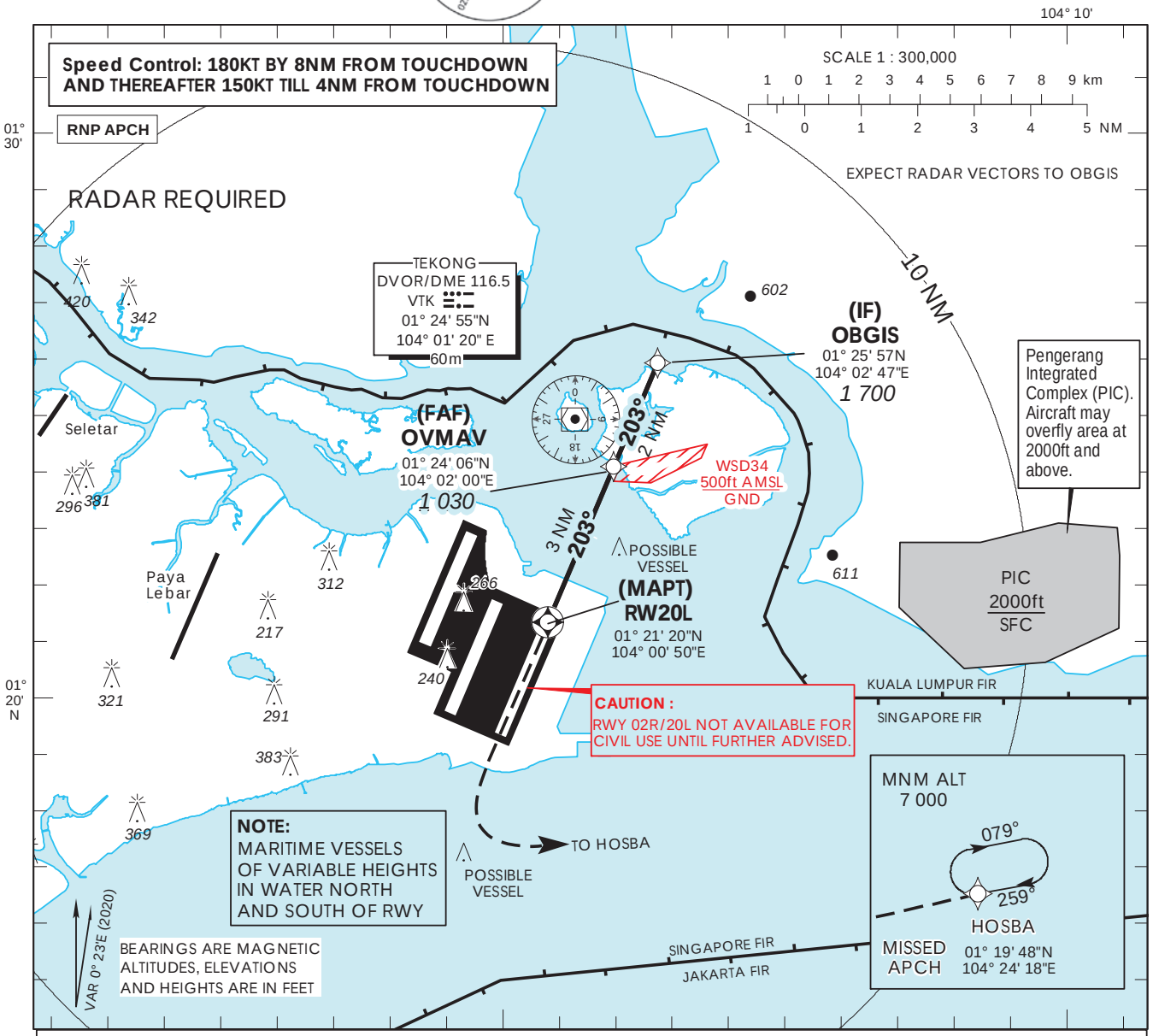
AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 20L - ELEV 16ft



D-ATIS	AP ID WSSS
	128.6
APP	124.05
	119.3
TWR	131.4

SINGAPORE/ SINGAPORE CHANGI

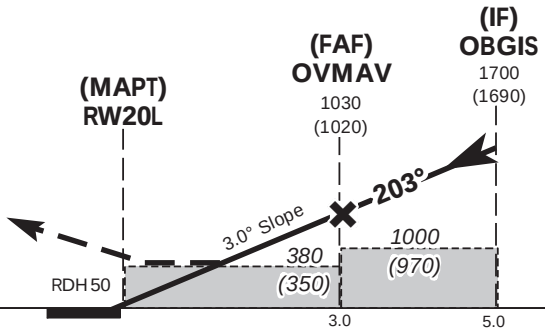
RNP RWY 20L



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.



MINIMUM TEMPERATURE FOR BARO-VNAV APPROACHES: 5°C

CIRCLING NOT AUTHORIZED

ELEV 16
(THR RWY 20L)

		OCA (OCH)			
Category of Aircraft		A	B	C	D
LNAV/VNAV	5%	**280 (260)**			
LNAV	5%	**380 (350)**			

Distance			OBGIS		OVMAV
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**

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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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	OVMAV	-	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
OVMAV (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

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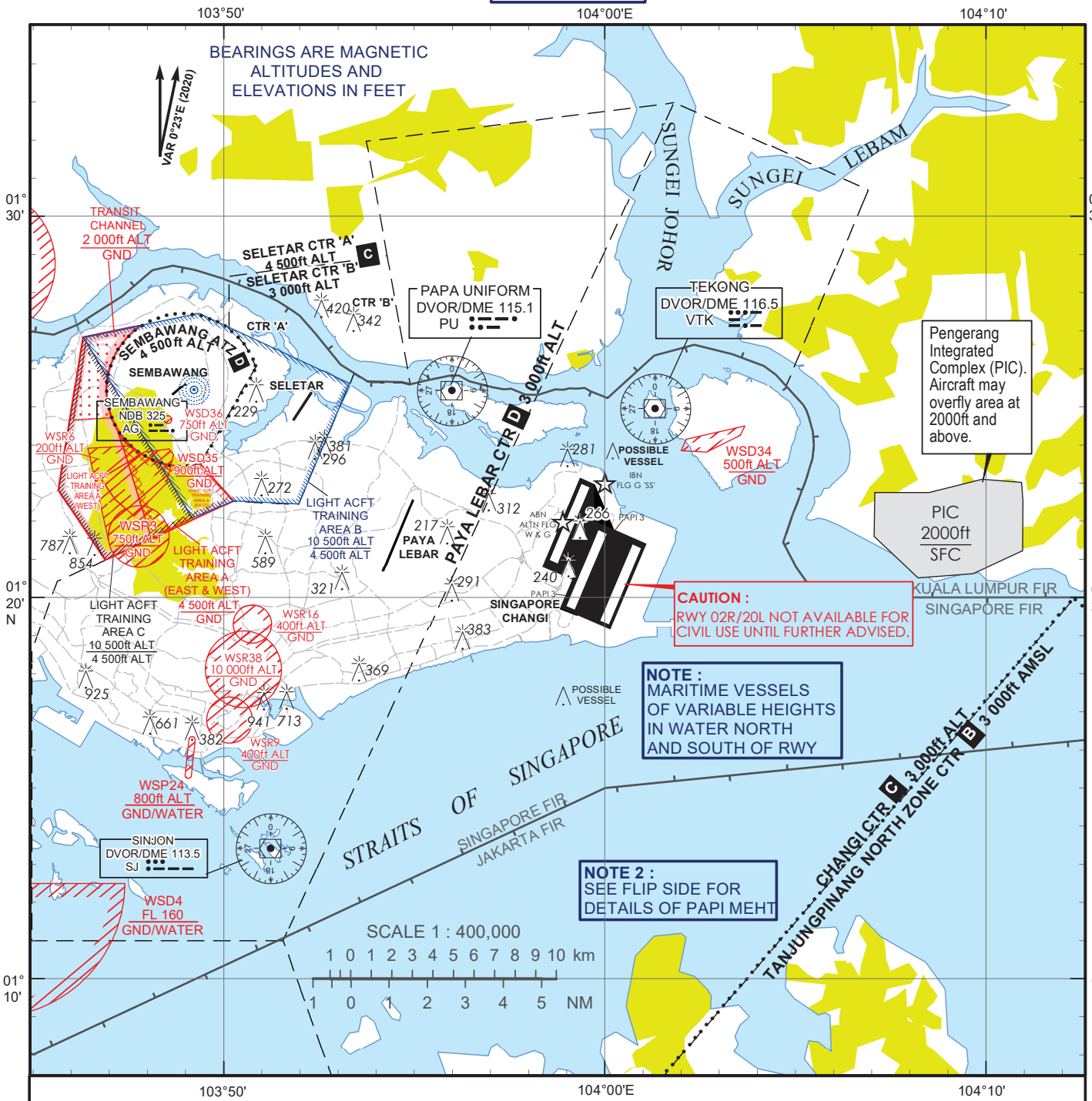
VISUAL APPROACH CHART - ICAO

AERODROME ELEV 22 ft

D-ATIS	AP ID WSSS
	128.025
APP	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.**

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CHANGES : Revision to Runway 20R MEHT in flip-page.

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	19.5m	19.8m	19.8m	19.7m	19.7m
3 White lights and 1 Red light	24.0m	23.3m	23.7m	23.7m	23.6m	23.6m
4 White lights	26.4m	25.7m	26.2m	26.2m	26.0m	26.0m

*MEHT : Minimum Eye Height Over the Threshold.

Note : Aircraft with eye-to-wheel height greater than 8 meters are advised to fly with 2 white lights and 2 red lights visible so as to achieve sufficient wheel clearance.

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WSSL SINGAPORE / SELETAR

WSSL AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WSSL - SINGAPORE / SELETAR

WSSL AD 2.2 AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA

1	*ARP Coordinates and Site at AD*	012501.04N 1035203.52E
2	*Direction and distance from (city)*	006°, 14.6km from city centre (The Fullerton Hotel , Singapore)
3	*Elevation/Reference Temperature*	14 M(46ft) / 33.3°C
4	*Geoid Undulation*	9.78 M
5	MAG VAR	0°23' E (2020)
6	*AD Administration, Address, Telephone, Telefax, AFS*	Address: CHANGI AIRPORT GROUP (S) PTE LTD SELETAR AIRPORT 21 Seletar Aerospace Road 1 Singapore 797405 TEL: (65)64812909, Fax: (65)64833044 (AIS) TEL: (65)64812893, Fax: (65)64831656 (Control Tower) TEL: (65)64815077, 97533361 FAX: (65)64831754 (Airside Operations) AFS: WSSLYDYX
7	*Types of Traffic Permitted*	IFR and VFR
8	*Remarks*	a) Scheduled Closure Periods for RWY 03/21: see AIP section WSSL AD 2.12 item 14 i). b) Night flight restriction for noise abatement purpose (see AIP section WSSL AD 2.21). c) PPR for aircraft not equipped with RTF. d) A subsonic jet aircraft, unless otherwise exempted, is not permitted to operate in Singapore unless it possesses a noise certificate stating that it meets the noise standards of ICAO Annex 16, Volume 1, Chapter 3, or equivalent. The noise certificate may also take the form of a suitable statement contained in another document approved by the State of Registry of the aircraft. e) Direct transit area. Overnight transit in Singapore city. f) All arriving and departing aircraft are required to appoint a licensed Ground Handling Agent (GHA). List of Seletar GHAs can be downloaded from URL - http://www.seletarairport.com/ ground-handling-agents-at-seletar-airport.html g) For non-scheduled flights, all passengers and crews are required to clear Customs and Immigration at Seletar Business Aviation Centre (SBAC)

WSSL AD 2.3 OPERATIONAL HOURS

1	*Aerodrome Administration*	H24	5	*ATS Reporting Office*	H24
2	*Customs and Immigration*	H24	6	*MET Briefing Office*	H24
3	*Health and Sanitation*	H24	7	*Air Traffic Services*	H24
4	*AIS Self-Briefing Office*	H24	8	*Apron Control Office*	H24

WSSL AD 2.4 HANDLING SERVICES AND FACILITIES

1	*Cargo Handling Facilities*	Provided by handling agent.
2	*Fuel / Oil Types*	AVGAS 100LL, JET A1

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3	*Fuelling Facilities / Capacity*	SUN/MON to THU/FRI BTN 2330-1400; SAT, SUN and Public holidays BTN 0030-0930 Contact during operating hours: TEL: (65)68538320 (Operations Room) Contact after operating hours: TEL: (65)82009899 (H24 Operations Mobile) FAX: (65)64839246 Group email: GX-SAV-Seletar-Operations24by7@shell.com PPP link: http://www.shell.com/business-customers/aviation/ppp.html
4	*Hangar space for visiting aircraft*	By arrangement with handling agent.
5	*Repair facilities for visiting aircraft*	By arrangement with handling agent.
6	*Remarks*	NIL

WSSL AD 2.5 PASSENGER FACILITIES

1	*Hotels*	NIL
2	*Restaurants*	Public area of terminal building
3	*Transportation*	Handling agent provides its own transport service for passengers and crew between airport and city. Public buses and private hired taxis are available at airport terminal.
4	*Medical Facilities*	NIL
5	*Bank and Post Office*	NIL
6	*Tourist Office*	NIL
7	*Remarks*	Internet address : http://www.seletarairport.com / for airport and flight information, facilities and services.

WSSL AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

1	*AD category for fire fighting*	CAT7 (No facilities for foaming of runways).
2	*Rescue equipment*	Adequately provided as recommended by ICAO.
3	*Capability for removal of disabled aircraft*	Up to B757-200. Contact Seletar Airside Operations at: +65 64815077 or +65 97533361
4	*Remarks*	All Airport Emergency Service personnel are trained in rescue and fire-fighting as well as medical first-aid.

WSSL AD 2.7 SEASONAL AVAILABILITY - CLEARING

The aerodrome is available throughout the year

WSSL AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

1	*Apron surface and strength*	Surface: Concrete (all other aircraft stands) Strength: PCR 432 / R /C/ W / U	
2	Taxiway width, surface and strength	Width:	23 M (75.5ft), 18 (59.1ft)TWY EC4, EC5 AND EC6
			8 M (26.2ft) TWY WS1 and WS2
		Surface: Bituminous concrete	
		Strength: PCR 423/F/C/X/U	
3	*Remarks : NIL*		

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WSSL AD 2.9 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS

SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS		
1	*Use of aircraft stand ID signs, TWY guidelines and visual docking/parking guidance system of aircraft stands*	Taxiing guidance signs at all intersections with TWY and RWY at all holding positions. Guidelines at apron. Nose-in guidance at aircraft stands.
2	*RWY and TWY markings and LGT*	RWY LGT: refer to page WSSL AD 2-5 for details. RWY Turn Pad LGT / Markings: Only AVBL at THR RWY 03. Yellow turnpad centreline. TWY LGT: TWY Edge LGT: Blue LGT, inset, elevated and omni-directional. TWY Centreline LGT: Green LGT, fixed. Intermediate Holding Position LGT: Yellow LGT, fixed, unidirectional. TWY markings: Yellow TWY centreline. The fixed green taxiway centreline lights and fixed unidirectional yellow intermediate holding position lights shall be switched on between sunset and sunrise or during periods of poor visibility. ATC will continue to verbalise the taxi route as per current practice. Pilots shall continue to adhere strictly to the taxi clearances issued by ATC at all times. In the event that the fixed green taxiway centreline lights and fixed unidirectional yellow intermediate holding position lights become unserviceable, pilots shall taxi following the single continuous yellow taxiway centreline markings and intermediate holding position markings (single broken line laid across the entire width of the taxiway) as per mode of operations during VMC daylight hours. MARKING AIDS: Threshold, touchdown zone, centreline stripes and RWY designation. RWY width outline from bituminous concrete surface by white lines. AIMING POINT MARKINGS: RWY 03: coincident with PAPI origin located 423.542m from THR respectively. RWY 21: coincident with PAPI origin located 271.279m from THR respectively.
3	*Stop Bars*	Stop Bars: Red LGT across taxiways W1, W2, W3, E1, E2, E3 and E4, flushed with TWY surface and are supplemented with elevated RWY guard LGT at the sides. By default, red stop bar lights remain on unless deselected by the runway controller. When deselected, these stop bar lights will re-activate automatically after 45 seconds. Pilots shall not cross any lighted red stop bar lights. Pilots and drivers shall enter / cross the runway only when both the following conditions are met: The crew have a) received positive ATC clearance to enter / cross the runway or taxiway, and b) observed that the red stop bar lights are turned off. Crash Alarm Stop Bars: Red LGT across junctions of EP, EC4 and EH2 TWY, flushed with TWY surface. (Note to pilots and tow-crew: Slow down when taxiing / towing on TWY EP between TWY EC4 and abeam the Control Tower. Keep a lookout for emergency vehicles that may cross the taxiway to respond to emergency on the RWY.)

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SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS		
4	Remarks	a) Aircraft operators/ground handlers shall be responsible for the safe and smooth operations of aircraft at the aircraft stands. b) A ground handler shall be at the aircraft stand when the aircraft is ready to depart and ensure that the area around the aircraft is clear of vehicles, equipment and personnel before aircraft engines are started. When the pilot signals that he is ready to taxi, the ground handler shall marshal the aircraft out of the aircraft stand. All personnel, tow tugs and equipment shall be cleared from the aircraft stand and red chevron markings on the adjacent aircraft stands before self-power out can commence. c) All arriving aircrafts will be assigned an aircraft stand. Aircraft with wingspan larger than 15m shall be marshalled into the aircraft stand by a ground handler. d) Code A, Code B and Code C aircraft can taxi into aircraft stands C1, C2, C3, C4, C5 and C6 from the north or the south via TWY WA. e) Only Code A aircraft, Code B aircraft, aircraft type Global Express (GLEX), Global 5000 (GL5T), Global 6000 (GL6T), Global Express XRS (GLEX), Global 7500 (GL7T), Fokker 50 (F50), Fokker 70 (F70), Fokker 100 (F100), Gulfstream 500 (GLF5), Gulfstream 550 (GLF5), Gulfstream 650 (GLF6), ATR 42 (AT45 & AT46), ATR 72 (AT75 & AT76), DASH 7 (DNC7), Falcon 7X (FA7X) and Falcon 8X (FA8X) are allowed to taxi out from aircraft stands C1, C2, C3, C4, C5 and C6 subjected to (g), (h) or (i). f) All other aircraft not listed in (e) departing from C1, C2, C3, C4, C5 and C6 are required to push back onto TWY WA or tow forward onto TWY WP. g) Aircraft departing stand C6 shall taxi out towards the south only. h) Aircraft departing stands C1, C2, C3, C4 and C5 are allowed to taxi out towards the south or the north. i) Aircraft types up to B757-200 (no winglets) can taxi into aircraft stands D50, D51, D52, D53, D54, D55 and D56. j) Only Code A aircraft, Code B aircraft and Code C aircraft, Airbus A320 family (A318, A319, A320, A321), ATR 42 (AT45 & AT46), ATR 72 (AT75 & AT76), DASH 7 (DNC 7), Embraer 190STD (E190), Embraer ERJ 135 (E135), Falcon 7X (FA7X), Falcon 8X (FA8X), Fokker 50 (F50), Fokker 70 - all, Fokker 100 - all, Global Express (GLEX), Global 5000 (GL5T), Global 6000 (GL6T), Global Express XRS (GLEX), Global 7500 (GL7T), Gulfstream 500 (GLF5), Gulfstream 550 (GLF5), Gulfstream 650 (GLF6) and Q400 (DH8) are allowed to taxi out from aircraft stands D50, D51, D52, D53, D54, D55 and D56. k) Aircraft type C130 is restricted to tow in operations at aircraft stand D1, D2 and D50. Aircraft is required to shut down at designated shut down area and be towed to aircraft stand D1, D2 and D50. l) Only aircraft type ATR72 (AT75 & AT76) and aircrafts with wingspan less than 27.2m can be parked at aircraft stands C60, C61 and C62.

1 PROCEDURES FOR START-UP AND PUSHBACK OF AIRCRAFT

1.1 1.1 For more detailed information on Seletar Aerodrome pushback procedures, please refer to Seletar Airport website at https://www.seletarairport.com/resources.html.

WSSL AD 2.10 AERODROME OBSTACLES

IN APPROACH / TKOF AREAS				IN CIRCLING AREA AND AT AD	
RWY/Area affected	Obstacle type Elevation Markings/LGT	Coordinates		Obstacle type Elevation Markings/LGT	Coordinates
a	b	c		a	b

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IN APPROACH / TKOF AREAS				IN CIRCLING AREA AND AT AD	
RWY/Area affected	**Obstacle type Elevation Markings/LGT**	**Coordinates**		**Obstacle type Elevation Markings/LGT**	**Coordinates**
RWY 03 TKOF RWY 21 APCH	1) Mast HGT ranging from 98ft AMSL and above in shipping channel	Approximately 1525m from THR RWY 21		1) Power station chimney 407ft AMSL	012656.8N1035251.7E
	2) Steel structure 300ft AMSL	012709.78N1035318.74E		2) Radio mast 217ft AMSL	012258.8N1035113.8E
	3) Chimney 276ft AMSL	012700.18N1035321.93E		3) Radio masts 184ft AMSL	012454N 1035300E
	4) Chimney 273ft AMSL	012651.81N1035330.23E		4) Radar tower 177ft AMSL marked/LGTD	012537.79N1035306.74E (reclaimed land north of RWY)
	5) Chimney 286ft AMSL	012646.99N1035331.46E		5) Mobile cranes 420ft AMSL	within area bounded by 012711.78N1035223.74E 012729.78N1035223.74E 012729.78N1035247.74E 012656.78N1035247.74E
	6) Mobile cranes 330ft AMSL	within area bounded by 012627.24N1035313.00E 012607.79N1035333.95E 012614.23N1035337.07E 012623.93N1035316.02E		6) Glide Path Antenna 72ft AMSL	012512N1035215E
	7) Silo, 342 ft AMSL, mark and lighted	012659.1N1035325.3E			
Obstacles in the approach / TKOF areas, circling area and at the aerodrome are shown on the AOC and VAC					

WSSL AD 2.11 METEOROLOGICAL INFORMATION PROVIDED

1	*Associated MET Office*	Seletar
2	*Hours of service*	H24
3	*Office responsible for TAF preparation, Periods of validity*	Singapore Changi, 30 hours
4	*Type of landing forecast, Interval of issuance*	METAR, SPECI and AD warning of adverse weather (H24). TREND NIL.
5	*Briefing/consultation provided*	NIL
6	*Flight documentation, Language(s) used*	Tabular forms, English
7	*Charts/other information available for briefing or consultation*	NIL
8	*Supplementary equipment available for providing information*	MDWR (Meteorological Doppler Weather Radar), Automated Weather Observing System (AWOS), Low Level Wind Shear Alert System (LLWAS)
9	*ATS units provided with information*	NIL
10	*Additional information*	TEL: 64815978 (MET Office)

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WSSL AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

Designations RWY NR	TRUE BRG	Dimensions of RWY (m)	Strength (PCR) 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	423/F/C/X/U Grooved Bituminous Concrete	THR: 012430.85N 1035143.79E RWY end: 012520.79N 1035216.43E (9.78M)	THR: 14m TDZ: Not applicable
21	213.33°	1836 x 46	423/F/C/X/U Grooved Bituminous Concrete	THR: 012520.79N 1035216.43E RWY end: 012430.85N 1035143.79E (9.78M)	THR: 5m TDZ: Not applicable

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	**i) Scheduled closure period for RWY 03/21** 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. b) BTN 0500-0630, 1030-1200, 1300-1430 and 2300-0030 daily for 15-minute RWY inspection. Aircraft to expect delay. **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. **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. **iv)** Wind Direction Indicators (WDIs) are located at both northern and southern ends of the RWY.

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

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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, bi - 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, bi - 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	*ABN/IBN location, characteristics and hours of operation*	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	*LD and LGTI location Ultrasonic wind sensor location and LGT*	Ultrasonic wind sensors and windsocks at ends of RWY.
3	*TWY edge and centreline lighting*	TWY Edge LGT: BLUE, elevated and omni-directional. TWY Centreline LGT: Green , fixed. Intermediate holding position LGT: Yellow, fixed, unidirectional.
4	*Secondary power supply/switch-over time*	Automatic standby generator power supply available for airfield lighting.
5	*Remarks*	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	

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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	*Designation and Lateral Limits*	**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 **SELETAR CONTROL ZONE A** Portion of Seletar CTR within Singapore FIR is known as Seletar CTR 'A'. **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).
2	*Vertical Limits*	**SELETAR CONTROL ZONE A** SFC to 4 500ft ALT Maximum Usable ALT 4 000ft **SELETAR CONTROL ZONE B** SFC to 3 000ft ALT
3	*Airspace Classification*	C
4	*ATS Unit Call sign* *Language(s)*	SELETAR TOWER English
5	*Transition Altitude*	11000 (3,350m)
6	*Remarks*	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.

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Service designation	Call sign	Frequency P-Pri S-Sec	Hours of operation	Remarks
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 AERODROME 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 1000ft (west of Seletar runway only);
Other aircraft 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.

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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.

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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). RWY 03 - 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. RWY 21 - 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

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Lateral Limits of Noise Abatement Area 1	
POINT	**COORDINATES**
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

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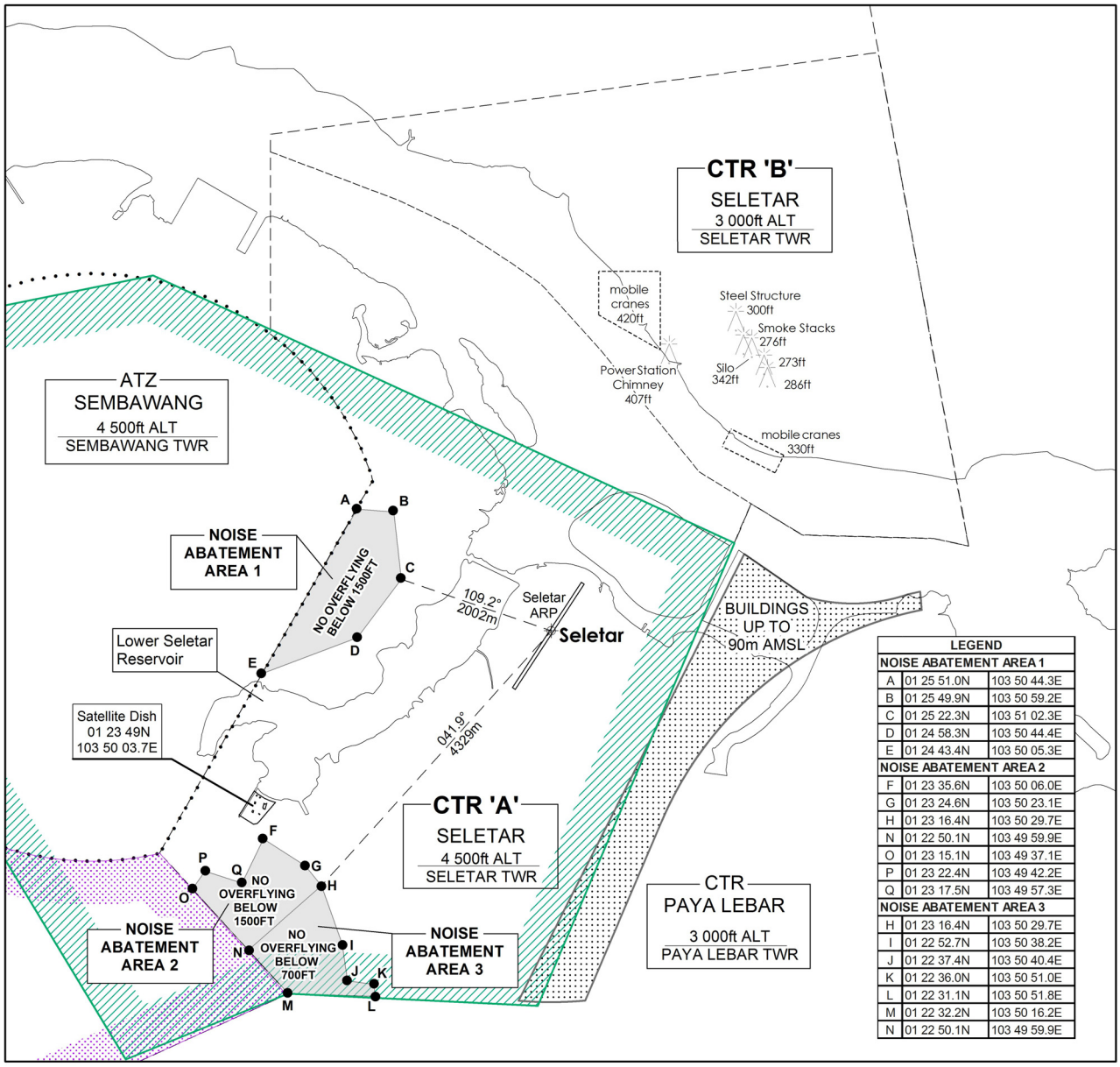
1.7 The map below shows the locations of Noise Abatement Areas 1, 2 and 3 within Seletar Control Zone.



LEGEND		
NOISE ABATEMENT AREA 1		
A	01 25 51.0N	103 50 44.3E
B	01 25 49.9N	103 50 59.2E
C	01 25 22.3N	103 51 02.3E
D	01 24 58.3N	103 50 44.4E
E	01 24 43.4N	103 50 05.3E
NOISE ABATEMENT AREA 2		
F	01 23 35.6N	103 50 06.0E
G	01 23 24.6N	103 50 23.1E
H	01 23 16.4N	103 50 29.7E
N	01 22 50.1N	103 49 59.9E
O	01 23 15.1N	103 49 37.1E
P	01 23 22.4N	103 49 42.2E
Q	01 23 17.5N	103 49 57.3E
NOISE ABATEMENT AREA 3		
H	01 23 16.4N	103 50 29.7E
I	01 22 52.7N	103 50 38.2E
J	01 22 37.4N	103 50 40.4E
K	01 22 36.0N	103 50 51.0E
L	01 22 31.1N	103 50 51.8E
M	01 22 32.2N	103 50 16.2E
N	01 22 50.1N	103 49 59.9E

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.

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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).

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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 left 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. Aircraft shall be vectored under radar to position for downwind RWY 03.

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. Aircraft shall be vectored under radar to position for downwind RWY 03.

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 011629N 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.

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

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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. Aircraft shall be vectored under radar to position for Straight-in-Approach RWY 21.

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). Aircraft shall be vectored under radar to position for Straight-in-Approach RWY 21.

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.

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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).

4 HELICOPTER CROSSING SELETAR NORTHERN EXTENDED CENTRELINE

4.1 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).

4.2 For eastbound crossing, all helicopters are to hold over the western tip of Seletar Island until a clearance has been issued by Seletar Tower.

4.3 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.

4.4 The holding altitude is 200 feet or otherwise instructed by ATC.

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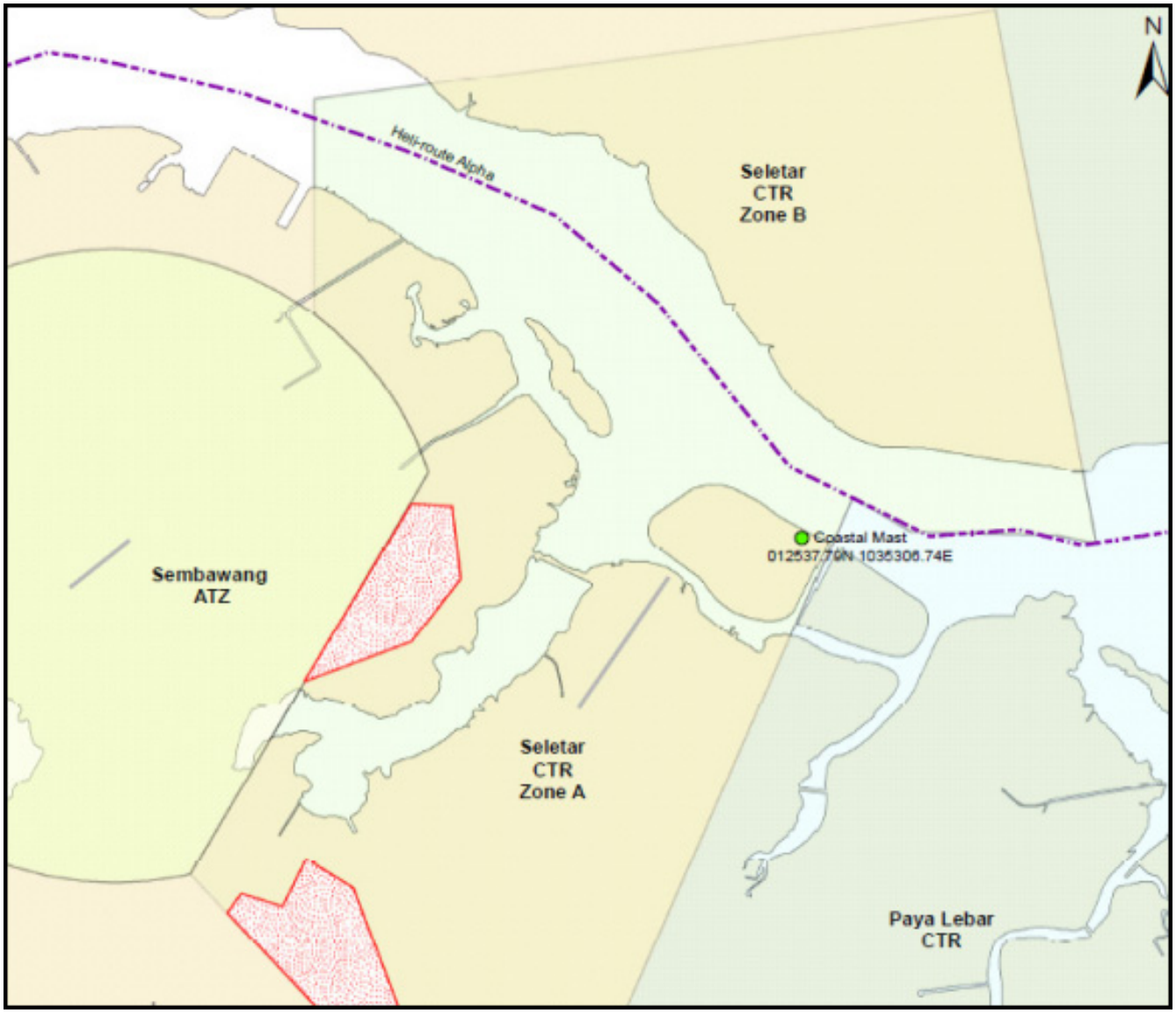

WSSL AD 2.23 ADDITIONAL INFORMATION

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.

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WSSL AD 2.24 CHARTS RELATED TO AN AERODROME

Aerodrome Chart - ICAO	AD-2-WSSL-ADC-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
AD-2-WSSL-VDC-2 to 2.1	AD-2-WSSL-VDC-2
AD-2-WSSL-VFR-1	AD-2-WSSL-VFR-1
AD-2-WSSL-IFR-1	AD-2-WSSL-IFR-1
AD-2-WSSL-IFR-2	AD-2-WSSL-IFR-2

WSSL AD 2.25 VISUAL SEGMENT SURFACE (VSS) PENETRATION

NIL (not applicable).

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AERODROME CHART - ICAO

01° 25' 01.04"N
103° 52' 03.52"E

ELEV 14m

TWR	118.45
	121.6

SINGAPORE/SELETAR

RWY	DIRECTION	THR	RUNWAY BEARING STRENGTH
03	033°	01 24 30.85N 103 51 43.79E	PCR 423/F/C/X/U
21	213°	01 25 20.79N 103 52 16.43E	
TAXIWAYS		BEARING STRENGTH PCR 423 F/C/X/U - All taxiways.	
APRONS		BEARING STRENGTH PCR 432/R/C/W/U - All aircraft stands.	

ELEVATIONS AND DIMENSIONS IN METRES

VAR 0°23'E (2020)
ANNUAL CHANGE NEGLIGIBLE

Pulau Punggol Barat

Fuel Farm
WDI
ANEMOMETER
ELEV 5
RESA 240 x 150m
CWY 60 x 150m
PRECISION APPROACH CAT 1 LIGHTING SYSTEM (BARRETTE CENTRE LINE)
SELETAR WEST LINK
AP IBN Flg G 'SL'
WEST SUBSTATION, WEST AFLCC
JET AVIATION
FOKKER
PAPI 3.5°
GP Antenna
ANEMOMETER
RVR
F/S METER
Paved Shoulder
1836m X 46m GROOVED BITUMINOUS CONCRETE
ST AEROSPACE ENGINEERING
Compass Swing Area
SELETAR PASSENGER TERMINAL
ABN
Altn Flg W & G every 2.5 sec
STRIP 1956m X 150m
STFC
WEST CAMP ROAD
WDI
PAPI 3.2°
F/S METER
RVR
ANEMOMETER
CONTROL TWR
AIS, MET, FIRE STATION
EAST AFLCC
Helicopter Landing Area (Closed)
(Restricted to normal landing and take-off operations only. Running landing not allowed due to unsuitable ground condition.)
SELETAR AEROSPACE DRIVE
CWY 60 x 150m
RESA 240 x 92m
ELEV 14
LOCALISER
LLZ BDLG
BELL HELICOPTER
BOMBARDIER

Metres
100 0 100 200 300
400 0 400 800 1200
Feet

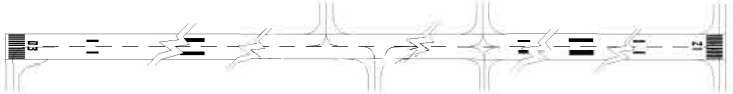
LEGEND	
AIRCRAFT STAND	C8
Taxiway Centre Line Lights	
Runway Edge Lights (No Runway Centreline Lights provided)	
Taxiway Edge Lights	
TAXI HOLDING POSITION	
STOP BAR	
MAST FOR WIND MONITORING SYSTEM	
THRESHOLD IDENTIFICATION LIGHTS 15m FROM RUNWAY EDGES	

PAPI 3.2°(RWY 03)/3.5°(RWY21) (MEHT) *		
Pilot's eye height over the threshold when the following PAPI lights come into view.	RUNWAY 03	21
2 White lights and 2 Red lights	21.24m	17.720m
3 White lights and 1 Red lights	22.27m	19.286m
4 White lights	24.75m	20.871m

* MEHT : Minimum Eye Height Over the Threshold

Note Aircraft with eye-to-wheel height greater than 6.3 metres are advised to fly with 2 white lights and 2 red lights visible so as to achieve sufficient wheel clearance.

MARKING AIDS RWY 03/21 AND EXIT TWY



LIGHTING AIDS RWY 03/21 AND EXIT TWY (NO RWY CENTRELINE LIGHTS PROVIDED)

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CHANGES : Added annotation "NO RWY CENTRELINE LIGHTS PROVIDED" to LIGHTING AIDS RWY 03/21 AND EXIT TWY diagram.
Remove the word "New" from Seletar Passenger Terminal.
Helicopter landing area (HLA) closed.
Legend updated.

INS COORDINATES FOR AIRCRAFT STANDS

STAND NR	NORTH LATITUDE	EAST LONGITUDE	ELEVATION
A1	01 25 13.10	103 51 56.17	6.18m (20.28ft)
A2	01 25 12.78	103 51 56.65	6.34m (20.80ft)
A3	01 25 12.35	103 51 57.30	6.59m (21.61ft)
A4	01 25 12.03	103 51 57.79	6.76m (22.18ft)
A50	01 24 51.43	103 52 05.77	7.81m (25.62ft)
A51	01 24 51.11	103 52 06.25	7.95m (26.08ft)
A52	01 24 50.68	103 52 06.90	8.11m (26.59ft)
A53	01 24 50.36	103 52 07.39	8.21m (26.94ft)
A54	01 24 50.04	103 52 07.87	8.34m (27.35ft)
A55	01 24 48.59	103 52 06.93	8.75m (28.71ft)
A56	01 24 48.91	103 52 06.44	8.59m (28.17ft)
A57	01 24 49.24	103 52 05.96	8.40m (27.57ft)
A58	01 24 49.67	103 52 05.31	8.18m (26.84ft)
A59	01 24 49.99	103 52 04.82	8.01m (26.29ft)
B1	01 25 11.40	103 51 55.23	6.30m (20.67ft)
B2	01 25 10.82	103 51 56.12	6.64m (21.78ft)
B3	01 25 10.22	103 51 57.01	6.97m (22.86ft)
B4	01 25 09.18	103 52 00.36	7.70m (25.27ft)
B5	01 25 08.26	103 51 59.76	7.93m (26.03ft)
B6	01 25 07.35	103 51 59.16	8.16m (26.78ft)
B7	01 25 04.51	103 51 57.52	8.44m (27.70ft)
B8	01 25 03.64	103 51 56.95	8.41m (27.58ft)
B9	01 25 02.77	103 51 56.38	8.40m (27.55ft)
B10	01 25 01.89	103 51 55.81	8.38m (27.51ft)
B11	01 25 01.01	103 51 55.24	8.33m (27.33ft)
B12	01 25 00.11	103 51 54.65	8.45m (27.72ft)
B13	01 24 59.37	103 51 54.17	8.57m (28.12ft)
B50	01 24 43.89	103 52 00.88	8.75m (28.72ft)
B51	01 24 43.15	103 52 00.39	8.85m (29.03ft)
B52	01 24 42.06	103 51 59.68	8.99m (29.49ft)
B53	01 24 41.33	103 51 59.20	9.18m (30.13ft)
B54	01 24 40.15	103 51 58.44	9.36m (30.70ft)
B55	01 24 39.42	103 51 57.95	9.43m (30.95ft)
B56	01 24 38.35	103 51 57.25	9.59m (31.47ft)
B57	01 24 37.61	103 51 56.77	9.68m (31.76ft)
B58	01 24 36.46	103 51 56.02	9.81m (32.17ft)
B59	01 24 35.73	103 51 55.54	9.93m (32.58ft)
B60	01 24 32.42	103 51 53.38	10.09m (33.12ft)
B61	01 24 31.27	103 51 52.62	10.18m (33.39ft)
B62	01 24 30.53	103 51 52.14	10.25m (33.62ft)
B63	01 24 23.86	103 51 47.94	10.64m (34.91ft)
C1	01 25 18.80	103 52 06.63	5.11m (16.75ft)
C2	01 25 17.50	103 52 05.77	5.42m (17.79ft)
C3	01 25 16.19	103 52 04.92	5.76m (18.90ft)
C4	01 25 14.89	103 52 04.07	6.26m (20.53ft)
C5	01 25 13.58	103 52 03.21	6.82m (22.39ft)
C6	01 25 12.28	103 52 02.36	7.30m (23.96ft)
C50	01 24 29.48	103 51 51.40	10.38m (34.06ft)
C51	01 24 27.63	103 51 50.19	10.59m (34.74ft)
C52	01 24 25.78	103 51 48.98	10.77m (35.34ft)
C60	01 24 54.47	103 52 16.30	6.28m (20.60ft)
C61	01 24 53.48	103 52 15.65	6.30m (20.67ft)
C62	01 24 52.50	103 52 15.01	6.31m (20.71ft)
D1	01 25 14.66	103 51 58.15	6.41m (21.03ft)
D2	01 25 24.03	103 52 04.80	3.47m (11.39ft)
D50	01 25 00.06	103 52 11.56	6.68m (21.92ft)
D51	01 25 01.59	103 52 12.56	6.44m (21.13ft)
D52	01 25 02.83	103 52 13.37	6.28m (20.60ft)
D53	01 25 04.36	103 52 14.37	6.04m (19.82ft)
D54	01 25 05.60	103 52 15.18	5.82m (19.09ft)
D55	01 25 07.13	103 52 16.18	5.55m (18.21ft)
D56	01 25 08.37	103 52 17.00	5.32m (17.45ft)

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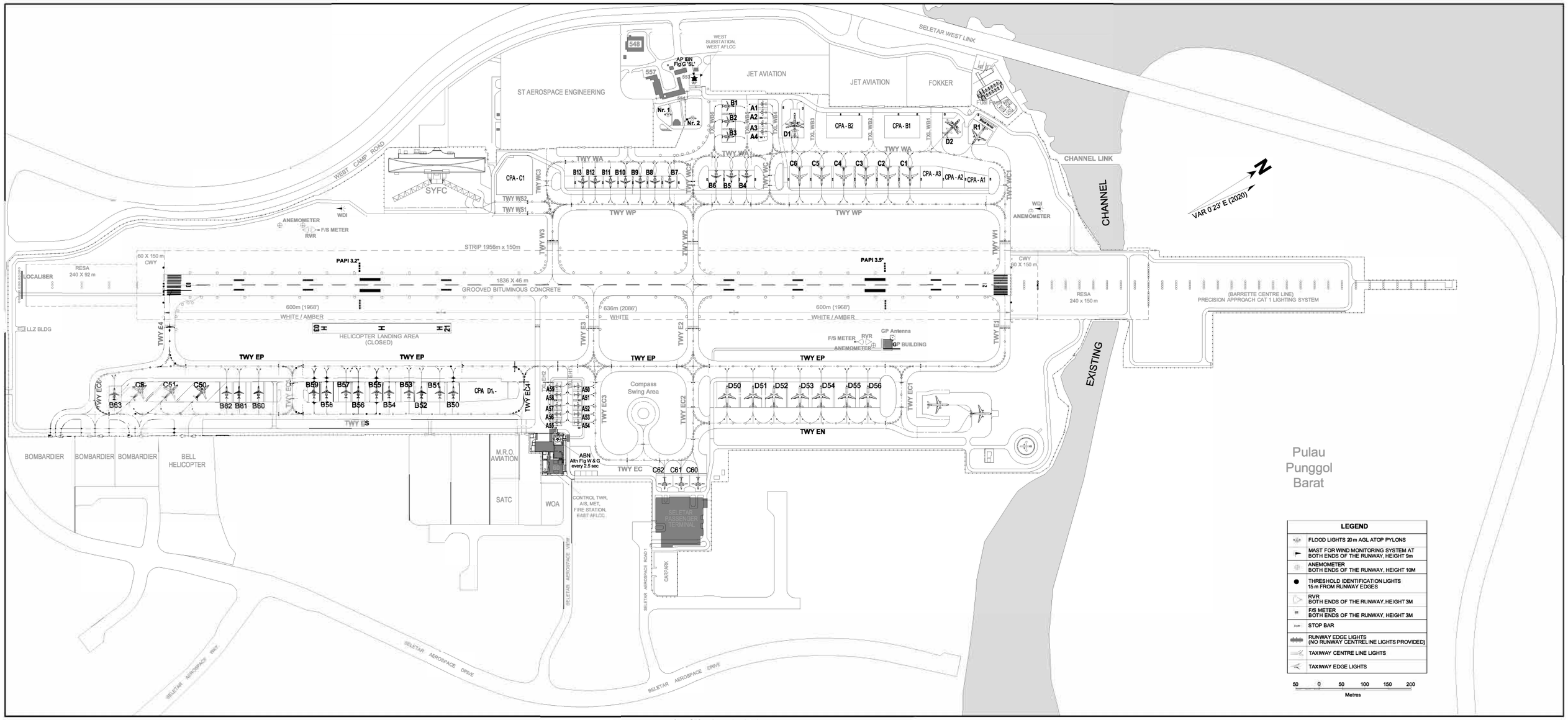
SELETAR AERODROME

LAYOUT OF SIGNIFICANT AERODROME BUILDINGS AND APRON FACILITIES



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CHANGES : Legend updated.
Remove the word "New" from Seletar Passenger Terminal.
Helicopter landing area (HLA) closed.

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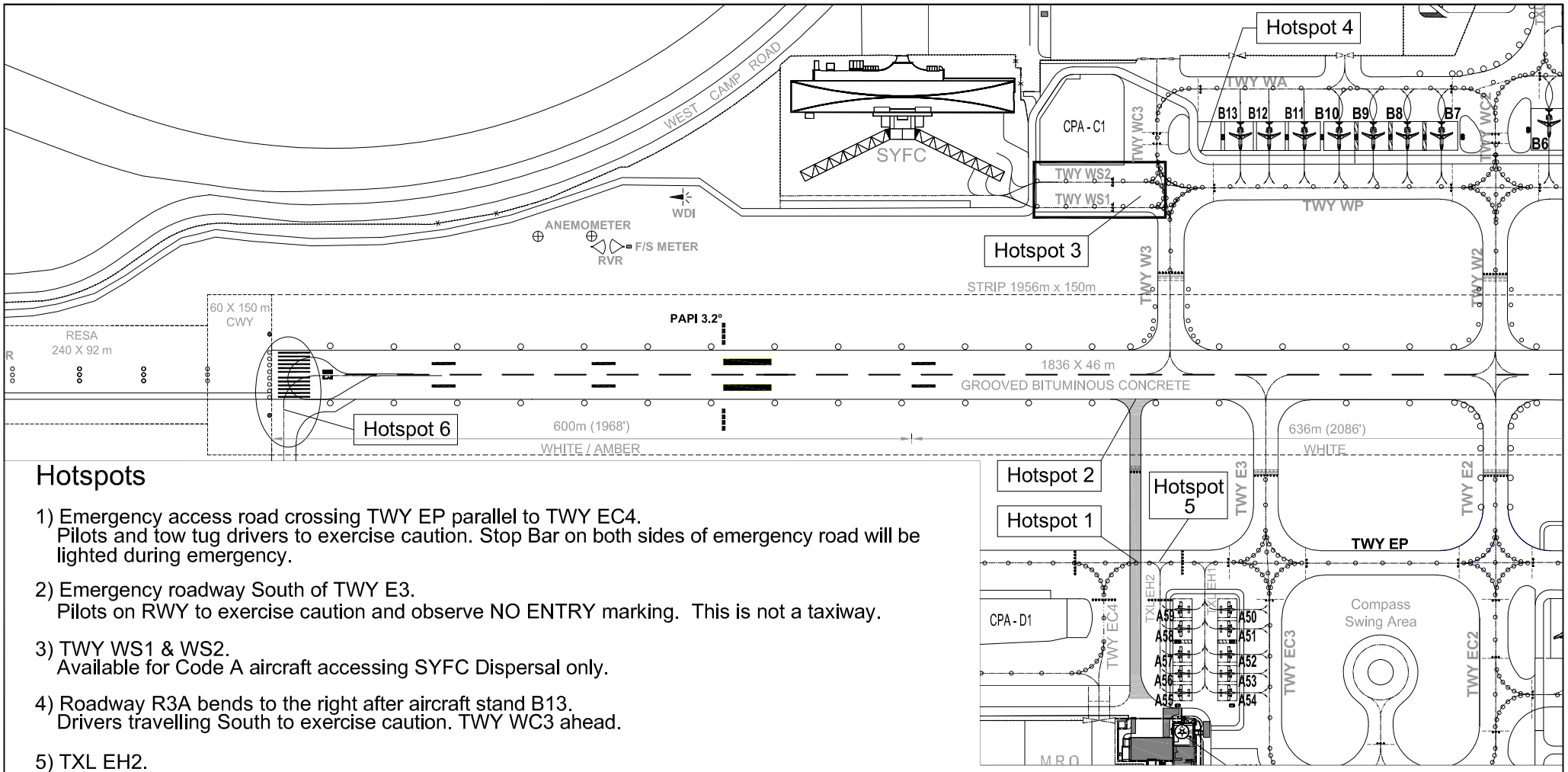
AERODROME HOTSPOTS



Hotspots

1) Emergency access road crossing TWY EP parallel to TWY EC4.
   Pilots and tow tug drivers to exercise caution. Stop Bar on both sides of emergency road will be lighted during emergency.

2) Emergency roadway South of TWY E3.
   Pilots on RWY to exercise caution and observe NO ENTRY marking. This is not a taxiway.

3) TWY WS1 & WS2.
   Available for Code A aircraft accessing SYFC Dispersal only.

4) Roadway R3A bends to the right after aircraft stand B13.
   Drivers travelling South to exercise caution. TWY WC3 ahead.

5) TXL EH2.
   No entry into TXL EH2 from TWY EP.
   Pilots taxiing southbound on TWY EP to exercise caution to avoid mistaking TXL EH2 as TWY EC4.
   TWY EC4 centre line is lit during low visibility or hours of darkness.

6) TWY E4 leading into the Threshold of RWY03.
   Pilots to exercise caution while taxiing to line up for take off.
   Runway edge lights are provided to aid in aligning with the runway which are not to be mistaken as runway centerline lights.
   Runway centerline lights are not installed at Seletar.

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CHANGES : Hotspot 6 added.

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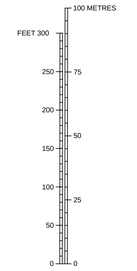
DIMENSIONS AND ELEVATIONS IN METRES

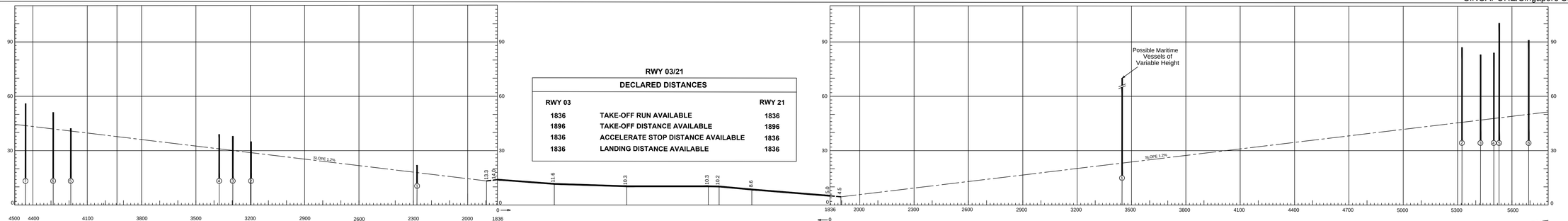
AERODROME OBSTACLE CHART - ICAO
TYPE A (OPERATING LIMITATIONS)

SINGAPORE/Singapore Seletar

MAGNETIC VARIATION 23E (2020)



VERTICAL SCALE 1:1000

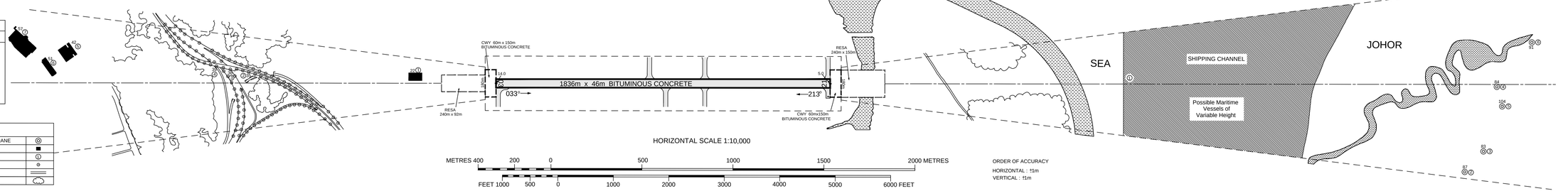


RWY 03/21

DECLARED DISTANCES

RWY 03		RWY 21
1836	TAKE-OFF RUN AVAILABLE	1836
1896	TAKE-OFF DISTANCE AVAILABLE	1896
1836	ACCELERATE STOP DISTANCE AVAILABLE	1836
1836	LANDING DISTANCE AVAILABLE	1836

AMENDMENT RECORD		
NO.	DATE	ENTERED BY



HORIZONTAL SCALE 1:10,000

METRES 400 200 0 500 1000 1500 2000 METRES

FEET 1000 500 0 1000 2000 3000 4000 5000 6000 FEET

LEGEND	
ANTENNA, CHIMNEY, MAST,POLE, SPIRE or CRANE	◎
BUILDING	■
IDENTIFICATION NUMBER	①
LAMP POST	⊕
ROAD	═══
TREE CANOPY	☁

ORDER OF ACCURACY
HORIZONTAL : ±1m
VERTICAL : ±1m

© 2020 Civil Aviation Authority Singapore

CHANGES : Magnetic Variation revised.

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AERODROME OBSTACLE CHART - ICAO
TYPE B

SINGAPORE / Seletar

AERODROME ELEVATION 14m

ELEVATIONS AND DIMENSIONS IN METRES
(ACCURACY OF ELEVATIONS : + 2.5m)

SELAT JOHOR

JOHOR

OUTER HORIZONTAL SURFACE 153m

APPROACH SURFACE SLOPE 1:40

TAKE-OFF CLIMB SURFACE SLOPE 1:50

TAKE-OFF CLIMB SURFACE SLOPE 1:50

APPROACH SURFACE SLOPE 1:40

Mobile Cranes 128

Possible Maritime Vessels of Variable Height

Mobile Cranes 100.5

P. SELETAR

INNER HORIZONTAL SURFACE 56m

CONICAL SURFACE Slope 1:20

MRT LINE

P. PUNGGOL BARAT

P. PUNGGOL TIMOR

RESA 240m

CWY 60m

TRANSITIONAL SURFACE SLOPE 1:7

APPROACH SURFACE SLOPE 1:50

APPROACH SURFACE SLOPE 1:50

TRANSITIONAL SURFACE SLOPE 1:7

03 / 21 — 2,745 x 60m — ASPHALT

033° / 213°

CWY 60m

RESA 240m

Buildings up to 90m

Lower Seletar Reservoir

Sungai Punggol

Sungai Serangoon

LRT LINE

MRT LINE

Lower Pierce Reservoir

APPROACH SURFACE SLOPE 1:40

TAKE-OFF CLIMB SURFACE SLOPE 1:50

TAKE-OFF CLIMB SURFACE SLOPE 1:50

APPROACH SURFACE SLOPE 1:40

HORIZONTAL SCALE 1 : 20,000

Meters 1000 500 0 1000 2000 3000 4000 5000

Feet 1000 0 5000 10000 15000 20000

VAR 23° E (2020)
ANNUAL CHANGE
NEGLIGIBLE

AMENDMENT RECORD		
NO	DATE	ENTERED BY

LEGEND	
AERODROME REF POINT 01° 25' 01.04"N LAT 103° 52' 03.52"E LONG	⊕
ANTENNA, CHIMNEY, MAST, POLE, SPIRE or CRANE	⊙
SPOT HEIGHT IN METRES	•
BUILDING or STRUCTURE	▙
ROAD	
BUILD - UP AREA	

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CHANGES : Magnetic Variation revised.

GRID : Grid lines and co-ordinates shown are based on WGS-84 datum.

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VISUAL APPROACH CHART - ICAO

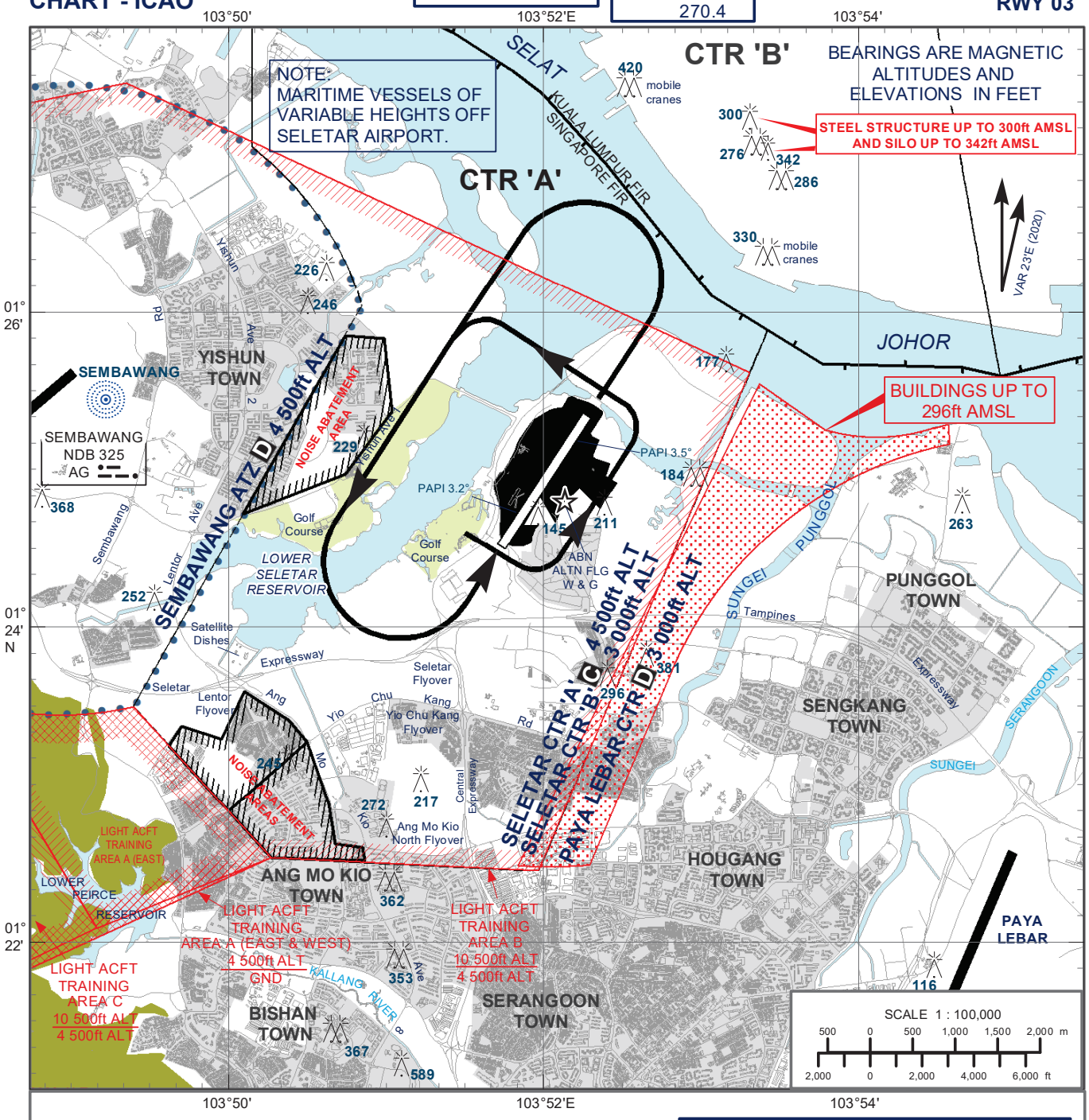
AD ELEV 46 ft

ATIS AP ID-WSSL 128.425

APP 124.05
126.025
TWR 118.45
270.4

SINGAPORE/SELETAR

RWY 03



JOINING PROCEDURE - RWY 03

1) Join overhead at 2 000ft ALT or as cleared by ATC and at a speed of not more than 170kt.

2) When over the south-end of the runway (THR RWY 03), join the circuit crossing the upwind north-end of the runway (THR RWY 21) at 1 500ft ALT or above or at the altitude cleared by ATC.

3) Joining aircraft shall give way to circuit traffic already on downwind.

CAUTION

a) Pilots are required to keep clear of Sembawang ATZ.

b) Pilots should not fly to the east of the runway.
This is to keep clear of tall buildings up to 296ft AMSL to the east of Seletar CTR.
(See area shaded in red).

Minimum altitudes apply over noise abatement areas (WSSL AD 2.21)
Aircraft types which are unable to safely manoeuvre clear of the noise abatement areas are not allowed to operate at Seletar Airport.

PAPI 3.2°		
Pilot's eye height over the threshold when the following PAPI lights come into view	RUNWAY	
	03	21
2 white lights and 2 red lights (MEHT)*	21.24m	17.720m
3 white lights and 1 red light	22.27m	19.286m
4 white lights	24.75m	20.871m

*MEHT : Minimum Eye Height Over the Threshold.

Note : Aircraft with eye-to-wheel height greater than 6.3 metres are advised to fly with 2 white and 2 red lights visible so as to achieve sufficient wheel clearance.

Note:
1) Pilots are to be advised of the steel structure 300ft AMSL and the Silo 342ft AMSL 2nm north of the airfield.
2) Pilots are required to keep their turns within Seletar Control Zone.
3) Pilots are required to keep clear of Sembawang ATZ and Paya Lebar CTR.

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CHANGES : Removal of obstacle at coordinates 012656.8N 1035251.7E with height 407ft AMSL.

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VISUAL APPROACH CHART - ICAO

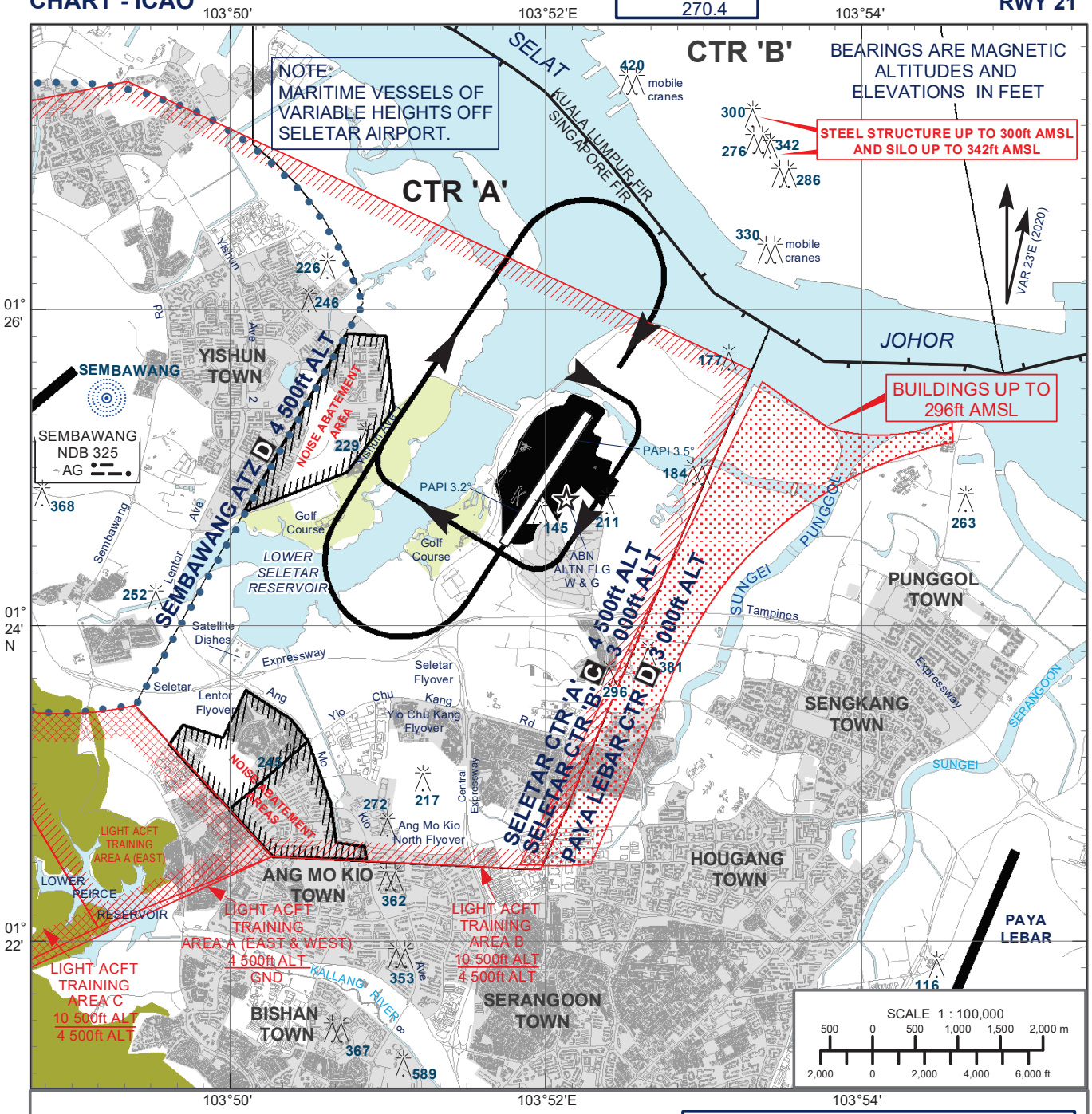
AD ELEV 46 ft

ATIS AP ID-WSSL
128.425

APP 124.05
126.025
TWR 118.45
270.4

SINGAPORE/SELETAR

RWY 21



JOINING PROCEDURE - RWY 21

1) Join overhead at 2 000ft ALT or as cleared by ATC and at a speed of not more than 170kt.

2) When over the north-end of the runway (THR RWY 21), join the circuit crossing the upwind south-end of the runway (THR RWY 03) at 1 500ft ALT or above or at the altitude cleared by ATC.

3) Joining aircraft shall give way to circuit traffic already on downwind.

CAUTION

a) Pilots are required to keep clear of Sembawang ATZ.

b) Pilots should not fly to the east of the runway.
This is to keep clear of tall buildings up to 296ft AMSL to the east of Seletar CTR.
(See area shaded in red).

Minimum altitudes apply over noise abatement areas (WSSL AD 2.21)
Aircraft types which are unable to safely manoeuvre clear of the noise abatement areas are not allowed to operate at Seletar Airport.

PAPI 3.5°		
Pilot's eye height over the threshold when the following PAPI lights come into view	RUNWAY	
	03	21
2 white lights and 2 red lights (MEHT)*	21.24m	17.720m
3 white lights and 1 red light	22.27m	19.286m
4 white lights	24.75m	20.871m

*MEHT : Minimum Eye Height Over the Threshold.

Note : Aircraft with eye-to-wheel height greater than 6.3 metres are advised to fly with 2 white and 2 red lights visible so as to achieve sufficient wheel clearance.

Note:
1) Pilots are to be advised of the steel structure 300ft AMSL and the Silo 342ft AMSL 2nm north of the airfield.
2) Pilots are required to keep their turns within Seletar Control Zone.
3) Pilots are required to keep clear of Sembawang ATZ and Paya Lebar CTR.

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CHANGES : Removal of obstacle at coordinates 012656.8N 1035251.7E with height 407ft AMSL.

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VISUAL APPROACH CHART - ICAO

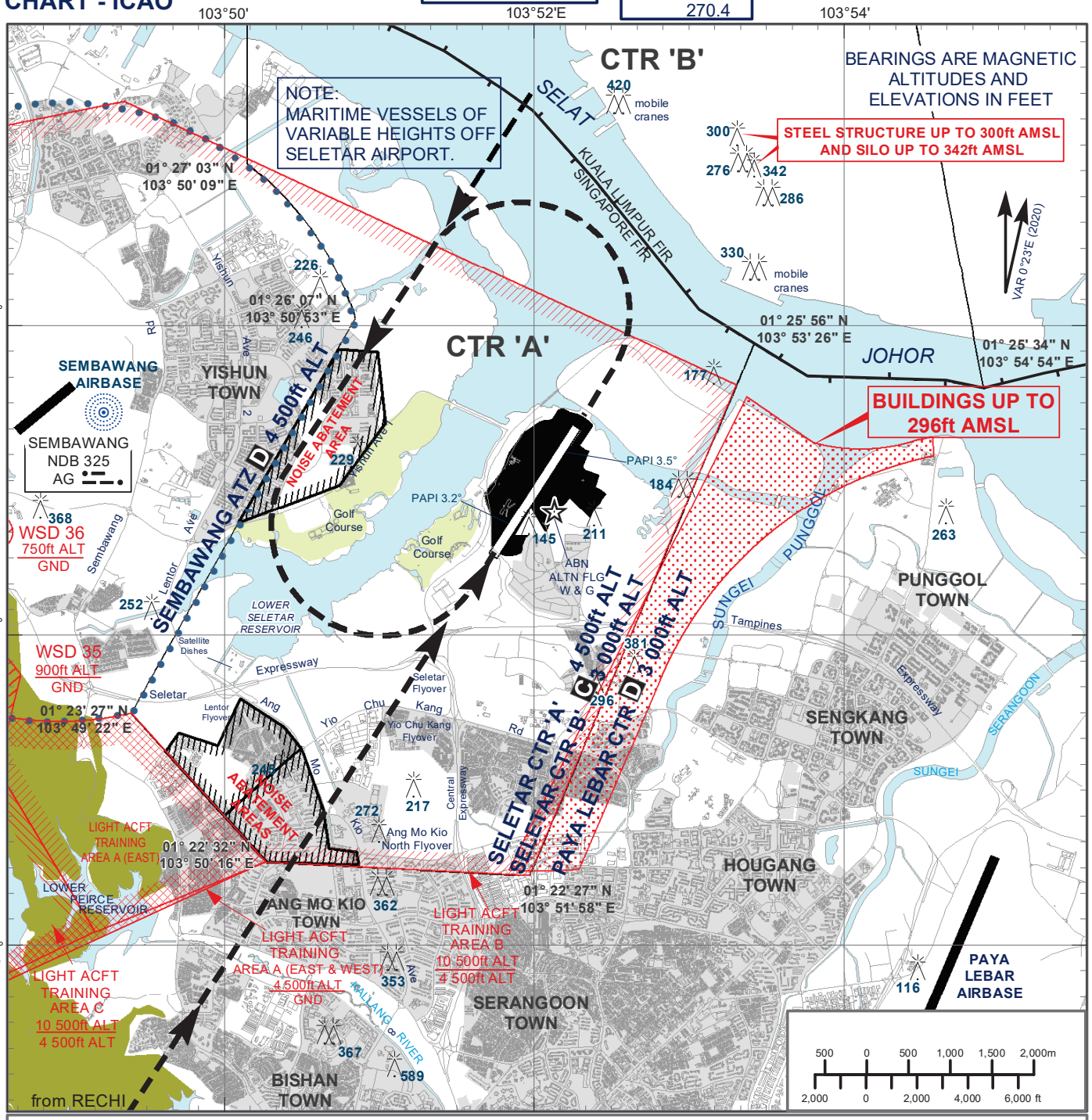
AD ELEV 46 ft

ATIS AP ID-WSSL 128.425

APP 124.05, 126.025
TWR 118.45, 270.4

SINGAPORE/SELETAR

RWY 03



ADVISORY JOINING PROCEDURES - RWY 03

Straight-in Approach

1) From GUMPU or OMKOM, join left downwind at 2 000ft, or as directed by ATC, 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 runway in sight. Aircraft shall give way to circuit traffic already on downwind.
2) From SJ-PONJO-RECHI, join direct for visual approach, descending from 2 000ft at a speed of not more than 170kt, or as cleared by ATC. Pilots should have runway in sight.

Circling Approach

1) From GUMPU or OMKOM, join left downwind at 2 000ft at a speed of not more than 160kt. Passing abeam south-end of the runway (THR RWY 03), turn left to over fly the runway. Passing over the noth-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 or as cleared by ATC. Pilots should have the runway in sight.
2) From SJ-PONJO-RECHI, overfly the runway at 2 000ft at a speed of not more than160kt. or as cleared by ATC. When passing over the 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 or as cleared by ATC. Pilots should have runway in sight.
3) Joining aircraft shall give way to circuit traffic already on downwind.

PAPI 3.2°		
Pilot's eye height over the threshold when the following PAPI lights come into view	RUNWAY	
	03	21
2 white lights and 2 red lights (MEHT)*	21.24m	17.720m
3 white lights and 1 red light	22.27m	19.286m
4 white lights	24.75m	20.871m

*MEHT : Minimum Eye Height Over the Threshold.

Note : Aircraft with eye-to-wheel height greater than 6.3 metres are advised to fly with 2 white and 2 red lights visible so as to achieve sufficient wheel clearance.

CAUTION

a) Pilots are required to keep clear of Sembawang ATZ. Turns should therefore be kept within Seletar CTR.
b) Pilots should not fly to the east of the runway. This is to keep clear of tall buildings up to 296ft AMSL there. Pilots should have all relevant obstructions in sight, including the steel structure 300ft AMSL and the Silo 342ft AMSL 2nm north of the airfield.
c) Minimum altitudes apply over noise abatement areas (WSSL AD 2.21)
Aircraft types which are unable to safely manoeuvre clear of the noise abatement areas are not allowed to operate at Seletar Airport.

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VISUAL APPROACH CHART - ICAO

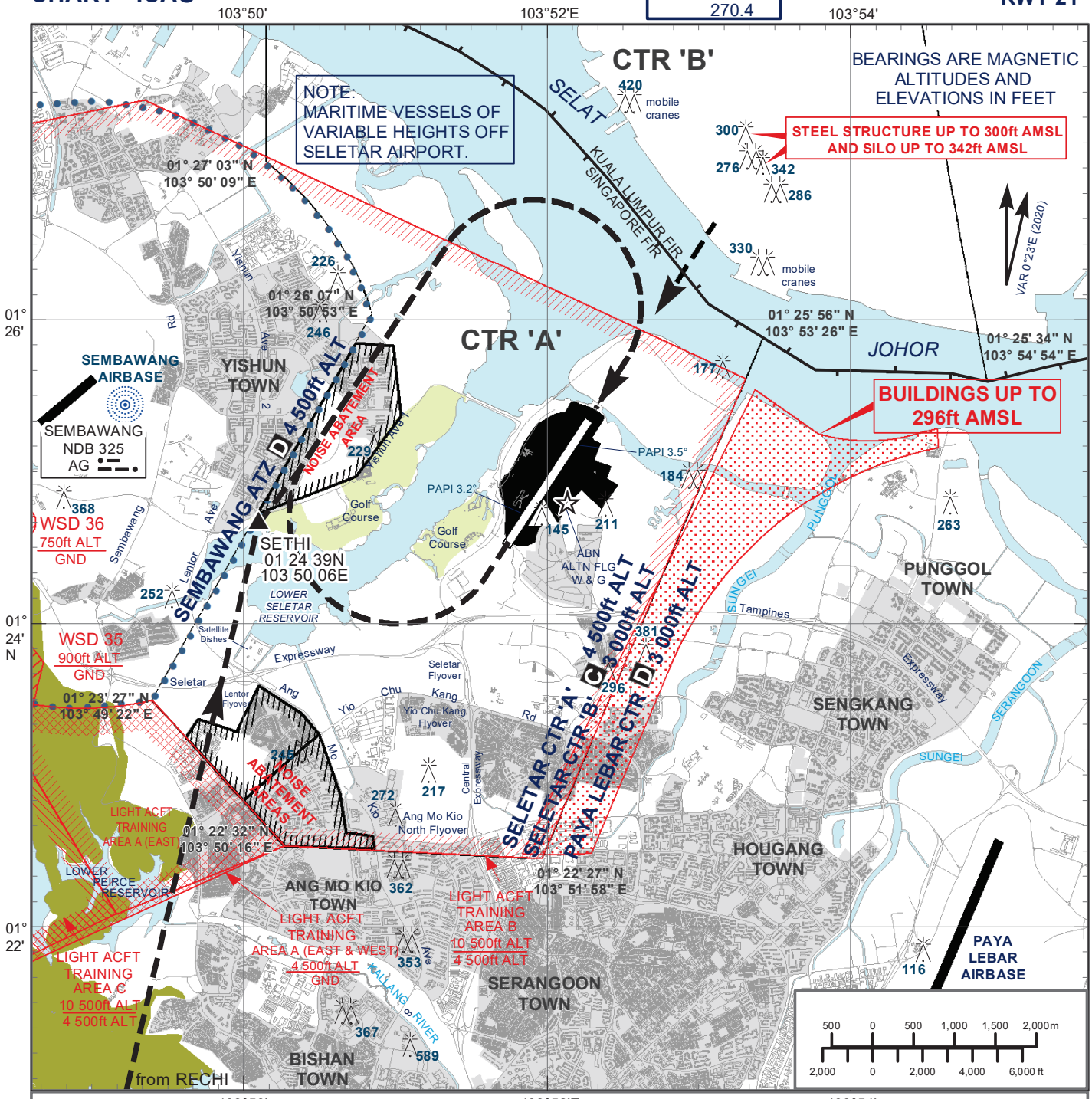
AD ELEV 46 ft

ATIS AP ID-WSSL 128.425

APP 124.05 126.025
TWR 118.45 270.4

SINGAPORE/SELETAR

RWY 21



ADVISORY JOINING PROCEDURES - RWY 21

Straight-in Approach

1) From GUMPU or OMKOM, join direct for a visual approach RWY 21, descending from 2 000ft at a speed of not more than 170kt, or as cleared by ATC. Pilots should have runway in sight..
2) From SJ-PONJO-RECHI-SETHI, join right downwind RWY 21 via SETHI at 2 000ft at a speed of not more than 170kt, When downwind, descend from 2 000ft for a visual approach or as cleared by ATC. Pilots should have runway in sight. Aircraft shall give way to circuit traffic already on downwind.

Circling Approach

1) From GUMPU or OMKOM, overfly the runway at 2 000ft at a speed of not more than 160kt. When passing over south-end of the runway (THR RWY 03), descend from 2 000ft to 1 500ft and turn right for right downwind RWY 21. At downwind, descend for a visual approach or as cleared by ATC. Pilots should have the runway in sight.
2) From SJ-PONJO-RECHI-SETHI, join right downwind RWY 21 via SETHI at 2 000ft at a speed of not more than160kt. 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 right downwind RWY 21. At downwind, descend for a visual approach or as cleared by ATC. Pilots should have runway in sight.
3) Joining aircraft shall give way to circuit traffic already on downwind.

PAPI 3.5°		
Pilot's eye height over the threshold when the following PAPI lights come into view	RUNWAY	
	03	21
2 white lights and 2 red lights (MEHT)*	21.24m	17.720m
3 white lights and 1 red light	22.27m	19.286m
4 white lights	24.75m	20.871m

*MEHT : Minimum Eye Height Over the Threshold.

Note : Aircraft with eye-to-wheel height greater than 6.3 metres are advised to fly with 2 white and 2 red lights visible so as to achieve sufficient wheel clearance.

CAUTION

a) Pilots are required to keep clear of Sembawang ATZ. Turns should therefore be kept within Seletar CTR.
b) Pilots should not fly to the east of the runway. This is to keep clear of tall buildings up to 296ft AMSL there. Pilots should have all relevant obstructions in sight, including the steel structure 300ft AMSL and the Silo 342ft AMSL 2nm north of the airfield.
c) Minimum altitudes apply over noise abatement areas (WSSL AD 2.21)
Aircraft types which are unable to safely manoeuvre clear of the noise abatement areas are not allowed to operate at Seletar Airport.

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CHANGES : Removal of obstacle at coordinates 012656.8N 1035251.7E with height 407ft AMSL.

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VISUAL DEPARTURE CHART

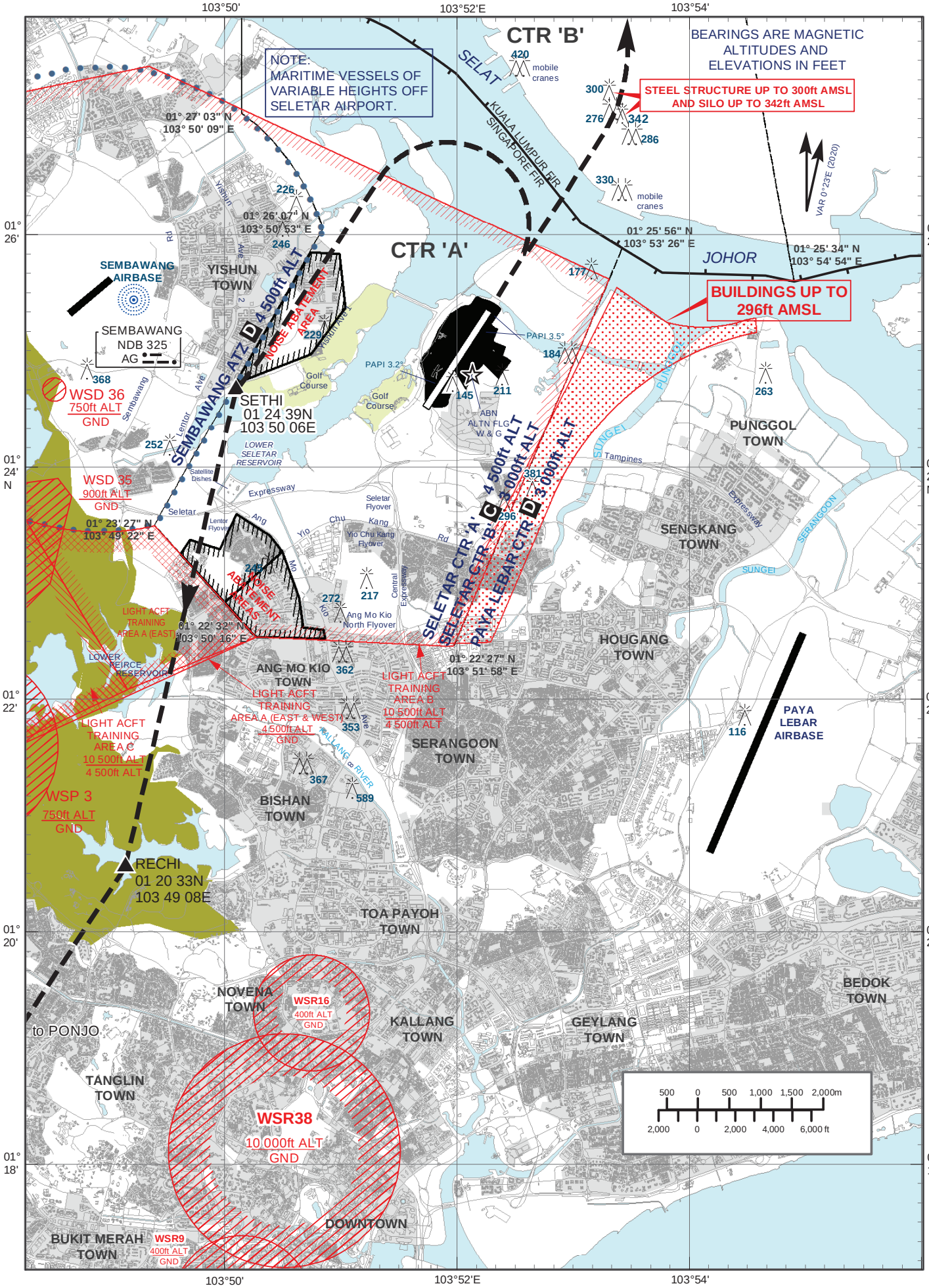
AD ELEV 46 ft

ATIS AP ID-WSSL 128.425

APP 124.05
TWR 118.45
270.4

SINGAPORE/SELETAR

RWY 03



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CHANGES : Revision to Restricted Areas WSR9 and WSR16

ADVISORY DEPARTURE PROCEDURES FOR RUNWAY 03

On departure, pilots of both fixed-wing and rotary-wing aircraft should climb ahead to an altitude cleared by ATC. Pilots can expect a radar heading to leave Seletar CTR. Where a radar heading is not given, pilots shall navigate to SETHI-RECHI-PONJO-SJ, or navigate to OMKOM, in accordance with their ATC clearance.

CAUTION

a) Pilots are required to keep clear of Sembawang ATZ. Turns should therefore be kept within Seletar CTR.

b) Pilots of fixed-wing aircraft should not fly to the east of the runway. This is to keep clear of tall buildings up to 296ft AMSL there. Pilots should have all relevant obstacles in sight, including the steel structure 300ft AMSL and SILO 342ft AMSL 2nm north of the airfield.

c) When cleared via SETHI-RECHI-PONJO-SJ, pilots shall not deviate from the clearance unless approved by ATC. This is due to the proximity of WSR38 which is Permanently active from Ground to 10,000ft.

d) Pilots shall maintain a speed of not more than 185KTS until passing PONJO to mitigate risk of encroaching into WSD4.

e) Minimum altitudes apply over noise abatement areas (WSSL AD 2.21). Aircraft types which are unable to safely manoeuvre clear of the noise abatement areas are not allowed to operate at Seletar Airport.

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VISUAL DEPARTURE CHART

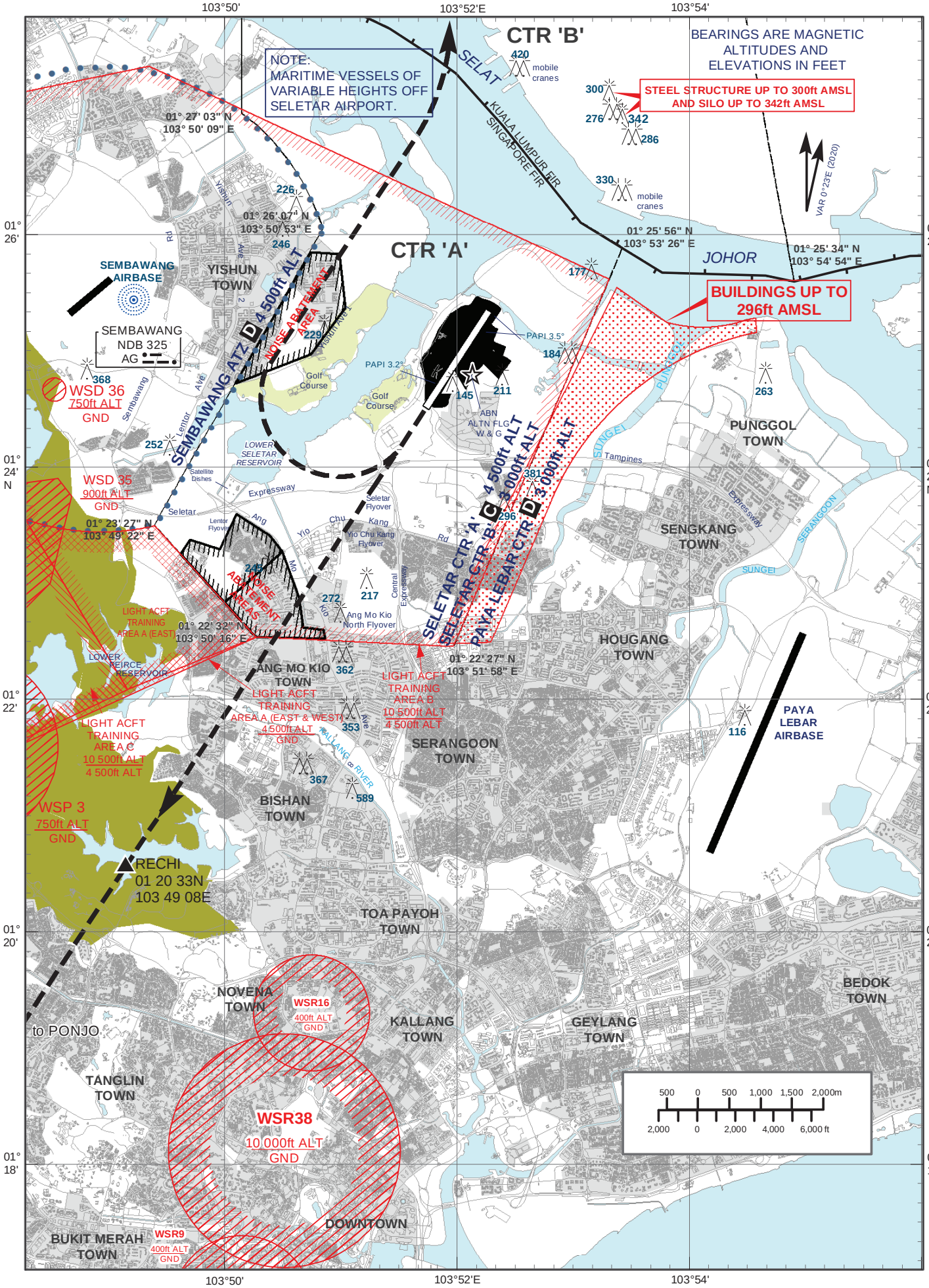
AD ELEV 46 ft

ATIS AP ID-WSSL 128.425

APP 124.05
TWR 118.45
270.4

SINGAPORE/SELETAR

RWY 21



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CHANGES : Revision to Restricted Areas WSR9 and WSR16

ADVISORY DEPARTURE PROCEDURES FOR RUNWAY 21

On departure, pilots can expect to climb to an initial altitude clearance by ATC. Pilots of fixed-wing aircraft navigating to OMKOM can expect to turn right to join the circuit till end of downwind and then expect a radar heading to leave Seletar CTR. Where a radar heading is not given, pilots shall navigate to RECHI-PONJO-SJ, or navigate to OMKOM in accordance with their ATC clearance.

Pilots of rotary-wing aircraft can expect to turn left after departure to join the helicopter circuit pattern till end of downwind. Thereafter, they can expect further en-route clearance.

CAUTION

a) Pilots are required to keep clear of Sembawang ATZ. Turns should therefore be kept within Seletar CTR.

b) Pilots of fixed-wing aircraft should not fly to the east of the runway. This is to keep clear of tall buildings up to 296ft AMSL there. Pilots should have all relevant obstacles in sight, including the steel structure 300ft AMSL and SILO 342ft AMSL 2nm north of the airfield.

c) When cleared via RECHI-PONJO-SJ, pilots shall not deviate from the clearance unless approved by ATC. This is due to the proximity of WSR38 which is Permanently active from Ground to 10,000ft.

d) Pilots shall maintain a speed of not more than 185KTS until passing PONJO to mitigate risk of encroaching into WSD4.

e) Minimum altitudes apply over noise abatement areas (WSSL AD 2.21). Aircraft types which are unable to safely manoeuvre clear of the noise abatement areas are not allowed to operate at Seletar Airport.

f) When cleared via OMKOM, pilots shall maintain a speed of not more 185KTS until established on the downwind leg to mitigate risk of encroaching into Sembawang ATZ.

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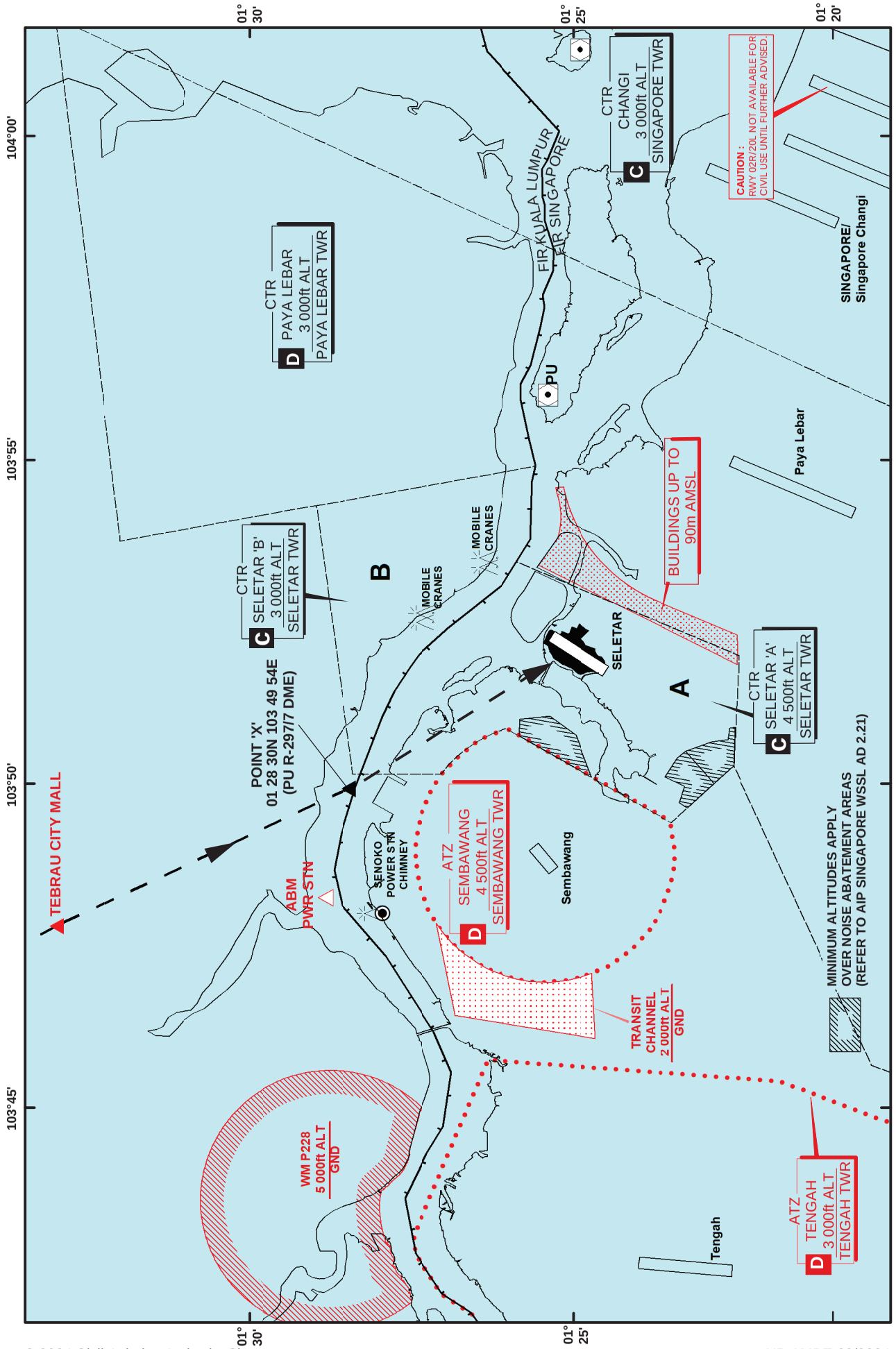
SELETAR AERODROME
JOINING PROCEDURE (VFR FLIGHTS) FROM JOHOR BAHRU



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CHANGES: 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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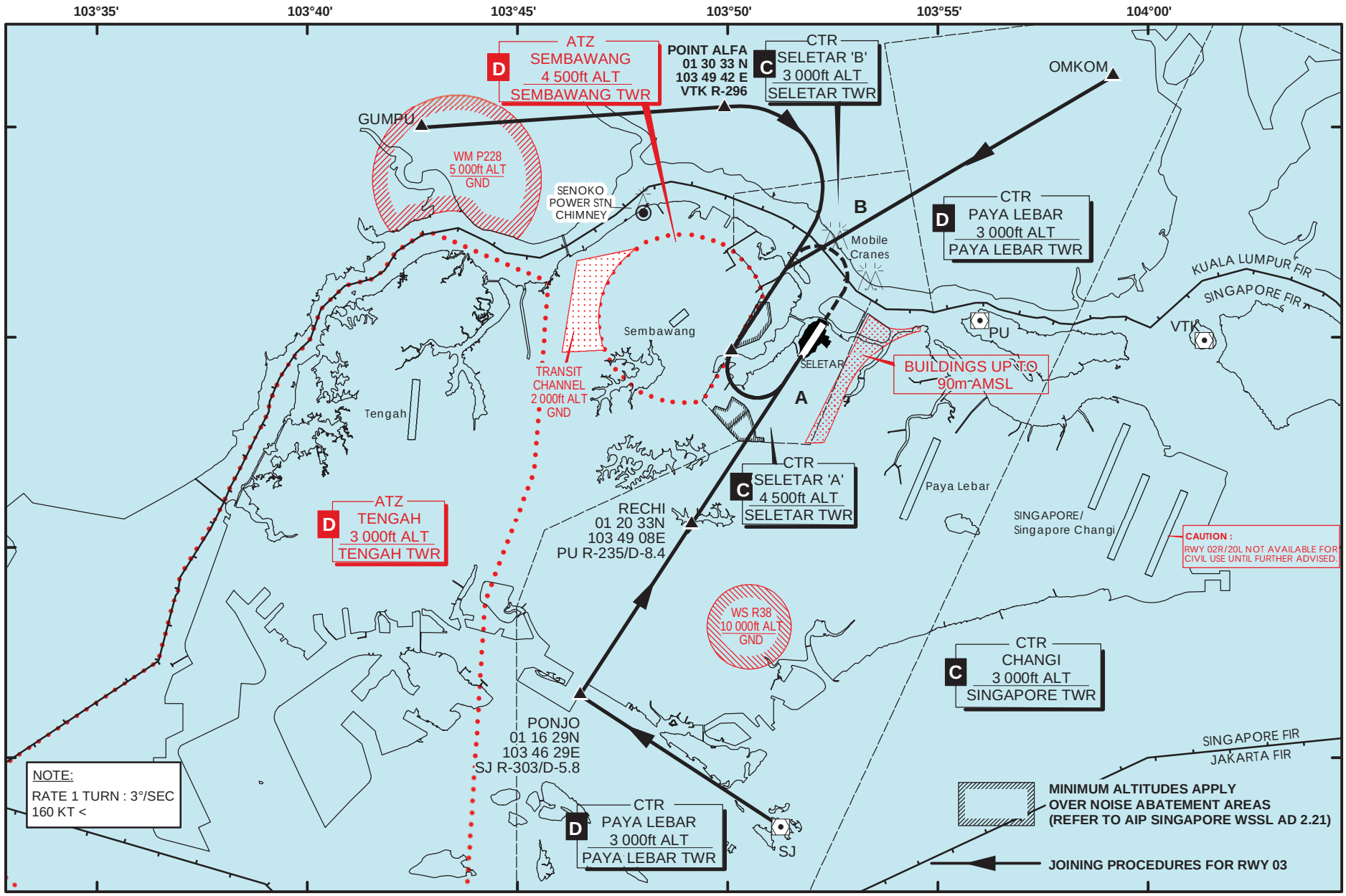
SELETAR AERODROME JOINING PROCEDURE (IFR FLIGHTS) FROM GUMPU, OMKOM AND SJ - RUNWAY 03



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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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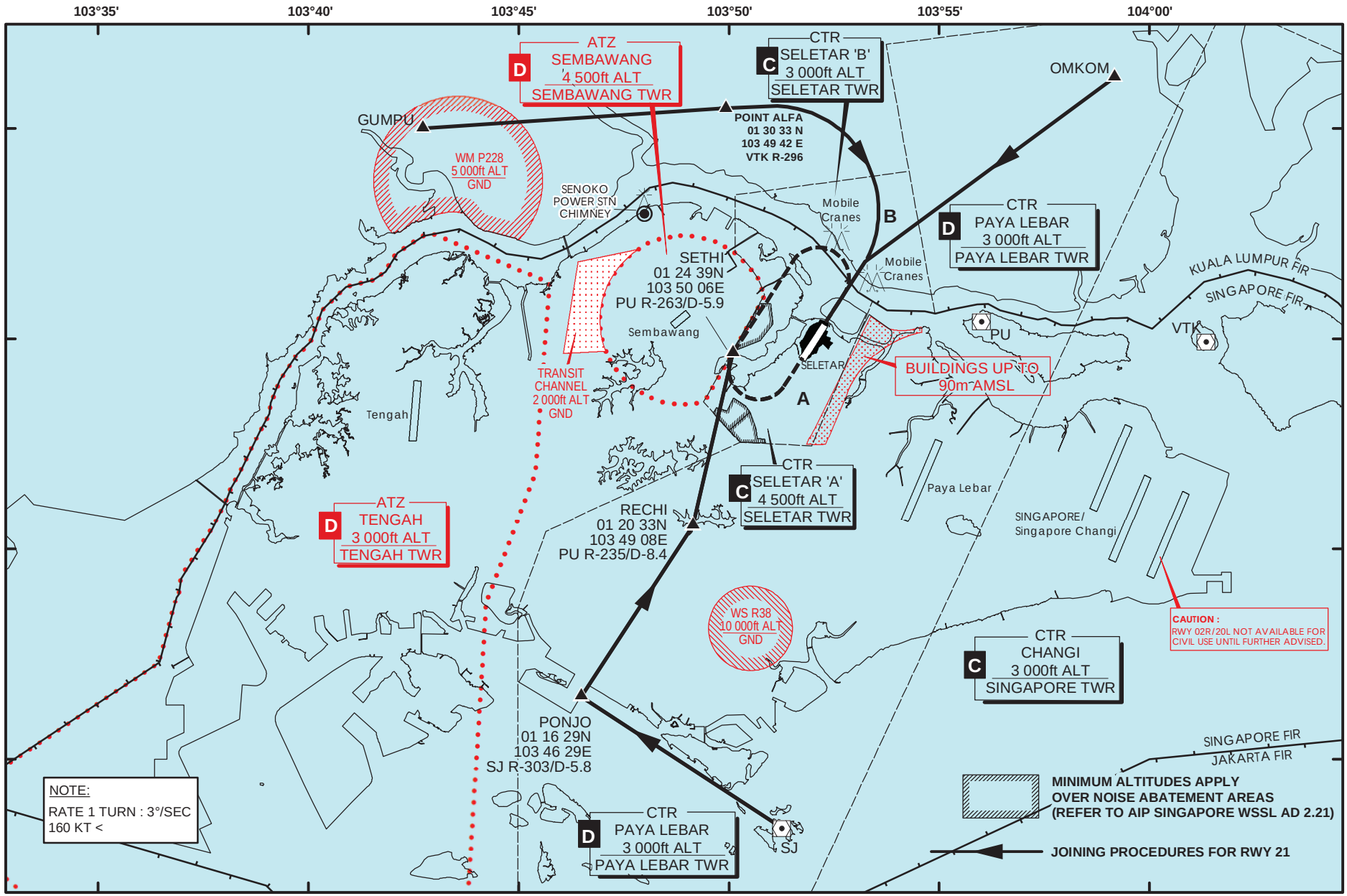
SELETAR AERODROME JOINING PROCEDURE (IFR FLIGHTS) FROM GUMPU, OMKOM AND SJ - RUNWAY 21



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CHANGES : 1. Updated caution text
2. Removal of Runway 3 closure crosses "X"

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WSAP PAYA LEBAR

Note: The following sections in this chapter are intentionally left blank:
AD 2.16, AD 2.21 and AD 2.25

WSAP AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WSAP - PAYA LEBAR

WSAP AD 2.2 AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA

1	*ARP coordinates and site at AD*	012120.60N 1035410.00E (Paya Lebar IBN)
2	Direction and distance from (city)	-
3	*Elevation/Reference temperature*	20 M(65ft) / 31.5°C
4	*MAG VAR*	0°23'E (2020)
5	*AD Administration, address, telephone, telefax, telex, AFS*	PAYA LEBAR AIRPORT SINGAPORE534395 Tel: 63813111 (Base Command Post) AFS: WSAPYWYX
6	*Types of traffic permitted*	IFR
7	*Remarks*	Operator: Republic of Singapore Air Force. Alternate/Emergency Diversionary Aerodrome for Singapore Changi Airport (see page WSAP AD 2-9)

WSAP AD 2.3 OPERATIONAL HOURS

1	*Aerodrome Administration*	BTN 2300-1100 SUN/MON to THU/FRI Public holidays and outside operating hours prior permission required from RSAF Headquarters via Paya Lebar Base Command Post.
2	*Customs and immigration*	by prior arrangement only
3	*Health and sanitation*	by prior arrangement only
4	*AIS Briefing Office*	-
5	*ATS Reporting Office*	-
6	*MET Briefing Office*	H24
7	*Air Traffic Services*	H24
8	*Remarks*	AD may be closed periodically for Foreign Object Damage (FOD) walk. Actual emergency or diversion will be accepted at 30 min notification. Such closure will be published via NOTAM.

WSAP AD 2.4 HANDLING SERVICES AND FACILITIES

1	*Cargo Handling Facilities*	-
2	*Fuel / Oil Types*	JET A1, Oil
3	*Fuelling Facilities / Capacity*	BTN 2300-1100 SUN/MON to THU/FRI Public holidays and outside operating hours prior permission required from RSAF Headquarters via Paya Lebar Base Command Post.
4	*Hangar space for visiting aircraft*	-
5	*Repair facilities for visiting aircraft*	-
6	*Remarks*	NIL

WSAP AD 2.5 PASSENGER FACILITIES

1	*Hotels*	NIL

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2	*Restaurants*	NIL
3	*Transportation*	NIL
4	*Medical Facilities*	NIL
5	*Banks and Post Offices*	NIL
6	*Tourist Office*	NIL
7	*Remarks*	NIL

WSAP AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

1	*AD category for fire fighting*	CAT9
2	*Rescue equipment*	Adequately provided as recommended by ICAO
3	*Capability for removal of disabled aircraft*	Sufficient salvage equipment provided by Airfield Ground Services section at military bases.
4	*Remarks*	All Airport Emergency Services personnel are trained in rescue and fire-fighting as well as medical first-aid.

WSAP AD 2.7 SEASONAL AVAILABILITY - CLEARING

The aerodrome is available throughout the year.

WSAP AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

1	*Apron surface and strength*	Strength: PCR559/R/B/W/U (Apron A) Strength: LCN100 - PCN71/R/B/W/U (Apron B) Strength: PCR637/R/B/W/U (Apron C) Strength: PCR305/R/B/W/U (Apron D) Strength: PCR559/R/B/W/U (Jet Apron) Strength: PCR574/R/B/W/U (Jet Apron Extension)
2	*Taxiway width, surface and strength*	Strength: PCR502/F/B/X/U
3	*Remarks*	TWY between TWY W1 and TWY W2 closed to all code C and above aircraft. Pilots to exercise caution.

WSAP AD 2.9 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS

SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS			
1	**Aircraft Parking Restrictions**		
	There are 4 designated parking aprons: Apron A, Apron C, Jet Apron and Jet Apron Extension:		
		ACFT Stand	Largest ACFT Type
	Apron A	A1 to A5	C17
	Apron C	C1 to C7 (reserved for RSAF) C8 to C9 C10 C10A C11 C11A	C130 C130 KC135 B747-400 C17 C5, AN124
	Jet Apron	J1 to J3 J1A and J2A	C130 B747
	Jet Apron Extension	J4 and J5	C17
2	**Taxiing Procedures**		
2.1	Taxiing in/out of Apron Areas		

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SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS			
	Pilots taxiing in/out of apron areas must adhere to ATC's instructions. Once a pilot has reported visual with the marshallers, the pilot will be instructed to continue to taxi and follow the marshaller's instructions. At any time, should the aircraft pilot decide not to comply with the marshaller's instructions, it is mandatory for the pilot or the marshalling agency to inform ATC immediately. All marshalling services shall terminate at that moment and the pilot will be instructed by ATC to shutdown the aircraft. Concurrently, ATC will also inform the marshallers via the ground communications network. Subsequently, the aircraft will be towed to its allocated aircraft stand. Pilots are to exercise caution when operating in the apron areas due to close proximity of obstacles (e.g. Floodlights, buildings, etc.)		
2.2	To minimize the possibility of ground taxiing confliction within the apron areas as well as to achieve an orderly flow of aircraft ground movements, the following guidelines are recommended for both RWY 02 (Departures) and RWY 20 (Arrivals):		
	Apron	Departures	Arrivals
	Apron A	Taxi for RWY 02 departure via TWY F4.	TWY F3 or F4
	Apron B	No taxiing is allowed within Apron B and TWY W7. Aircraft will be towed in/out of Apron B to an assigned aircraft stand via TWY W7.	
	Apron C	TWY F1	TWY F1 or F2
	Jet Apron/Jet Apron Extension	TWY F3	TWY F3
3	**Ground Taxiing Guidelines**		
3.1	The recommended taxiing guidelines may be subject to changes due to work-in-progress or unforeseen circumstances and shall be included in the NOTAM. Pilots will receive a taxiing brief from the Flight Planning office prior to departure.		
4	**Ground Restrictions due to Weather**		
4.1	In the event of inclement weather over Paya Lebar airport, ground support services for aircraft are to be terminated when the meteorological office issues a Lightning Risk Category 1 warning (very high lightning risk with extremely probable lightning producing CB clouds over the affected area). Ground agencies will be alerted of the warnings through the Base Public Announcement system as well as through the ground communications network. The following ground support services are to be terminated: a) aircraft refuelling and de-refuelling b) towing of aircraft in the open c) maintenance works on aircraft on the apron areas d) marshalling of aircraft in and out of the apron areas e) loading and unloading of cargo from aircraft f) customs and immigration checks in the apron areas		
4.2	There is no work restriction for Lightning Risk Categories 2, 3, 4 and 5. As aircraft marshalling is not permitted during Lightning Risk Category 1, aircraft that has landed at Paya Lebar Airport will be instructed to hold at the following designated areas until the warning has expired: a) Non-VIP aircraft at TWY F1, F2, F3 or F4 b) VIP aircraft at TWY F3 or F4		
4.3	There may be occasions when despite a declaration of Lightning Risk Category 1, certain activities would still need to be performed in the open areas due to critical or operational requirements. In such instances, approval must be sought from Paya Lebar Tower after careful assessment of the overall weather situation over Paya Lebar Airport. Examples of such critical activities include: a) Marshalling of VVIP / VIP aircraft b) Embarkation / disembarkation of VIP from aircraft		
5	**Ground Procedures - General**		
5.1	Engine Start-ups and Ground Runs Clearance from the Ground Controller must be sought and obtained for all engine start-ups or any associated activities within the apron areas. In addition, all engine ground runs, regardless of intensity, must be co-ordinated with ATC for approval. However, ground runs exceeding 85% of the engine power are prohibited within the apron areas. Within Paya Lebar Airport, the designated area for engine ground runs exceeding 85% of the engine power are the Northern Access Run-up Pad and Hush-House or as designated by Paya Lebar Base Command Post. The area allocated will be dependent on the type of aircraft concerned.		
5.2	Aircraft to/from Apron B Engine start-ups and shutdowns at TWY W7 are strictly prohibited. Aircraft departing or arriving to/from Apron B shall be allocated the appropriate aircraft stands for their start-ups or shutdowns and shall be towed in/out of the allocated aircraft stand. In addition, wing-walkers are to be provided for large aircraft on tow at TWY W7 due to construction works located next to TWY W7.		
5.3	Prohibited Activities - Smoking in the Apron Areas Smoking is strictly prohibited within the Apron areas. Disciplinary action will be taken on any personnel caught contravening this restriction.		

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WSAP AD 2.10 AERODROME OBSTACLES

IN APPROACH / TKOF AREAS			
RWY/Area affected		***OBST type, ELEV, Markings/LGT***	***Location/Coordinates***
1		2	3
a.	RWY 02 APCH RWY 20 TKOF	Industrial buildings, HGT 83ft AMSL. OBST LGTD.	Located on either side of approach funnel 2300ft from RWY 02 THR.
b.	RWY 02 APCH RWY 20 TKOF	Structure (water tower), HGT AMSL, marked and LGTD.	012022N 1035436E (east of RWY)
c.	RWY 02/20 APCH RWY 02/20 TKOF	ILS LLZ, co-located with LLZ antennae, HGT 17ft AGL.	LLZ RWY 02 located 1324ft from RWY 20 THR. LLZ RWY 20 located 1525ft from RWY 02 THR.
d.	RWY 02/20 APCH RWY 02/20 TKOF	ILS LLZ, co-located with LLZ antennae, HGT 8ft AGL.	LLZ RWY 02 located 1244ft from RWY 20 THR.

IN CIRCLING AREA AND AT AERODROME		
OBST type, ELEV, Markings/LGT		***Location/Coordinates***
1		2
a.	ILS GP huts co-located with GP antenna mast, 53ft AGL, marked and lighted.	GP RWY 02 located 296ft west of western edge of RWY and 858ft from RWY 02 THR. GP RWY 20 located 296ft west of western edge of RWY and 984ft from RWY 20 THR.
b.	Precision Approach Radar (PAR) hut, 49.2ft AGL, marked and lighted.	211ft east of eastern edge of RWY, 7089ft north of RWY 02 THR.
c.	2 x Frangible PAR Moving Target Indicator (MTI) reflectors, 16ft AGL, marked and lighted.	RWY 02 MTI reflectors, located 213ft east of eastern edge of RWY, 4389ft from RWY 02 THR. RWY 20 MTI reflectors, located 209ft east of eastern edge of RWY, 2911ft from RWY 20 THR.
d.	Arrestor hookwire retriever unit, 4ft AGL, lighted .	Within the RWY strip. Located 52ft from both sides of the RWY edges, installed 1200ft from RWY 02 THR and 1100ft from RWY 20 THR.
e.	Arrestor barrier flat on the ground.	Within the RWY strip, installed 210ft south of RWY 02 THR and 118ft north of RWY 20 THR.
f.	Surface wind direction sleeves, 25ft AGL, marked and lighted.	344ft west of western edge of RWY for both sides, 458ft from RWY 02 THR and 307ft from RWY 20 THR.
g.	AWOS stanchions, 23ft AGL, marked and lighted.	296ft west of western edge of RWY on both sides, 658ft from RWY 02 THR and 654ft from RWY 20 THR.
h.	One wheel structure, 585ft AMSL, lighted.	Erected at 011726N 1035150E, BRG 216 DEG, DIST 5NM from WSAP ARP - within WSAP CTR.
i.	One Building, 804ft AMSL, lighted.	Erected at 011642N 1035105E, BRG 216 DEG, DIST 6.2NM from WSAP ARP - within WSAP CTR.
j.	Mobile aircraft arrestor gear, 6.6ft AGL, lighted.	39ft from edge of western taxiway between TWY W1 and W2 at 1362ft south of TWY W1.
k.	Lightning protection system, 218ft AMSL, marked and lighted.	Erected at 012203.36N 1035509.39E.
l.	Mobile aircraft arrestor gear, 6.6ft AGL, lighted.	300ft south of RWY 20 THR, 33ft from RWY edge on both sides. All RWY 20 inbound shall land 500ft up RWY 20 THR. LDA 11,900ft.
m.	Lightning protection system, 40ft AGL, and cabin structure, 19.8ft AGL, marked and lighted.	Erected at 012240N 1035453E.
n.	Trees, 197ft AMSL.	Exceed HGT limitations of Eastern Transitional Surface for Runway 02 and Runway 20. Pilots to exercise caution.
o.	Concrete hut, arm barrier and fences, 19.3ft AGL.	Erected at 012032N 1035405E, Exceed HGT limitations of Take-Off Climb Surface for RWY 20. Pilots to exercise caution.
p.	ILS GP huts co-located with GP antenna mast, 49ft AGL, marked and lighted.	GP RWY 02 located 263ft west of western edge of RWY and 858ft from RWY 02 THR. GP RWY 20 located 266ft west of western edge of RWY and 950ft from RWY 20 THR.

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WSAP AD 2.11 METEOROLOGICAL INFORMATION PROVIDED

1	*Associated MET Office*	Paya Lebar (WSAP)
2	*Hours of service*	H24
3	*Office responsible for TAF preparation and Periods of validity*	Paya Lebar (WSAP), 9, 24
4	*Type of landing forecast and Interval of issuance*	NIL
5	*Briefing/consultation provided*	P
6	*Flight documentation and Language(s) used*	Charts or Tabular forms, English
7	*Charts and other information available for briefing or consultation*	S, U, P
8	*Supplementary equipment available for providing information*	APT, WXR
9	*ATS units provided with information*	-
10	*Additional information*	Tel : 63813156 (Met Office)

WSAP AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

Designations RWY NR	**TRUE & MAG BRG**	**Dimensions of RWY (m)**	**Strength (PCR) and surface of RWY/SWY**	**THR Coordinates**	**THR elevation and highest elevation of TDZ of precision APCH RWY**
1	2	3	4	5	6
02	23° GEO 23° MAG	3780 x 61	502/F/B/X/U Bituminous concrete	012041.08N 1035410.36E	12.9M (43ft)
20	203° GEO 203° MAG	3780 x 61	502/F/B/X/U Bituminous concrete	012234.41N 1035458.53E	19.7M(65ft)
Designations RWY NR	*Slope of (RWY - SWY)*	*Dimensions of SWY (m)*	*Dimensions of CWY (m)*	*Dimensions of Strip*	*OFZ*
1	7	8	9	10	11
02	-	300x61	300x150	-	-
20	-	300x61	300x150	-	-

12	*Remarks*

a) Intensive fixed wing flying operation west of runway.
b) Helizone adjacent west of runway up to 800ft QNH.
c) Arrestor Barrier both ends of runway. Pilots are to land at least 500ft up the THR of RWY in use.
d) Hookwire cable installed 335m inwards from RWY 20 THR and 360m inwards from RWY 02 THR.
e) Intense bird activity after rain, and up to 2 hour after dusk and dawn.
f) Pilots making approaches for RWY 20 are to take note of the high ground, 32m AMSL, 1NM north of RWY 20 THR and to exercise caution.
g) Threshold markings consist of 16 stripes.

WSAP AD 2.13 DECLARED DISTANCES

RWY Designator	**TORA (m)**	**TODA (m)**	**ASDA (m)**	**LDA (m)**	**Remarks**
1	2	3	4	5	6
02	3780	4080	4080	3780	NIL
20	3780	4080	4080	3780	NIL

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WSAP 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 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

WDI/Taxiway/Stopway	Lighted
IBN	012120.60N 1035410.00E012120.60N 1035410.00E; Flashing RED 'PL" ; Operating hours HN and IMC

WSAP AD 2.16 [NIL] HELICOPTER LANDING AREA

NIL (not applicable).

WSAP AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	**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	*Vertical Limits*	GND to 3000FT ALT
3	*Airspace Classification*	D
4	*ATS Unit Call Sign, Language(s)*	PAYA LEBAR TOWER (Singapore APP outside the opr hours of PAYA LEBAR TOWER), English
5	*Transition Altitude*	11000FT (3,350m)
6	*Remarks*	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.

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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 On SAT-SUN, public holidays and outside the above times PPR from RSAF Headquarters via Paya Lebar Base Command Post.	* 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		NIL
GND	PAYA LEBAR GROUND	130.8 MHz 296.0 MHz		
PAR	PAYA LEBAR TALKDOWN	119.9 MHz †269.0 MHz ♦240.5 MHz		† 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	115.1MHz 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

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Type of Aid and MAG Variation	IDENT	FREQ	OPR Hour	Position of transmitting Antenna Coordinates	DME transmitting Antenna Elevation / Remarks
SINJON DVOR/DME	SJ	113.5MHz CH82X	H24	011321.34N 1035115.22E	201° MAG 14.5km from THR RWY 02 (Paya Lebar). Antenna HGT: 190ft 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
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 AERODROME 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.

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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 2.21 [NIL] NOISE ABATEMENT PROCEDURES

NIL (not applicable).

WSAP AD 2.22 FLIGHT PROCEDURES

1 DEPARTURE AND ARRIVAL PROCEDURES

1.1 The designated runway for departures is RWY 02 and for arrivals is RWY 20.

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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 AN AERODROME

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

WSAP AD 2.25 VISUAL SEGMENT SURFACE (VSS) PENETRATION

NIL (not applicable).

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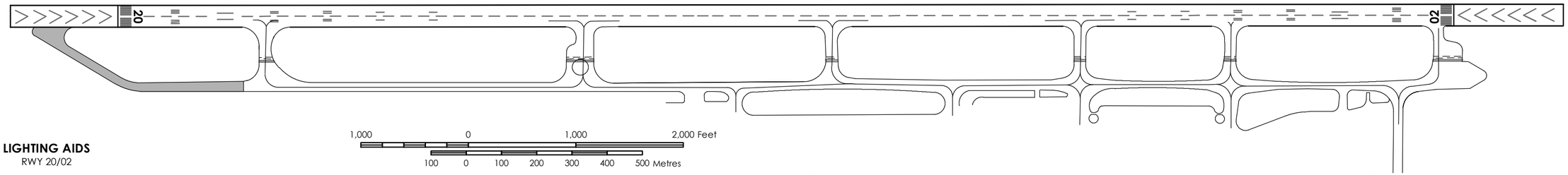
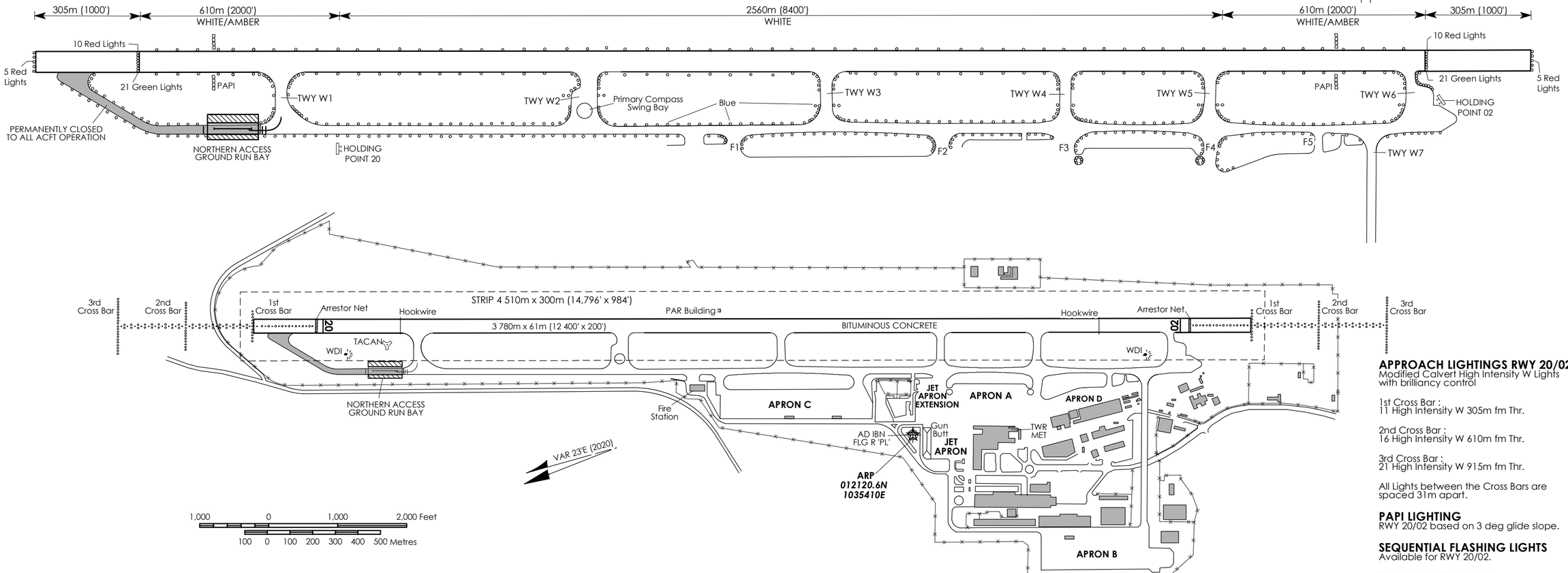
AERODROME CHART - PAYA LEBAR AIRPORT

MARKING AIDS
RWY 20/02



1,000 0 1,000 2,000 Feet
100 0 100 200 300 400 500 Metres

LIGHTING AIDS
RWY 20/02



1,000 0 1,000 2,000 Feet
100 0 100 200 300 400 500 Metres

APPROACH LIGHTINGS RWY 20/02
Modified Calvert High Intensity W Lights with brilliancy control

1st Cross Bar :
11 High Intensity W 305m fm Thr.

2nd Cross Bar :
16 High Intensity W 610m fm Thr.

3rd Cross Bar :
21 High Intensity W 915m fm Thr.

All Lights between the Cross Bars are spaced 31m apart.

PAPI LIGHTING
RWY 20/02 based on 3 deg glide slope.

SEQUENTIAL FLASHING LIGHTS
Available for RWY 20/02.

TAXIWAYS 75ft WIDE.

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CHANGES : Magnetic Variation revised.

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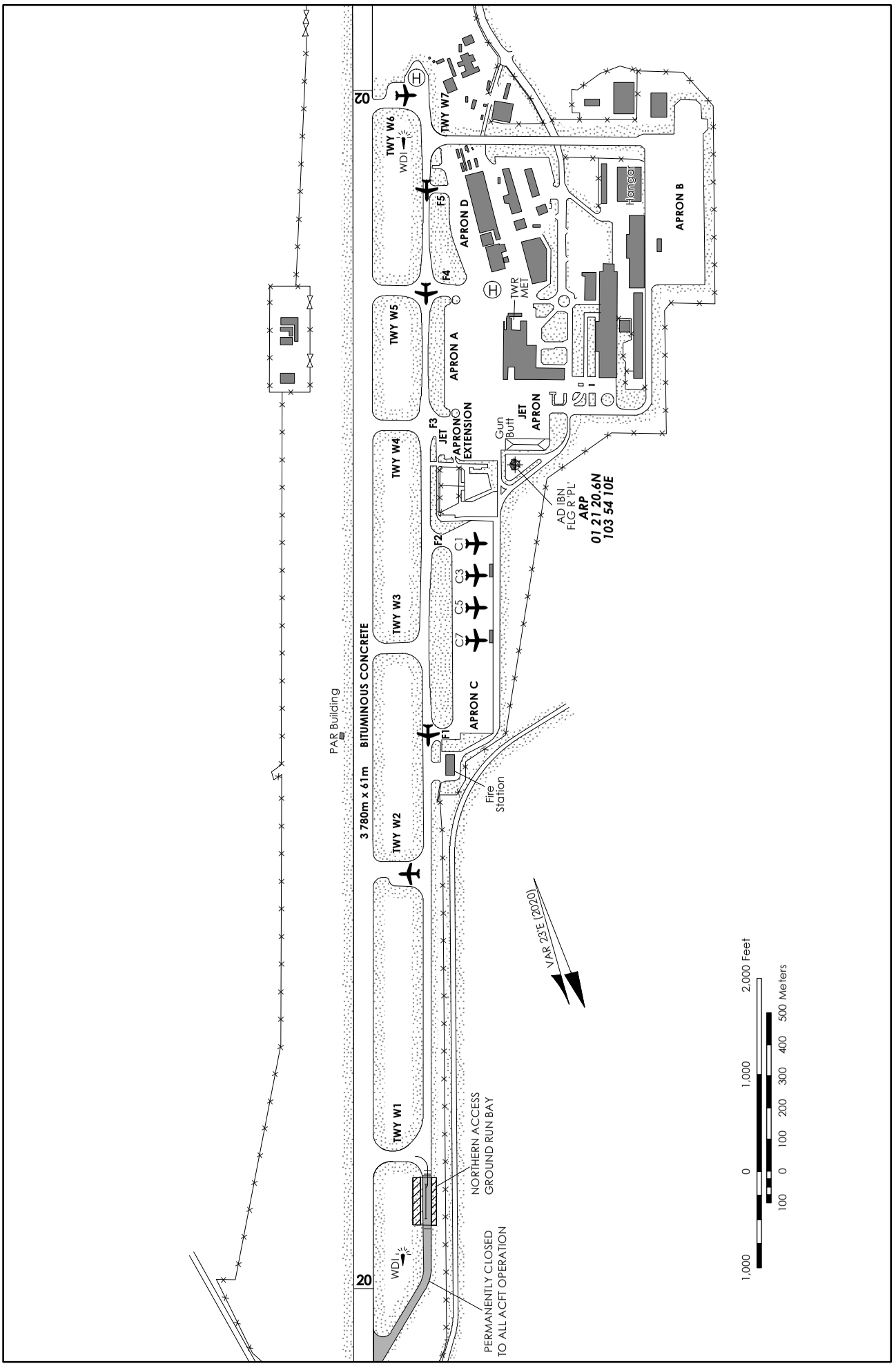
LOCATION OF AIRCRAFT STANDS FOR CIVIL AIRCRAFT AT PAYA LEBAR AIRPORT



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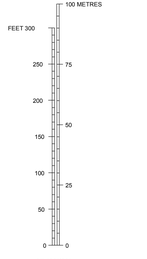
DIMENSIONS AND ELEVATIONS IN METRES

AERODROME OBSTACLE CHART - ICAO

TYPE A (OPERATING LIMITATIONS)

SINGAPORE/Paya Lebar Airport

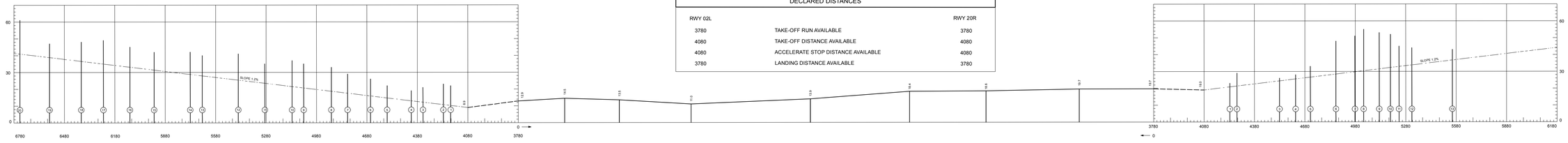
MAGNETIC VARIATION 23'E (2020)

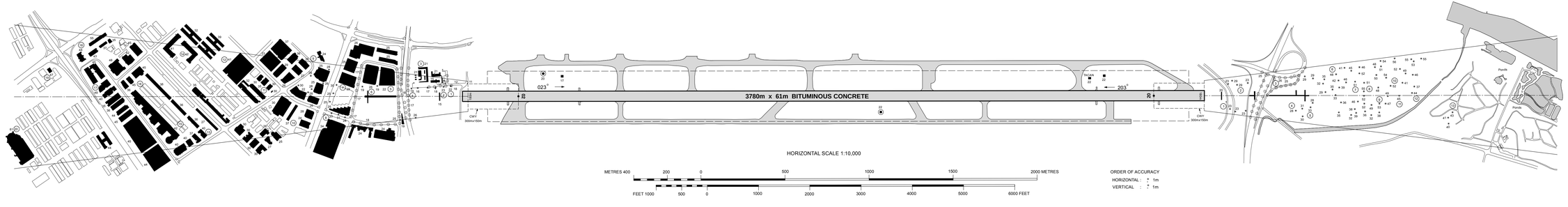


VERTICAL
SCALE
1:1000

RWY 02/20

DECLARED DISTANCES		
RWY 02L		RWY 20R
3780	TAKE-OFF RUN AVAILABLE	3780
4080	TAKE-OFF DISTANCE AVAILABLE	4080
4080	ACCELERATE STOP DISTANCE AVAILABLE	4080
3780	LANDING DISTANCE AVAILABLE	3780





HORIZONTAL SCALE 1:10,000

ORDER OF ACCURACY

HORIZONTAL	1m
VERTICAL	1m

AMENDMENT RECORD		
NO.	DATE	ENTERED BY

LEGEND	
ANTENNA, CHIMNEY, MAST, POLE, SPIRE or CRANE	
BUILDING	
IDENTIFICATION NUMBER	
LAMP POST	
LOCALISER ANTENNA	
ROAD	
SPOT HEIGHT	33
TREE	
TREE CANOPY	

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CHANGES : Reprint.

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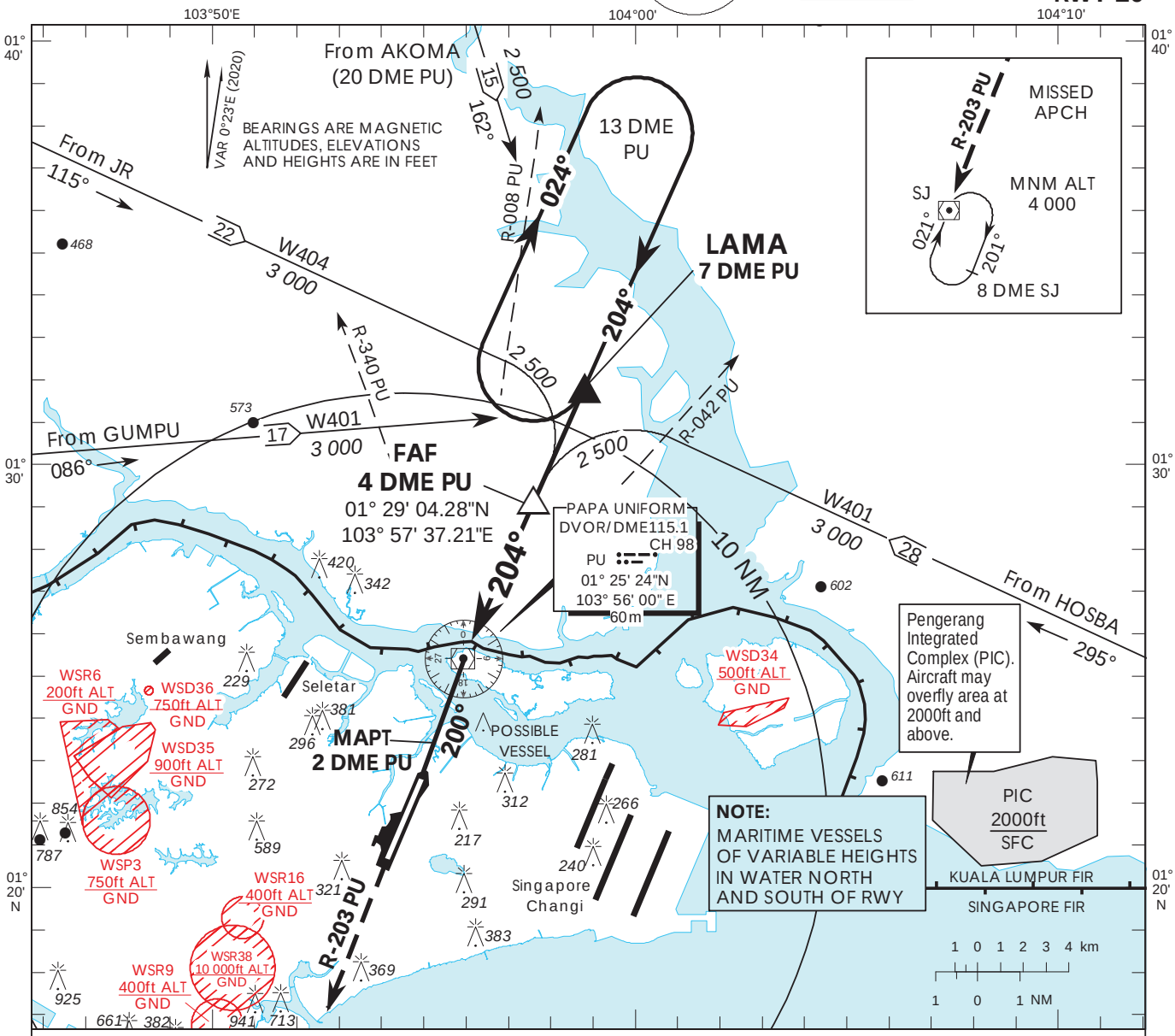
INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 65ft
HEIGHT RELATED TO AD ELEV - 65ft

MSA 25 NM from PAPA UNIFORM DVOR
3400' 2900' 2100'

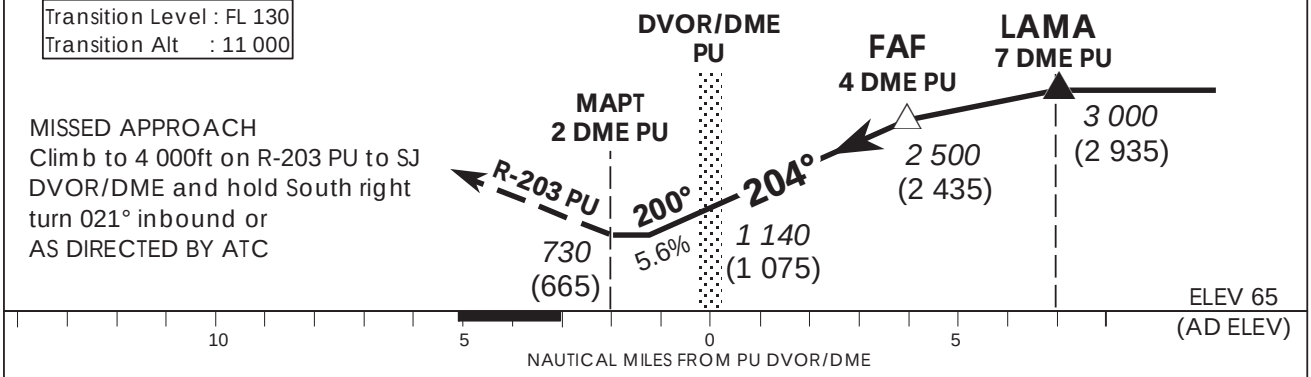
APP	124.05
	119.9
	126.025
TWR	118.05

SINGAPORE/ PAYA LEBAR
PU DVOR/DME RWY 20



Transition Level : FL 130
Transition Alt : 11 000

MISSED APPROACH
Climb to 4 000ft on R-203 PU to SJ DVOR/DME and hold South right turn 021° inbound or AS DIRECTED BY ATC



OCA (OCH)				
Category of Aircraft	A	B	C	D
Straight-in	**730 (665)**			

Distance	3 DME	2 DME	1 DME	PU DVOR/DME	1 DME
Altitude (Height)	**2160 (2095)**	**1820 (1755)**	**1480 (1415)**	**1140 (1075)**	**800 (735)**
Speed	knots	70	120	150	185
FAF - MAPT 6nm	min : s	**5 : 09**	**3 : 00**	**2 : 24**	**1 : 57**
Rate of descent/GS	ft/min	**370**	**635**	**795**	**980**

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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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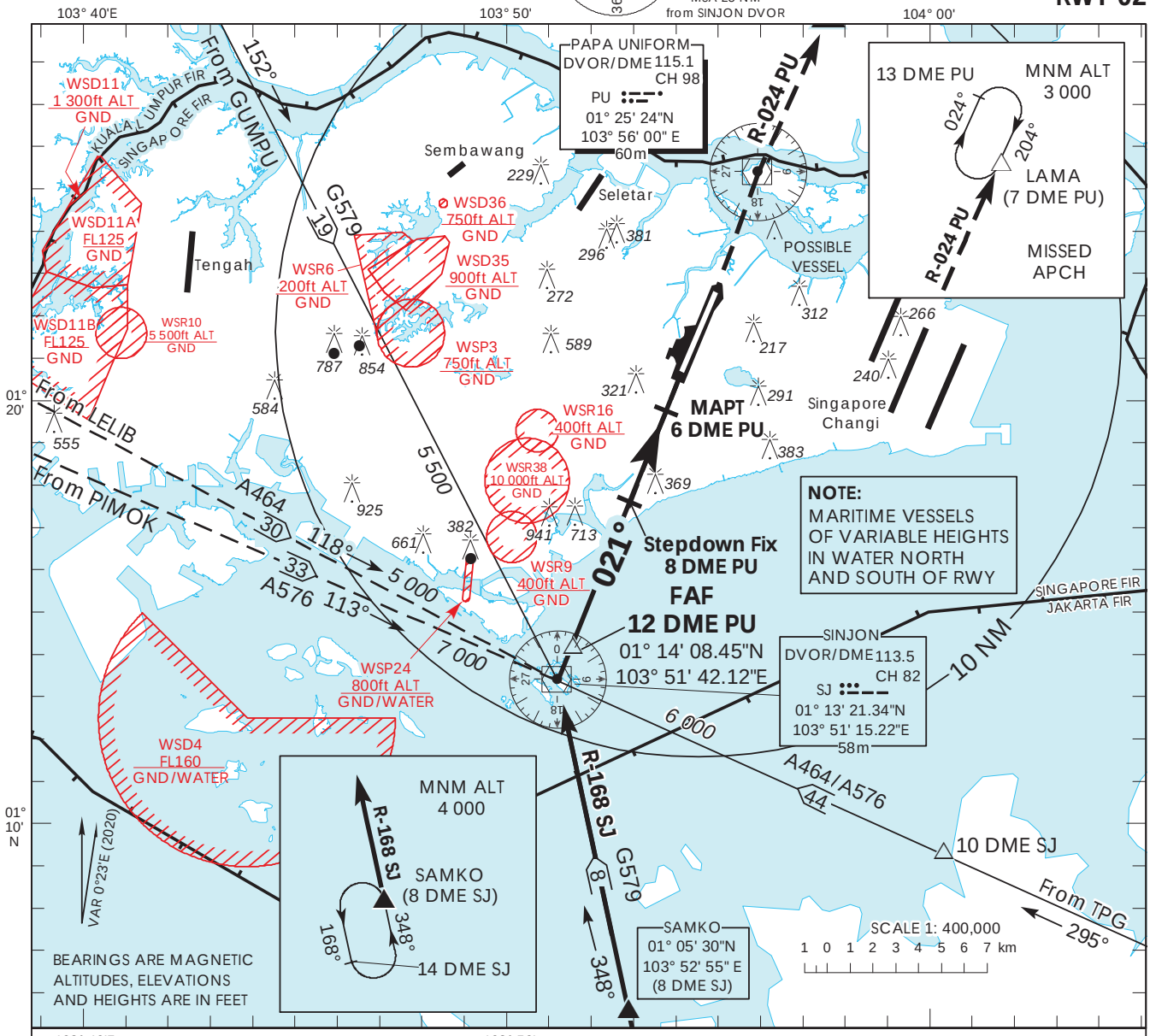
INSTRUMENT APPROACH CHART - ICAO

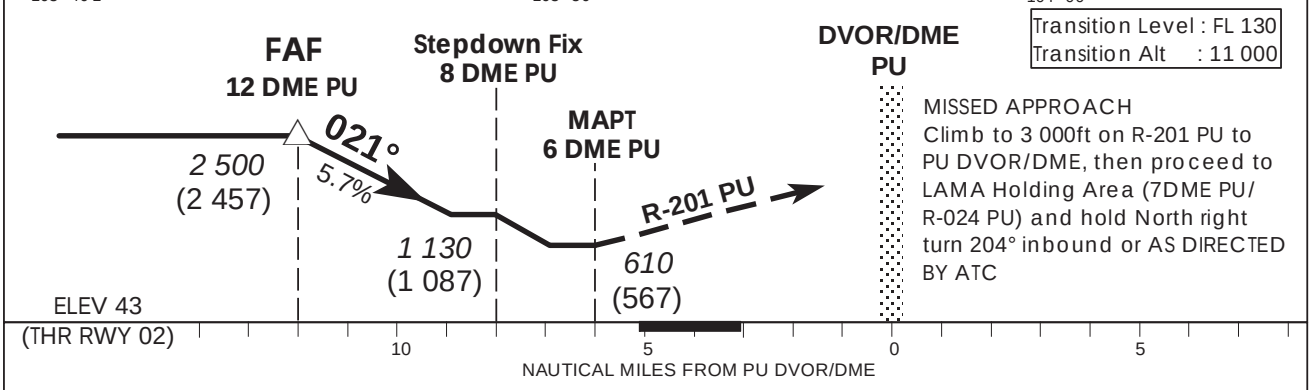
AERODROME ELEV 65ft
HEIGHT RELATED TO
THR RWY 02 - ELEV 43ft

MSA 25 NM from SINJON DVOR
3400' 090° 2100' 180° 2500' 360°

APP 124.05
119.9
126.025
TWR 118.05

SINGAPORE/ PAYA LEBAR
PU DVOR/DME RWY 02





Transition Level : FL 130
Transition Alt : 11 000

MISSED APPROACH
Climb to 3 000ft on R-201 PU to PU DVOR/DME, then proceed to LAMA Holding Area (7DME PU/ R-024 PU) and hold North right turn 204° inbound or AS DIRECTED BY ATC

OCA (OCH)				
Category of Aircraft	A	B	C	D
Straight-in (with stepdown fix)	**610 (567)**			
Straight-in (without stepdown fix)	**1 130 (1 087)**			

Distance	11 DME	10 DME	9 DME	8 DME	7 DME
Altitude (Height)	**2170 (2127)**	**1820 (1777)**	**1470 (1427)**	**1130 (1087)**	**780 (737)**
Speed	knots	70	120	150	185
FAF - MAPT 6nm	min : s	**5 : 09**	**3 : 00**	**2 : 24**	**1 : 57**
Rate of descent/GS	ft/min	**370**	**635**	**795**	**980**

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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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INSTRUMENT APPROACH CHART - ICAO

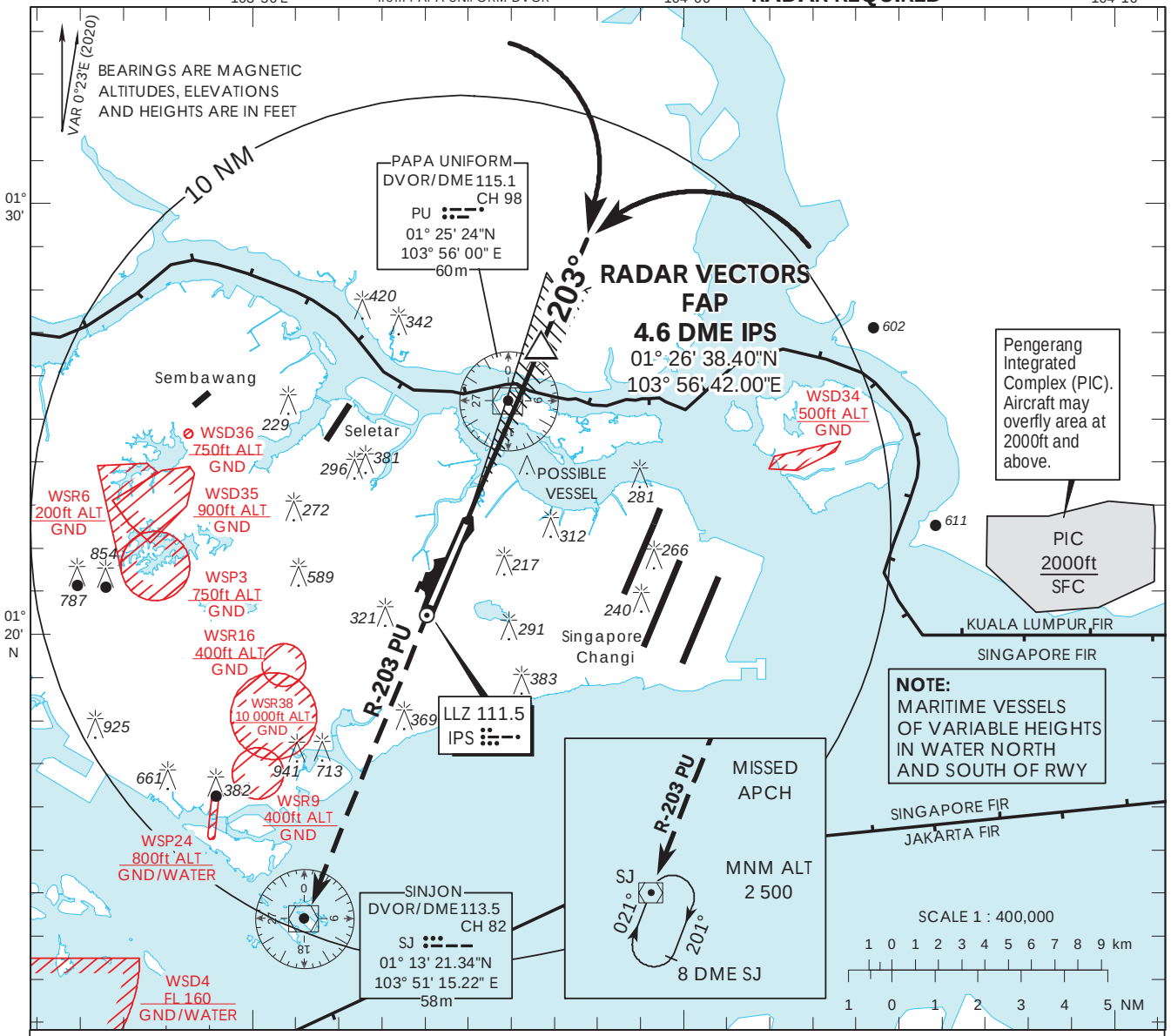
AERODROME ELEV 65ft
HEIGHT RELATED TO THR RWY 20 - 65ft

MSA 25 NM from PAPA UNIFORM DVOR
3400' 2900' 2100'

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

RADAR REQUIRED

SINGAPORE/ PAYA LEBAR
IPS ILS/DME RWY 20

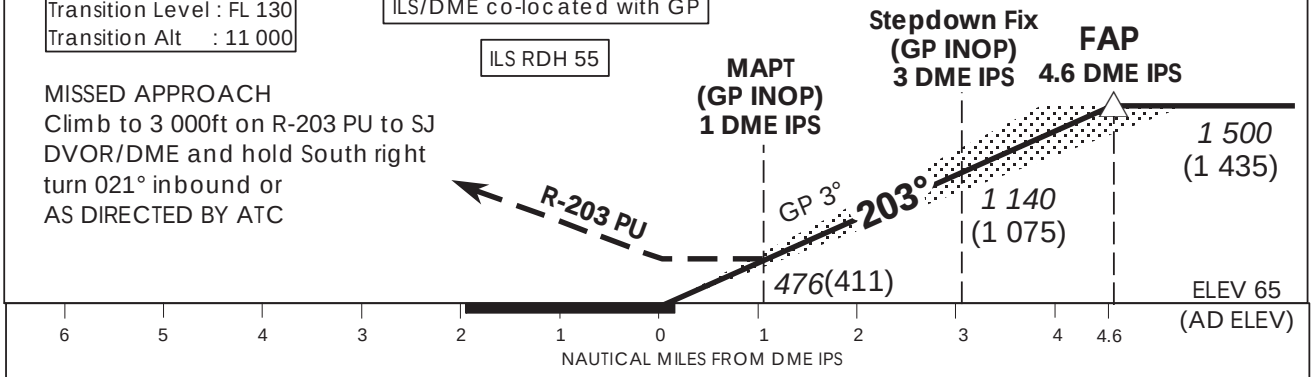


Transition Level : FL 130
Transition Alt : 11 000

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



OCA (OCH)					
Category of Aircraft		A	B	C	D
Straight-in	CAT I ILS	**194 (129)**	**204 (139)**	**214 (149)**	**224 (159)**
	GP INOP	**476 (411)**			

Distance		4 DME	3 DME	2 DME	
Altitude (Height)		**1300 (1235)**	**1140 (1075)**	**820 (755)**	
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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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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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

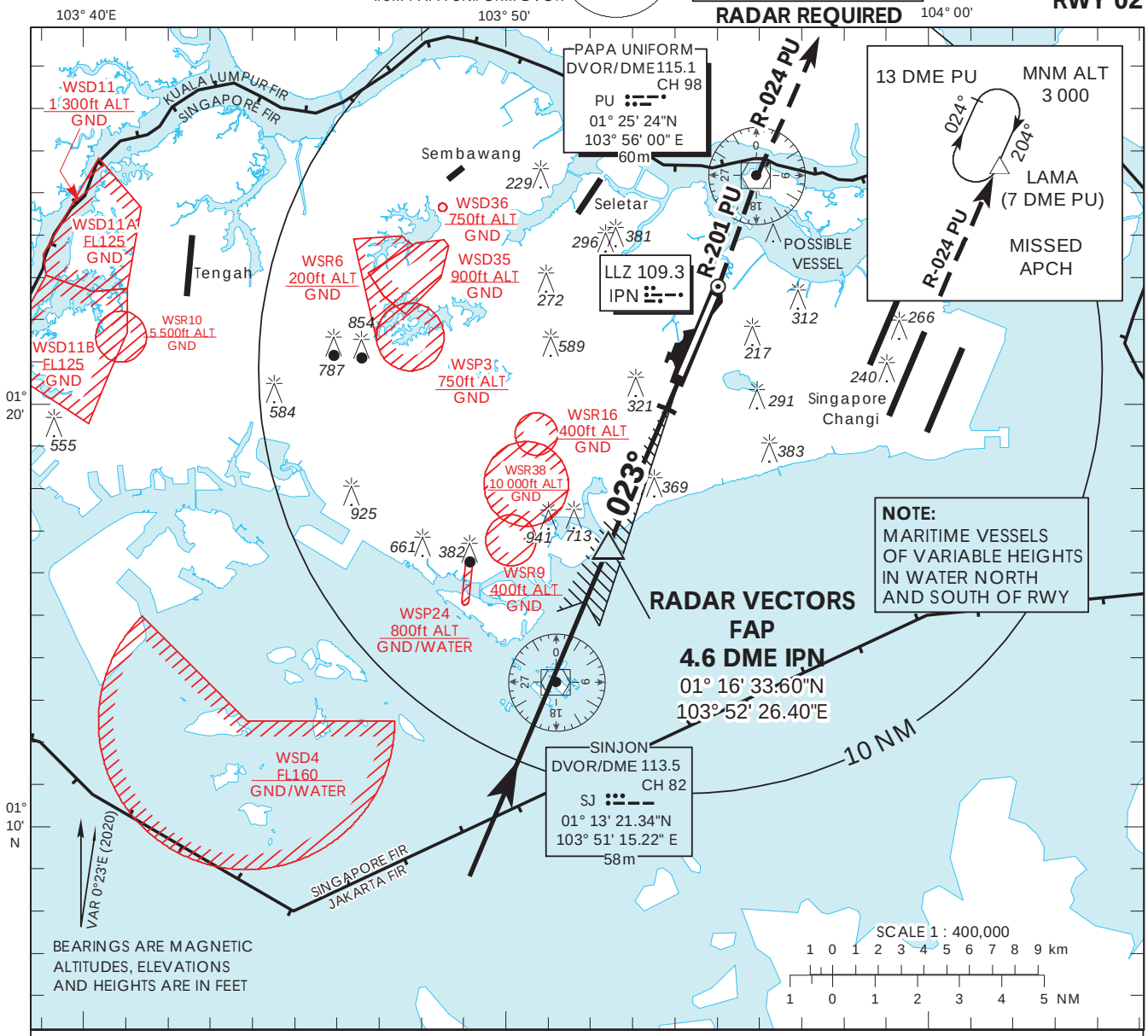
3400' 2900' 2100'

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

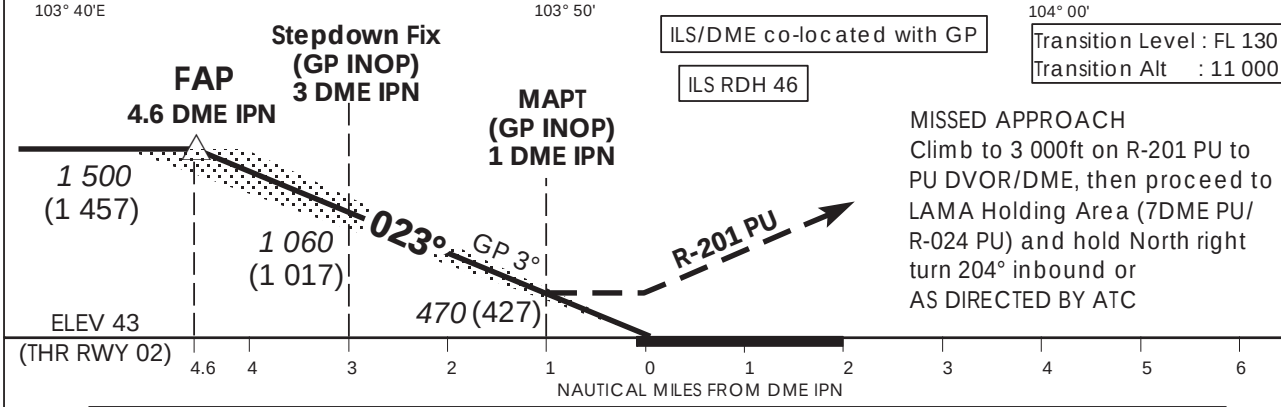
RADAR REQUIRED



ILS/DME co-located with GP

ILS RDH 46

Transition Level : FL 130
Transition Alt : 11 000



MISSED APPROACH
Climb to 3 000ft on R-201 PU to PU DVOR/DME, then proceed to LAMA Holding Area (7DME PU/ R-024 PU) and hold North right turn 204° inbound or AS DIRECTED BY ATC

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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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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INSTRUMENT APPROACH CHART - ICAO

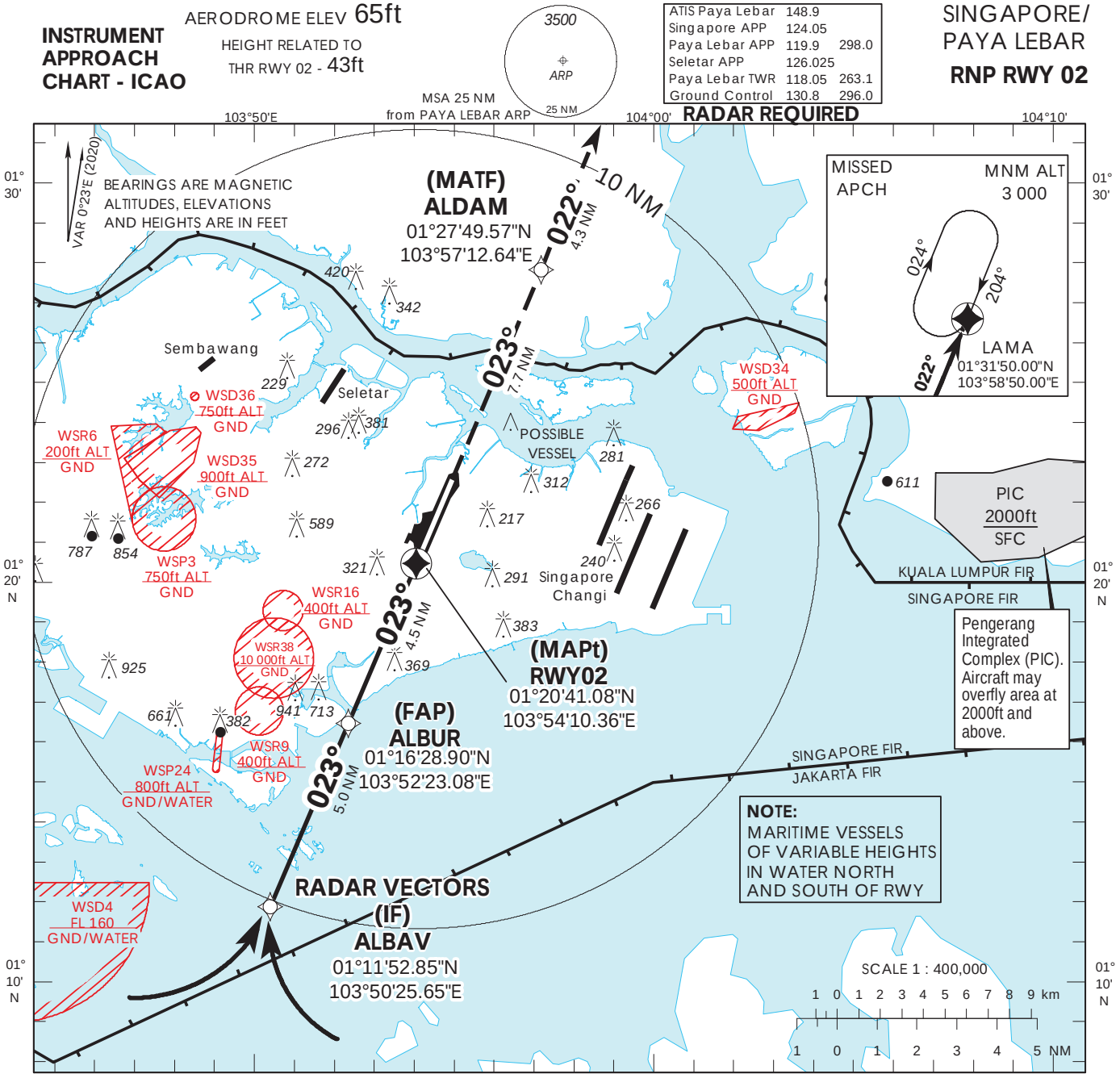
AERODROME ELEV 65ft

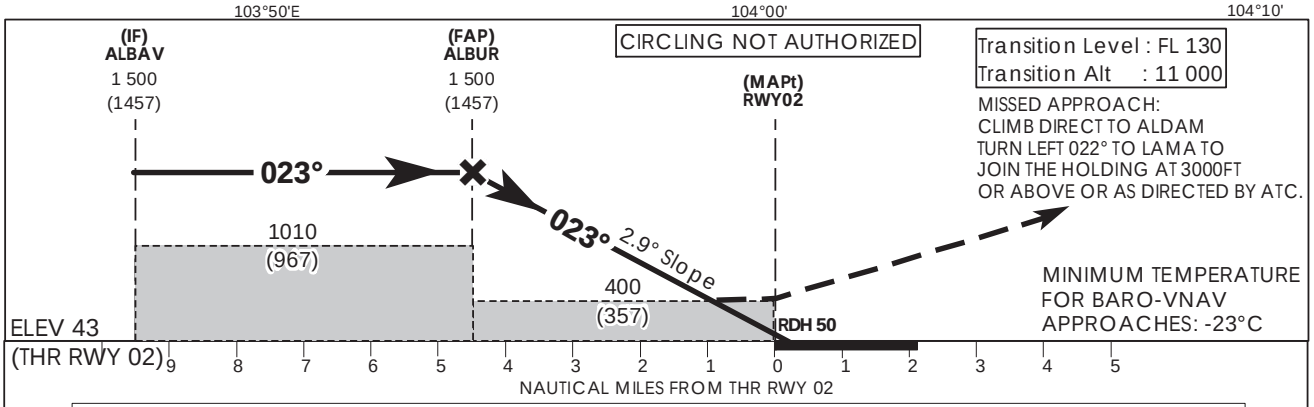
HEIGHT RELATED TO THR RWY 02 - 43ft

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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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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INSTRUMENT APPROACH CHART - ICAO

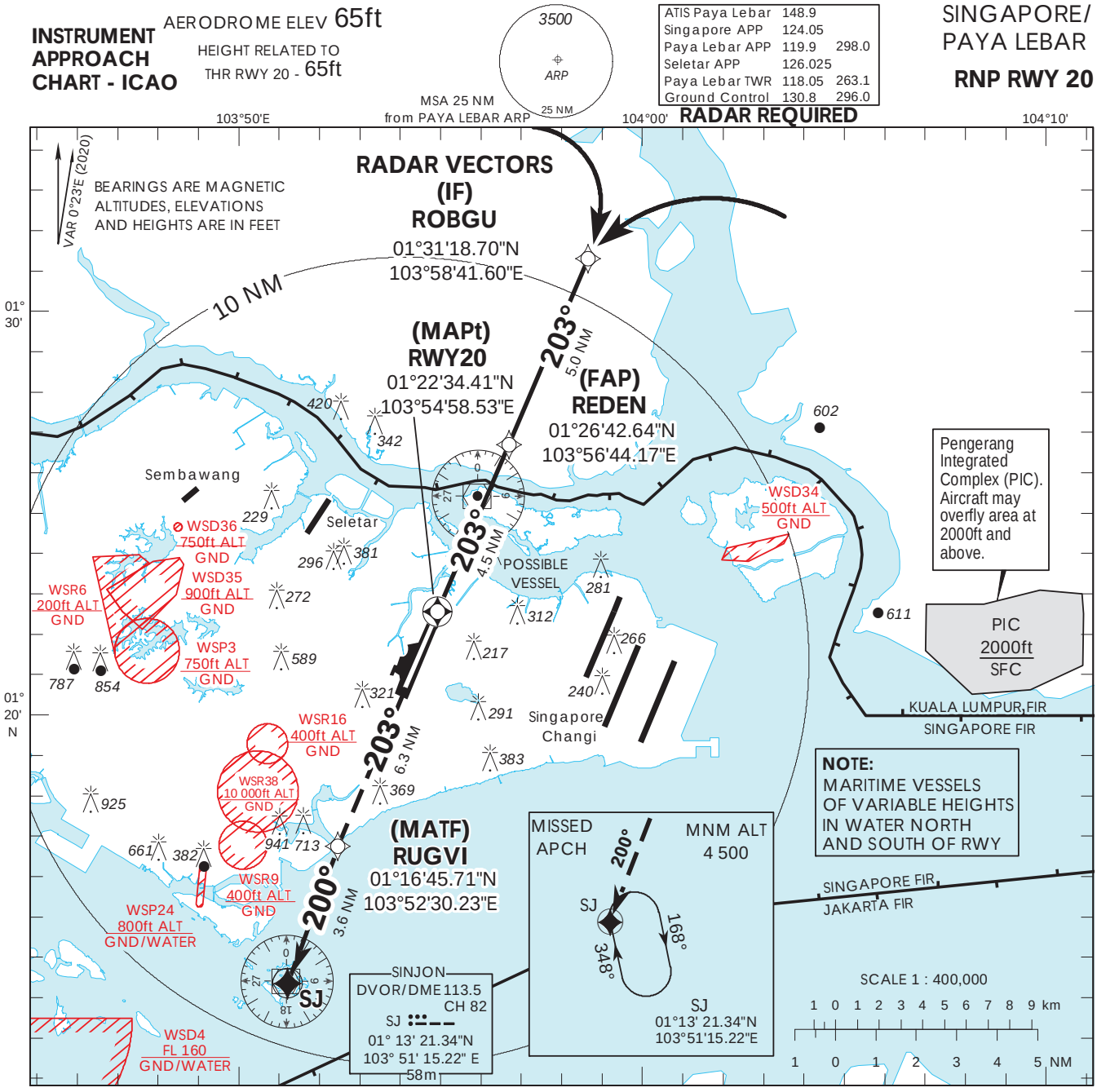
AERODROME ELEV 65ft

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

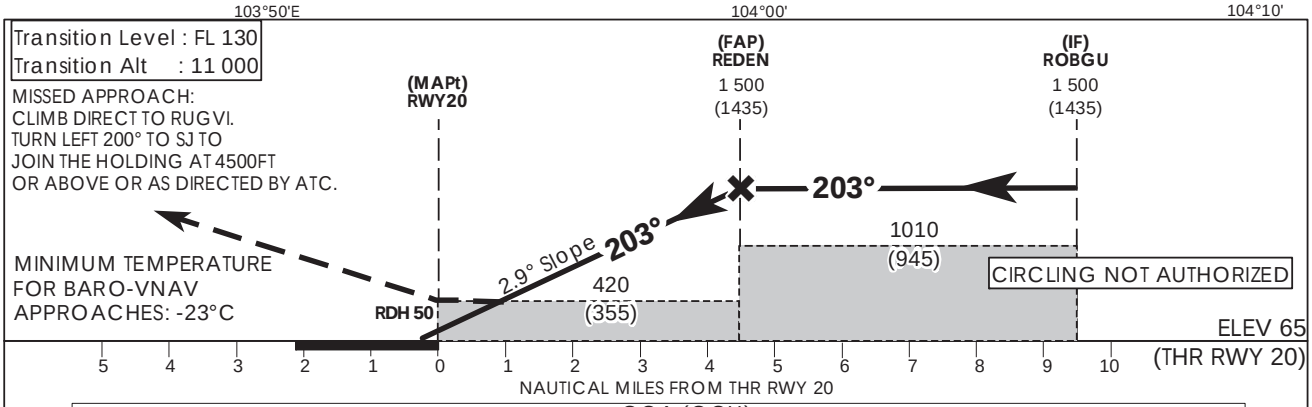
RNP RWY 20



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



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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CHANGES : Revision to Restricted Areas WSR9 and WSR16

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WSAT TENGAH

Note: The following sections in this chapter are intentionally left blank:
AD 2.9, AD 2.11, AD 2.16, AD 2.21, AD 2.22, AD 2.23

WSAT AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WSAT - TENGAH

WSAT AD 2.2 AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA

1	*ARP coordinates and site at AD*	012315.40N 1034229.80E
2	*Direction and distance from (city)*	-
3	*Elevation/Reference temperature*	15.24 (50ft) / 31.5^{0}C
4	*MAG VAR*	0^{0}23'(2020)
5	*AD Administration, address, telephone, telefax, telex, AFS*	RSAF TENGAH AIRBASE CHOA CHU KANG ROAD SINGAPORE669638 Telephone: (65)67612222 AFS: WSATYWYX
6	*Types of traffic permitted*	IFR
7	*Remarks*	Emergency Diversion Aerodrome for Singapore Changi Airport (see page WSAT AD 2-7)

WSAT AD 2.3 OPERATIONAL HOURS

1	*Aerodrome Administration*	2300-1100 SUN/MON to THU/FRI. Public holidays and outside the above stipulated operating hours, prior permission required from RSAF Headquarters via Tengah Operations. For EMERG diversions AD AVBL at 2 hours notice. Only Aerodrome Control Service provided. No radar service AVBL outside aerodrome OPR hours.
2	*Customs and Immigration*	by prior arrangement
3	*Health and Sanitation*	by prior arrangement
4	*AIS Briefing Office*	-
5	*ATS Reporting Office*	-
6	*MET Briefing Office*	-
7	*Air Traffic Services*	-
8	*Remarks*	-

WSAT AD 2.4 HANDLING SERVICES AND FACILITIES

1	*Cargo Handling Facilities*	-
2	*Fuel / Oil Types*	JET A1, F3
3	*Fuelling Facilities / Capacity*	2300-1100 SUN/MON to THU/FRI; Public holidays & outside OPR HR PPR from RSAF HQ via Tengah Operations.
4	*Hangar space for visiting aircraft*	-
5	*Repair facilities for visiting aircraft*	-
6	*Remarks*	Nil

WSAT AD 2.5 PASSENGER FACILITIES

1	*Hotels*	-
2	*Restaurants*	-

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3	*Transportation*	-
4	*Medical Facilities*	-
5	*Bank and Post Office*	-
6	*Tourist Office*	-
7	*Remarks*	Nil

WSAT AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

1	AD category for fire fighting	CAT8
2	*Rescue equipment*	Adequately provided as recommended by ICAO
3	*Capability for removal of disabled aircraft*	Sufficient salvage equipment provided by Airfield Ground Services section at Military bases.
4	*Remarks*	All Airport Emergency Services personnel are trained in rescue and fire-fighting as well as medical first-aid.

WSAT AD 2.7 SEASONAL AVAILABILITY - CLEARING

The aerodrome is available throughout the year.

WSAT AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

1	*Apron surface and strenght*	-
2	*Taxiway width, surface and strength*	Strength: PCR 573/F/B/X/U (Taxiway E) Surface: ASPH
3	*Remarks*	Nil

WSAT AD 2.10 AERODROME OBSTACLES

In approach / TKOF areas	*In circling area and at aerodrome*
RWY 18/36 APCH / TKOF Areas ILS LLZ co-located with LLZ antenna, HGT 21m AGL, 004 degrees MAG 260m from THR RWY 18 ILS LLZ co-located with LLZ antenna, HGT 15m AGL, 184 degrees MAG 290m from THR RWY 36	2 masts, HGT 6m, located on eastern shoulders of RWY 36, 233m from THR, 100m from RWY centreline and RWY 18,273m from THR, 100m from RWY centreline. Masts LGTD at NGT. PAR hut co-located with GP antenna mast, HGT 16m AGL, 074 degrees MAG, 100m from WSAT ARP. ILS GP huts co-located with GP antenna mast, HGT 19m AGL, at 029 degrees MAG, 322m from THR RWY 36 and 123 degrees MAG, 303m from THR RWY 18. 1 Monopole located at 012432N 1034035E, HGT 117.5m AMSL, 304 degrees MAG, 4255m from WSAT ARP. 1 Lightning rod located at 012135N 1034425E, HGT 64.04m AMSL, 131 degrees MAG, 4719m from WSAT ARP. 1 Lightning rod located at 012133N 1034426E, HGT 64.17m AMSL, 131 degrees MAG, 4783m from WSAT ARP. 2 Lightning rod located at 012051N 1034419E, HGT 60.23m AMSL, 142 degrees MAG, 5591m from WSAT ARP.

WSAT AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

Designation RWY NR	*TRUE &MAG BRG*	*Dimensions of RWY (m)*	*Strength (PCR) and surface of RWY and SWY*	*THR coordinates*	*THR elevation and highest elevation of TDZ of precision APCH RWY*
1	2	3	4	5	6
18	184.5	2743 x 46	PCR 573/F/B/X/U	-	50 FT

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Designation RWY NR	*TRUE &MAG BRG*	*Dimensions of RWY (m)*	*Strength (PCR) and surface of RWY and SWY*	*THR coordinates*	*THR elevation and highest elevation of TDZ of precision APCH RWY*
1	2	3	4	5	6
36	004.5	2743 x 46	PCR 573/F/B/X/U	-	50 FT

12	*Remarks*	a) Intensive fixed wing flying operation east of runway. b) Helizone adjacent east of runway up to 800ft QNH. c) Arrestor Barrier both ends of runway. d) Hookwire cable installed 366m inwards from each end of runway. e) Intense bird activity after rain, and up to 2 hour after dusk and dawn.

WSAT AD 2.13 DECLARED DISTANCES

RWY Designator	*TORA (m)*	*TODA (m)*	*ASDA (m)*	*LDA (m)*	*Remarks*
1	2	3	4	5	6
18 36	2743 2743	3115 3030	2743 2743	2743 2743	Nil Nil

WSAT AD 2.14 APPROACH AND RUNWAY LIGHTING

RWY	*APCH LGT Type, LEN INTST*	*THR LGT colour WBAR*	*VASIS (MEHT) PAPI*	*TDZ LGT LEN*	*RCL LGT, LEN,spacing , colour, INTST*	*RWY edge LGT, LEN, spacing, colour,INTST*	*RWY End LGT, colour WBAR*	*SWY LGT, LEN colour*	*Remarks*
1	2	3	4	5	6	7	8	9	10
18	High INTST white centreline and two bars, PAPI, Sequenced flashing lights	GREEN	4 units PAPI on each side of RWY at 3 Glide Slope	Nil	Nil	High INTST omni-directional white variable INTST	RED	Nil	Distance to run markers illuminated
36	High INTST white centreline and five bars, PAPI, Sequenced flashing lights	GREEN	4 units PAPI on each side of RWY at 3 Glide Slope	Nil	Nil	High INTST omni-directional white variable INTST	RED	Nil	Distance to run markers illuminated

WSAT AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

TWY Lighting	blue edge lights
IBN	012400.00N 1034254.00E012400.00N 1034254.00E, FLG R 'TN', operating hours HN and IMC.
Remarks	WDI lighted. Dispersal area floodlights

WSAT AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	**TENGAH ATZ** 010842N 1034336E thence clockwise around the arc of radius 14 NM centred on 012242N 1034203E to 011351N 1033117E thence east along the Singapore - Kuala Lumpur FIR boundary to 012728N 1034302E 012620N 1034544E 012150N 1034524E 011845N 1034414E 010842N 1034336E.
2	*Vertical Limits*	SFC to 3000 FT ALT

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3	*Airspace Classification*	D
4	*ATS Unit Callsign* *Language(s)*	TENGAH APPROACH English
5	*Transition altitude*	11000 FT (3,350m)
6	*Remarks*	Controlling Authority: Tengah Approach During Aerodrome operating hours: Contact Tengah APP on 130.0 MHz, 263.4 MHz or 122.0 MHz Outside Aerodrome operating hours: Contact SATCC (RSAF element) on 123.4MHz or 288.2MHz

WSAT AD 2.18 ATS COMMUNICATION FACILITIES

Service designation	*Call sign*	*Frequency* *P - Primary* *S - Secondary*	*Hours of operation*	*Remarks*
APP	TENGAH APPROACH	P130.0 MHz P263.4 MHz S122.0 MHz	BTN 2300-1100 SUN/ MON to THU/FRI; and On SUN, Public holidays and outside the above times, PPR from RSAF HQ via Tengah Ops.	Nil
TWR	TENGAH TOWER	P122.0 MHz P282.5 MHz S263.4 MHz		
	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					
Type of Aid	*IDENT*	*FREQ*	*OPR Hour*	*Coordinates*	*Remarks*
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 011321.34N 1035115.22E	201° MAG 14.5km from THR RWY 02 (Paya Lebar) Antenna HGT: 190ft AMSL. Coverage 200NM Maint Period: 0200-0600 third THU of EV month

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RADIO NAVIGATION AND LANDING AIDS					
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 AERODROME REGULATIONS

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.

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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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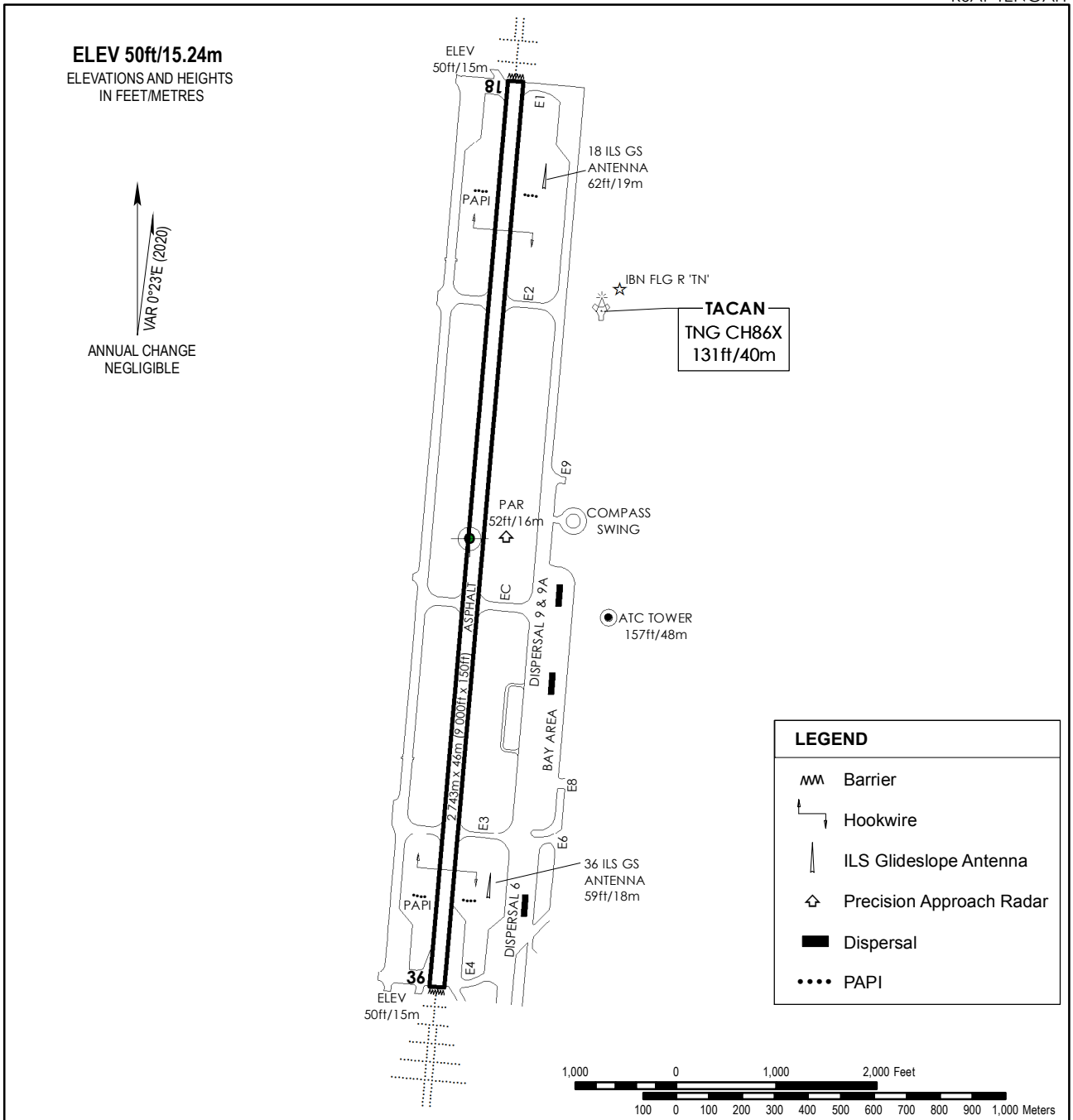
AERODROME CHART - TENGAH

01°23'15.40"N 103°42'29.80"E

RSAF TENGAH



AERODROME LIGHTING

APPROACH LIGHTING :

Approach RWY 18	High intensity white centre line and 2 bars.
Approach RWY 36	High intensity white centre line and 5 bars.
RWY 18/36	Sequenced flashing lights.

RUNWAY LIGHTING :

RWY 18/36	High intensity omni-directional white edge lights. Green THR lights. Red RWY end lights.
Ident Beacon	TN coding in RED.
Taxiway	Blue edge lights. Green centreline lights.
Dispersal	Blue edge lights. Floodlights

Illuminated distance to run marker boards.

CAUTION

1) RWY lights 0.3m out from RWY edge.

2) All circuits east of aerodrome within 3NM up to 1 500ft (457m).

3) RWY 36 - Right hand circuit.

4) Two masts, height 6m, located on the eastern shoulders :
   a) Runway 36 - 233m from threshold, 100m from runway centre line.
   b) Runway 18 - 273m from threshold, 100m from runway centre line.

Obstacles lit at night.

Helicopters operating in Helizone are to exercise extreme caution.

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CHANGES : Scale added.

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WSAG - SEMBAWANG

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Note: The following sections in this chapter are intentionally left blank:
AD 2.4, AD 2.5, AD 2.7, AD 2.9, AD 2.11, AD 2.14, AD 2.16, AD 2.20, AD 2.21, AD 2.22, AD 2.23, AD 2.24, AD 2.25.

WSAG AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WSAG - SEMBAWANG

WSAG AD 2.2 AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA

1	*ARP coordinates and site at AD*	012535.40N 1034857.72E
2	*Elevation/Reference temperature*	25.60 M (84ft) / 31.5^{0}C
3	*MAG VAR*	0^{0}23' (2020)
4	*Ad Administration, address, telephone, telefax, telex, AFS*	RSAF Sembawang Airbase, Sembawang Road, SINGAPORE TEL: (65)67508036 (Base Operations Centre) AFS: WSAGYWYX
5	*Types of traffic permitted*	VFR only
6	*Remarks*	Operator: Republic of Singapore Air Force. AD for helicopter use only.

WSAG AD 2.3 OPERATIONAL HOURS

1	*Aerodrome Administration*	H24
2	*MET Briefing Office*	2330-1430 SUN/MON to TUE/WED. 2330-1130 WED/THU TO THU/FRI. Prior arrangement required for weekend.
3	*Air Traffic Services*	H24
4	*Remarks*	Nil

WSAG AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

1	*AD category for fire fighting*	CAT 4
2	*Rescue equipment*	Adequately provided as recommended by ICAO
3	*Capability for removal of disabled aircraft*	Sufficient salvage equipment provided by Airfield Ground Services section at Military Bases.
4	*Remarks*	All Airport Emergency Services personnel are trained in rescue and fire fighting as well as medical first-aid.

WSAG AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

1	*Apron surface and strength*	Strength: PCN 26
2	*Taxiway width, surface and strength*	Strength: PCN 26
5	*Remarks*	Nil

WSAG AD 2.10 AERODROME OBSTACLES

In Approach / TKOF Areas	*In Circling Area and at Aerodrome*
6 tower cranes, HGT 128m, located at 012800N 1035000E (Sembawang Shipyard). Marked/Lighted.	Nil

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WSAG AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

RWY Designator	*True and Magnetic Bearing*	*RWY Dimensions (m)*	*Strength and surface of RWY/ SWY*	*THR Coordinates*	*THR ELEV and highest ELEV of TDZ of Precision APCH RWY*
1	2	3	4	5	6
05	046^0	914 x 30	LCN 26 BITUM	Nil	84 FT
23	226^0	914 x 30	LCN 26 BITUM	Nil	56 FT

WSAG AD 2.13 DECLARED DISTANCES

RWY Designator	*TORA (m)*	*TODA (m)*	*ASDA (m)*	*LDA (m)*	*Remarks*
1	2	3	4	5	6
05	914	914	975	914	Nil
23	914	914	975	914	Nil

WSAG AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

1	*IBN*	012528.43N 1034845.75E, FLG R 'AG', EV 20 SEC, OPR HR: HN and IMC
2	*WDI/Taxiway/Stopway*	Lighted

WSAG AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	**SEMBAWANG ATZ** An arc of 2NM radius centred on Sembawang AD (012536.00N 1034858.02E) commencing from 168° radial clockwise to 072° radial and thence a straight line joining these two points.
2	*Vertical Limits*	SFC to 4 500ft ALT Maximum Usable ALT 4 000ft
3	*Airspace Classification*	D
4	*ATS unit Callsign* *Language(s)*	SEMBAWANG TOWER English
5	*Transition Altitude*	11000 FT (3,350m)
6	*Remarks*	Controlling Authority: RSAF, Sembawang Air Base. Prior permission required for non-scheduled aircraft. Traffic Circuit: RWY 05 - left hand circuit Traffic Circuit: RWY 23 - right hand circuit Transit Channel: refer to chart on page ENR 3.5-3.

WSAG AD 2.18 ATS COMMUNICATION FACILITIES

Service designation	*Call sign*	*Frequency*	*Hours of operation*	*Remarks*
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

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Service designation	*Call sign*	*Frequency*	*Hours of operation*	*Remarks*
1	2	3	4	5
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

Type of Aid	*IDENT*	*Frequency*	*OPR HR*	*Coordinates*	*Remarks*
1	2	3	4	5	6
SEMBAWANG NDB	AG	325 kHz	H24	012526.40N 1034913.00E	For training approaches in VMC only.

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WMKJ - JOHOR BAHRU

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WMKJ AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WMKJ - JOHOR BAHRU

WMKJ AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	**JOHOR BAHRU CTR** 012730N 1034354E 013530N 1033554E 014130N 1033254E thence clockwise around the arc of a circle of radius 5NM centred on 014400N 1033724E to 014620N 1034134E 014000N 1034454E 012830N 1034754E then along the national BDRY to 012730N 1034354E.
2	*Vertical Limits*	GND to 3000 FT ALT
3	*Airspace Classification*	C
4	*ATS Unit Call Sign* *Language (s)*	Johor Approach / Johor Tower English
5	*Transition Altitude*	11,000 FT (3,350m)
6	*Remarks*	Nil

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WIDD - BATAM / HANG NADIM (INDONESIA)

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WIDD AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WIDD - BATAM/HANG NADIM (INDONESIA)

WIDD AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	Hang Nadim Vicinity of Aerodrome
2	*Vertical Limits*	Vicinity of Aerodrome
3	*Airspace Classification*	C
4	*ATS Unit Callsign*	HANG NADIM TOWER
5	*Language(s)*	English
6	*Transition Altitude*	11000 FT / FL 130
7	*Hours of applicability*	H24
8	*Remarks*	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	121.950 MHz	Nil	Nil	H24	Nil
ATIS	Nil	126.25 MHZ	Nil	Nil	H24	Nil

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)

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WIDN AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WIDN - TANJUNGPINANG / RAJA HAJI FISABILILLAH (INDONESIA)

WIDN AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	**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. **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.
2	*Vertical Limits*	**Tanjungpinang North Control Zone (CTR):** GND/WATER up to 3,000ft **Tanjungpinang South Control Zone (CTR):** GND/WATER up to 6,000ft
3	*Airspace Classification*	C
4	*ATS Unit Callsign*	APP: Tanjungpinang Radar TWR: Raja Tower
5	*Language(s)*	English
6	*Transition Altitude*	11,000ft / FL 130
7	*Hours of applicability*	H24
8	*Remarks*	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)

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WIDT AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WIDT - TANJUNG BALAI KARIMUN/ RAJA HAJI ABDULLAH (INDONESIA)

WIDT AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	Vicinity of Aerodrome
2	*Vertical Limits*	Vicinity of Aerodrome
3	*Airspace Classification*	G
4	*ATS Unit Callsign*	Raja Haji Abdullah Aerodrome Information
5	*Language(s)*	English
6	*Transition Altitude*	11000FT / FL 130
7	*Hours of applicability*	0000-0900
8	*Remarks*	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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