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eAIP

AMDT
02/2021
Effective date
22 APR 2021
Publication date
22 APR 2021

wp-AMDT-2021-02

1. Significant information and changes

1.1 Singapore Changi Airport

a. Changes in the wind sensor used in METAR/SPECI.

b. Operationalization of new ultrasonic wind sensors and RVR along runway 02L/20R.

2. This amendment incorporates information contained in the listed NOTAM which is hereby superseded:

NOTAM
A0952/21 dated 26/02/2021

Amended Pages

GEN 0.2-1/2: *: replace.*
GEN 0.3-1/2: *: replace.*
GEN 0.3-3/4: *: replace.*
GEN 0.3-5/6: *: replace.*
GEN 0.4-1/2: *: replace.*
GEN 0.4-3: *: replace.*
GEN 1.1-1/2: *: replace.*
GEN 1.3-1/2: *: replace.*
GEN 1.3-3/4: *: replace.*
GEN 1.3-5: *: replace.*
GEN 1.4-1/2: *: replace.*
GEN 1.7-1/2: *: replace.*
GEN 3.2-3/4: *: replace.*
GEN 3.5-1/2: *: replace.*
GEN 3.5-3/4: *: replace.*
ENR-2.1-9: *: replace.*
ENR-2.1-15: *: replace.*
ENR-3.1/ATS Chart: *: replace.*
ENR 3.3-13/14: *: replace.*
ENR 3.3-29/30: *: replace.*
ENR 3.3-33/34: *: replace.*
ENR 3.3-35/36: *: replace.*
ENR 4.4-3/4: *: replace.*
ERC-6-1 En-Route Chart: *: replace.*
AD-2-WSSS-ADC-2: *: replace.*
AD-2-WSSS-AOC-4: *: replace.*
AD-2-WSSS-IAC-13 to 13.1: *: replace.*

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Part 1 — General (GEN)

GEN 0

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

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.

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.

4.1.1 *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.

4.1.2 *PART 2 — EN-ROUTE (ENR)*

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

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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.

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.

4.1.3 *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
01/2021	25 February 2021
02/2021	22 April 2021
03/2021	17 June 2021
04/2021	12 August 2021
05/2021	07 October 2021
06/2021	02 December 2021

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:

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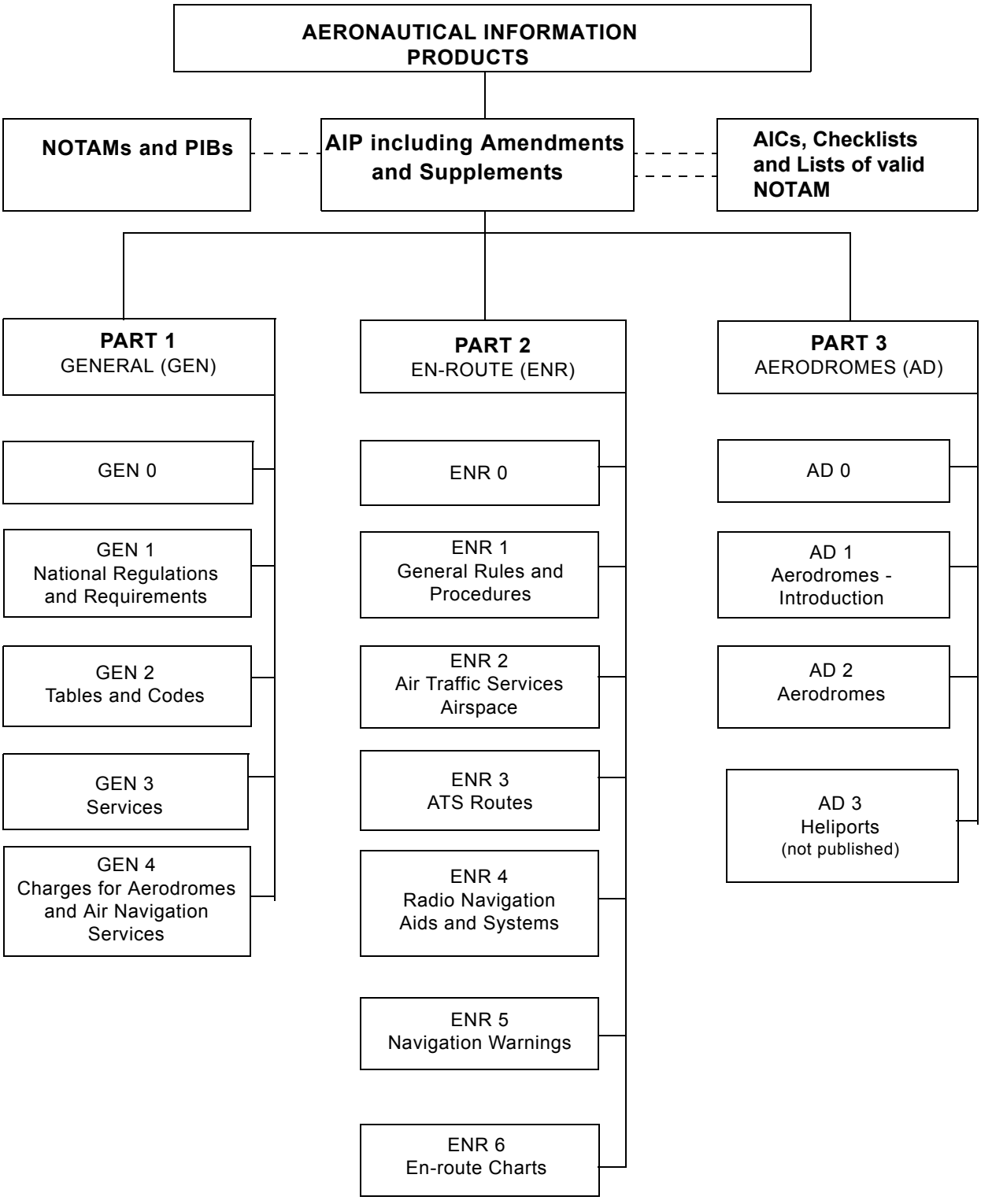
GEN 0.1 PREFACE



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GEN 0.2 RECORD OF AIP AMENDMENTS

AIP AMENDMENT

NR/Year	*Publication date*	*Date inserted*	*Inserted by*
5/2014	18 SEP 2014	18 SEP 2014	
6/2014	13 NOV 2014	13 NOV 2014	
1/2015	08 JAN 2015	08 JAN 2015	
2/2015	05 MAR 2015	05 MAR 2015	
3/2015	30 APR 2015	30 APR 2015	
4/2015	25 JUN 2015	25 JUN 2015	
5/2015	20 AUG 2015	20 AUG 2015	
6/2015	15 OCT 2015	15 OCT 2015	
07/2015	10 DEC 2015	10 DEC 2015	
01/2016	04 FEB 2016	04 FEB 2016	
02/2016	31 MAR 2016	31 MAR 2016	
03/2016	26 MAY 2016	26 MAY 2016	
04/2016	21 JUL 2016	21 JUL 2016	
05/2016	15 SEP 2016	15 SEP 2016	
06/2016	10 NOV 2016	10 NOV 2016	
01/2017	05 JAN 2017	05 JAN 2017	
02/2017	02 MAR 2017	02 MAR 2017	
03/2017	27 APR 2017	27 APR 2017	
04/2017	22 JUN 2017	22 JUN 2017	
05/2017	17 AUG 2017	17 AUG 2017	
06/2017	12 OCT 2017	12 OCT 2017	
07/2017	07 DEC 2017	07 DEC 2017	
01/2018	01 FEB 2018	01 FEB 2018	
02/2018	29 MAR 2018	29 MAR 2018	
03/2018	24 MAY 2018	24 MAY 2018	
04/2018	19 JUL 2018	19 JUL 2018	
05/2018	13 SEP 2018	13 SEP 2018	

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AIP AMENDMENT

NR/Year	*Publication date*	*Date inserted*	*Inserted by*
06/2018	08 NOV 2018	08 NOV 2018	
01/2019	03 JAN 2019	03 JAN 2019	
02/2019	28 FEB 2019	28 FEB 2019	
03/2019	25 APR 2019	25 APR 2019	
04/2019	20 JUN 2019	20 JUN 2019	
05/2019	15 AUG 2019	15 AUG 2019	
06/2019	10 OCT 2019	10 OCT 2019	
07/2019	05 DEC 2019	05 DEC 2019	
01/2020	30 JAN 2020	30 JAN 2020	
02/2020	26 MAR 2020	26 MAR 2020	
03/2020	21 MAY 2020	21 MAY 2020	
04/2020	16 JUL 2020	16 JUL 2020	
05/2020	10 SEP 2020	10 SEP 2020	
06/2020	05 NOV 2020	05 NOV 2020	
07/2020	31 DEC 2020	31 DEC 2020	
01/2021	25 FEB 2021	25 FEB 2021	
02/2021	22 APR 2021	22 APR 2021	

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GEN 0.3 RECORD OF CURRENT AIP SUPPLEMENTS

NR/Year	*Subject*	*AIP section(s) affected*	*Period of validity (from/to)*	*Cancellation record*
021/2018	Paya Lebar Airport - Luffer Crane and Saddle Cranes	AD	*06 APR 2018 / 31 DEC 2022*	
028/2018	Paya Lebar Airport - Saddle Cranes	AD	*20 JUN 2018 / 31 DEC 2022*	
029/2018	Paya Lebar Airport - Luffer Cranes	AD	*20 JUN 2018 / 31 DEC 2021*	
030/2018	Paya Lebar Airport - Luffer Crane and Topless Cranes	AD	*20 JUN 2018 / 31 DEC 2021*	
053/2018	Sembawang Aerodrome - Saddle Cranes	AD	*25 SEP 2018 / 31 DEC 2021*	
071/2018	Paya Lebar Airport - Saddle Cranes	AD	*13 NOV 2018 / 31 DEC 2023*	
077/2018	Paya Lebar Airport - Luffer Crane	AD	*28 NOV 2018 / 18 NOV 2021*	
078/2018	Paya Lebar Airport - Luffer Cranes	AD	*28 NOV 2018 / 30 DEC 2022*	
009/2019	Paya Lebar Airport - Luffer Cranes	AD	*01 JUN 2019 / 31 MAY 2021*	
030/2019	Paya Lebar Airport - Luffer Crane and Topless Cranes	AD	*27 MAR 2019 / 30 JUL 2021*	
031/2019	Paya Lebar Airport - Luffer Cranes	AD	*27 MAR 2019 / 28 JAN 2022*	
032/2019	Paya Lebar Airport - Topless Cranes	AD	*27 MAR 2019 / 09 MAR 2022*	
033/2019	Paya Lebar Airport - Luffer Crane	AD	*27 MAR 2019 / 31 DEC 2022*	
034/2019	Paya Lebar Airport - Saddle Cranes	AD	*27 MAR 2019 / 31 DEC 2022*	
035/2019	Paya Lebar Airport - Luffer Crane	AD	*27 MAR 2019 / 31 DEC 2022*	
051/2019	Paya Lebar Airport - Luffer Crane	AD	*07 MAY 2019 / 22 APR 2021*	
053/2019	Paya Lebar Airport - Saddle Cranes and Luffer Crane	AD	*07 MAY 2019 / 31 DEC 2023*	
055/2019	Paya Lebar Airport - Topless Cranes	AD	*07 MAY 2019 / 25 APR 2021*	
060/2019	Paya Lebar Airport - Topless Crane	AD	*06 JUN 2019 / 14 NOV 2021*	
066/2019	Paya Lebar Airport - Luffing Crane	AD	*04 JUL 2019 / 16 JUN 2021*	
067/2019	Paya Lebar Airport - Topless Cranes	AD	*04 JUL 2019 / 30 JUN 2021*	
068/2019	Paya Lebar Airport - Luffing Crane	AD	*04 JUL 2019 / 30 DEC 2021*	
073/2019	Paya Lebar Airport - Luffer Cranes	AD	*19 AUG 2019 / 31 DEC 2021*	
075/2019	Paya Lebar Airport - Luffing Crane	AD	*19 AUG 2019 / 31 DEC 2021*	
091/2019	Paya Lebar Airport - Cranes	AD	*10 SEP 2019 / 30 DEC 2021*	
126/2019	Paya Lebar Airport - Luffer Cranes	AD	*12 NOV 2019 / 31 DEC 2022*	
004/2020	Paya Lebar Airport - Mobile Cranes	AD	*08 JAN 2020 / 20 JUN 2021*	
009/2020	Paya Lebar Airport - Topless Cranes	AD	*11 FEB 2020 / 30 APR 2021*	

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NR/Year	*Subject*	*AIP section(s) affected*	*Period of validity (from/to)*	*Cancellation record*
021/2020	Singapore Changi Airport - Long term closure of aircraft stand E5 at Terminal 2, Singapore Changi Airport	AD	*30 MAR 2020 / 30 DEC 2024*	
025/2020	Paya Lebar Airport - Luffing Cranes	AD	*10 MAR 2020 / 31 DEC 2021*	
033/2020	Paya Lebar Airport - Cranes	AD	*19 MAY 2020 / 31 DEC 2021*	
034/2020	Paya Lebar Airport - Cranes	AD	*19 MAY 2020 / 31 DEC 2021*	
035/2020	Paya Lebar Airport - Luffing Crane	AD	*19 MAY 2020 / 30 DEC 2021*	
042/2020	Paya Lebar Airport - Crawler Crane	AD	*12 JUN 2020 / 05 MAY 2021*	
043/2020	Paya Lebar Airport - Topless Cranes	AD	*12 JUN 2020 / 31 MAY 2021*	
044/2020	Paya Lebar Airport - Obstacles	AD	*12 JUN 2020 / 31 DEC 2021*	
045/2020	Paya Lebar Airport - Topless Cranes	AD	*12 JUN 2020 / 01 MAY 2021*	
048/2020	Paya Lebar Airport - Topless Cranes	AD	*31 JUL 2020 / 01 AUG 2021*	
049/2020	Paya Lebar Airport - Cranes	AD	*12 JUN 2020 / 15 MAY 2021*	
050/2020	Paya Lebar Airport - Mobile Crane	AD	*12 JUN 2020 / 30 APR 2021*	
052/2020	Paya Lebar Airport - Crawler Crane	AD	*12 JUN 2020 / 31 DEC 2021*	
053/2020	Sembawang Aerodrome - Saddle Cranes	AD	*15 JUN 2020 / 30 DEC 2021*	
056/2020	Paya Lebar Airport - Flat Top Cranes	AD	*16 JUL 2020 / 30 DEC 2021*	
057/2020	Paya Lebar Airport - Flat Top Cranes	AD	*16 JUL 2020 / 30 DEC 2021*	
058/2020	Sembawang Aerodrome - Mobile Crane	AD	*16 JUL 2020 / 24 JUN 2021*	
059/2020	Singapore Changi Airport - Long term closure of aircraft stand E20 at Terminal 2, Singapore Changi Airport	AD	*25 AUG 2020 / 30 DEC 2026*	
060/2020	Paya Lebar Airport - Topless Cranes	AD	*06 AUG 2020 / 30 JUN 2021*	
061/2020	Paya Lebar Airport - Luffer Cranes	AD	*06 AUG 2020 / 26 JUL 2021*	
062/2020	Paya Lebar Airport - Topless Cranes	AD	*06 AUG 2020 / 31 MAY 2021*	
063/2020	Paya Lebar Airport - Cranes	AD	*06 AUG 2020 / 19 JUN 2021*	
065/2020	Paya Lebar Airport - Cranes	AD	*06 AUG 2020 / 31 DEC 2021*	
066/2020	Paya Lebar Airport - Topless Cranes	AD	*06 AUG 2020 / 31 DEC 2021*	
067/2020	Paya Lebar Airport - Luffing Cranes	AD	*06 AUG 2020 / 01 AUG 2021*	
068/2020	Paya Lebar Airport - Topless Cranes	AD	*17 SEP 2020 / 01 SEP 2021*	
069/2020	Paya Lebar Airport - Mobile Crane	AD	*17 SEP 2020 / 27 AUG 2021*	
070/2020	Paya Lebar Airport - Mobile Crane	AD	*17 SEP 2020 / 27 AUG 2021*	
071/2020	Paya Lebar Airport - Topless Cranes	AD	*17 SEP 2020 / 29 AUG 2021*	

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NR/Year	Subject	AIP section(s) affected	Period of validity (from/to)	Cancellation record
072/2020	Paya Lebar Airport - Luffing Cranes	AD	*17 SEP 2020 / 29 AUG 2021*	
073/2020	Paya Lebar Airport - Cranes	AD	*17 SEP 2020 / 01 JUN 2021*	
074/2020	Paya Lebar Airport - Luffer Cranes	AD	*17 SEP 2020 / 29 AUG 2021*	
075/2020	Paya Lebar Airport - Mobile Crane	AD	*17 SEP 2020 / 01 NOV 2021*	
076/2020	Paya Lebar Airport - Topless Crane	AD	*17 SEP 2020 / 01 SEP 2021*	
078/2020	Paya Lebar Airport - Luffer Crane	AD	*17 SEP 2020 / 06 AUG 2021*	
079/2020	Paya Lebar Airport - Luffer Cranes	AD	*17 SEP 2020 / 06 AUG 2021*	
080/2020	Paya Lebar Airport - Mobile Crane	AD	*17 SEP 2020 / 30 JUN 2021*	
081/2020	Paya Lebar Airport - Luffing Cranes	AD	*17 SEP 2020 / 30 DEC 2021*	
083/2020	Paya Lebar Airport - Cranes	AD	*17 SEP 2020 / 09 DEC 2021*	
086/2020	Paya Lebar Airport - Cranes	AD	*08 OCT 2020 / 20 DEC 2021*	
087/2020	Paya Lebar Airport - Topless Cranes	AD	*08 OCT 2020 / 01 MAY 2021*	
088/2020	Paya Lebar Airport - Mobile Cranes	AD	*08 OCT 2020 / 01 JUL 2021*	
089/2020	Paya Lebar Airport - Luffing Crane	AD	*08 OCT 2020 / 31 DEC 2021*	
090/2020	Paya Lebar Airport - Topless Cranes	AD	*08 OCT 2020 / 01 OCT 2021*	
091/2020	Paya Lebar Airport - Luffing Crane	AD	*08 OCT 2020 / 31 DEC 2021*	
092/2020	Paya Lebar Airport - Luffer Cranes	AD	*08 OCT 2020 / 31 DEC 2021*	
093/2020	Paya Lebar Airport - Mobile Cranes	AD	*08 OCT 2020 / 01 NOV 2021*	
094/2020	Paya Lebar Airport - Luffing Cranes	AD	*08 OCT 2020 / 01 OCT 2021*	
095/2020	Paya Lebar Airport - Flat Top Cranes	AD	*02 NOV 2020 / 31 DEC 2021*	
096/2020	Paya Lebar Airport - Luffing Cranes	AD	*08 OCT 2020 / 14 SEP 2021*	
097/2020	Paya Lebar Airport - Saddle Cranes	AD	*08 OCT 2020 / 31 DEC 2021*	
098/2020	Paya Lebar Airport - Topless Crane	AD	*08 OCT 2020 / 01 OCT 2021*	
099/2020	Paya Lebar Airport - Mobile Crane	AD	*08 OCT 2020 / 01 JUL 2021*	
100/2020	Singapore Changi Airport - Partial closure of taxilane R1 and temporary revision/removal of ground markings at taxilane R1 at Terminal 2	AD	*18 NOV 2020 / 12 MAY 2021*	
102/2020	Singapore Changi Airport -Closure of runway 02C/20C due to Changi East development works	AD	*03 DEC 2020 / 19 MAY 2021*	
103/2020	Paya Lebar Airport - Mobile Crane	AD	*12 NOV 2020 / 01 JUL 2021*	
104/2020	Paya Lebar Airport - Crawler Tower Crane	AD	*12 NOV 2020 / 01 JAN 2022*	

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NR/Year	Subject	AIP section(s) affected	Period of validity (from/to)	Cancellation record
106/2020	Paya Lebar Airport - Cranes	AD	*12 NOV 2020 / 01 DEC 2021*	
107/2020	Paya Lebar Airport - Luffing Crane	AD	*12 NOV 2020 / 31 DEC 2021*	
108/2020	Paya Lebar Airport - Flat Top Cranes	AD	*12 NOV 2020 / 01 JUL 2021*	
109/2020	Paya Lebar Airport - Tower Crane	AD	*12 NOV 2020 / 24 OCT 2021*	
110/2020	Paya Lebar Airport - Tower Cranes	AD	*12 NOV 2020 / 01 JUL 2021*	
111/2020	Paya Lebar Airport - Topless Cranes	AD	*12 NOV 2020 / 19 OCT 2021*	
112/2020	Paya Lebar Airport - Luffer Cranes	AD	*12 NOV 2020 / 31 DEC 2021*	
113/2020	Paya Lebar Airport - Cranes	AD	*12 NOV 2020 / 31 DEC 2021*	
115/2020	Sembawang Aerodrome - Mobile Crane	AD	*12 NOV 2020 / 13 SEP 2021*	
117/2020	Paya Lebar Airport - Cranes	AD	*08 DEC 2020 / 18 NOV 2021*	
118/2020	Paya Lebar Airport - Crawler Crane	AD	*08 DEC 2020 / 01 JUN 2021*	
119/2020	Paya Lebar Airport - Luffing Cranes	AD	*08 DEC 2020 / 31 OCT 2021*	
120/2020	Paya Lebar Airport - Mobile Crane	AD	*08 DEC 2020 / 01 JUN 2021*	
121/2020	Paya Lebar Airport - Mobile Crane	AD	*08 DEC 2020 / 01 JUN 2021*	
122/2020	Paya Lebar Airport - Cranes	AD	*08 DEC 2020 / 31 DEC 2021*	
123/2020	Paya Lebar Airport - Luffer Cranes	AD	*08 DEC 2020 / 01 DEC 2021*	
001/2021	Singapore Changi Airport - Closure of taxiway L9 and taxiway EP between taxiway L8 and L11	AD	*31 JAN 2021 / 19 MAY 2021*	
002/2021	Paya Lebar Airport - Cranes	AD	*14 JAN 2021 / 01 FEB 2022*	
003/2021	Paya Lebar Airport - Topless Cranes	AD	*14 JAN 2021 / 01 FEB 2022*	
004/2021	Paya Lebar Airport - Mobile Crane	AD	*14 JAN 2021 / 01 JAN 2022*	
005/2021	Paya Lebar Airport - Topless Cranes	AD	*14 JAN 2021 / 01 FEB 2022*	
006/2021	Paya Lebar Airport - Cranes	AD	*14 JAN 2021 / 01 JAN 2022*	
007/2021	Paya Lebar Airport - Mobile Cranes	AD	*14 JAN 2021 / 01 JUL 2021*	
008/2021	Paya Lebar Airport - Crawler Tower Cranes	AD	*14 JAN 2021 / 01 JAN 2022*	
009/2021	Paya Lebar Airport - Mobile Crane	AD	*14 JAN 2021 / 01 JUL 2021*	
010/2021	Paya Lebar Airport - Luffing Cranes	AD	*14 JAN 2021 / 15 DEC 2021*	
011/2021	Paya Lebar Airport - Cranes	AD	*14 JAN 2021 / 31 DEC 2021*	
012/2021	Paya Lebar Airport - Flat Top Cranes	AD	*14 JAN 2021 / 31 DEC 2021*	
013/2021	Paya Lebar Airport - Luffing Crane	AD	*14 JAN 2021 / 31 DEC 2021*	

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NR/Year	Subject	AIP section(s) affected	Period of validity (from/to)	Cancellation record
014/2021	Paya Lebar Airport - Mobile Crane	AD	*14 JAN 2021 / 01 JUN 2021*	
015/2021	Paya Lebar Airport - Cranes	AD	*14 JAN 2021 / 01 NOV 2021*	
016/2021	Paya Lebar Airport - Luffing Tower Crane	AD	*14 JAN 2021 / 24 DEC 2021*	
017/2021	Paya Lebar Airport - Crawler Crane	AD	*14 JAN 2021 / 06 JUN 2021*	
018/2021	Paya Lebar Airport - Flat Top Cranes	AD	*14 JAN 2021 / 01 JAN 2022*	
019/2021	Paya Lebar Airport - Cranes	AD	*14 JAN 2021 / 31 DEC 2021*	
021/2021	Paya Lebar Airport - Cranes	AD	*08 FEB 2021 / 01 FEB 2022*	
022/2021	Paya Lebar Airport - Mobile Cranes	AD	*08 FEB 2021 / 15 NOV 2021*	
023/2021	Paya Lebar Airport - Tower Cranes	AD	*08 FEB 2021 / 19 JAN 2022*	
024/2021	Paya Lebar Airport - Mobile Cranes	AD	*08 FEB 2021 / 01 OCT 2021*	
025/2021	Paya Lebar Airport - Tower Crane	AD	*08 FEB 2021 / 15 JAN 2022*	
026/2021	Paya Lebar Airport - Topless Cranes	AD	*08 FEB 2021 / 01 MAR 2022*	
027/2021	Paya Lebar Airport - Mobile Crane	AD	*08 FEB 2021 / 01 JAN 2022*	
028/2021	Paya Lebar Airport - Topless Cranes	AD	*08 FEB 2021 / 01 DEC 2021*	
029/2021	Paya Lebar Airport - Mobile Crane	AD	*08 FEB 2021 / 12 JUL 2021*	
030/2021	Paya Lebar Airport - Topless Cranes	AD	*08 FEB 2021 / 01 JUL 2021*	
031/2021	Paya Lebar Airport - Luffing Tower Crane	AD	*08 FEB 2021 / 09 JAN 2022*	
032/2021	Paya Lebar Airport - Mobile Crane	AD	*08 FEB 2021 / 12 JUL 2021*	
033/2021	Paya Lebar Airport - Mobile Crane	AD	*08 FEB 2021 / 12 JUL 2021*	
034/2021	Paya Lebar Airport - Cranes	AD	*08 FEB 2021 / 01 FEB 2022*	
035/2021	Paya Lebar Airport - Cranes	AD	*08 FEB 2021 / 01 FEB 2022*	
036/2021	Paya Lebar Airport - Saddle Crane	AD	*08 FEB 2021 / 01 FEB 2022*	
037/2021	Sembawang Aerodrome - Crawler Crane	AD	*08 FEB 2021 / 31 DEC 2021*	
038/2021	Singapore Changi Airport - Closure of aircraft stand F50 at Terminal 2, Singapore Changi Airport	AD	*14 MAR 2021 / 31 AUG 2021*	
039/2021	Seletar Airport - Closure of Helicopter Landing Area	AD	*18 MAR 2021 / 30 SEP 2021*	
040/2021	Paya Lebar Airport - Luffing Cranes	AD	*08 MAR 2021 / 01 MAR 2022*	
041/2021	Paya Lebar Airport - Mobile Crane	AD	*08 MAR 2021 / 01 MAR 2022*	
042/2021	Paya Lebar Airport - Cranes	AD	*08 MAR 2021 / 01 MAR 2022*	
043/2021	Paya Lebar Airport - Luffing Crane	AD	*08 MAR 2021 / 01 MAR 2022*	

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NR/Year	*Subject*	*AIP section(s) affected*	*Period of validity (from/to)*	*Cancellation record*
044/2021	Paya Lebar Airport - Mobile Crane	AD	*08 MAR 2021 / 01 JUL 2021*	
045/2021	Paya Lebar Airport - Topless Cranes	AD	*08 MAR 2021 / 03 FEB 2022*	
046/2021	Paya Lebar Airport - Topless Cranes	AD	*08 MAR 2021 / 25 JAN 2022*	
048/2021	Singapore Changi Airport - Closure of aircraft stand F60 at Terminal 2	AD	*10 APR 2021 / 19 JUL 2021*	
049/2021	Singapore Changi Airport -Closure of runway 02C/20C and taxiways due to Changi East development works	AD	*20 MAY 2021 / 03 NOV 2021*	
050/2021	Paya Lebar Airport - Mobile Cranes	AD	*08 APR 2021 / 21 JUN 2022*	
051/2021	Paya Lebar Airport - Mobile Crane	AD	*08 APR 2021 / 01 OCT 2021*	
052/2021	Paya Lebar Airport - Luffing Tower Crane	AD	*08 APR 2021 / 01 FEB 2022*	
053/2021	Paya Lebar Airport - Luffing Crane	AD	*08 APR 2021 / 01 SEP 2021*	
054/2021	Paya Lebar Airport - Luffing Cranes	AD	*08 APR 2021 / 15 MAR 2022*	
055/2021	Paya Lebar Airport - Mobile Crane	AD	*08 APR 2021 / 15 MAR 2022*	
056/2021	Paya Lebar Airport - Tower Cranes	AD	*08 APR 2021 / 01 APR 2022*	
057/2021	Paya Lebar Airport - Topless Cranes	AD	*08 APR 2021 / 10 MAR 2022*	
058/2021	Paya Lebar Airport - Mobile Crane	AD	*08 APR 2021 / 08 JUL 2021*	
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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
SINGAPORE CHANGI AIRPORT, P.O. BOX 1
SINGAPORE 918141
Tel: (65) 65421122
Fax: (65) 65421231
AFS: WSSSYAYX
URL: www.caas.gov.sg

2 METEOROLOGY

Post:
DIRECTOR-GENERAL METEOROLOGICAL SERVICE SINGAPORE
Singapore Changi Airport, P.O. Box 8
SINGAPORE 918141
Tel: (65) 65457190
Fax: (65) 65457192
AFS: WSSSYMYX
URL: www.weather.gov.sg

3 CUSTOMS

Post:
SINGAPORE CUSTOMS
55 Newton Road #10-01, Revenue House
SINGAPORE 307987
Tel: (65) 63552000
Fax: (65) 62508663
URL: www.customs.gov.sg

4 IMMIGRATION

Post:
IMMIGRATION & CHECKPOINTS AUTHORITY
10 Kallang Road, #08-00 ICA Building
SINGAPORE 208718
Tel: (65) 63916100
Fax: (65) 62980837
URL: www.ica.gov.sg

5 HEALTH

Post:
MINISTRY OF HEALTH
16 College Road, College of Medicine Building
SINGAPORE 169854
Tel: (65) 63259220
Fax:
URL: www.moh.gov.sg

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6 ENROUTE AND AERODROME CHARGES

Post:
CIVIL AVIATION AUTHORITY OF SINGAPORE
Singapore Changi Airport P.O. Box 1
SINGAPORE 918141
Tel: (65) 65421122
Fax: (65) 65421231
AFS: WSSSYAYX

Post:
CHANGI AIRPORT GROUP (S) PTE LTD
SELETAR AIRPORT
21 Seletar Aerospace Road 1 #02-01
SINGAPORE 797405
Tel: (65)64815077 Airside Operations
Fax: (65)64831754

7 AGRICULTURE QUARANTINE

Post:
Head Office: ANIMAL & VETERINARY SERVICE
JEM Office Tower, 52 Jurong Gateway Road #14-01
SINGAPORE 608550
Tel: (65) 68052992
Fax: (65) 63341831
URL: www.nparks.gov.sg/avs

Post:
CHANGI ANIMAL AND PLANT QUARANTINE STATION
Gate C7, Airport Cargo Road Changi Airfreight Centre
SINGAPORE 918104
Tel: (65) 65457523
Fax: (65) 65453023

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) 65412798
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 Singapore FIR, aircraft operators should also consult AIP Indonesia GEN 1.2 Entry, Transit and Departure of Aircraft at https://aimindonesia.dephub.go.id for Indonesia's requirements for flights intending to enter, depart, and/or overfly its sovereign airspace. Please note that this AIP's reference to these requirements is without prejudice to Singapore's legal position on such requirements.

2 APPLICATION FOR SLOTS AT SINGAPORE CHANGI AIRPORT

2.1 Singapore Changi Airport is a slot coordinated airport, with Changi Airport Group (CAG) as the Slot Coordinator. To ensure efficiency of aircraft operations and optimisation of airport resources, all operators of scheduled and non-scheduled (commercial and non-commercial) flights must obtain slots from the Changi Slot Coordinator prior to the operation of such flights.

2.2 To apply for slots for access to Singapore Changi Airport, all operators or agents of non-scheduled, commercial and non-commercial flights shall submit applications for slots via either a Slot Clearance Request (SCR) to the Changi Slot Coordinator, or for operators without a 2-letter IATA airline code, a General (Aviation) Clearance Request (GCR) through the Online Coordination System (OCS) (at www.online-coordination.com).
Changi Slot Coordinator
c/o Changi Airport Group (Singapore) Pte Ltd
Singapore Changi Airport
P.O. Box 168
Singapore 918146
Email: csc@changiairport.com
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 earlier than 7 calendar days and but no later than 24 hours prior to the operation of the flight, for which the slot will be utilized.

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 48 hours from the arrival slot timing.

2.5 For urgent non-scheduled, commercial and non-commercial flight operations that are less than 24 hours from the proposed date of operation, in addition to submitting the SCR/GCR, operators/agents must also inform the Airside Operations Section of CAG (Airside Management Centre) at +65 6603 4906 / +65 6541 2275 / +65 6541 2273.

2.6 EXEMPT FLIGHTS

2.6.1 Notwithstanding paragraph 2.1, the following types of flights may operate to / from Singapore Changi Airport without obtaining slots from the Changi Slot Coordinator:

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

2.7 RESTRICTIONS ON OPERATION OF PROPELLER AIRCRAFT AT SINGAPORE CHANGI AIRPORT

2.7.1 Both scheduled and non-scheduled (commercial and non-commercial) propeller aircraft operations will not be allocated new slots at Singapore Changi Airport.

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

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

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

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

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

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

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

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

3.7 EXEMPT FLIGHTS

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

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

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

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:

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- 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 may apply for permission to operate scheduled flights.

4.2.2 All airline operators are to submit their applications for scheduled flights for each IATA schedule season 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 CAAS Air Transport Licensing and Administration System (ATLAS) at https://appserver1.caas.gov.sg/ATLAS 5 working days before flight changes take place.

4.2.4 If insufficient notice as specified in paragraphs 3.2.2 and 3.2.3 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 3.2.5 should be submitted via ATLAS.

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.*

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.

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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 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 para 3.2.5;
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 para 4.1.3.4 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://appserver1.caas.gov.sg/ATLAS

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

5.1.3.4 Operators, other than operators of business aviation aircraft as stated in para 4.1.3.5, 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 para 1.5 b) regarding off-peak discount of 40% on landing charges).*

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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://appserver1.caas.gov.sg/ATLAS. The following fee shall be paid:

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

Note 1: "Working Day" means:

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

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

Definitions:

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

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

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

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

5.2 DOCUMENTARY REQUIREMENTS FOR CLEARANCE OF AIRCRAFT

5.2.1 Same requirements as for SCHEDULED FLIGHTS.

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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 TEST FLIGHTS

6.1 All applications for test flights are subject to prior approval.

6.2 All applications are to be made at least 2 working days but not more than 2 weeks in advance. If notice is not complied with, the application may not be considered.

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 test 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
Email: caas_atsops@caas.gov.sg
Fax: 65457526

6.5 Details on flight planning for test 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 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, selective checks may be conducted on passengers going through the Green Channel. All crew members shall produce their baggage for clearance at the Red Channel only. 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**. 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 7 percent. GST is levied on the value of goods, which may include the cost, insurance and freight (CIF) plus other chargeable costs and the duty payable (if applicable).

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	S$500
Less than 48 hours	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.

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 mobile app or web portal. Once tax payment is successful, the app 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.

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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 or commercial use 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
- Cigarette lighters of pistol or revolver shape
- 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, birds, fish and their products
- CDs, DVDs, films and video games
- Arms and explosives
- Medicines and pharmaceutical products
- Telecommunication and radio communication equipment

Please visit Customs 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 measures, which can be found at https://safetravel.ica.gov.sg.

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 test 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:

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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 i.e. Armenia~, Azerbaijan*, Belarus+, Kazakhstan*, Kyrgyzstan*, Moldova*, Russia*, Tajikistan*, and Uzbekistan~
- Democratic People's Republic of Korea
- Egypt
- Georgia#
- India*
- Iran
- Iraq
- Jordan*
- Kosovo
- Lebanon
- Libya
- Mali
- Morocco~
- Nigeria*
- People's Republic of China^
- Pakistan
- Saudi Arabia~
- Somalia
- Sudan
- Syria
- Tunisia*
- Turkmenistan*
- Ukraine*
- Yemen

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

* Holders of diplomatic, official and service passports do not need a visa for entry.

^ Holders of diplomatic, public affairs and service passports do not need a visa for entry.

+ Holders of diplomatic and official passports do not need a visa for entry

~ Holders of diplomatic passports do not need a visa for entry

** These travel documents are subjected to assessment of recognition for entry into Singapore

Holders of diplomatic and service passports do not need a visa for entry

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.

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Nationals of India and the PRC 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

* A visa is considered valid so long as it is 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 and Long-Term Pass holders must satisfy the following basic entry requirements before they are allowed to enter Singapore:

← a. They are in possession of entry approval letters issued by the Singapore Government and 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;
c. They hold confirmed onward/return tickets and entry facilities (including visas) to their onward destinations; and
d. They have a Yellow Fever Vaccination Certificate and negative Covid-19 PCR test result taken within 72 hours before departure, if applicable.

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 travellers above one year of age who have been in or have passed through any country with risk of yellow fever transmission in the six days before arriving in Singapore. The certificate is valid for life, beginning from 10 days after the date of vaccination (this applies to existing and new certificates). An exemption letter, signed by a medical practitioner, is required for individuals who are exempted from being vaccinated before entry into Singapore. Please refer to Singapore's Immigration & Checkpoints Authority website for the updated list of countries with risk of yellow fever transmission.

3.4 All travellers, including Singapore Citizens, Permanent Residents, Long-Term Pass holders and foreign visitors, will need to take a COVID-19 PCR test upon arrival in Singapore.

←

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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.

4.2.2 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

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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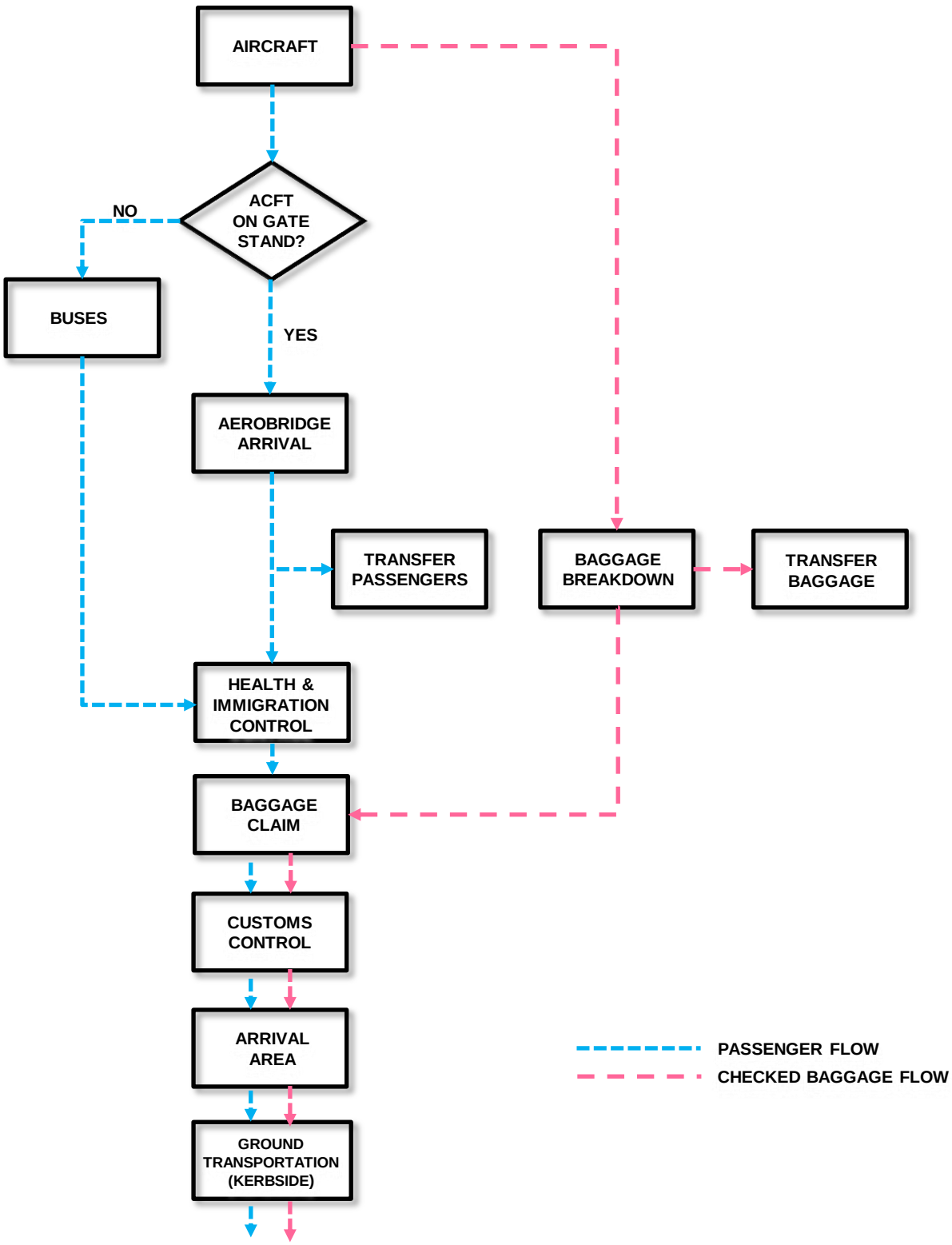
SINGAPORE CHANGI AIRPORT
PASSENGER FACILITATION FLOW

ARRIVAL



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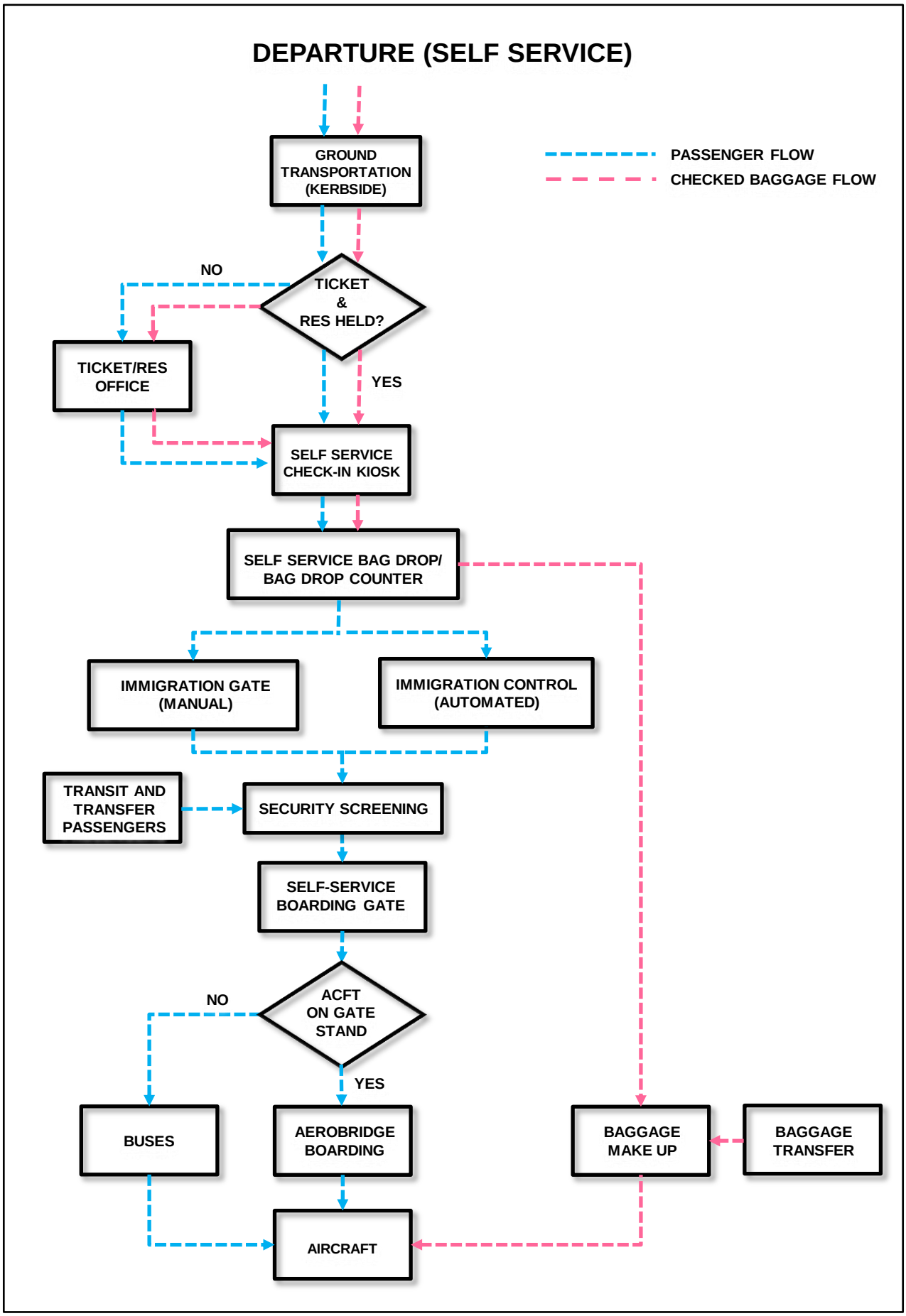
SINGAPORE CHANGI AIRPORT
PASSENGER FACILITATION FLOW

DEPARTURE (SELF SERVICE)



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CHANGES : New self-service passenger processes at check-in and boarding.

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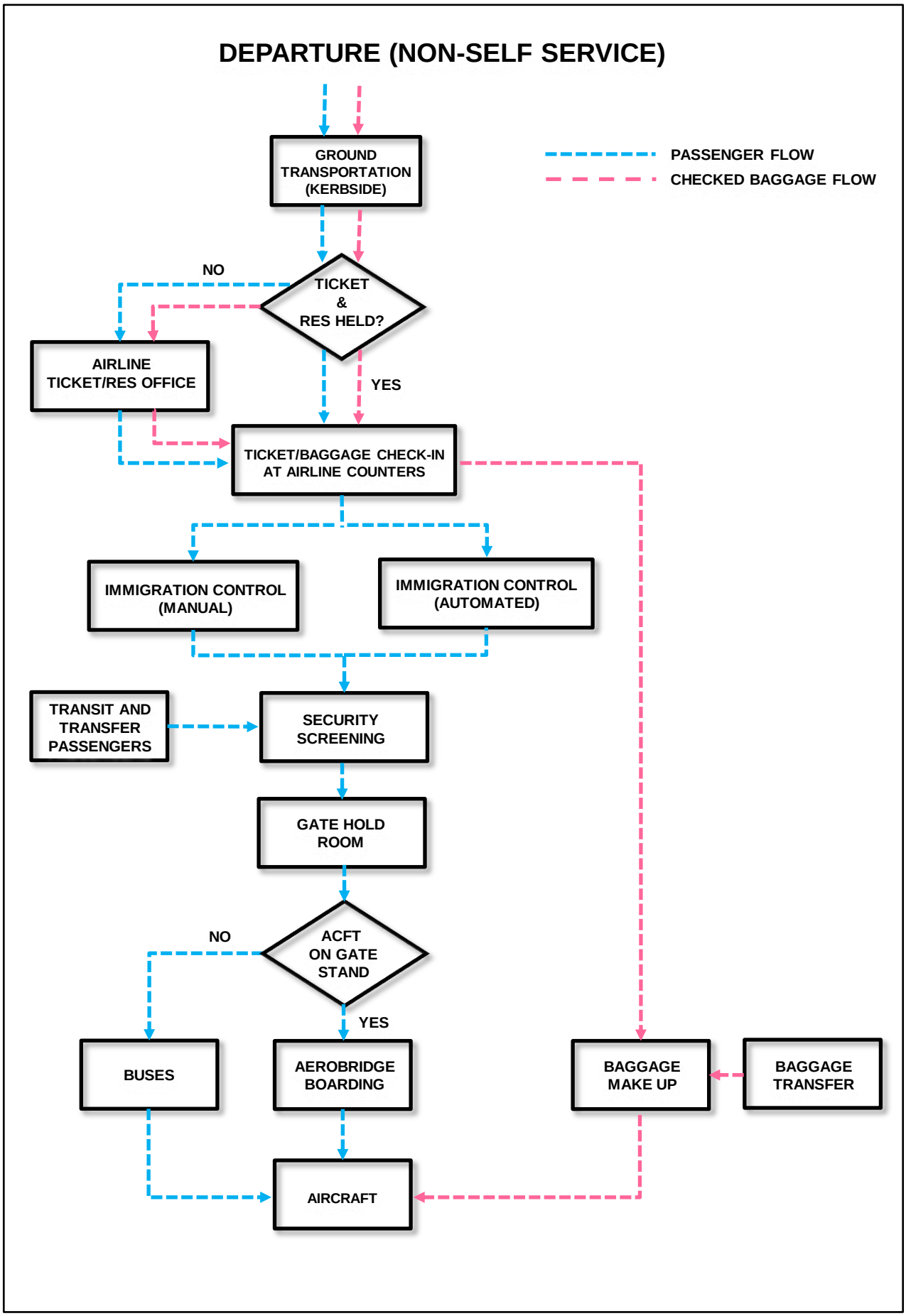
SINGAPORE CHANGI AIRPORT
PASSENGER FACILITATION FLOW

DEPARTURE (NON-SELF SERVICE)



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CHANGES : New Chart.

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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, 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), an import permit is required for the importation of goods into the FTZ and an export permit is required for the exportation of goods from the same FTZ.

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 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 VETERINARY, ANIMALS, BIRDS, MEAT, FISH AND PLANT QUARANTINE REQUIREMENTS

← 2.1 Prior permission of the Animal & Veterinary Service (AVS) is required for import, export or transshipment of:

a. Animals, birds, eggs, meat and meat products(including canned or processed meat), animal products, veterinary biological, fertilizers containing animal products;

b. Fish (for human consumption as well as for aquaria), fisheries products (in all forms), aquatic animals (alive or dead).

c. Plants and propagatable plant parts including cuttings, seeds and bulbs with or without potting medium, organic fertilisers of plant origin, live insects and microorganisms. Plant produce including cutflowers, fruits and vegetables from the American Tropics (between Lat 23 1 / 2° N and 23 1 / 2 ° S).

2.2 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.

← 2.3 Prior permission of the Animal & Veterinary Service (AVS) is required for the import and export of all species of wild animals and plants and their parts or derivatives protected under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

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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 Paragraph 50D of the Air Navigation Order state that dangerous goods shall not be carried or have loaded in an aircraft unless the operator of the aircraft has been granted with a dangerous goods permit granted by the Director-General of Civil Aviation and in accordance with any conditions which may be imposed. This provision applies to all aircraft flying to, from or over the Republic of Singapore, and to Singapore registered aircraft wherever they may be. Where an operator of an aircraft has diplomatic clearance from the Ministry of Foreign Affairs 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.

4.1.2 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.

4.1.3 Operators who wish to carry dangerous goods should submit their applications to the address below, in the prescribed form, giving full details of the consignment:

Flight Standards Division
Civil Aviation Authority of Singapore
Singapore Changi Airport
P.O.Box 1, Singapore 918141
FAX: (65) 65456519
TEL: (65) 65413487

Each application must be supported by a shipper's declaration form, airway bill and commercial invoice. All airline operators planning to carry dangerous goods to, from or through Singapore may request for the application forms from Flight Standards Division, CAAS (email: CAAS_dangerousgoods@caas.gov.sg). These applications should be submitted at least 7 working days before the intended date of carriage.

5 REPORTING OF DANGEROUS GOODS ACCIDENT/INCIDENT

5.1 Operators are required to submit a written report to the CAAS within 24 hours of the occurrence coming to the knowledge of the person making the report in the event of any dangerous goods accident, dangerous goods incident or the finding of undeclared or mis declared munitions of war or dangerous goods in cargo or passenger's baggage on board any aircraft operated by that operator.

5.2 When any dangerous goods accident occurs on board any Singapore aircraft, or any aircraft that lands in or departs from Singapore, the operator of that aircraft should notify CAAS immediately through the most expeditious means (i.e. Telephone call or SMS etc.) and submit a written notification within 3 hours from immediate notification. The initial report may be made by any means but a written report utilising Part 4 of CAAS AW139 form, including all relevant documents, should be sent as soon as possible and which shall in any case be within 24 hours, even if all the information is not available. The report should then be updated as soon as more information becomes available.

5.3 Where any information referred to in paragraph 5.4 below is not in the possession of the person making a report, that person shall dispatch the information in a form as specified by the Chief Executive, and by the quickest available means within 24 hours of the information coming into his possession.

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5.4 A report required shall contain such of the following information as is appropriate to the occurrence:

a. date of the occurrence;
b. State of the operator;
c. State of origin;
d. State of registry;
e. location of the occurrence, flight number and flight date;
f. description of the goods and the reference number of the airway bill, pouch, baggage tag and ticket;
g. proper shipping name (including the technical name, if applicable);
h. UN or ID number, whichever is applicable;
i. class or division of the goods in accordance with the Technical Instructions and any subsidiary risk;
j. type of packaging and the packaging specification marking;
k. quantity of the munitions of war or dangerous goods;
l. name and address of the shipper or passenger;
m. suspected cause of the occurrence;
n. action taken upon discovery of the occurrence, including any mitigation measures;
o. any serious injury, death or damage of property caused by the occurrence;
p. any other reporting action taken;
q. name, title, address and contact number of the reporter;
r. any other relevant details.

5.5 All formal written notifications shall be made by the air operator through the submission of the Part 4 of CAAS AW139 form in an email to CAAS at “caas_dfirs@caas.gov.sg”or in any other manner acceptable to CAAS. Providing it is safe to do so, all dangerous goods, packaging, documents, etc., relating to the occurrence must be retained by the operator and its agent until CAAS authorises its release.

5.6 The prescribed form above is available on the CAAS website from the following link below: http://www.caas.gov.sg/caas/en/eServices_Forms/sai_reporting.html?_locale=en

5.7 The existing CAAS FO130 (Dangerous Goods Occurrence Report) form has been discontinued from 1st April 2011.

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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 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 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
http://sso.agc.gov.sg
http://www.caas.gov.sg

Electronic versions of all Singapore legislation may be accessed via subscription to Lawnet at
http://www.lawnet.com.sg

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

Post:
Toppan Leefung Pte. Ltd.,
No. 1 Kim Seng Promenade, #18-01,
Great World City, East Tower
Singapore 237994.
Tel: (65) 68269600
Fax: (65) 68203341
URL: www.toppanleefung.com

1.1 CIVIL AVIATION LEGISLATION

No	Legislation	Citation
Civil Aviation Authority of Singapore Act & related legislation		
1	Civil Aviation Authority of Singapore Act	Cap. 41 (2014 Rev Ed.)
2	Civil Aviation Authority of Singapore (Airport Development Levy) Order 2018	S437/2018
3	Civil Aviation Authority of Singapore (Aviation Levy) Order 2018	S522/2018
4	Civil Aviation Authority of Singapore (Changi Airport) By-laws 2009	S313/2009
5	Civil Aviation Authority of Singapore (Changi Airport) Notification 2009	S293/2009
6	Civil Aviation Authority of Singapore (Composition of Offences) Regulations 2009	S315/2009
7	Civil Aviation Authority of Singapore (Licensing of Airport Operators) Regulations 2009	S311/2009
8	Civil Aviation Authority of Singapore (Price Control of Aeronautical Charges) Rules 2009	S298/2009
9	Civil Aviation Authority of Singapore (Seletar Airport) By-laws 2009	S314/2009
10	Civil Aviation Authority of Singapore (Seletar Airport) Notification 2009	S294/2009
11	Delegation of Powers	Cap. 41, N1
Air Navigation Act & related legislation		
12	Air Navigation Act	Cap. 6 (2014 Rev Ed.)
13	Air Navigation Order	Cap. 6, O2 (1990 Rev Ed.)
14	Air Navigation (101 - Unmanned Aircraft Operations) Regulations 2019	S833/2019
15	Air Navigation (119 – Air Operator Certification) Regulations 2018	S443/2018
16	Air Navigation (121 – Commercial Air Transport by Large Aeroplanes) Regulations 2018	S444/2018
17	Air Navigation (125 – Complex General Aviation) Regulations 2018	S501/2018

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No	Legislation	Citation
18	Air Navigation (135 – Commercial Air Transport by Helicopters and Small Aeroplanes) Regulations 2018	S445/2018
19	Air Navigation (137 – Aerial Work) Regulations 2018	S502/2018
20	Air Navigation (91 – General Operating Rules) Regulations 2018	S441/2018
21	Air Navigation (98 – Special Operations) Regulations 2018	S442/2018
22	Air Navigation (99 - Breath Testing for Alcohol) Regulations 2019	S177/2019
23	Air Navigation (Aviation Security) Order	Cap. 6, O5
24	Air Navigation (Composition of Offences) Rules 2017	S667/2017
25	Air Navigation (Flight Crew Recency - Exemption) Order 2020	S347/2020
26	Air Navigation (Investigation of Accidents and Incidents) Order	Cap. 6, O7
27	Air Navigation (Licensing of Air Services) Regulations	Cap. 6, RG 2
28	Air Navigation (Paya Lebar and Tengah Aerodrome Fees) Order	Cap. 6, O1
29	Air Navigation (Prohibited Flights) Order	Cap. 6, O6
30	Air Navigation (Protected Areas) (No. 2) Order 2015	S435/2015
31	Air Navigation (Protected Areas) Order 2015	S350/2015
32	Air Navigation (Regulated Air Cargo Agents and Known Consignors) Regulations 2017	S166/2017
33	Air Navigation (Wreck and Salvage of Aircraft) Regulations	Cap. 6, RG 1
34	Designation of Authorised Persons	Cap. 6, N2
35	Use of Seletar Aerodrome	Cap. 6, N1
Other Acts & related legislation		
36	Carriage by Air Act	Cap. 32A (2001 Rev Ed.)
37	Carriage by Air (Parties to Conventions) Order	Cap. 32A, O1
38	Carriage by Air (Singapore Currency Equivalents) Order	Cap. 32A, O2
39	Carriage by Air (Montreal Convention, 1999) Act	Cap. 32B (2008 Rev Ed.)
40	Carriage by Air (Montreal Convention, 1999) (Exclusion from Convention) Order	Cap. 32B, O1
41	Tokyo Convention Act	Cap. 327 (1985 Rev Ed.)
42	Tokyo Convention (Convention Countries) Notification	Cap. 327, N1
43	Tokyo Convention (Protocol Countries) Notification 2019	S893/2019
44	Hijacking of Aircraft and Protection of Aircraft and International Airports Act	Cap. 124 (1997 Rev Ed.)
45	International Interests in Aircraft Equipment Act	Cap. 144B (2012 Rev Ed.)
46	Infrastructure Protection Act 2017	Act 41 of 2017
47	Immigration Act	Cap. 133 (2008 Rev Ed.)
48	Immigration (Authorised Places of Entry and Departure, and Rates) Notification 2012	S627/2012
49	Immigration Regulations	Cap. 133, RG 1
50	Arms and Explosives Act	Cap. 13 (2003 Rev Ed.)
51	Arms and Explosives (Aircraft Exemption) Rules	Cap. 13, R3
52	Arms and Explosives (Explosives) Rules	Cap. 13, R2
53	Arms and Explosives (Movement Control) Rules	Cap. 13, R4
54	International Organisations (Immunities and Privileges) Act	Cap. 145 (2013 Rev Ed.)
55	International Organisations (Immunities and Privileges) (International Civil Aviation Organisation) Order	Cap. 145, OR 4

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1.2 OTHER RELEVANT LEGISLATION

No	Legislation	Citation
1	Infectious Diseases Act	Cap. 137 (2003 Rev Ed.)
2	Infectious Diseases (Quarantine) Regulations	Cap. 137, RG 1
3	Infectious Diseases (Certificates of Vaccination or Other Prophylaxis) Regulations 2008	S611/2008
4	Arms and Explosives (Arms) Rules	Cap. 13, R1
5	Inspector of Explosives	Cap. 13, N1
6	Arms Offences Act	Cap. 14 (2008 Rev Ed.)

Note: "Cap." means "Chapter ", unless otherwise stated.

1.3 INTERNATIONAL CONVENTIONS AND PROTOCOLS

No	Legislation
1	Convention on International Civil Aviation, done at Chicago on 7 December 1944
2	International Air Services Transit Agreement, signed at Chicago on 7 December 1944
3	Protocol Relating to an Amendment to the Convention on International Civil Aviation [Article 83 bis], signed at Montreal on 6 October 1980
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

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2 TAXATION IN THE FIELD OF INTERNATIONAL AIR TRANSPORT

2.1 Petroleum exemptions and income tax

a. Petroleum for aircraft is granted Goods and Services Tax (GST) relief under item 11 of the Schedule to the GST (Imports Relief) Order (2001 Rev Ed.).

b. The matter of income tax on air transport is contained within Section 12(2) of the Income Tax Act (2014 Rev Ed.).

Where a non-resident person carries on either:

i. the business of shipowner or charterer, or

ii. the business of air transport,

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

This subsection shall not apply to passengers, mail, livestock or goods which are brought to Singapore solely for 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, 12th Edition

Chapter 2 (10th edition, Amendment 169)

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 (Amendment 42)

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 page ENR 1.7-5 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	(Amendment 34)
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
Chapter 6	(Amendment 29)
6.1.1	General aviation aircraft in Singapore are required to be registered in the Public Transport Category.
Part III	(International Operations - Helicopters) - 9th 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, 15th Edition

Chapter 3

3.25	Singapore issues single, double, triple, or multiple journey visas, some with validity of less than six months.
3.26	Singapore adopts an electronic visa system (e-Visa) to retrieve information to verify the identity of the visa holder.
3.27	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.
3.46	Special Pass may be issued to an inadmissible passenger to enable him to apply for travel documents from the relevant diplomatic mission. In such cases, the aircraft operator shall continue to be responsible for the custody and care of the passenger.
3.66	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, an entry permit and valid travelling documents are required before entry is granted.

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5.27	An application for a travel document has to be duly signed by the applicant before the travel document can be issued.
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
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, 11th Edition

Chapter 5	(Amendment 13)
5.1.2	ICAO requires States to investigate serious incident involving aircraft of a maximum certificated take-off (MCT) mass of over 2250kg. With effect from 2 August 2010, Singapore requires all serious incidents to be investigated, regardless of the aircraft's MCT mass.

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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	
4.2.1.4	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) - 4th Edition

- Not applicable

ANNEX 15 Aeronautical Information Services, 16th Edition

- NIL Difference

ANNEX 16 Environmental Protection

Volume I	(Aircraft Noise) - 8th Edition
Volume II	(Aircraft Engine Emissions) - 4th Edition

- NIL Difference

ANNEX 17 Security - Safeguarding International Civil Aviation Against Acts of Unlawful Interference, 10th Edition

- NIL Difference

ANNEX 18 The Safe Transport of Dangerous Goods by Air, 4th Edition

- NIL Difference

ANNEX 19 Safety Management, 1st Edition

- NIL Difference

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GEN 2 TABLES AND CODES

GEN 2.1 MEASURING SYSTEM, AIRCRAFT MARKING, HOLIDAYS

1 UNITS OF MEASUREMENT

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

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 TIME SYSTEM

2.1 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.

3 GEODETIC REFERENCE DATUM

3.1 Name/designation of datum

3.1.1 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.

3.2 Area of Application

3.2.1 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.

3.3 Use of asterisk

3.3.1 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.

4 AIRCRAFT NATIONALITY AND REGISTRATION MARKS

4.1 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.

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5 PUBLIC HOLIDAYS IN SINGAPORE

5.1 The following dates are notified as public holidays:

Name of Holiday	Date	Day
Deepavali	14 November 2020	Saturday
Christmas Day	25 December 2020	Friday
New Year's Day	01 January 2021	Friday
Chinese New Year	12 February 2021	Friday
	13 February 2021	Saturday
Good Friday	02 April 2021	Friday
Labour Day	01 May 2021	Saturday
Hari Raya Puasa	13 May 2021	Thursday
Vesak Day	26 May 2021	Wednesday
Hari Raya Haji	20 July 2021	Tuesday
National Day	09 August 2021	Monday
Deepavali	04 November 2021	Thursday
Christmas Day	25 December 2021	Saturday

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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.

A

A/A	Air-to-air
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
A/G	Air-to-ground
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	Centre (preceded by runway designation number to identify a parallel runway)

C

C	Degrees Celsius (Centigrade)
CAAS*	Civil Aviation Authority of Singapore
CAT	Clear air turbulence
CAVOK	(to be pronounced "KAV-OH-KAY") visibility, cloud and present weather better than prescribed values or conditions
CAFHI*	Changi Airport Fuel Hydrant Installation
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

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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

GA	General Aviation
G/A	Ground-to-air
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-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)
HEL-H*	Heavy helicopter (radius of action, for rescue purposes, more than 370km (200NM) and capacity of evacuating more than 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
INCORP	Incorporated
INCERFA	Uncertainty phase
INFO	Information
INOP	Inoperative
INPR	In progress

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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	Left (preceded by runway designation number to identify a parallel runway)

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

OAC	Oceanic area control centre
OAS	Obstacle assessment surface
OBS	Observe or observed or observation
OBST	Obstacle
OCA	Oceanic control area or 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
O/R	On request
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

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

Q

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

R

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

.

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

R

RA	Rain
RAD*	Radius
RAF*	Royal Air Force
RAG	Runway arresting gear
RAI	Runway alignment indicator
RAIM	Receiver autonomous integrity monitoring
RB	Rescue boat
RCC	Rescue coordination centre
RCF	Radiocommunication failure (message type designator
RCL	Runway centre line
RCLL	Runway centre line light(s)
RCP	Required communication performance
RDH	Reference datum height
RDL	Radial
RDO	Radio
REC	Receive or receiver
REDL	Runway edge light(s)
REF	Reference to ... or refer to ...
REG	Registration
RENL	Runway end light(s)
REP	Report or reporting or reporting point
REQ	Request or requested
RESA	Runway end safety area
RFC*	Radio facility chart
RFFS	Rescue and fire fighting services
RH*	Rescue helicopter
RHC	Right-hand circuit
RIF	Reclearance in flight
RLLS	Runway lead-in lighting system
RMAF*	Royal Malaysian Air Force
RMK	Remark
RNAV	(to be pronounced "AR-NAV") Area navigation
RNP	Required navigation performance
ROC	Rate of climb
ROD	Rate of descent
RPI	Receiving only
RPLC	Replace or replaced
RPS	Radar position symbol
RQMNTS	Requirements
RQP	Request flight plan (message type designator)
RQS	Request supplementary flight plan (message type designator)
RSAF*	Republic of Singapore Air Force
RSC	Rescue sub-centre
RSCD	Runway surface condition
RSFC*	Republic of Singapore Flying Club
RSP	Required surveillance performance
RSP	Responder beacon
RSR	En-route surveillance radar
RTE	Route
RTF	Radiotelephone
RTHL	Runway threshold light(s)
RTN	Return or returned or returning
RTODAH	Rejected take-off distance available, helicopter
RTT	Radioteletypewriter
RTZL	Runway touchdown zone light(s)
RUT	Standard regional route transmitting frequencies
RV	Rescue vessel
RVA	Radar vectoring area
RVR	Runway visual range
RWY	Runway
RVSM	Reduced vertical separation minimum (300m(1000ft)) between FL290 and FL410

S

S	South or southern latitude
SAF*	Singapore Armed Forces
SALS	Simple approach lighting system
SAR	Search and rescue
SARPS	Standards and recommended practices (ICAO)
SAT	Saturday
SATCC*	Singapore Air Traffic Control Centre
SATCOM	Satellite communication (used only when referring generally to both voice and data satellite communication or only data satellite communication)
SATVOICE	Satellite voice communication
SDBY	Stand by
SDF	Step down fix
SEC	Seconds
SELCAL	Selective calling system
SEP	September
SER	Service or servicing or served
SFC	Surface
SFL*	Sequenced flashing light
SGL	Signal
SIA*	Singapore Airlines Limited
SID	Standard instrument departure
SIG	Significant
SIGMET	Information concerning en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations
SIMUL	Simultaneous or simultaneously
SKED	Schedule or scheduled
SMC	Surface movement control
SMR	Surface movement radar
SOC	Start of climb
SPECI	Aerodrome special meteorological report (in meteorological code)
SPECIAL	Local special meteorological report (in abbreviated plain language)
SPL	Supplementary flight plan (message type designator)
SPOT	Spot wind
SQ	Squall
SR	Sunrise
SRA	Surveillance radar approach
SRE	Surveillance radar element of precision approach radar system
SRR	Search and rescue region
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

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

U

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

V

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

W

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

X

XBAR	Crossbar (of approach lighting system)
XNG	Crossing

Y

YCZ	Yellow caution zone (runway lighting)

4

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

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GEN 2.3 CHART SYMBOLS

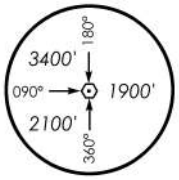
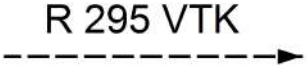
The aeronautical symbols used on charts contained in the AIP and other aeronautical charts series listed in GEN 3.2 are shown below. They correspond in every respect to the internationally agreed symbols contained in ICAO Annex 4 - Aeronautical Charts, Tenth Edition and the Aeronautical Chart Manual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

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	
VOR radial Radial bearing from, and identification of, VOR	
Radio Marker Beacon Elliptical	

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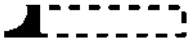
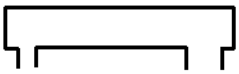
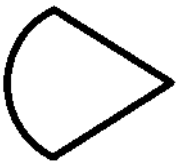
Instrument landing system ILS - PLAN VIEW	
Instrument landing system ILS -PROFILE	

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	
Obstacle light	
Aeronautical ground light	

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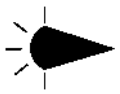
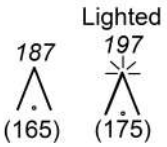
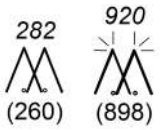
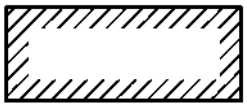
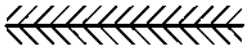
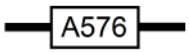
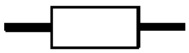
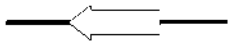
Wind direction indicator (lighted)	
Landing direction indicator (lighted)	

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

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GEN 2.5 LIST OF RADIO NAVIGATION AIDS

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

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

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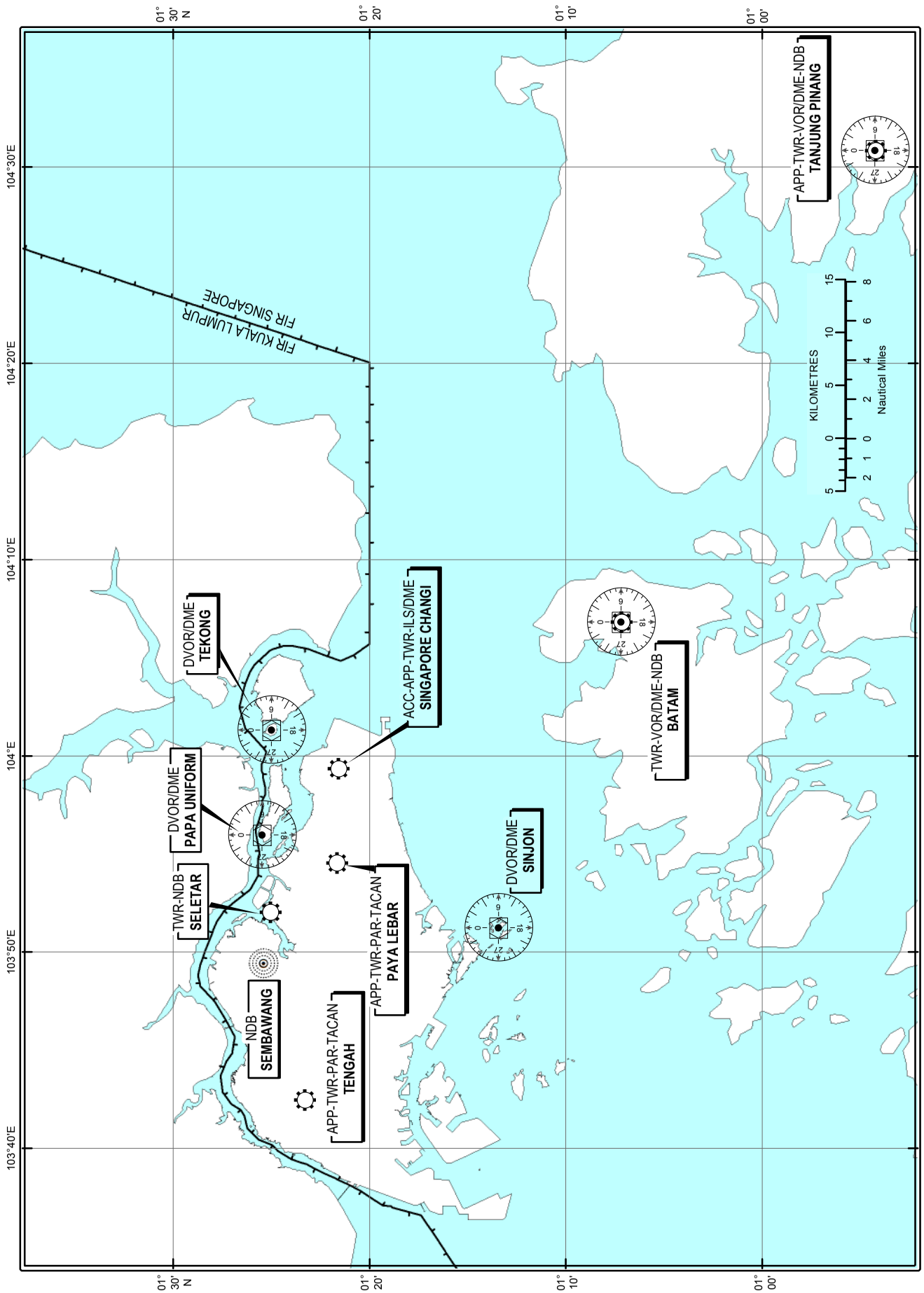
SINGAPORE
RADIO FACILITY INDEX CHART



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GEN 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
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

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From decimal minutes of an arc to seconds of an arc							
MIN	*SEC*	*MIN*	*SEC*	*MIN*	*SEC*	*MIN*	*SEC*
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 2020 to Year 2024.

1.2 The times shown in the Sunrise-Sunset table, calculated for the year 2022, is an “average year” for the years from 2020 to 2024. 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	01-04	2306	1110	**MAY**	01-07	2256	1106	**SEP**	01-06	2300	1108
	05-09	2308	1112		08-23	2255	1106		07-09	2258	1106
	10-14	2310	1114		24-26	2255	1107		10-12	2257	1105
	15-20	2312	1116		27-31	2256	1107		13-18	2255	1103
	21-27	2314	1118						19-23	2253	1101
	28-31	2315	1119						24-28	2252	1059
									29-30	2251	1057
FEB	01-20	2316	1120	**JUN**	01-04	2256	1108	**OCT**	01-07	2250	1056
	21-28	2315	1120		05-09	2257	1109		08-10	2248	1054
					10-14	2258	1110		11-18	2247	1053
					15-23	2259	1112		19-23	2246	1051
					24-28	2301	1113		24-31	2246	1050
					29-30	2302	1114				
MAR	01-03	2313	1119	**JUL**	01-04	2303	1114	**NOV**	01-15	2247	1050
	04-09	2313	1118		05-09	2303	1115		16-17	2247	1051
	10-13	2311	1117		10-16	2304	1116		18-24	2248	1052
	14-17	2309	1116		17-31	2305	1116		25-27	2250	1153
	18-22	2308	1115						28-30	2251	1054
	23-28	2306	1114								
	29-31	2305	1112								
APR	01-06	2303	1112	**AUG**	01-10	2305	1115	**DEC**	01-05	2252	1056
	07-09	2302	1110		11-17	2304	1114		06-09	2255	1058
	10-14	2300	1109		18-24	2302	1112		10-14	2256	1100
	15-20	2259	1108		25-31	2301	1110		15-18	2258	1102
	21-26	2258	1107						19-22	2300	1104
	27-30	2257	1106						23-26	2302	1106
									27-28	2304	1107
									29-31	2305	1109

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GEN 3 SERVICES

GEN 3.1 AERONAUTICAL INFORMATION SERVICES

1 RESPONSIBLE SERVICE

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

1.2 AIS Headquarters

Post:
Aeronautical Information Services
Civil Aviation Authority of Singapore
Singapore Changi Airport
P.O. Box 1
Singapore 918141

Tel: (65) 64227036
Fax: (65) 64410221
Email: caas_singaporeais@caas.gov.sg

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).

2 AREA OF RESPONSIBILITY

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 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
Checklists and Lists of valid NOTAM

NOTAM and checklist 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.

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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 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)	

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

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 Checklist and NOTAM List

A checklist of current NOTAM is issued monthly via the AFS. A monthly NOTAM List containing the plain language presentation of current NOTAM, information on the latest AIP Amendment, AIP Supplement, AIC issued and a checklist for AIP Supplements is also available online.

4 AIRAC SYSTEM

4.1 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.

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4.2 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 2019 to 2023:

AIRAC Effective Dates				
Year 2019	**Year 2020**	**Year 2021**	**Year 2022**	**Year 2023**
03 January	02 January	28 January	27 January	26 January
31 January	30 January	25 February	24 February	23 February
28 February	27 February	25 March	24 March	23 March
28 March	26 March	22 April	21 April	20 April
25 April	23 April	20 May	19 May	18 May
23 May	21 May	17 June	16 June	15 June
20 June	18 June	15 July	14 July	13 July
18 July	16 July	12 August	11 August	10 August
15 August	13 August	09 September	08 September	07 September
12 September	10 September	07 October	06 October	05 October
10 October	08 October	04 November	03 November	02 November
07 November	05 November	02 December	01 December	30 November
05 December	03 December	30 December	29 December	28 December
	31 December			

4.3 A TRIGGER NOTAM will be issued 10 days before the effective date of the AIRAC AIP Supplement giving a brief description of the contents of the AIP Supplement, the effective date and the reference number of the AIRAC AIP Supplement. This trigger NOTAM will come into force on the same effective date as the AIRAC AIP Supplement and will remain in force until 14 days after the effective date.

4.4 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.

5 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		

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GEN 3.2 AERONAUTICAL CHARTS

1 RESPONSIBLE SERVICES

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

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.

2 MAINTENANCE OF CHARTS

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.

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

3 AVAILABILITY OF CHARTS

3.1 The charts listed in paragraph 4.1 can be downloaded from AIM-SG URL: https://aim-sg.caas.gov.sg

4 AERONAUTICAL CHART SERIES AVAILABLE

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

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. The 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.

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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.

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.

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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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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	30 JAN 20
← **Enroute Chart** ICAO (ENRC)			ERC 6-1	In AIP	22 APR 21
Instrument Approach Chart ICAO (IAC)		***Singapore Changi***			
	1:400 000	RWY 02L - ICW ILS/DME	AD-2-WSSS-IAC-1	In AIP	31 DEC 20
	1:400 000	RWY 02C - ICE ILS/DME	AD-2-WSSS-IAC-2	In AIP	31 DEC 20
	1:400 000	RWY 20R - ICH ILS/DME	AD-2-WSSS-IAC-5	In AIP	31 DEC 20
	1:400 000	RWY 20C - ICC ILS/DME	AD-2-WSSS-IAC-6	In AIP	31 DEC 20
	1:400 000	RWY 20C - VTK DVOR/DME	AD-2-WSSS-IAC-7	In AIP	31 DEC 20
	1:400 000	RWY 02L - RNP	AD-2-WSSS-IAC-9	In AIP	31 DEC 20
	1:400 000	RWY 02C - RNP	AD-2-WSSS-IAC-10	In AIP	31 DEC 20
	1:400 000	RWY 20R - RNP	AD-2-WSSS-IAC-11	In AIP	31 DEC 20
	1:400 000	RWY 20C - RNP	AD-2-WSSS-IAC-12	In AIP	31 DEC 20
	1:400 000	← RWY 02R - RNP	AD-2-WSSS-IAC-13	In AIP	22 APR 21
	1:400 000	RWY 20L - RNP	AD-2-WSSS-IAC-14	In AIP	25 FEB 21
		Paya Lebar			
	1:400 000	RWY 20 - PU DVOR/DME	AD-2-WSAP IAC-1	In AIP	31 DEC 20
	1:400 000	RWY 02 - PU DVOR/DME	AD-2-WSAP IAC-2	In AIP	31 DEC 20
	1:400 000	RWY 20 - IPS ILS/DME	AD-2-WSAP IAC-3	In AIP	31 DEC 20
	1:400 000	RWY 02 - IPN ILS/DME	AD-2-WSAP IAC-4	In AIP	31 DEC 20
	1:400 000	RWY 02 - RNP	AD-2-WSAP-IAC-5	In AIP	31 DEC 20
	1:400 000	RWY 20 - RNP	AD-2-WSAP-IAC-6	In AIP	31 DEC 20
Visual Approach Chart ICAO (VAC)	1:400 000	***Singapore Changi***	AD-2-WSSS-VAC-1	In AIP	31 DEC 20
		Seletar			
	1:100 000	RWY 03	AD-2-WSSL-VAC-1	In AIP	16 JUL 20
	1:100 000	RWY 21	AD-2-WSSL-VAC-2	In AIP	16 JUL 20
	1:100 000	RWY 03	AD-2-WSSL-VAC-3	In AIP	16 JUL 20
	1:100 000	RWY 21	AD-2-WSSL-VAC-4	In AIP	16 JUL 20
Visual Departure Chart		***Seletar***			
	1:100 000	RWY 03	AD-2-WSSL-VDC-1	In AIP	16 JUL 20
	1:100 000	RWY 21	AD-2-WSSL-VDC-2	In AIP	25 FEB 21
← **Aerodrome Chart** ICAO (AC)		***Singapore Changi***	AD-2-WSSS-ADC-2	In AIP	22 APR 21
		Seletar	AD-2-WSSL-ADC-1	In AIP	16 JUL 20
		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	16 JUL 20
	1:10 000	RWY 20C/02C	AD-2-WSSS-AOC-2	In AIP	31 DEC 20
	1:10 000	← RWY 02R/20L	AD-2-WSSS-AOC-4	In AIP	22 APR 21
		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	16 JUL 20

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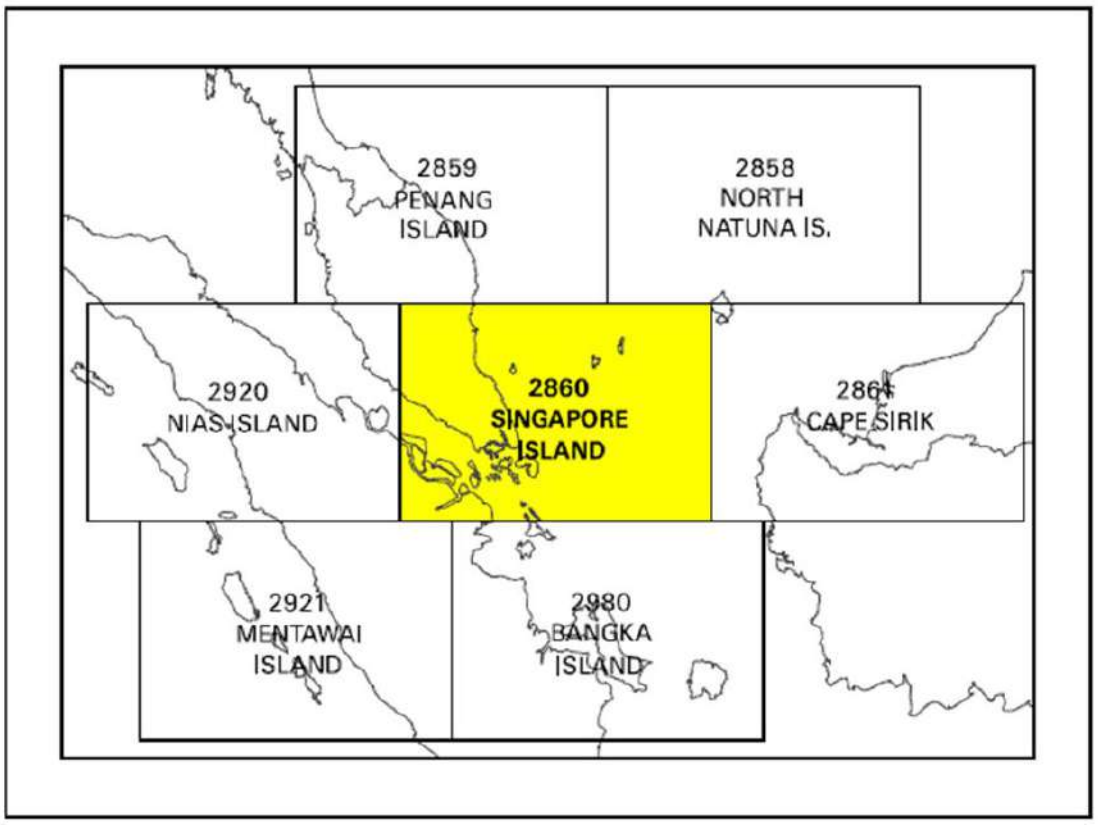
GEN 3.2.5 LIST OF AERONAUTICAL CHARTS AVAILABLE					
Title of Chart Series	*Scale*	*Name and/or number*		*Price ($)*	*Date*
Aerodrome Obstacle Chart ICAO TYPE B (AOC)		***Singapore Changi***			
	1:20 000	RWY 02L/20R, 02C/20C and RWY 02R/20L	AD-2-WSSS-AOC-3	In AIP	31 DEC 20
		Seletar			
	1:20 000	RWY 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	01 FEB 18
	1:2 500	RWY 02R	AD-2-WSSS-PATC-3	In AIP	31 DEC 20
	1:2 500	RWY 20L	AD-2-WSSS-PATC-4	In AIP	31 DEC 20

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



7 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

1 RESPONSIBLE SERVICE

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
Singapore Changi Airport
P. O. Box 1, Singapore 918141

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

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*

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

2 AREA OF RESPONSIBILITY

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.

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 TYPES OF SERVICES

3.1 The following types of services are provided:

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

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 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.

3.4 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.

3.5 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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3.6 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 sub-section ENR 1.1.

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.

3.8 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.

3.9 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.

3.10 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.

4 CO-ORDINATION BETWEEN THE OPERATOR AND ATS

4.1 Co-ordination between the operator and air traffic services is effected in accordance with Chapter 2, paragraph 2.15 of ICAO Annex 11 - Air Traffic Services and Chapter II, paragraphs 11.2.1.1.4 and 11.2.1.1.5 ICAO Doc 4444 - Procedures for Air Navigation Services - Air Traffic Management (PANS-ATM).

5 MINIMUM FLIGHT ALTITUDE

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.

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 (65) 65412672	(65) 65456252	-	WSJCZQZX
SINGAPORE TOWER	Singapore Changi Control Tower Civil Aviation Authority of Singapore P.O Box 1, Singapore Changi Airport Singapore 918141	(65) 65956057 (65) 65412410 (65) 65412416	(65) 65456224	-	Nil
SELETAR TOWER	Seletar Control Tower Civil Aviation Authority of Singapore Seletar Airport Building 1007, West Camp Road Singapore 797794	(65) 64812893	(65) 64813510	-	WSSLZTZX

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GEN 3.4 COMMUNICATION SERVICES

1 RESPONSIBLE SERVICE

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

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

Post:
Director-General of Civil Aviation
Civil Aviation Authority of Singapore
Singapore Changi Airport
P. O. Box 1
Singapore 918141

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

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

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

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

2 AREA OF RESPONSIBILITY

2.1 Communication services are provided for the entire SINGAPORE FIR.

3 TYPES OF SERVICE

3.1 Radio navigation services

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

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

3.2 Voice/data link services

3.2.1 *Voice service*

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

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

3.2.2 *Enroute Communications Organisation*

a. The radio frequencies for enroute communications are listed in subsection ENR 2.1

b. The Singapore HF network provides an umbrella communication coverage for the FIR and may be contacted if communication cannot be maintained on the primary channel.

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c. Aircraft approaching or departing from an airport is required to communicate with that airport on the appropriate surface movement, tower or approach control frequency.

d. ADS-C and / or CPDLC services are available to suitably equipped aircraft operating outside radar cover and not in ADS-B exclusive airspace within the Singapore FIR. The hours when ADS-C and CPDLC services are available and the logon requirements are listed in ENR 2.1. Full details of the services are published in ENR 1.1 paragraphs 8.1 to 8.7.

3.2.3 Data link Service

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

a. the messages satisfy the requirements of ICAO Annex 10, Volume II, Chapter 3, paragraph 3.3;

b. the messages are prepared in the form specified in ICAO Annex 10;

c. the text of an individual message does not exceed 1800 characters.

3.2.4 General Aircraft Operating Agency Messages

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

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

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

3.3 Broadcasting Service

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

a. HF RTF Volmet Broadcasts (page GEN 3.5-7 refers)

b. VHF ATIS Broadcasts (page GEN 3.4-3 refers)

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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.			

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.

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4 REQUIREMENTS AND CONDITIONS

4.1 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.

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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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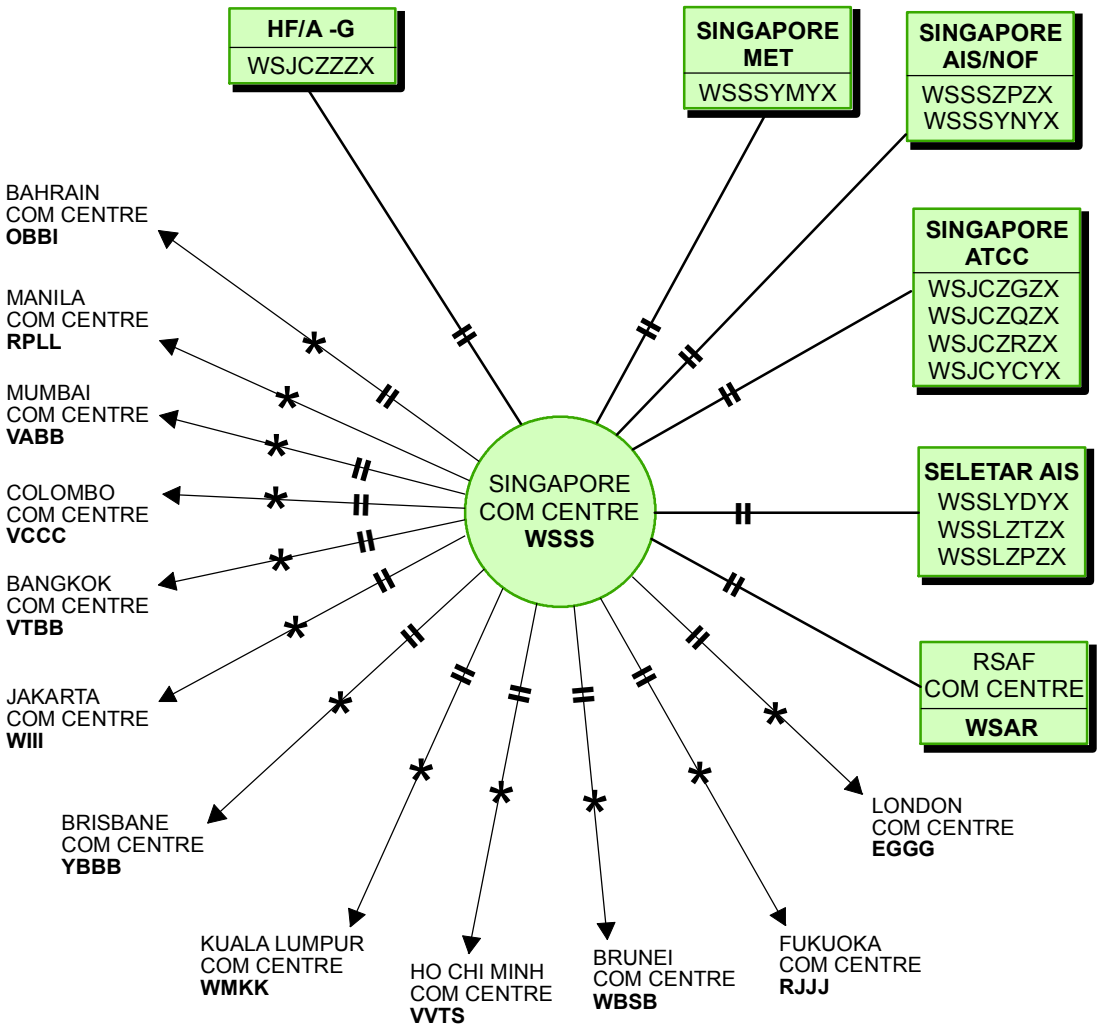
AERONAUTICAL FIXED SERVICES - AERONAUTICAL FIXED TELECOMMUNICATIONS NETWORK (AFTN) AIR TRAFFIC SERVICES (ATS) MESSAGE HANDLING SERVICES (AMHS)



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

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CHANGES : AFTN addressees of Singapore AIS/NOF and Seletar AIS revised.

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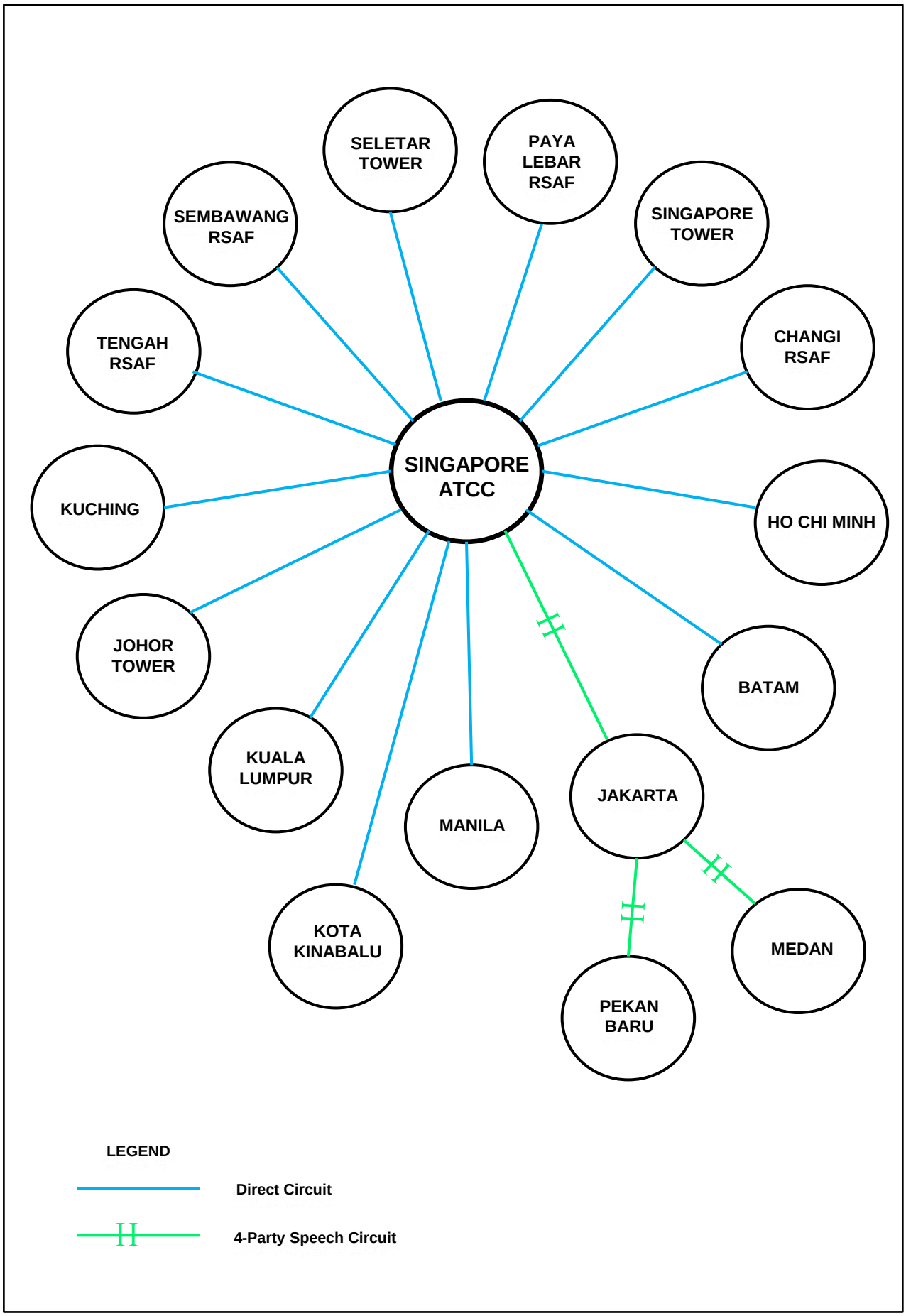
AERONAUTICAL FIXED SERVICES - TELEPHONE



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GEN 3.5 METEOROLOGICAL SERVICES

1 RESPONSIBLE SERVICE

1.1 The meteorological services for civil aviation are provided by the Meteorological Service Singapore of the National Environment Agency.

Post:
THE DIRECTOR-GENERAL
Meteorological Service Singapore
Singapore Changi Airport,
P.O. Box 8
SINGAPORE 918141
Tel: (65) 65457190(HQ)
(65) 65425059 / (65) 65422837 (MET Office)
Fax: (65) 65457192 (HQ)
(65) 65425026 (MET Office)
AFS: WSSSYMYX
URL: www.weather.gov.sg

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

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

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

2 AREA OF RESPONSIBILITY

2.1 Area meteorological watch is provided for the Singapore FIR.

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3 METEOROLOGICAL OBSERVATIONS AND REPORTS

TABLE GEN 3.5.3 Meteorological Observations and Reports

Name of Station/ Location Indicator	*Type & Frequency of Observation/ Automatic Observing Equipment*	*Types of MET Reports & Supplementary 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) 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 the runway 02R/20L 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 at the southern part of the runway is used for wind report in METAR and SPECI. If the sensor in the southern part of the runway is down, the sensor in the northern part of the runway will be used.	H24	NIL

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4 TYPES OF SERVICES

4.1 The Meteorological Office and Meteorological Watch Office at Singapore Changi Airport operate H24 and provide the following services for civil aviation:

a. Full meteorological documentation and briefing for current operational planning for all flights operating out of Singapore Changi Airport;

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. 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);

d. Meteorological information for ATS

4.2 Weather briefing by a forecaster is available H24 to qualified flight operations personnel at the Meteorological Office at Singapore Changi Airport or via telephone at (65)65425059 / (65)65422837. Weather information is available online via our Aviation Weather Services Portal at URL http://www.weather.gov.sg/ (see paragraph 9.2 for further details).

4.3 The Meteorological Office at Seletar Aerodrome operates H24 and provides meteorological documentation without briefing for international and general aviation flights operating out of Seletar Aerodrome.

4.4 Details of documentation supplied for each flight are determined by arrangement between the operator and the Meteorological Office. In general, the pilot-in-command is provided with documentation comprising one or more fixed-time prognostic streamline/istotach/spot temperature charts of standard isobaric surfaces appropriate to the cruising level (ICAO model IS), one of fixed-time prognostic significant weather chart code form and appropriate aerodrome forecasts in TAF code form.

4.5 Routine aerodrome forecasts received from other Meteorological Offices are normally included in meteorological documentation without modification. When a required aerodrome forecast is not received, a provisional forecast may be issued by the Meteorological Office providing the documentation.

← 4.6 After documentation has been issued and until take-off (i.e. the latest ETD notified to the Meteorological Office), the Meteorological Office at Singapore Changi Airport makes available amendments to the documentation. It is the responsibility of the operator's local representative or the pilot-in-command to obtain any pre-departure amendment(s) from the Meteorological Office at Singapore Changi Airport. The pilot-in-command may request pre-departure amendment(s) through the Singapore Changi Airport Control Tower.

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

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

4.8.1 SINGAPORE CHANGI AIRPORT

4.8.1.1 RWY 02L/20R (Runway 1)

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

		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

4.8.1.1.2 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

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

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

4.8.1.2 RWY 02C/20C (Runway 2)

4.8.1.2.1 Surface wind is measured by three cup anemometers and wind vanes located as follows:

	DIST FROM END OF RWY	DIST FROM RWY CENTRELINE
(i) One set at	450 metres north of RWY 02C	130 metres
(ii) One set at	middle of runway	130 metres
(iii) One set at	450 metres south of RWY 20C	130 metres

4.8.1.2.2 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	400 metres north of RWY 02C	110 metres
2nd set	Middle of runway	110 metres
3rd set	400 metres south of RWY 20C	110 metres

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

← *4.8.1.3 RWY 02R/20L (Runway 3)*

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

	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

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

	DIST FROM THRESHOLD	DIST FROM RWY CENTRELINE
1st Set	421 metres north of RWY 02R	120 metres
2nd Set	Middle of runway	121 metres
3rd Set	425 metres south of RWY 20L	120 metres

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

*4.8.1.4 **Wind Shear Observations (Singapore Changi Airport)***

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

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

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

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

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

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

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

4.8.2 SELETAR AERODROME

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

4.8.2.2 Wind Shear Observations (Seletar Aerodrome)

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

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

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

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

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

5 NOTIFICATION REQUIRED FROM OPERATORS

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

6 AIRCRAFT REPORTS REQUIRED FROM OPERATORS

6.1 AIREP

6.1.1 Routine aircraft meteorological observations shall be made and the reports transmitted at ATS/ MET reporting points listed on page GEN 3.5-6 and as indicated in subsection ENR 3.1 - ATS ROUTES.

6.1.2 Special aircraft observations and aircraft observations during climb-out and approach shall be made and the reports transmitted as necessary.

6.1.3 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: 65425026 or 65429978) to the Meteorological Office, Singapore Changi Airport.

6.2 REPORTING OF LOW LEVEL WIND SHEAR

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

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

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.

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

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

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

6.3 AIRCRAFT ATS/MET REPORTING POINTS IN THE SINGAPORE FIR

6.3.1 Aircraft Meteorological Observations shall be made in relation to and transmitted in flight by all aircraft at the following selected Air Traffic Services position reporting points within the Singapore FIR except when:

a. The flight duration is less than 2 hours, or
b. The altitude of the flight path is less than 5 000ft, or
c. The aircraft is less than 1 hour's flying time from the next intended point of landing.

6.3.2 The aircraft ATS/MET reporting points listed below are indicated in page ENR 3.1/ATS Chart.

6.3.3 The position of the mean wind or spot wind, to the nearest whole degree latitude and longitude, shall be recorded and transmitted in flight.

ATS ROUTE	AIRCRAFT ATS/MET REPORTING POINTS IN THE SINGAPORE FIR
G580	NIMIX
L642	ESPOB
L644	KIKOR
M635	SURGA
M758 / M767	TERIX
M767	TEGID
M768 / N884	LAGOT
M774	KADAR
L504	BAVUS
N875	ARUPA
N892	MELAS

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7 VOLMET SERVICE

TABLE GEN 3.5.7 VOLMET SERVICE

Name of station	*CALLSIGN IDENT (EM)*	*Frequency*	*Broadcast period*	*HR of SER*	*Aerodromes included*	*Contents and format of REP and FCST*
1	2	3	4	5	6	7
SINGAPORE	SINGAPORE RADIO (A3J)	6676KHz (1230-2230) 11387KHz (2230-1230)	H + 20 to H + 25 and H + 50 to H + 55	H24	SINGAPORE (1) SINGAPORE (2) KUALA LUMPUR (3)(4) SUBANG AIRPORT (4) SOEKARNO-HATTA (3)(4) KUCHING (3)(4) BRUNEI (3)(4) KOTA KINABALU (3)(4) DEN PASAR (3) (4) PENANG (3)(4) SINGAPORE (5) KUALA LUMPUR (4)(8) SINGAPORE (1) SINGAPORE (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 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 lUMPUR 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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8 SIGMET SERVICE

TABLE GEN 3.5.8 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	H24	Singapore FIR	SIGMET / 4-6HR	Nil	Singapore ACC	Nil

8.1 General

8.1.1 For the safety of air traffic, the Meteorological Authority maintains an area meteorological watch and warning service. This service consists partly of a continuous weather watch within the lower and upper FIR and issuance of appropriate information (SIGMET) by Meteorological Watch Office and partly of the issuing of warnings for Changi Airport.

8.2 Area Meteorological Watch Service

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

8.2.2 The Meteorological Service Singapore issues information in the form of SIGMET messages about the occurrence or expected occurrence of one or several of the following significant meteorological phenomena:

- thunderstorms *
- severe turbulence
- severe icing
- severe mountain waves
- heavy sand storm/dust storm
- volcanic ash cloud
- tropical cyclone

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

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

8.2.4 SIGMETs issued by the Meteorological Service Singapore are transmitted to adjacent MWOs in accordance with regional air navigation agreements and inserted in the MET page of LORADS (Long Range Radar and Display System) for use by the Singapore Air Traffic Control Centre.

8.3 Warning Service

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

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

8.3.2 The warnings are:

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

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

8.3.4 SIGMET is disseminated by directed transmissions to aircraft through general calls by the Area Control Centre, Singapore for Singapore FIR.

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9 OTHER AUTOMATED METEOROLOGICAL SERVICES

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

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

TABLE 3.5.9 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 and 480km 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: WSJCZGZX or WSJCYCYX

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 is responsible for SAR operations within Singapore FIR.

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 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.

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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.

6.1.2 Ditching reports, requested by aircraft about to ditch, are given in accordance with the provisions in *Procedures for Air Navigation Services, Meteorology (Doc 7605-MET/526)*

6.2 Communications

6.2.1 Transmission and reception of distress messages within the Singapore Search and Rescue Region are handled in accordance with ICAO Annex 10, Volume II, Chapter 5, para 5.3.

6.2.2 For communications during search and rescue operations, the codes and abbreviations published in *ICAO Abbreviations and Codes (Doc 8400)* are used.

6.2.3 Information concerning positions, callsigns, frequencies and hours of operation of Singapore aeronautical stations is published in sections AD 2 and ENR 2.

6.2.4 The frequency 121.5MHz is guarded continuously by the Control Tower, Singapore Changi Airport, the Singapore Air Traffic Control Centre and Control Tower, Seletar Aerodrome. The Coast Radio Station in Singapore guards the international distress frequencies.

6.2.5 Search and Rescue aircraft conducting Search and Rescue Operations will use the following callsigns:

a. Fixed Wing ‘Rescue (plus number 61 to 85)’
b. Rotary Wing ‘Rescue (plus number 10 to 19)’

6.2.6 Rescue vessels / boats conducting Search and Rescue Operations will use the following callsigns:

a. ‘Rescue Vessel (plus number 21 to 31)’
b. ‘Rescue Boat (plus number or callsign)’

6.3 Search and Rescue Signals

6.3.1 The search and rescue signals to be used are those prescribed in ICAO Annex 12, Chapter 5, para 5.10.

6.3.2 Ground/Air Visual Signal Codes for use by Survivors

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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 lay out 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 Search and Rescue Units

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

6.5 Search and Rescue Frequencies

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

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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 between Kuching and Singapore ATS Unit is also available. Direct speech communications circuits exist between Singapore ATS Unit and Bangkok, 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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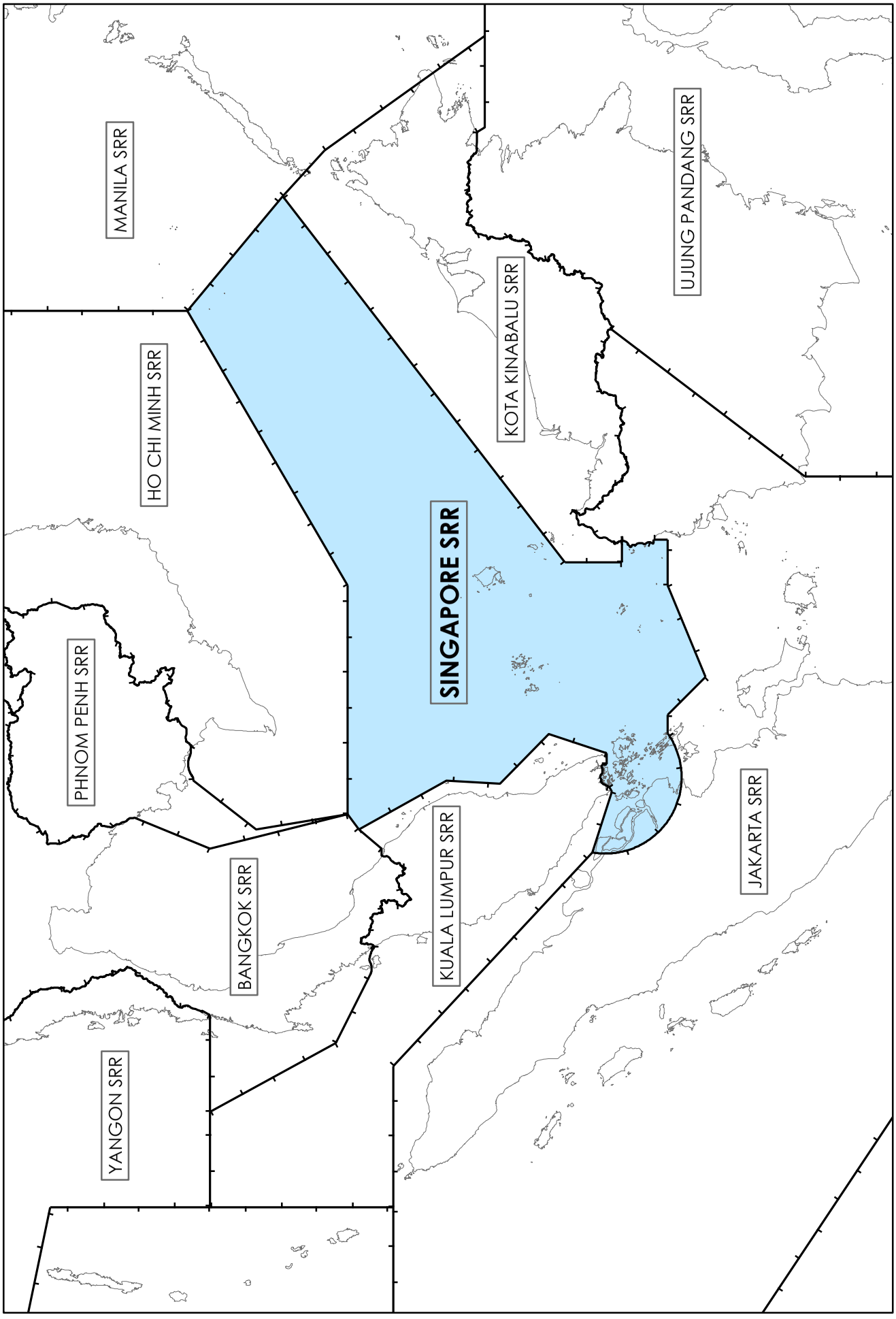
SINGAPORE AND ADJACENT SEARCH AND RESCUE REGIONS CHART



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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: http://changiairportgroup.com/cag/html/our-services/airport-fees-and-charges.html

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: http://www.caas.gov.sg/caas/en/Regulations/Legislations/Civil_Aviation_Authority_of_Singapore_Act.html

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: http://www.seletarairport.com/list-of-charges/

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: http://www.caas.gov.sg/caas/en/Regulations/Legislations/Civil_Aviation_Authority_of_Singapore_Act.html

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 byJTC'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 http://www.dnata.sg/contact.html
SATS Ltd http://www.sats.com.sg/ContactUs/Pages/ContactUs.aspx
SIA Engineering Company Limited http://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: http://www.seletarairport.com/ground-handling-agents-at-seletar-airport/

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GEN 4.2 AIR NAVIGATION SERVICES CHARGES

ROUTE AIR NAVIGATION SERVICES (RANS) CHARGES IN SECTOR A AIRSPACE

1 GENERAL

1.1 All civil aircraft operating in the airspace within 90NM south of SINJON, from ground/sea level to FL370, will be levied a route air navigation services (RANS) charge. This airspace is referred to as Sector A (refer to chart at page GEN 4.2-3).

1.2 The air navigation charges collected by the Civil Aviation Authority of Singapore (CAAS) will be remitted to Indonesia as Sector A includes Indonesian territorial airspace.

2 RANS CHARGES

2.1 The formula for computing RANS charges in Sector A is as follows:

RANS Charge = Unit Rate X Route Unit

(a) The Unit Rate is : US$0.65 (with effect from 1 May 2013)

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

Route Unit = Distance Factor (DF) X Weight Factor
where
1km ≤ Distance < 50km (27NM) : DF = 0
50km (27NM) ≤ Distance < 150km (81NM) : DF = 1

Thereafter, for every subsequent 100km (54NM) or part thereof, DF shall increase by 1.

Weight Factor is based on the Weight Factor Table (refer to GEN 4.2-4).

3 EXEMPTION FROM RANS CHARGES

3.1 No charge will be levied for the following types of flights:

a. all non-civil flights;

b. State aircraft belonging to Republic of Indonesia and Republic of Singapore;

c. VVIP flights such as aircraft used by a Head of State/Government and his group;

d. aircraft used for search and rescue purposes;

e. aircraft which have obtained exemption from the Directorate General of Civil Aviation, Indonesia;

f. aircraft which CAAS exempts from landing charges; and

g. non-commercial aircraft for training, instructional and test flight.

4 COLLECTION OF RANS CHARGES

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

4.2 Operators with credit arrangement with CAAS will be billed on a monthly basis. Payment must be made 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.

4.3 Operators with no credit arrangement with CAAS will need to make payment prior to each flight departure as follows:

a. Singapore Changi Airport - cash payment at the Changi Apron Office.

b. Seletar Airport - payment through USD cheques at the Seletar Apron Office.

4.4 Where credit arrangement is desired in the case of regular users, a written application for credit facility has to be submitted.

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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)
Singapore Changi Airport
P. O. Box 1
Singapore 918141

TEL : (65) 65412069 or 65412042
FAX : (65) 65423952

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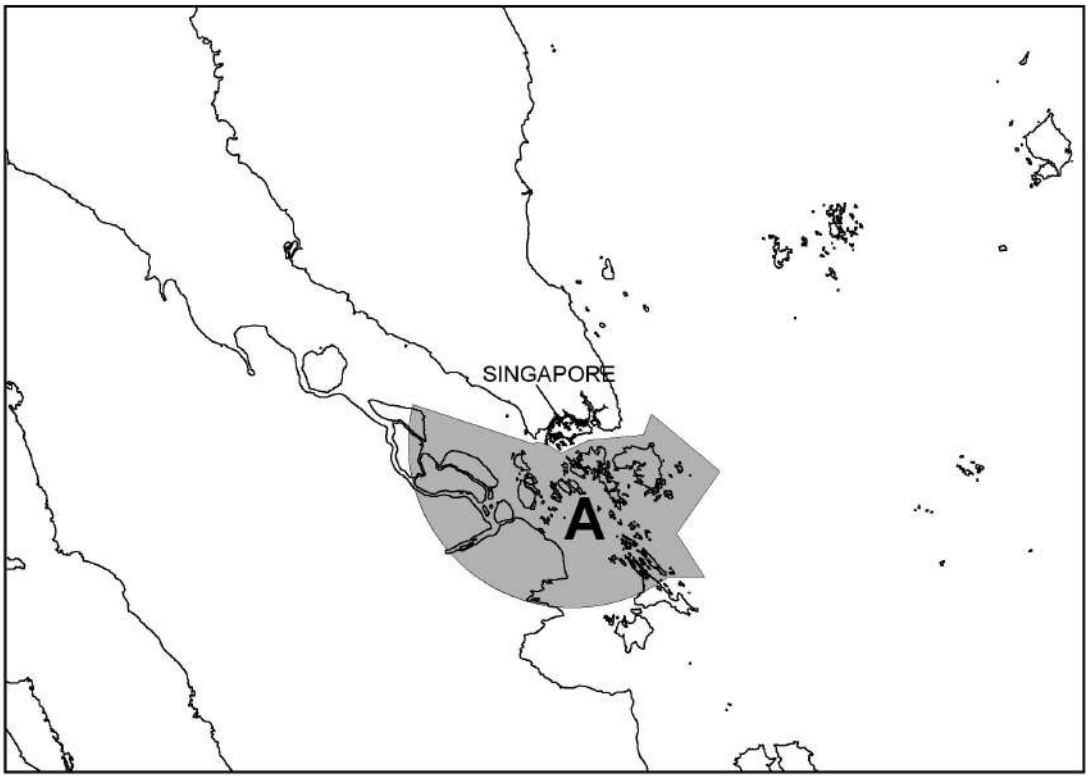
Sector A Airspace



Sector A - from sea level to 37,000ft

Area contained within an arc of a circle 90NM radius centred on SINJON DVOR (011321N 1035115E) from 013432N 1022347E anti-clockwise to Equator 1044324E, thence a straight line to Equator 1050340E, 002404N 1044807E, 005805N 1051200E, 012921N 1043441E, 011800N 1043000E, 011500N 1040000E, 010800N 1034500E, 011046N 1034015E, 011200N 1033900E, 011408N 1033142E, 011300N 1033000E and 013432N 1022347E.

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WEIGHT FACTOR TABLE	
Aircraft Weight (1,000kg)	**Weight Factor**
0 - 1	1
1 - 2.38	2
2.38 - 3.95	3
3.95 - 5.66	4
5.66 - 7.48	5
7.48 - 9.39	6
9.39 - 11.39	7
11.39 - 13.45	8
13.45 - 15.59	9
15.59 - 17.78	10
17.78 - 20.03	11
20.03 - 22.33	12
22.33 - 24.68	13
24.68 - 27.08	14
27.08 - 29.52	15
29.52 - 32.00	16
32.00 - 34.52	17
34.52 - 37.08	18
37.08 - 39.67	19
39.67 - 42.49	20
42.49 - 44.95	21
44.95 - 47.65	22
47.65 - 50.37	23
50.37 - 53.12	24
53.12 - 55.90	25
55.90 - 58.71	26
58.71 - 61.55	27
61.55 - 64.41	28
64.41 - 67.30	29
67.30 - 70.21	30
70.21 - 73.15	31
73.15 - 76.11	32
76.11 - 79.09	33
79.09 - 82.10	34
82.10 - 85.13	35
85.13 - 88.15	36
88.15 - 91.25	37
91.25 - 94.35	38
94.35 - 97.46	39
97.46 - 100.59	40
100.59 - 103.75	41
103.75 - 106.92	42
106.92 - 110.11	43
110.11 - 113.32	44
113.32 - 116.55	45
116.55 - 119.80	46
119.80 - 123.06	47
123.06 - 126.34	48
126.34 - 129.64	49
129.64 - 132.96	50
132.96 - 136.29	51
136.29 - 139.64	52
139.64 - 143.00	53
143.00 - 146.38	54
146.38 - 149.78	55

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WEIGHT FACTOR TABLE	
Aircraft Weight (1,000kg)	**Weight Factor**
149.78 - 153.19	56
153.19 - 156.62	57
156.62 - 160.06	58
160.06 - 163.62	59
163.62 - 166.99	60
166.99 - 170.48	61
170.48 - 173.98	62
173.98 - 177.49	63
177.49 - 181.02	64
181.02 - 184.56	65
184.56 - 188.12	66
188.12 - 191.69	67
191.69 - 195.27	68
195.27 - 198.87	69
198.87 - 202.48	70
202.48 - 206.10	71
206.10 - 209.73	72
209.73 - 213.38	73
213.38 - 217.04	74
217.04 - 220.71	75
220.71 - 224.40	76
224.40 - 228.09	77
228.09 - 231.80	78
231.80 - 235.52	79
235.52 - 239.26	80
239.26 - 245.00	81
245.00 - 246.76	82
246.76 - 250.52	83
250.52 - 254.30	84
254.30 - 258.09	85
258.09 - 261.89	86
261.89 - 265.70	87
265.70 - 269.53	88
269.53 - 273.36	89
273.36 - 277.21	90
277.21 - 281.06	91
281.06 - 284.93	92
284.93 - 288.80	93
288.80 - 292.69	94
292.69 - 296.59	95
296.59 - 300.50	96
300.50 - 304.41	97
304.41 - 308.34	98
308.34 - 312.28	99
312.28 - 316.26	100
316.26 - 320.19	101
320.19 - 324.15	102
324.15 - 328.13	103
328.13 - 332.12	104
332.12 - 336.11	105
336.11 - 340.12	106
340.12 - 344.14	107
344.14 - 348.16	108
348.16 - 352.19	109
352.19 - 356.24	110

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WEIGHT FACTOR TABLE	
Aircraft Weight (1,000kg)	**Weight Factor**
356.24 - 360.29	111
360.29 - 364.36	112
364.36 - 368.43	113
368.43 - 372.50	114
372.50 - 376.60	115
376.60 - 380.69	116
380.69 - 384.80	117
384.80 - 388.91	118
388.91 - 393.04	119
393.04 - 397.17	120

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Part 2 — EN-ROUTE (ENR)

ENR 0

ENR 0.1 PREFACE

NIL (not applicable).

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ENR 0.2 RECORD OF AIP AMENDMENTS

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 0.6 TABLES OF CONTENTS TO PART 2

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

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ENR 1 GENERAL RULES AND PROCEDURES

ENR 1.1 GENERAL RULES

1 INTRODUCTION

1.1 Aircraft in flight or operating on the manoeuvring area of an aerodrome shall comply with the general flight rules applicable to the operation of aircraft (Annex 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. 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 (AREA CONTROL)

2.1 INTRODUCTION

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.

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

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

2.4 ROUTE AND LEVEL ASSIGNMENT

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

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

2.5 ESSENTIAL TRAFFIC INFORMATION

2.5.1 Essential traffic is that controlled traffic to which the provision of separation by ATC is applicable but, which in relation to a particular controlled traffic, does not have the required minimum separation.

2.5.2 Essential traffic information shall 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 shall 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.

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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 http://www.caas.gov.sg - Regulations - Safety - Documents and Notices - Information Circulars.

2.8 WEATHER INFORMATION

2.8.1 Weather information will be passed to inbound aircraft on request. However, pilots should tune on to ATIS frequency 128.6 MHz for the weather.

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

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.

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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. Danger Areas will be promulgated by NOTAM, giving the reference point, vertical extent, radius and duration of the operation.

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

2.12 SINGAPORE/JOHOR AIRSPACE COMPLEX - SPECIAL REQUIREMENTS

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

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

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

2.13 IFR FLIGHTS OUTSIDE SINGAPORE/JOHOR AIRSPACE COMPLEX IN VMC

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

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

3 AIR TRAFFIC ADVISORY SERVICE

Not Provided

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4 FLIGHT INFORMATION SERVICE

4.1 INTRODUCTION

4.1.1 Flight Information Service is provided to all flights.

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

4.2 PROVISION OF FLIGHT INFORMATION SERVICE

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

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

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

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

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

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

4.3 USE OF RADAR IN THE FLIGHT INFORMATION SERVICE - Functions

4.3.1 The information presented on a radar display may be used to provide identified aircraft with:

a. information regarding any aircraft observed to be on a conflicting path with the radar identified aircraft and suggestions or advice regarding avoiding action;

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;

c. information to assist the aircraft in its navigation.

Note: The use of radar in the provision of flight information service does not relieve the pilot-in-command of an aircraft of any responsibilities, including the final decision regarding any suggested alteration of the flight plan.

Attention must be given to the fact that under certain circumstances, the most active area of adverse weather may not show on a radar display.

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5 AERODROME/APPROACH CONTROL SERVICE

5.1 INTRODUCTION

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

5.1.2 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.

5.1.3 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.

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

5.2 PROCEDURE

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

5.2.2 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.

5.2.3 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.

5.2.4 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.

5.2.5 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.

5.2.6 Special VFR Flight

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

5.2.6.2 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.

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

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5.2.6.4 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.

5.2.6.5 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.

5.3 SEPARATION STANDARDS

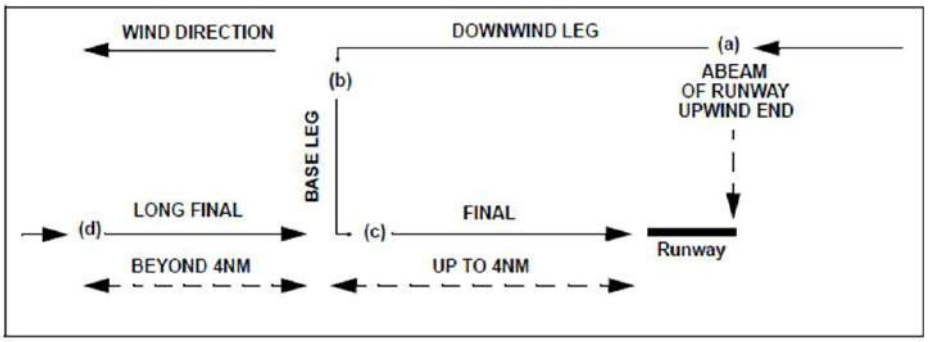
5.3.1 All flights VFR or IFR within CTRs will be regulated in accordance with IFR separation standards unless the conditions stated in page ENR 1.7-8 para 4.10.2 prevail. ATC Services are also provided to aircraft within ATZs.

5.4 SPECIAL SEPARATION STANDARD - WAKE TURBULENCE

5.4.1 The relevant wake separation minima contained in ICAO PANS-ATM DOC 4444 are applied by ATC.

5.5 VISUAL CIRCUIT REPORTING PROCEDURE

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



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.

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5.6 USE OF RUNWAY

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

5.6.2 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.

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

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

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

5.6.6 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.

5.7 CLOSURE OF AERODROMES

5.7.1 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.

5.7.2 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.

5.7.3 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.

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

5.8.1 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.

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

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

5.9 AIR TRAFFIC CONTROL CLEARANCES

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

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

5.9.3 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.

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5.10 NOISE ABATEMENT PROCEDURE

5.10.1 To alleviate the problem of noise, all aircraft on Awy G579 between SINJON and JAYBEE shall operate at/above 5,000ft.

5.11 SPEED CONTROL PROCEDURES FOR ARRIVALS INTO AIRPORTS IN SINGAPORE

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

5.11.2 All arriving turbo-propeller and turbo-jet aircraft are to fly at not faster than indicated air speed 250knots 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.

5.11.3 All arrivals into Singapore Changi Airport will be issued instructions by ATC to maintain 180KT till 8NM from touchdown and thereafter 150kt till 4NM from touchdown.

5.11.4 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.

5.12 AUTHORIZATION

5.12.1 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.

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

5.12.3 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.

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

5.12.5 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.

5.12.6 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.

5.12.7 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.

5.12.8 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.

5.13 APPLICATION OF GENERAL FLIGHT RULES

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

6 REQUIREMENTS FOR AERIAL PHOTOGRAPHY

6.1 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.

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7 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.

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8 DATA LINK SERVICES IN SINGAPORE FIR

8.1 INTRODUCTION

8.1.1 Data link services are available to FANS 1/A compatible aircraft (which are compliant to RTCA DO- 258A or ED EUROCAE 100A) on ATS Routes G334, L504, L517, L625, L642, L644, L649, M646, M753, M758, M761, M767, M768, M771, M772, M904, N875, N884, N891 and N892 in the Singapore FIR daily on a 24-hour basis.

8.1.2 The introduction of data link services does not affect current procedures for non-data link equipped aircraft operating in the same airspace.

8.2 BACKGROUND

8.2.1 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 3.3.

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

8.2.3 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.

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

8.2.5 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.

8.3 LOGON PROCEDURES

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

8.3.2 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.

8.3.3 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.

8.3.4 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.

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

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8.4 APPLICATION OF CPDLC

8.4.1 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.

8.4.2 To ensure the correct synchronisation of messages, controller/pilot dialogues opened by CPDLC must be closed by CPDLC. Controller/pilot dialogues opened by voice must be closed by voice.

8.4.3 Due to inherent integrity checks and a coded reference to any preceding related message contained within CPDLC messages, a clearance issued by CPDLC requires only the appropriate CPDLC response, not a read-back as would be required if the clearance had been issued by voice.

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

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

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

8.4.7 If multiple clearance requests are contained in a single downlink message and the controller cannot approve all requests, the uplink message element “UNABLE” will be sent as a response to the entire message. A separate message containing a response to those requests that can be complied with will be sent by the controller.

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

8.4.9 Standard pre-formatted message elements must be used whenever possible. Free text messages should be used only when an appropriate pre-formatted message element does not exist or to supplement the pre-formatted message element. The use of free text should be kept to a minimum.

8.4.10 When CPDLC connection is established, aircraft will be instructed to transfer from voice to CPDLC.
The phraseology used is:
TRANSFER TO SINGAPORE CONTROL ON DATA LINK [position];
MONITOR [HF frequency primary/secondary]

8.4.11 Pilots should down link a CPDLC position report upon position over first compulsory reporting point when aircraft enters Singapore FIR. Pilots are also required to make AIREPS at ATS/MET reporting points using CPDLC regardless of ADS connection.

8.4.12 CPDLC connections will be terminated at the FIR boundary position or when entering radar coverage. The CONTACT [unit name][frequency] message and the END SERVICE message will be sent as separate messages. The END SERVICE message will be sent as soon as possible after receipt of the WILCO response to the CONTACT message.

8.5 APPLICATION OF ADS

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

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

8.5.3 For ADS logged-on aircraft, CPDLC position reports are not required except when the following event occurs:

a. upon position over first compulsory reporting point when aircraft enters Singapore FIR;
b. aircraft at ATS/MET reporting point.

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

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8.6 DATA LINK FAILURE

8.6.1 Pilots recognising a failure of a CPDLC connection must immediately establish communications on the appropriate voice frequency. When voice communications have been established, voice must continue to be used as the primary medium until a CPDLC connection has been re-established and the controller has authorised the return to data link.

8.6.2 In the event of an expected CPDLC shutdown, the controller will immediately advise all data link connected aircraft of the failure by voice. Instructions will continue to be issued by voice until the return of the data link system. The return of the system to an operational state will require a new AFN LOGON from the affected aircraft.

8.7 FLIGHT PLAN NOTIFICATION

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

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

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

b. Aircraft registration must be inserted in Item 18 as the ground system uses the information during the AFN LOGON.

c. Serviceable ADS equipment carried must be annotated on the flight plan by adding one or more of the following descriptors to describe the serviceable surveillance equipment and/or capabilities on board:

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

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

9 WEATHER DEVIATION PROCEDURES FOR USE IN THE SINGAPORE FIR

9.1 GENERAL

9.1.1 Deviations applicable in the South China Sea airspace, particularly outside the coverage of direct controller-pilot VHF communication.

9.1.2 These 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.

9.1.3 If an aircraft is required to deviate from track to avoid weather and prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time. In the meantime, the aircraft shall broadcast its position (including the ATS route designator or the track code, as appropriate) and intentions on frequency 121.5MHz at suitable intervals until ATC clearance is received.

9.1.4 The pilot shall advise ATC when weather deviation is no longer required or when a weather deviation has been completed and the aircraft has returned to its cleared track.

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9.2 OBTAINING ATC PRIORITY WHEN WEATHER DEVIATION IS REQUIRED

9.2.1 When the pilot initiates communications with ATC, rapid response may be obtained by stating that "WEATHER DEVIATION IS REQUIRED" to indicate that priority is desired on the frequency and for ATC response.

9.2.2 The pilot also retains the option of initiating the communication using the urgency call "PAN-PAN" 3 times to alert all listening parties of a special handling condition which will receive ATC priority for issuance of a clearance or assistance.

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

9.3.1 When two-way pilot-controller communications are in effect, and a pilot identifies the need to deviate from track to avoid weather, the pilot shall notify ATC and request clearance to deviate from track, advising where possible the extent of the deviation expected.

9.3.2 ATC will then take one of the following actions:

i. if there is no conflicting traffic in the lateral dimension, ATC shall issue clearance to deviate from track;
ii. 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;
iii. 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.

9.3.3 The pilot shall comply with the ATC clearance issued for the deviation or, if ATC is unable to issue a revised clearance, and after evaluating the circumstances of the situation, the pilot shall execute the procedures detailed in paragraph 9.4 below. The pilot shall immediately inform ATC of intentions and ATC will issue essential traffic information to all affected aircraft.

9.3.4 The pilot shall, at regular intervals, update ATC of the extent and progress of the deviation to ensure that separation applied is not infringed or to enable ATC to update essential traffic information.

9.4 ACTIONS TO BE TAKEN WHEN PILOT-CONTROLLER COMMUNICATIONS ARE NOT ESTABLISHED OR REVISED ATC CLEARANCE IS NOT AVAILABLE

9.4.1 If contact cannot be established, or a revised ATC clearance is not available and deviation from track is required to avoid weather, the pilot shall take the following actions:

a. deviate away from an organised track or route system, if possible;

b. broadcast aircraft position and intentions on frequency 121.5MHz at suitable intervals stating:

i. flight identification;
ii. flight level;
iii. track code or ATS route designator; and
iv. extent of deviation expected.

c. watch for conflicting traffic both visually and by reference to TCAS (if equipped);

d. turn on aircraft exterior lights;

e. when the aircraft is approximately 10NM from track, initiate a level change based on the following criteria:

Route Centreline Track	**Deviation Greater than 10NM**	**Above FL290 Level Change**	**At FL290 & Below Level Change**
East	Left	Descend 500ft	Descend 300ft
000-179 Mag	Right	Climb 500ft	Climb 300ft
West	Left	Climb 500ft	Climb 300ft
180-359 Mag	Right	Descend 500ft	Descend 300ft

f. when returning to track, be established at the assigned flight level or altitude when the aircraft is within approximately 10NM of track;

g. if contact cannot be established prior to deviation, continue to attempt to contact ATC to obtain a clearance. If contact is subsequently established, continue to keep ATC advised of intentions and obtain essential traffic information.

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ENR 1.2 VISUAL FLIGHT RULES

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

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

2. An aircraft operating in Class G airspace flying at speeds of 140kt or less may operate under VFR at or below 3 000ft outside controlled airspace with a flight visibility of at least 1.5km. An aircraft flying at speeds above 140kt IAS may operate under VFR with a flight visibility of at least 5km. In both cases, the aircraft must remain clear of cloud and in sight of ground or water.

3. Except when a clearance is obtained from air traffic control, VFR flights shall not take off or land at an aerodrome within a control zone, or enter the aerodrome traffic zone or traffic pattern:

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

4. Unless authorized, VFR flights shall not be operated:

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

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

   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.

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 ENR 1.7-5.

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.

8. A VFR flight operating within or into areas, or along Routes shall maintain continuous air-ground voice communication watch on the appropriate communication channel of, and report its position as necessary, to the air traffic services unit providing flight information service.

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

   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.

10. Helicopters may be permitted to operate in less than 1.5km flight visibility, if manoeuvred at a speed that will give adequate opportunity to observe other traffic or any obstacles in time to avoid collision.

11. In the case of helicopters, navigation shall be accomplished by visual reference to landmarks at least every 110km (60NM)

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ENR 1.3 INSTRUMENT FLIGHT RULES

1 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 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.

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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*

* 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.

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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 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 1.

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 AD-2-WSSS-IAC-1 to AD-2-WSSS-IAC-14.

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 HOLDING PROCEDURES

1.2.1 Initial approach tracks and holding patterns associated with Singapore Airports are detailed in charts ENR 3.6-5, ENR 3.6-7 and ENR 3.6-9. Holding patterns for other airfields are indicated on the applicable approach charts.

1.3 LOW LEVEL HOLDING AREAS

1.3.1 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) - Lower/Upper limits - 3,500ft / FL140.
b. RWY 20R/20C/20L - NYLON Holding Area (NHA) - Lower/Upper limits - 2,500ft / FL140.

1.3.2 Details of these holding areas and those mentioned in paras 1.3.3 and 1.3.4 are given in sub-section ENR 3.6. They are also shown in charts ENR 3.6-7 and ENR 3.6-9.

1.3.3 An intermediate holding area - HOSBA Holding Area (HHA) - is also established. The lower/upper limits are 7,000ft/FL140.

1.3.4 A bad weather holding area - SINJON Holding Area - is established for Seletar bound commercial traffic. The lower/upper limits are 4 500ft/FL140.

1.4 HIGH LEVEL HOLDING AREAS

1.4.1 High Level Holding Areas are also established at NHA, SHA and HHA. The lower/upper limits are FL150/FL250. Details of these areas are given in sub-section ENR 3.6.

1.5 HOLDING SPEEDS

1.5.1 The maximum holding speed for all low level holding areas is 230kt.

1.5.2 The maximum holding speed for all high level holding areas is 265kt.

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

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

Pilots departing from and landing at Singapore Changi Airport should refer to the procedures in charts AD-2-WSSS-SID-1 to AD-2-WSSS-STAR-21.

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 charts AD-2-WSSS-IAC-1 to AD-2-WSSS-IAC-14.

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2.2 CATEGORY I ILS APPROACHES

2.2.1 Category I ILS approaches are generally available on RWY 02L/20R and RWY 02C/20C at Singapore Changi Airport. Pilots making Category I ILS approaches to Singapore Changi Airport should refer to the procedures in charts AD-2-WSSS-IAC-1 to AD-2-WSSS-IAC-7.

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 para 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.

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-19. Altitude restrictions at fixes and/or DME specify ATC/airspace requirements.

c. Minimum climb gradient specifies obstacle clearance requirements.

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

3.2 RUNWAY 02L

a. When there are no reports of vessel movement along the northern shipping channel or where the reported vessel height is 35m AMSL and below, all aircraft departures on Runway 02L, regardless of on SID or vectors, shall be on a minimum climb gradient of 3.3%.

b. Where the reported vessel height is above 35m AMSL, ATC shall advise departing pilots of the vessel height. Pilots on receipt of this information shall apply the minimum climb gradient in accordance with Para 3.6.

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

3.3 RUNWAY 02C

a. When there are no reports of vessel movement along the northern shipping channel or where the reported vessel height is 70m AMSL and below, all aircraft departures on Runway 02C, regardless of on SID or vectors, shall be on a minimum climb gradient of 3.3%.

b. Where the reported vessel height is above 70m AMSL, ATC shall advise departing pilots of the vessel height. Pilots on receipt of this information shall apply the minimum climb gradient in accordance with Para 3.6.

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

3.4 RUNWAYS 20L, 20C AND 20R

3.4.1 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%.

3.4.2 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%.

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

3.4.4 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-19: Standard Instrument Departures for Runway 20L, Runway 20C and Runway 20R).

3.5 RUNWAY 02R

a. When there are no reports of vessel movement along the northern shipping channel or where the reported vessel height is 65m AMSL and below, all aircraft departures on Runway 02R, regardless of on SID or vectors, shall be on a minimum climb gradient of 5% until reaching or passing 2,500ft. Thereafter, the minimum climb gradient shall be 3.3%.

b. Where the reported vessel height is above 65m AMSL, ATC shall advise departing pilots of the vessel height. Pilots on receipt of this information shall apply the minimum climb gradient in accordance with Para 3.6.

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

d. The minimum climb gradient restriction stated above for Runway 02R is for the purpose of air traffic management. If the climb gradient restriction cannot be complied with, the pilot-in-command of an aircraft departure shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. Delays can be expected as coordination is required.

3.6 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 (refer to ENR 1.5 paragraphs 3.2 a., 3.3 a. and 3.4 a.)

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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 310m

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

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ENR 1.6 ATC SURVEILLANCE SERVICES AND PROCEDURES

1 PRIMARY RADAR

1.1 DESCRIPTION OF PRIMARY RADAR SERVICES AND PROCEDURES

1.1.1 Radar control service is provided to identified aircraft operating in controlled airspace. The approximate area within which radar services are provided is shown in Table A on page ENR 1.6-7. Positive traffic separation service is provided. This involves monitoring the navigation of, or issuing instructions for, the navigation of an aircraft, to ensure that radar separation standards are maintained between identified aircraft and other aircraft in controlled airspace.

1.1.2 Radar advisory service is provided to aircraft operating outside controlled airspace. This service may be provided to identified aircraft subject to radar coverage and workload and involves the provision of position information to aircraft to assist in its navigation, warnings of other aircraft operating in its proximity and assistance to aircraft in an emergency. Advice and/or suggestion to pilots will be given. Aircraft receiving radar advisory service are not obliged to follow instructions given by ATC.

1.1.3 Radar control will be exercised outside controlled airspace only in respect of aircraft which are intending to enter or cross controlled airspace.

1.1.4 Singapore Radar Units will use the following callsigns when providing radar service:

a. Aircraft under Area Control (ACC) - Singapore Radar;

b. Aircraft under Approach Control (ACR)

i. Flow Control;
ii. Singapore Approach;
iii. Singapore Arrival.
(See Table A in page ENR 1.6-7)

1.1.5 The minimum horizontal radar separation are:

a. 7NM beyond 150NM from Singapore Changi Airport;
b. 5NM up to 150NM from Singapore Changi Airport.

1.1.6 Whenever SSR is used without its associated primary radar the separation minimum in a) and b) are increased to 15NM and 10NM respectively.

1.1.7 Radar separation may be reduced to 3NM provided the following conditions exist:

a. Aircraft are under the Terminal Approach Control Radar Unit;
b. Aircraft are below FL245;
c. Aircraft are within 40NM of Singapore Changi Airport.

1.1.8 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 radar separation shall be applied.

1.2 AIRCRAFT IDENTIFICATION PROCEDURES

1.2.1 Before providing a radar service aircraft will be identified by 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 issuing instructions to a pilot to carry out a turn or turns or by observing a turn or turns reported by a pilot;

c. By observing and correlating the radar echo of a departing aircraft to a known airborne time;

d. By the use of SSR.

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1.3 RADAR NAVIGATION

1.3.1 Whether or not radar control is being applied, navigation along the authorised flight routes is normally the responsibility of the pilot-in-command but, for a number of reasons, primarily the separation and expedition of traffic, the radar controller may require to establish positive control. Pilots will be advised when radar navigation of the aircraft is terminated whereupon pilots will resume their own navigation.

1.3.2 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).

1.4 WEATHER AVOIDANCE AND STORM WARNING RADAR

1.4.1 Modern ATC radar equipment are normally designed to suppress weather clutter and the radar controller may not always be aware of its presence. If, however, weather is observed the radar controller may pass this information to the pilot, if it appears likely to affect his flight.

1.4.2 When this service is provided to aircraft within controlled airspace, the pilot will be advised by the radar controller if the action will result in the aircraft leaving controlled airspace. The pilot will be responsible for deciding whether to accept a detour into uncontrolled airspace.

1.4.3 If an aircraft is equipped with storm warning radar and the pilot intends to detour a storm centre observed on his radar display, he should, when operating within controlled airspace, obtain clearance from the radar controller for his proposed action and, if leaving controlled airspace, request permission to rejoin. This is necessary to ensure that separation which the radar controller may be providing to other aircraft is not prejudiced. The pilot may request navigational assistance as necessary.

1.4.4 An aircraft flying in uncontrolled airspace under circumstances arising from paras 1.4.2 or 1.4.3 above will be provided with the following services.

1.4.5 When ATC initiates the diversion out of controlled airspace, as in para 1.4.2 above, the radar controller will provide avoiding action from unknown aircraft.

1.4.6 When the pilot initiates the weather detour, as in para 1.4.3 above, only advice on the position of unknown aircraft and the recommended action would be given e.g. “Unknown aircraft ten o’ clock, eight NM, crossing left to right. Advise turn right heading 090”.

1.5 MILITARY RADAR UNITS AUTHORISED TO PROVIDE RADAR CROSSING SERVICE

1.5.1 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).

1.6 RADAR FAILURE

1.6.1 In the event of radar failure or loss of radar contact, 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.

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1.7 RADIO FAILURE

1.7.1 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.

1.7.2 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.

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

1.8 TOTAL RADIO COMMUNICATION FAILURE PROCEDURES

1.8.1 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 para 1.8.2 below.

1.8.2 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' , pages ENR 1.6-9 and 1.6-11).

1.8.3 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.

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

1.9 RADIO FAILURE - TRANSPONDER - EQUIPPED AIRCRAFT

1.9.1 Aircraft equipped with transponder shall set transponder to Mode A/C Code 7600.

1.9.2 Partial Radio Failure

a. Aircraft Unable to Receive
Pilots shall adopt the complete RTF failure procedures specified in para 1.8.

b. Aircraft Able to Receive
Following verification that aircraft is able to receive ground transmissions, ATC will continue to issue instructions and/or clearance to pilots. Such instructions and clearances will be repeated.

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

1.10.1 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.

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

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

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

a. 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.

b. Commence descent from SHA at or as close as possible to the ETA as indicated on the flight plan.

c. Carry out the appropriate instrument approach procedure from SHA to land on RWY 02L/02C/02R.

iii. 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

iv. Identify the runway-in-use in accordance to paragraph 1.11. If unable to effect a landing on:

a. 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.

b. RWY 02C
Carry out missed approach procedure to NYLON Holding Area (NHA) and execute the appropriate instrument procedure from NHA to land on RWY 20R, RWY 20C or RWY 20L, as appropriate.

c. RWY 20R
Carry out missed approach procedure to SAMKO Holding Area (SHA) and execute the appropriate instrument procedure from SHA to land on RWY 02L, RWY 02C or RWY 02R, as appropriate.

d. 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.

e. 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.

f. 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.

1.11 IDENTIFICATION OF RUNWAY-IN-USE

1.11.1 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.

1.11.2 If unable to land within 30 minutes of EAT or ETA, if no EAT has been received and acknowledged, proceed in accordance with AIP page ENR 1.6-3 para 1.8.3 (d).

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

1.12.1 When an aircraft which has been cleared by ATC to an intermediate level experiences total radio communication failure immediately after departure from Singapore Changi Airport and it is deemed unsafe for it to continue to its destination, the pilot will set the aircraft transponder to Mode A/C Code 7600 and adhere to the procedures below.

1.12.2 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:

1. Proceed straight ahead to NYLON Holding Area (NHA) climbing to the last assigned altitude. At NHA, climb/descend to maintain 7,000ft;

2. 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;

3. After fuel jettison, proceed to SAMKO Holding Area (SHA) via Awy 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 para 1.11 above.

1.12.3 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.

1.12.4 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.

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

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

1.13.1 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.

1.13.2 If in IMC or when weather conditions are such that the total radio communication failure aircraft cannot complete its flight in accordance with 1.13.1, 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 KK NDB;

ii. commence descent from KK NDB 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 KK NDB 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.

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

1.13.4 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.

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1.13.5 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.

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

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

1.14.1 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.

1.14.2 If departing aircraft experiences total radio communication failure outside the Seletar Control Zone, the pilot shall follow procedures as set out in paragraph 1.13.

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

1.15 RADIO FAILURE - SPECIAL PROCEDURES - SELETAR AP - HELICOPTERS

1.15.1 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.

1.15.2 Unless the pilot unmistakenly 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.

1.15.3 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.

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

1.16.1 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.

1.16.2 Unless the pilot unmistakenly 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.

1.16.3 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.

1.17 ACTION TAKEN BY ATC DURING RADIO FAILURE

1.17.1 In addition to the action specified in paragraph 1.8.2, 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 acft in the vicinity of the presumed psn of the acft experiencing radio failure;
d. Use ground radar to check whether or not 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.

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2 SECONDARY SURVEILLANCE RADAR (SSR)

2.1 OPERATING PROCEDURES

2.1.1 All aircraft flying in controlled airspace in the Singapore FIR are required to operate SSR transponders selecting Mode 3/A (4096 codes) and Mode C simultaneously.

2.1.2 Aircraft dep 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.

2.1.4 Aircraft bound for Singapore shall transpond 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.

2.2 EMERGENCY PROCEDURES

2.2.1 The pilot of an aircraft encountering a state of emergency shall set his transponder to Code 7700.

2.3 RADIO COMMUNICATION FAILURE

2.3.1 The pilot of an aircraft experiencing 2-way radio communication failure shall set his transponder to Code 7600.

2.4 SYSTEM OF SSR CODE ASSIGNMENT

2.4.1 Aircraft operating in the Singapore FIR 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

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Table A

AIR TRAFFIC CONTROL RADAR UNITS			
LOCATION	PARENT ATC UNIT	RADAR UNIT CALLSIGN	SERVICE/FACILITIES PROVIDED
SINGAPORE CHANGI AIRPORT	SINGAPORE CONTROL	SINGAPORE RADAR (in general)	Radar surveillance and control of aircraft in controlled airspace and, in certain circumstances, outside controlled airspace within the Singapore FIR. Maximum operating range is 220NM on PSR and 250NM on SSR. Radar services will be provided at the discretion of ATC.
		SINGAPORE RADAR	Flow Control. Radar surveillance and control of aircraft in controlled airspace within 40NM radius of Singapore Changi Airport.
		SINGAPORE ARRIVAL	Radar surveillance and control of all arrivals in controlled airspace within 20NM radius of Singapore Changi Airport.

Note:

The transfer of responsibility from one radar unit to another will be effected at any mutually agreed time, level or place.

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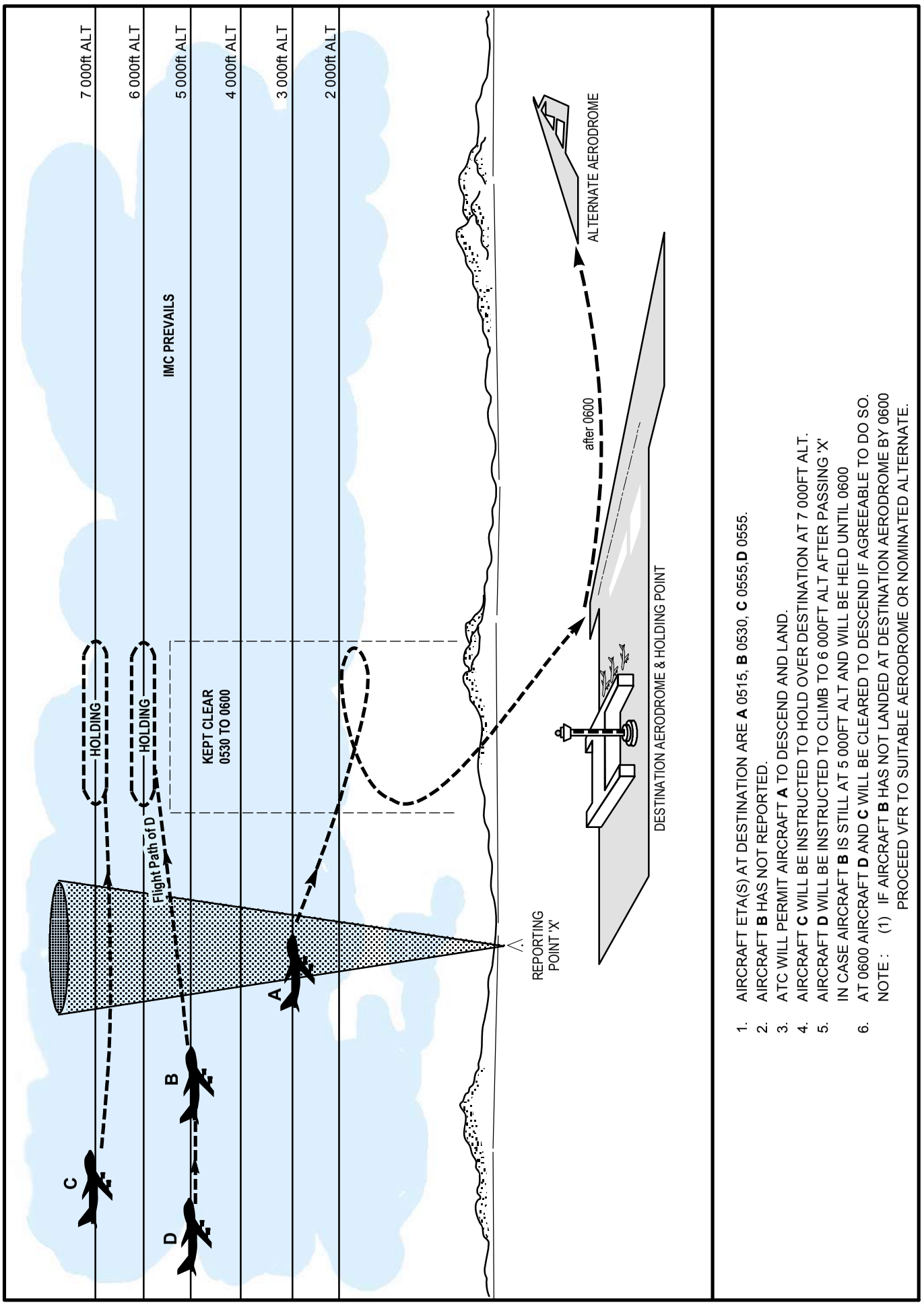
ATC PROCEDURE FOR RADIO FAILURE

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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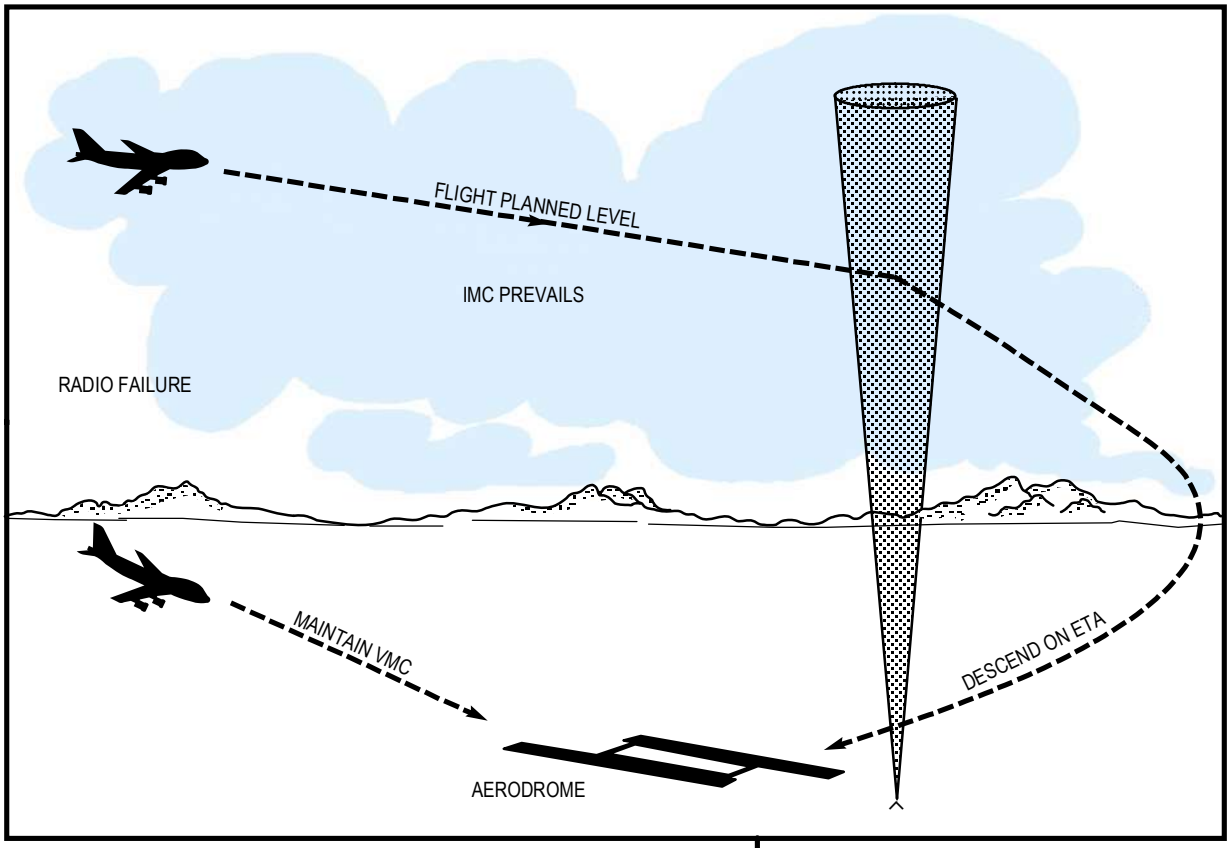
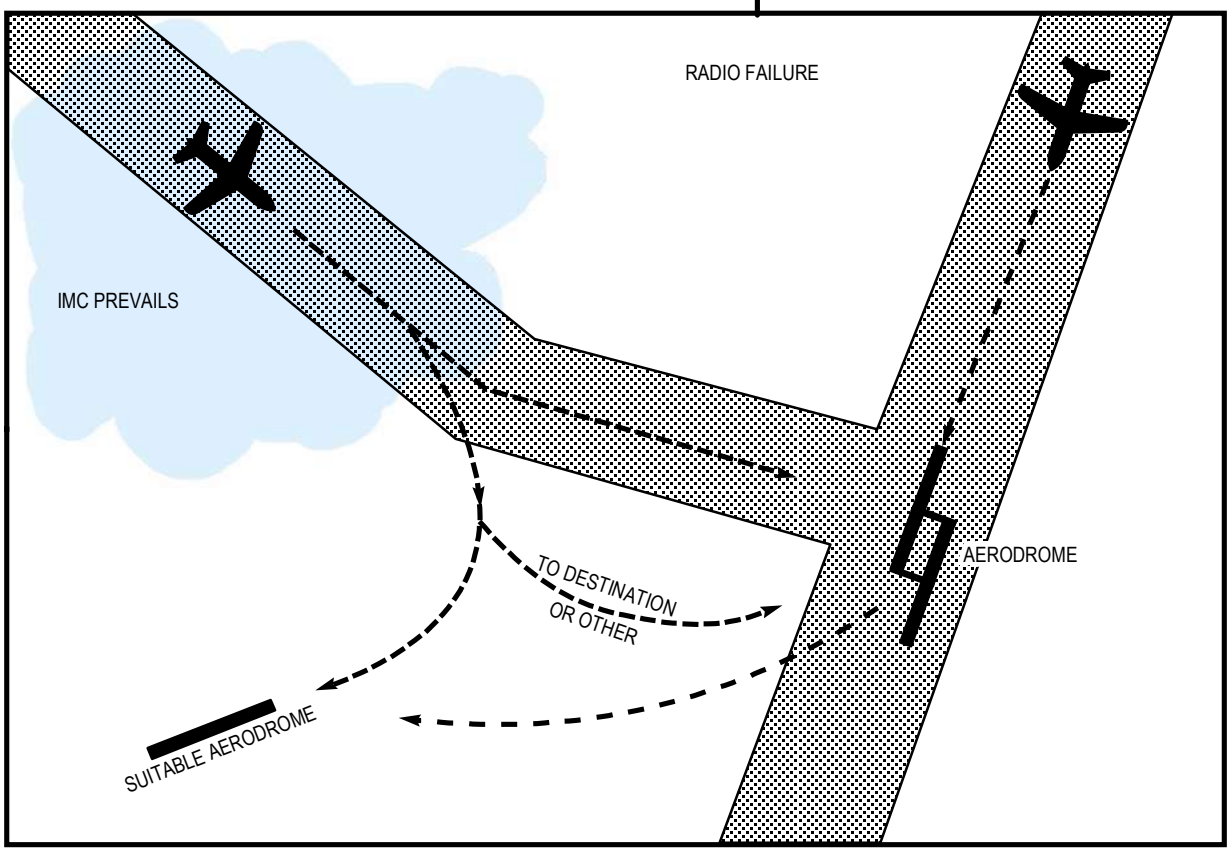
PILOT PROCEDURE FOR RADIO FAILURE

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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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. 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 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.

1.4 AREA QNH ZONES (AQZ)

1.4.1 Within the airspace in the Singapore FIR.

1.5 AREA QNH

1.5.1 AREA QNH is the forecast value of the LOWEST mean sea level pressure within the AQZ, valid for a period of 6 hours. e.g. AREA QNH valid 0600-1200.

1.5.2 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 the AQZ during the period of validity.

1.5.3 Amendments are issued by MET when the mean sea level pressure at any location in the AQZ 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.

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 the ACC of that FIR.

2.1.8 Vertical displacement of aircraft when at or below the transition is expressed in terms of altitude whereas such displacement at or above the transition level is expressed in terms of flight level. While passing through the transition layer, vertical displacement is expressed in terms of altitude when descending and in terms of flight level when ascending.

2.1.9 Flight Level zero is located at the atmospheric pressure level of 1013.2hPa. Consecutive flight levels are separated by a pressure level corresponding to 500ft in the Standard Atmosphere.

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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 (irrespective of 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, reference should be made to the following:

a. Semi-circular system of cruising levels within all controlled airspace (IFR flights) (page ENR 1.7-4);
b. VFR flights cruising levels up to FL150 within controlled airspace (page ENR 1.7-5);
c. Quadrantal cruising levels in uncontrolled airspace of the Singapore FIR (page ENR 1.7-5).

2.4 APPROACH AND LANDING

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

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

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

2.5 MISSED APPROACH

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

3 PROCEDURES APPLICABLE TO OPERATORS AND PILOTS

3.1 Flight Planning

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

a. In terms of flight level(s) if the flight is to be conducted at or above the transition level, and

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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

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 FL250 in uncontrolled airspace of the Singapore FIR.

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

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

4.3 VFR FLIGHTS - CRUISING LEVELS WITHIN THE SINGAPORE FIR IN CONTROLLED AIRSPACE

T R A C K			
000° to 179°		**180° to 359°**	
Flight Level	Altitude (feet)	Flight Level	Altitude (feet)
15	1 500	25	2 500
35	3 500	45	4 500
55	5 500	65	6 500
75	7 500	85	8 500
95	9 500	105	10 500
135	13 500	145	14 500

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4.4 QUADRANTAL CRUISING LEVELS FOR FLIGHTS OPERATING IN UNCONTROLLED AIRSPACE WITHIN PARTS OF SINGAPORE FIR BETWEEN PANGKAL PINANG TMA, PONTIANAK TMA AND PEKAN BARU TMA BELOW FL250

4.4.1 The pilot-in-command of a VFR or IFR flight operating at or above 3,000ft and below FL250 between Pangkal Pinang TMA, Pontianak TMA and Pekan Baru TMA shall select a level corresponding to the appropriate magnetic track as indicated in the following Quadrantal Cruising Levels:

QUADRANTAL CRUISING LEVELS			
000° to 089°	**090° to 179°**	**180° to 269°**	**270° to 359°**
30	35	40	45
50	55	60	65
70	75	80	85
90	95	100	105
110	-	-	-
130	135	140	145
150	155	160	165
170	175	180	185
190	195	200	205
210	215	220	225
230	235	240	245

Note: VFR flights within the Singapore FIR are permitted to operate only up to FL200.

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 transitting 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.

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

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

4.6.3 A pilot-in-command shall report:

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

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

4.7 UNIDIRECTIONAL ATS ROUTES LEVEL ASSIGNMENTS - SINGAPORE/JAKARTA SECTOR

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

4.7.2 Level Assignments

4.7.2.1 Jakarta ACC shall assign:

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

4.7.2.2 Singapore ACC shall assign:

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

4.8 POSITION REPORTS

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

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

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

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

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

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

Section 1 (Position Information)

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

Section 2 (Operational Information)

7. estimated time of arrival
8. endurance

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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. Position reports which require Section 3 (Meteorological information) are detailed in page GEN 3.5-6.

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-ATM/501 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.

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

Note: See Area Charts ENR 3.6-7 and ENR 3.6-9.

4.10.4 When operating in VMC, on an IFR flight plan, the pilot-in-command shall keep a lookout for other aircraft to avoid collision hazard.

4.10.5 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 in adjacent FIRs is normally made at the agreed transfer point or at the common FIR boundary.

4.12 ALERTING SERVICE

4.12.1 Alerting service is available for all notified aircraft movements in Singapore FIR.

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

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

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

a. a single alternate FLOS (i.e. 'east odd flight levels, west even flight levels') in compliance with the Table "RVSM-FEET" of Appendix 3 of ICAO Annex 2 and in accordance with the FLOS in surrounding areas;

b. special high capacity arrangements for six unidirectional parallel routes (L642, M771, N892, L625, N884 and M767) that involve managed use of odd and even flight levels in the same direction of flight; and

c. an associated FLAS agreed between affected ACCs to facilitate ATC 'No-PDC' operations.

1.1.2 To harmonise with RVSM operations within Jakarta FIR, RVSM operations within the Singapore FIR shall be conducted between FL290 and FL410 (inclusive) in the following areas:

ATS Routes	Flight Level Assignment
A464 (S) Southbound	FL290, FL310, FL330, FL350, FL370, FL390, FL410
A576 (S) Southbound	FL290, FL310, FL330, FL350, FL370, FL390, FL410
B470	FL290, FL300, FL310, FL320, FL330, FL340, FL350, FL360, FL370, FL380, FL390, FL400 and FL410 except for flights beyond Jakarta where only odd levels shall be assigned.
B469 (S) Southbound	FL290, FL310, FL330, FL350, FL370, FL390 and FL410
N875/G464 (S) Southbound	FL290, FL330, FL370 and FL410
W36 (S) Southbound	FL290, FL330, FL370 and FL410
L644 (S) Southbound	FL290, FL330, FL370 and FL410
L762(W) Westbound	FL300, FL320, FL340, FL360, FL380 and FL400
R469 (W) Westbound	FL300, FL320, FL340, FL360, FL380 and FL400
W22 (W) Westbound	FL300, FL320, FL340, FL360, FL380 and FL400

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

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

1.2 RVSM OPERATIONAL APPROVAL AND MONITORING

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

http://www.caas.gov.sg/caasWeb2010/export/sites/caas/en/Regulations/Safety/Advisory_Circulars/AC-AOC_series-AIR_Operators/AC_AOC-15_0.pdf

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 (http://www.aerothai.co.th/maar/approvals.php)

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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:

http://www.aerothai.co.th/maar/monitoringsystems.php

1.3 ACAS II AND TRANSPONDER EQUIPAGE

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

1.4 IN-FLIGHT PROCEDURES WITHIN RVSM AIRSPACE

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

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

1.4.2 The pilot must notify ATC whenever the aircraft:

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

See pages ENR 1.8-8 to ENR 1.8-11 or Appendix 5 of FAA IG 91-RVSM 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.

1.4.5 Paragraphs 1.5, 1.6, 1.7 and 1.8 below contain procedures for in-flight contingencies that have been updated for RVSM operations. The contingency procedures in paragraphs 1.5 and 1.6 and the off-set procedures in paragraph 1.8 should be applied in Oceanic operations. The weather deviation procedures in paragraph 1.7 may be applied in all airspace in the region.

1.5 SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES IN OCEANIC AIRSPACE IN THE SINGAPORE FIR

1.5.1 The following general procedures apply to both subsonic and supersonic aircraft and are intended as guidance only. Although all possible contingencies cannot be covered, they provide for cases of inability to maintain assigned level due to:

a. weather;
b. aircraft performance;
c. pressurisation failure; and
d. problems associated with high-level supersonic flight.

1.5.2 The procedures are applicable primarily when rapid descent and/or turn-back or diversion to an alternate airport is required. The pilot's judgement shall determine the sequence of actions to be taken, taking into account specific circumstances.

1.5.3 If an aircraft is unable to continue flight in accordance with its air traffic control clearance, a revised clearance shall, whenever possible, be obtained prior to initiating any action, using a distress or urgency signal as appropriate.

1.5.4 If prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time and, until a revised clearance is received, the pilot shall:

a. if possible, deviate away from an organised track or route system;
b. establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: flight identification, flight level, aircraft position (including the ATS route designator or the track code) and intentions on the frequency in use, as well as on frequency 121.5MHz (or, as a back-up, the VHF inter-pilot air-to-air frequency 123.45MHz);
c. watch for conflicting traffic both visually and by reference to ACAS (if equipped); and
d. turn on all aircraft exterior lights (commensurate with appropriate operating limitations).

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1.6 IN-FLIGHT CONTINGENCY PROCEDURES FOR SUBSONIC AIRCRAFT REQUIRING RAPID DESCENT, TURN-BACK OR DIVERSION IN OCEANIC AIRSPACE IN THE SINGAPORE FIR

Initial action

1.6.1 If unable to comply with the provisions of 1.5.3 to obtain a revised ATC clearance, the aircraft should leave its assigned route or track by turning 45 degrees right or left whenever this is possible. The direction of the turn should be determined by the position of the aircraft relative to any organised route or track system (for example, whether the aircraft is outside, at the edge of, or within the system). Other factors to consider are terrain clearance and the levels allocated to adjacent routes or tracks.

Subsequent action

1.6.2 An aircraft able to maintain its assigned level should acquire and maintain in either direction a track laterally separated by 15NM from its assigned route or track and once established on the offset track, climb or descend 500ft (150m).

1.6.3 An aircraft NOT able to maintain its assigned level should, whenever possible, minimise its rate of descent while turning to acquire and maintain in either direction a track laterally separated by 15NM from its assigned route or track. For subsequent level flight, a level should be selected which differs by 500ft (150m) from those normally used.

1.6.4 Before commencing a diversion across the flow of adjacent traffic, the aircraft should, while maintaining the 15NM offset, expedite climb above or descend below levels where the majority of aircraft operate (e.g. to a level above FL400 or below FL290) and then maintain a level which differs by 500ft (150m) from those normally used. However, if the pilot is unable or unwilling to carry out a major climb or descent, the aircraft should be flown at a level 500ft above or below levels normally used until a new ATC clearance is obtained.

1.6.5 If these contingency procedures are employed by a twin-engine aircraft as a result of an engine shutdown or a failure of an ETOPS critical system, the pilot should advise ATC as soon as practicable of the situation, reminding ATC of the type of aircraft involved and requesting expeditious handling.

1.7 WEATHER DEVIATION PROCEDURES IN THE SINGAPORE FIR

General procedures

1.7.1 The following procedures are intended to provide guidance. 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.

1.7.2 If the aircraft is required to deviate from track to avoid weather and prior clearance cannot be obtained, an air traffic control clearance shall be obtained at the earliest possible time. In the meantime, the aircraft shall follow the procedures detailed in paragraph 1.7.9.

1.7.3 The pilot shall advise ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to the centreline of its cleared route.

1.7.4 When the pilot initiates communications with ATC, rapid response may be obtained by stating "WEATHER DEVIATION REQUIRED" to indicate that priority is desired on the frequency and for ATC response.

1.7.5 The pilot still retains the option of initiating the communications using the urgency call "PAN PAN" to alert all listening parties to a special handling condition, which may receive ATC priority for issuance of a clearance or assistance.

1.7.6 When controller-pilot communications are established, the pilot shall notify ATC and request clearance to deviate from track, advising, when possible, the extent of the deviation expected. ATC will take one of the following actions:

a. if there is no conflicting traffic in the horizontal dimension, ATC will issue clearance to deviate from track; or

b. if there is conflicting traffic in the horizontal dimension, ATC will separate aircraft by establishing vertical separation or, if unable to establish vertical separation, ATC shall:

i. advise the pilot unable to issue clearance for requested deviation
ii. advise pilot of conflicting traffic
iii. request pilot's intentions

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SAMPLE PHRASEOLOGY:

"Unable (requested deviation), traffic is (callsign, position, altitude, direction), advise intentions."

1.7.7 The pilot will take the following actions:

a. advise ATC of intentions by the most expeditious means available,
b. comply with air traffic control clearance issued, or
c. execute the procedures detailed in 1.7.9 below, (ATC will issue essential traffic information to all affected aircraft.)
d. if necessary, establish voice communications with ATC to expedite dialogue on the situation.

Actions to be taken if a revised air traffic control clearance cannot be obtained

1.7.8 The pilot shall take the actions listed below under the provision that the pilot may deviate from rules of the air (e.g. the requirement to operate on route or track centreline unless otherwise directed by ATC), when it is absolutely necessary in the interests of safety to do so.

1.7.9 If a revised air traffic control clearance cannot be obtained and deviation from track is required to avoid weather, the pilot shall take the following actions:

a. if possible, deviate away from an organised track or route system;

b. establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: flight identification, flight level, aircraft position (including the ATS route designator or the track code) and intentions (including the magnitude of the deviation expected) on the frequency in use, as well as on frequency 121.5MHz (or, as a back-up, the VHF inter-pilot air-to-air frequency 123.45MHz).

c. watch for conflicting traffic both visually and by reference to ACAS (if equipped);

d. turn on all aircraft exterior lights (commensurate with appropriate operating limitations);

e. for deviations of less than 10NM, aircraft should remain at the level assigned by ATC;

f. for deviations of greater than 10NM, when the aircraft is approximately 10NM from track, initiate a level change based on the following criteria:

Route centreline track	Deviations greater than 10NM	Level change
EAST 000-179 magnetic	LEFT RIGHT	DESCEND 300ft CLIMB 300ft
WEST 180-359 magnetic	LEFT RIGHT	CLIMB 300ft DESCEND 300ft

Note: Items b) and c) call for the pilot to broadcast aircraft position and pilot's intentions, identify conflicting traffic and communicate air-to-air with nearby aircraft.

If the pilot determines that there is another aircraft at or near the same FL with which his aircraft might conflict, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.

g. 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.

h. when returning to track, be at its assigned flight level when the aircraft is within approximately 10NM of centreline.

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

1.8.1 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.

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

a. the pilot should establish contact with other aircraft, if possible, on the appropriate VHF inter-pilot air-to-air frequency 123.45MHz, and

b. one (or both) aircraft may initiate lateral offset(s) not to exceed 2NM from the assigned track, provided that:

i. as soon as practicable to do so, the offsetting aircraft notify ATC that temporary lateral offset action has been taken and specify the reason for doing so (ATC will not normally respond); and

ii. the offsetting aircraft notify ATC when re-established on assigned route(s) or track(s) (ATC will not normally respond).

1.9 FLIGHT PLANNING REQUIREMENTS

1.9.1 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.

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

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

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

1.10.3 Non-RVSM compliant aircraft operating in RVSM airspace should use the phraseology as contained in page ENR 1.8-12.

1.10.4 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.

1.10.5 Non-RVSM compliant aircraft may not flight plan between FL290 and FL410 inclusive within RVSM airspace. After special coordination as detailed in paragraph 1.10.6 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 1.11 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).

1.10.6 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.

1.10.7 Contact details for approval request are as follows:

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

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

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1.11 DELIVERY FLIGHTS FOR AIRCRAFT THAT ARE RVSM COMPLIANT ON DELIVERY

1.11.1 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.

1.12 PROCEDURES FOR SUSPENSION OF RVSM

1.12.1 Air traffic services will consider suspending RVSM procedures within affected areas of the Singapore FIR 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.

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

1.13.1 See pages ENR 1.8-7 to ENR 1.8-10 for guidance in these circumstances.

1.14 PROCEDURES FOR AIR-GROUND COMMUNICATION FAILURE

1.14.1 The air-ground communication failure procedures specified in page ENR 1.6-3 in conjunction with ICAO PANS-ATM DOC 4444 should be applied.

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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 intented 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).	
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).	
Consider declaring an emergency. Notify ATC of the failure and intended course of action.	Obtain pilot's intentions and pass essential traffic information.
Possible courses of action include:	
a) Maintaining CFL and route provided that ATC can provide lateral, longitudinal or conventional vertical separation.	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.
b) Requesting ATC clearance to climb above or descend below RVSM airspace if ATC cannot establish adequate separation from other aircraft.	If the pilot requests clearance to exit RVSM airspace, accommodate expeditiously, if possible.
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.

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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) Executing the contingency manoeuvre shown in paragraphs 1.5 and 1.6 to offset from the assigned track and FL, if ATC clearance cannot be obtained and the aircraft cannot maintain CFL.	Assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum. If unable to provide adequate separation, advise the pilot of essential traffic information and request pilot's intentions. Notify other aircraft in the vicinity and monitor the situation. Notify adjoining ATC facilities/sectors of the situation.

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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*

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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 the revised South China Sea ATS route structure which forms part of the Singapore FIR. 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 FAA AC 90-45 (Approval of Area Navigation Systems for use in the US National Airspace System).

2.1.4 Minimum longitudinal separation of 10 minutes between RNAV equipped aircraft based on Mach Number Technique is applied on ATS routes A464, A576, B470, G334, L625, L642, L644, L649, L762, M646, M751, M753, M758, M761, M767, M768, M771, M772, M774, N875, N884, N891 and N892 in accordance with DOC 7030/4. MNPS criteria is not required. If item 10 of the flight plan does not include any of the following equipment designators “G”, “I” or “R”, operators shall insert “NAV/NON-RNAV” in item 18 of the flight plan.

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

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

2.2 MACH NUMBER IN A FLIGHT PLAN

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

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

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

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

2.3 ATC CLEARANCE

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

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

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

2.4 MAINTENANCE/CHANGE OF MACH NUMBER

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

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

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

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

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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 600m 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 A (see page ENR 1.8-16).

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, B470, G579, L625, L642, L644, L649, L762, M646, M751, M753, M767, M768, M771, M772, N875, N884, N891 AND N892

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 para 2.5.2 shall be applied.

2.6.4 Separation of aircraft when the preceding aircraft is faster

The separation minima specified in para 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 para 2.6.1.

Note: The longitudinal separation minimum for aircraft operating between Singapore and Jakarta airports on airways B470 and G579 is 10 minutes irrespective of whether they are RNAV-equipped.

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APPENDIX A

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

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3 RNP 10 NAVIGATION REQUIREMENTS

3.1 INTRODUCTION

3.1.1 ATC will apply 50NM lateral separation minima to aircraft which are approved for RNP 10 operations on the following segments of RNAV routes which fall within the Singapore FIR:

L625	- BTN TOMAN and AKMON
L642	- BTN ESPOB and MERSING
L649	- BTN DAKIX and LAXOR
M635	- BTN VTK and SURGA
M767	- BTN TEGID and TOMAN
M771	- BTN MERSING and DUDIS
M774	- BTN OBDOS and KADAR
N884	- BTN MERSING and LAXOR
N892	- BTN MELAS and MERSING

3.1.2 A Performance-Based Longitudinal Separation Minima of 50NM may be applied between RNP 10 approved aircraft on RNAV routes L642, M635, M767, M771, M774 and N884 which either LOGON to CPDLC or are within VHF radio range as the primary means of communication. Such direct controller-pilot communication (DCPC) shall be maintained at all times when applying these separation minima

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

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

3.1.5 ATC will apply 60NM lateral separation minima to aircraft which are approved for RNP 10 operations on RNAV routes:

L644	- BTN DUDIS and KIKOR
M772	- BTN ASISU and LAXOR

3.1.6 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.

3.1.7 Pilots of aircraft meeting RNP 10 navigation requirements must indicate /R at Item 10 of the ICAO Flight Plan.

3.2 OPERATIONS BY AIRCRAFT NOT MEETING RNP 10 REQUIREMENTS

3.2.1 An aircraft that is unable to meet the minimum navigational requirements for RNP 10 must file flight plan at FL280 or below. Operations above FL280 for these aircraft will be subject to ATC approval, in accordance with the provisions of paragraph 3.2.3.

3.2.2 Pilots of such aircraft wishing to operate on ATS routes specified in paragraph 3.1.1, at or above FL290, must indicate their level requirements at Item 18 of the ICAO Flight Plan as RMK/REQ FL (insert level). Approval to operate at the preferred level will be subject to ATC co-ordination and clearance. Flights that are not approved will be required to operate at FL280 or below or via alternative routes.

3.2.3 ATC units receiving a request for a non-RNP 10 approved aircraft to operate on ATS routes specified in paragraph 3.1.1, 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 communications 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).

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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. A lateral separation minima of 60NM will be applied between aircraft equipped in accordance with RNP 10 navigation requirements, operating at FL290 or above, on ATS routes L644 and M772 (see paragraph 3.1.2). 50NM lateral separation minima will be applied between aircraft which are approved for RNP10 operations on ATS routes L625, L642, L649, M635, M767, M771, M774, N884 and N892 (see paragraph 3.1.1).

b. When an aircraft not meeting the RNP 10 navigation requirements is approved to operate at or above FL290, on the ATS routes shown in paragraphs 3.1.1 and 3.1.2, vertical separation shall be applied with aircraft operating on adjacent routes.

3.5.2 Longitudinal Separation

3.5.2.1 80NM RNAV or 10 minutes (or less) Mach Number Technique (MNT) separation minima may be applied between aircraft.

3.5.2.2 50NM longitudinal separation may be applied between RNP10 approved aircraft on ATS routes L642, L762, M635, M767, M771, M774 and N884 which either LOGON to CPDLC or are within VHF radio range.

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 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 AIP Singapore pages ENR 1.8-2 to ENR 1.8-5.

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 the Bali, Bangkok, Hanoi, Ho Chi Minh, Hong Kong, Jakarta, Kota Kinabalu (including Brunei), Kuala Lumpur, Manila, Phnom Penh, Sanya, Singapore, Taipei 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.

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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	Uni-directional
L625	FL310, FL320, FL350, FL360, FL390, FL400	Uni-directional
L642	FL310, FL320, FL350, FL360, FL390, FL400	Uni-directional
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	Uni-directional
M768	Eastbound - FL270, FL330, FL410 Westbound - FL300, FL380	
M771	FL310, FL320, FL350, FL360, FL390, FL400	Uni-directional
M772	Northbound - FL300, FL380	
N875	Eastbound - FL290, FL330, FL370 Westbound - FL300, FL340, FL380	
N884	FL310, FL320, FL350, FL360, FL390, FL400	Uni-directional
N891	Northbound - FL260, FL300, FL380 Southbound - FL330	
N892	FL310, FL320, FL350, FL360, FL390, FL400	Uni-directional

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

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

4.2.3 Aircraft requesting FL280, FL300 and FL320 on ATS route L759, L515/M770, N571, N571/N877, P628 and P574 will be cleared to FL280. Succeeding aircraft on the same route will be cleared to FL280 with 10 minutes longitudinal separation provided there is no closing speed with the preceding aircraft. Additional longitudinal separation as appropriate shall be provided by ATC for the faster aircraft following a slower aircraft on the same route.

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4.2.4 For aircraft on N571 or N571/ N877, the first aircraft from Singapore or Kuala Lumpur to be over GUNIP can expect its requested flight level.

4.2.5 For aircraft on M770, the first aircraft from Singapore or Kuala Lumpur to be over the Kuala Lumpur / Bangkok FIR boundary can expect its requested flight level.

4.2.6 For aircraft on L759, the first aircraft from Singapore or Kuala Lumpur to be over the Kuala Lumpur / Bangkok FIR boundary can expect its requested flight level.

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

4.2.8 For aircraft going beyond Medan on ATS route L762, FL280 and FL300 may be assigned. Succeeding aircraft on the same route will be cleared to FL280 or FL300 with 10 minutes longitudinal separation provided there is no closing speed with the preceding aircraft. Additional longitudinal separation as appropriate shall be provided by ATC for the faster aircraft following a slower aircraft on the same route.

5 STRATEGIC LATERAL OFFSET PROCEDURES

5.1 INTRODUCTION

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

5.2 STRATEGIC LATERAL OFFSETS IN EN-ROUTE AIRSPACE

5.2.1 Offsets may only be applied outside surveillance cover in en-route airspace within the Singapore FIR.

5.2.2 Offsets may only be applied by aircraft with automatic offset tracking capability.

5.2.3 The following requirements may apply to the use of the offset:

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 CHANGI FLOW MANAGEMENT PROCEDURES

6.1 INTRODUCTION

6.1.1 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.

6.1.2 The procedures require the holding of Changi arrivals over established holding areas.

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6.2 ENTRY AND EXIT GATES

6.2.1 '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
BOBAG	010230N 1032954E
PASPU	015915N 1040618E
REMES	004342N 1035735E
LAVAX	010950N 1042714E

6.3 ARRIVING AIRCRAFT TO SINGAPORE CHANGI AIRPORT

6.3.1 STANDARD INSTRUMENT ARRIVAL (STAR)
IFR flight should expect a Standard Instrument Arrival (STAR). Changi arrivals via ATS route A464 shall flight plan ARAMA STAR route. LELIB STAR would be issued to pilots when traffic permits. ATC may also clear arrivals to join the LEBAR STAR when air traffic permits to facilitate arrivals joining downwind to the west of Singapore Changi Airport.

6.3.2 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.

6.3.3 DESCENT PROFILE
Pilots shall plan their descent profile in accordance to the published STAR procedures.

6.3.4 SPEED CONTROL
Speed control restrictions are incorporated into the STARs toenhance 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.

6.4 APPROACH AIRSPACE HOLDING PROCEDURES

6.4.1 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.

6.4.2 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.

6.4.3 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.

6.4.4 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)
LAVAX 010950N 1042714E	269°	Left	220 knots	1	FL140 7,000ft	Singapore Approac 124.05MHz (PRI) 132.15MHz (SRY)
REMES 004342N 1035735E	348°	Right	220 knots	1	FL140 6,000ft	Singapore Approach 124.6MHz (PRI) 132.15MHz (SRY)
BOBAG 010230N 1032954E	083°	Right	220 knots	1	FL140 6,000ft	Singapore Approac 124.6MHz (PRI) 132.15MHz (SRY)

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6.4.5 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 6.4.4)

6.5 EXPECTED TIME TO LEAVE HOLDING AREA

6.5.1 If arrival delay is processed by means of holding, pilots will be informed of the expected time to leave the respective holding area.

6.5.2 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 page ENR 1.6-4). Subsequently, a specified time to leave the holding area will be issued to pilots to resume the flight according to the assigned RNAV STARs.

6.6 DEPARTING AIRCRAFT FROM SINGAPORE CHANGI AIRPORT

6.6.1 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.

7 AUTOMATIC DEPENDENT SURVEILLANCE BROADCAST (ADS-B) OUT EXCLUSIVE AIRSPACE WITHIN PARTS OF THE SINGAPORE FIR

7.1 ADS-B BASED SURVEILLANCE AIRSPACE AND AIRCRAFT OPERATOR APPROVAL

7.1.1 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), 045223N 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. The equipment configuration standards in Appendix XI of Civil Aviation Order 20.18 of the Civil Aviation Safety Authority of Australia.

7.1.2 Aircraft that does not comply with the requirements stipulated in paragraph 7.1.1 will not be accorded priority n the delineated airspace and flight level assignments would be subjected to air traffic conditions.

7.1.3 If an aircraft carries ADS-B transmitting equipment but does not comply with the requirements stipulated in paragraph 7.1.1, 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).

7.1.4 Flights operating in the delineated airspace are to contact Singapore Radar on 134.35MHz (primary frequency) and 133.6MHz (secondary frequency).

7.2 FLIGHT PLANNING REQUIREMENTS

7.2.1 Aircraft operators complying with the requirements stipulated in paragraph 7.1.1 are to indicate the appropriate ADS-B designator in Item 10 of the ICAO flight plan:

B1 ADS-B with dedicated 1090 MHz ADS-B “out” capability
B2 ADS-B with dedicated 1090 MHz ADS-B “out” and “in” capability

7.2.2 Aircraft operators are to include the aircraft address (24 Bit Code) in hexadecimal format in Item 18 of the ICAO flight plan as per the following example:

CODE/7C432B

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7.2.3 Aircraft Identification (ACID) not exceeding 7 characters must be accurately indicated in Item 7 of the ICAO flight plan and replicated exactly when set in the aircraft avionics (for transmission as Flight ID) as follows:

either

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. SINGAPORE 123, MALAYSIAN 123, INDONESIA 123).

or

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.

7.3 STATE AIRCRAFT

7.3.1 The conditions stipulated apply to STATE aircraft intending to operate within the delineated airspace.

7.4 INFLIGHT CONTINGENCIES

7.4.1 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.

7.5 ATC-PILOT PHRASEOLOGIES

7.5.1 Aircraft operators and pilots are to note the following phraseologies when operating in the delineated airspace:

	Circumstances	Phraseologies
1	To request the capability of the ADS-B equipment	a) ADVISE ADS-B CAPABILITY *b) ADS-B TRANSMITTER (data link) *c) ADS-B RECEIVER (data link) *d) NEGATIVE ADS-B * Denotes pilot transmission
2	To request reselection of aircraft identification	RE-ENTER ADS-B AIRCRAFT IDENTIFICATION
3	To request the operation of the IDENT feature	TRANSMIT ADS-B IDENT
4	To request transmission of pressure-altitude	TRANSMIT ADS-B ALTITUDE
5	To request termination of transponder and / or ADS-B transmitter operation	a) STOP SQUAWK [TRANSMIT ADS-B ONLY] b) STOP ADS-B TRANSMISSION [SQUAWK (code) ONLY]
6	To request termination of pressure-altitude transmission because of faulty operation	STOP ADS-B ALTITUDE TRANSMISSION [WRONG INDICATION, or reason]
7	Confirmation of ADS-B operations	ADS-B TRANSMISSION NOT RECEIVED, CONFIRM ADS-B OPERATIONAL
8	To inform an aircraft that its ADS-B transmitter appears to be inoperative or malfunctioning	ADS-B TRANSMITTER APPEARS TO BE INOPERATIVE / MALFUNCTION
9	ATS ADS-B surveillance system ground equipment un-serviceability	ADS-B OUT OF SERVICE (appropriate information as necessary)

8 AIR TRAFFIC MANAGEMENT CONTINGENCY PLAN

8.1 INTRODUCTION

8.1.1 The Air Traffic Management (ATM) Contingency Plan for Singapore FIR 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 the Singapore Flight Information Region (FIR), 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 Singapore FIR.

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8.1.2 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.

8.1.3 This ATM Contingency Plan provides:

a. the contingency routes structure using existing published airways to enable transit through the Singapore FIR; and

b. the associated Air Traffic Control (ATC) procedures to support the contingency plan.

8.1.4 As and where dictated by circumstances, aircraft planning to operate through Singapore FIR 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.

8.1.5 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.

8.1.6 Aircraft operators may elect to avoid the Singapore FIR by using ATS routes outside of Singapore FIR.

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

8.2.1 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.

8.2.2 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.

8.2.3 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.

8.2.4 In the event that ATS cannot be provided in the Singapore FIR, 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.

8.2.5 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.

8.3 AIRCRAFT SEPARATION AND SPACING

8.3.1 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).

8.3.2 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.

8.3.3 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.

8.4 PRIORITY FOR FLIGHT LEVELS

8.4.1 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 8.10.

8.5 AIRSPACE CLASSIFICATIONS

8.5.1 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.

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8.6 AIRCRAFT POSITION REPORTING

8.6.1 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 8.9.

8.6.2 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 as outline in paragraph 8.11 on 121.5MHz.

8.7 EXCLUSIONS

8.7.1 VFR flights shall not operate in the Singapore FIR during contingency operations, except for State aircraft, Medevac flights, and any other aircraft as authorised by CAAS.

8.8 PILOT AND OPERATOR PROCEDURES

8.8.1 Filing of flight plans

8.8.1.1 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.

8.8.1.2 Airspace users are expected to familiarize themselves with the Contingency Plan of the Singapore FIR 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.

8.8.1.3 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.

8.8.2 Overflight approval

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

8.8.3 Pilot operating procedures

8.8.3.1 Pilots will continue to make or broadcast routine position reports in line with normal ATC procedures.

8.8.3.2 Pilots of aircraft operating in the Singapore FIR 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 8.10;
b. aircraft are to flight plan using the Contingency Routes specified in paragraph 8.10, 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 8.10;
e. aircraft position reports and other information as necessary shall be broadcast in accordance with TIBA procedures defined in paragraph 8.11;
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. 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 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;

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j. pilots are to strictly adhere to the ICAO Traffic Information Broadcasts by Aircraft (TIBA) procedures, reproduced in paragraph 8.11, on the specified VHF and HF frequencies listed in paragraph 8.10. 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, 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, 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.

8.8.4 Interception of civil aircraft

8.8.4.1 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.

8.8.4.2 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.

8.8.4.3 If circumstances leading to the closure of the Singapore FIR where no contingency routes are available, aircraft will be required to keep clear of Singapore FIR. As much warning as possible will be provided by the appropriate ATS authorities in the event of the complete closure of airspace.

8.8.4.4 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.

8.9 COMMUNICATION PROCEDURES

8.9.1 Degradation of Communication - Pilot Radio Procedures

8.9.1.1 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.

8.9.1.2 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 8.11.

8.9.2 Communication frequencies

8.9.2.1 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 is detailed in paragraph 8.10.

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8.10 CONTINGENCY ROUTES

8.10.1 Between Singapore and Manila FIR

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

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

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8.10.2 Between Singapore and Ho Chi Minh FIR

8.10.2.1 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 VVTS - VHF: 133.05 / 120.9 - HF: 5655 / 8942	International operators may choose to avoid the Singapore FIR by using alternate ATS routes in other FIRs.
CRS-3	N884 (060000N 1095600E – 075400N 1122000E)	East	FL310 FL350	Ho Chi Minh ACC	At 060000N 1095600E, contact Ho Chi Minh ATC: - ADS / CPDLC: Logon VVTS - 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 VVTS - VHF: 133.05 / 120.7	
CRH-1	N891 (XONAN - IGARI)	North	FL300	Hanoi ACC	At IGARI, contact Hanoi ACC: - VHF: 120.9	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.
		South	FL330	Hanoi ACC	At IGARI, contact Singapore ATC: - ADS / CPDLC: Logon WSJC - VHF: 134.35 - HF: 5655 / 8942	
CRH-2	M753 (OSOTA – IPRIX)	North	FL270	Hanoi ACC	At IPRIX, contact Hanoi ACC: - VHF: 120.9	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.
		South	FL260	Hanoi ACC	At IPRIX, contact Singapore ATC: - ADS / CPDLC: Logon WSJC - VHF: 134.35 - HF: 5655 / 8942	

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CR	ATS Route	Direction	FLAS	ACC	Transfer of Communication (TOC)	Remarks
CRH-3	R468 / M768 (SAPEN – TSN – AKMON)	East	FL270	Hanoi ACC	At AKMON, contact Singapore ATC: - ADS / CPDLC: Logon WSJC - HF: 5655 / 8942	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.
		West	FL380	Hanoi ACC	At AKMON, contact Hanoi ACC: - VHF: 133.05 - HF: 5655 / 8942	
CRH-4	L642 (EXOTO – ESPOB)	West	FL310 FL320 FL390 FL400	Hanoi ACC	At ESPOB, contact Singapore ATC: - ADS / CPDLC: Logon WSJC - VHF: 134.35 - HF: 5655 / 8942	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.
CRH-5	M771 (DUDIS - DONDA)	East	FL310 FL320 FL390 FL400	Hanoi ACC	At DUDIS, contact Hanoi ACC: - VHF: 133.05 / 120.7 - HF: 5655 / 8942	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.
CRH-6	N892 (MIGUG – MELAS)	West	FL310 FL320 FL390 FL400	Hanoi ACC	At MELAS, contact Singapore ATC: - ADS / CPDLC: Logon WSJC - VHF: 134.35 - HF: 5655 / 8942	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.
CRH-7	L625 (AKMON – ARESI)	East	FL310 FL320 FL390 FL400	Hanoi ACC	At AKMON, contact Hanoi ACC: - VHF: 133.05 / 120.7 - HF: 5655 / 8942	International operators may choose to avoid the Ho Chi Minh FIR by using alternate ATS routes in other FIRs.

8.10.3 Between Singapore and Kota Kinabalu FIR

8.10.3.1 To be developed

8.10.4 Between Singapore and Kuala Lumpur FIR

8.10.4.1 To be developed

8.11 TRAFFIC INFORMATION BROADCASTS BY AIRCRAFT (TIBA)

8.11.1 Introduction and applicability of broadcasts

8.11.1.1 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.

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

8.11.1.3 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.

8.11.1.4 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 8.11.1.3 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.

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8.11.1.5 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).

8.11.2 Details of broadcasts

VHF RTF frequency to be used

8.11.2.1 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.

8.11.2.2 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

8.11.2.3 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

8.11.2.4 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

8.11.2.5 The broadcasts other than those indicating changes in flight level, i.e. the broadcasts referred to in paragraph 8.11.2.4 a., b., c., d. and g., should be in the following form:

ALL STATIONS (necessary to identify a traffic information broadcast)

(call sign)

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

(direction)

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

POSITION (position**) AT (time)

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

(call sign)

FLIGHT LEVEL (number) (direction)

Fictitious example:

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

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8.11.2.6 Before a change in flight level, the broadcast (referred to in paragraph 8.11.2.4 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)

8.11.2.7 Except as provided in paragraph 8.11.2.8, the broadcast at the time of a change in flight level (referred to in paragraph 8.11.2.4 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)

8.11.2.8 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, 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:

ANSP	Airport
Cambodia	VDPP, VDSR
China	ZGGG, ZGSZ, ZJHK, ZJSY
Hong Kong	VHHH, VMMC
Indonesia	WIII, WADD, WARR
Malaysia	WBGG, WBGR, WBKK, WMKC, WMKI, WMKJ, WMKK, WMKP, WMSA
Myanmar	VYMD, VYNT, VYYY
Philippines	RPLL
Thailand	VTBS, VTSP, VTBD, VTCC, VTCT, VTSB, VTSG, VTSM, VTSP, VTSS, VTUD
Vietnam	VVTS, VVNB

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

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

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

2.6 All AUs planning to arrive into WSSS shall:

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

2.7 FPLs and ATS messages shall be addressed to WSJCZQZX.

3 ATFM OPERATIONS FOR FLIGHTS PLANNING TO OPERATE WITHIN THE SINGAPORE FIR

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. For example, flow restriction on a given ATS route in a form of Minutes-in-trail MINIT at downstream segments would be converted into CTOT, and/or Calculated Time Over (CTO) at a given waypoint within the Singapore FIR.

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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
Web Conference link: https://caas.adobeconnect.com/caasatfm

5 BAY OF BENGAL COOPERATIVE ATFM (BOBCAT)

5.1 INTRODUCTION

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

5.2 PROVISION OF ATFM SERVICES

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

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

5.2.3 The ATFMU utilises the automated web based Bay of Bengal Cooperative ATFM System (BOBCAT) system in meeting its ATFM responsibilities. These responsibilities will be managed in coordination with aircraft operators and Singapore ATC in the Singapore FIR.

5.2.4 The 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 2.3. The objectives of these ATFM services are to:

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

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5.3 ATFM AFFECTED ATS ROUTES, FLIGHT LEVELS AND APPLICABLE HOURS

5.3.1 All westbound flights intending to enter Kabul FIR between 2000UTC and 2359UTC daily on ATS routes and flight levels specified in the Table below shall comply with the BOBCAT ATFM procedure. This includes a mandatory requirement to obtain 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
L509 - M875	LAJAK	FL280, FL300, FL320, FL340, FL360, FL380, FL400
M875	SITAX	FL280, FL300, FL320, FL340, FL360, FL380, FL400
N644	DOBAT	FL280, FL300, FL320, FL340, FL360, FL380, FL400
L750	BIROS	FL280, FL300, FL320, FL340, FL360, FL380, FL400
P628	ASLUM	FL320, FL340, FL360, FL380, FL400
N636 - P628	SERKA	FL280, FL300

5.3.2 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.

5.3.3 In order to ensure availability of slots for westbound departures from designated airports in northern India and Pakistan, departures from these airports are given priority for FL280 in the slot allocation. This does not preclude these flights from requesting higher flight levels with initial slot request.

5.3.4 The following flights are exempted from the ATFM procedures:

a. Flights experiencing an emergency, including aircraft subjected to unlawful interference;
b. Flights on search and rescue or 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.

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

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

5.4 MANDATORY CTOT AND KABUL FIR SLOT ALLOCATION

5.4.1 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 CTOT and Kabul slot allocation will enable ANSPs to tactically control westbound flights transiting the Kabul FIR at specified times by assigning minimum spacing requirements at established gateway fix points in the vicinity of the eastern boundary of the Kabul FIR.

5.4.2 The application, calculation and distribution of CTOT and Kabul FIR entry waypoint slot allocations will be managed via internet access to the BOBCAT system in accordance with the ATFM operating procedures in paragraph 2.5.

5.5 BOBCAT OPERATING PROCEDURES

5.5.1 All affected flights are required to submit their slot requests to the BOBCAT system by logging onto https://www.bobcat.aero between 0100UTC and 1159UTC on the day of flight and completing the electronic templates provided.

5.5.2 Affected aircraft operators who do not have dedicated BOBCAT username / password access should complete the application form provided and fax it to the ATFMU as soon as possible.

5.6 SLOT ALLOCATION PROCESS

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

Slot Request Submission

5.6.2 Slot requests including preferred ATS route, flight level and Maximum Acceptable Delay (MAD) should be lodged between 0001UTC and 1159UTC on the day of flight. Slot requests may subsequently be amended prior

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1200UTC, which is the cut-off time. 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 MAD.

5.6.3 Slot requests shall be for flight parameters that are able to be met by the flight. For example, flights requesting a slot at FL390 must be able to transit Kabul FIR at FL390. Flights subsequently unable to meet the slot parameters (flight level, ATS route or CTO at entry waypoint) should expect non-preferred routes and / or flight levels, enroute holding and / or diversion around Kabul FIR.

5.6.4 As BOBCAT will allocate FL280 on a priority basis to facilitate departures from northern India and Pakistan underneath overflying traffic, flights departing these points are encouraged to include FL280 as at least one slot request preference.

5.6.5 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.

Slot Allocation and Distribution

5.6.6 Slot allocation will commence at the cut-off time at 1200UTC. 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 1230UTC via the ATFMU website. Alternative arrangements for notification of slot distribution (e.g. e-mail, fax, telephone) should be coordinated with the ATFMU.

5.6.7 After the slot allocation has been published at https://www.bobcat.aero, aircraft operators can:

a. use the slot allocation result for ATS flight planning purposes;

b. cancel the allocated slot; and / or

c. change slot allocation to another available slot in the published list of unallocated slots.

5.6.8 Singapore ATC and AIS can also view the slot allocation results at https://www.bobcat.aero.

5.7 SUBMISSION OF ATS FLIGHT PLAN

5.7.1 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.

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

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

Aircraft Operator / Pilot-in-Command

5.8.1 In accordance with ICAO PANS-ATM provisions, it is the responsibility of the Pilot-in-Command (PIC) and the aircraft operator 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 / level) allocated by BOBCAT.

5.8.2 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.

ANSPs

5.8.3 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.

5.8.4 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 CTOT and allocated CTO at Kabul FIR entry waypoint.

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

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

5.9.2 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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5.9.3 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 and via the most expeditious means (e.g. via coordination between flight dispatcher, PIC, Singapore ATC and Bangkok ATFMU). Early advice that the Kabul FIR slot parameters will be missed also enables the slots so vacated to be efficiently reassigned to other flights.

5.9.4 Prior to departure and after the aircraft has left the gate, in the event that the aircraft is unable to meet the Kabul FIR entry waypoint slot parameters, when requested by the PIC, Singapore ATC shall assist the PIC to coordinate with the ATFMU for a revised slot allocation.

5.9.5 The 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.).

5.9.6 The 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.

5.9.7 A missed slot results in dramatically 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 ATFMU;

b. If the flight has left the gate, coordination to ATFMU may also take place via the ATS unit presently communicating with the flight.

5.10 BASIC COMPUTER REQUIREMENT

5.10.1 Aircraft operators and Singapore ATC are required to have computer equipment capable of connecting to the BOBCAT website https://www.bobcat.aero via the internet and satisfying the following minimum technical requirements:

a. A personal computer of any operating system with the following characteristics:

i. Processor: minimum CPU clock speed of 150MHz;

ii. Operating System: any that operates one of the following web browsers (i.e. Windows 2000 / XP, Linux, Unix, or Mac OS);

iii. Web Browser: Internet Explorer 5.5 or newer, Mozilla 1.0 or newer, Mozilla Firefox 1.0 or newer, Netscape 7 or newer;

iv. RAM: 64MB or larger (depending on operating system);

v. Hard Disk Space: minimum of 500MB or larger (depending on operating system);

vi. Monitor Display Resolution: minimum of 800 x 600 pixels; and

vii. Internet Connection: 56Kbps modem or faster.

5.11 ATFM USERS HANDBOOK

5.11.1 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

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

5.12 CONTINGENCY PROCEDURES

5.12.1 In the event that an aircraft operator or Singapore ATC is unable to access the ATFMU website, the ATFMU shall be contacted via the alternative means (telephone, fax, AFTN) described in paragraph 2.13.

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

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5.12.3 In the event of system failure of BOBCAT, 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.

5.13 ATFM SYSTEM FAULT REPORTING

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

5.13.2 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 ATFMU at the address indicated on the form. The ATFMU will analyse all reports, make recommendations / suggestions as appropriate and provide feedback to the parties concerned to enable remedial action.

5.14 ADDRESS OF AIR TRAFFIC FLOW MANAGEMENT UNIT (ATFMU)

5.14.1 The ATFMU may be contacted as follows:

Unit Name	:	Bangkok ATFMU
Telephone	:	+66-2-287-8024, +66-2-287-8025
Fax	:	+66-2-287-8027
Tel/Fax	:	+66-2-287-8026
E-mail	:	atfmu@bobcat.aero
AFTN	:	VTBBZDZX
Website	:	https://www.bobcat.aero

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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 test/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 Test/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.

1.1.4 The pilot-in-command or the operator of IFR flight operating out of Seletar is required to file via KK or RECHI - PONJO - SJ.

1.1.5 The pilot-in-command or the operator of IFR flight operating into Seletar is required to file according to WSSL AD 2.22 Flight Procedures.

1.1.6 VFR flight operating between Seletar and Johor Bahru shall route via Point X (012830N1034954E), Tebrau City Mall (013259N1034748E), Felda Ulu Tebrau (013751N1034510E) and vice versa.

1.2 Requirement for submission of a Flight Plan for Test Flights

1.2.1 Test flights shall be conducted on Airway G580 between HOSBA and NIMIX to minimise disruption to civil scheduled flight movements and to facilitate the test flight operations.

1.2.2 A flight plan shall be submitted for a test 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 shall maintain a 2-way VHF communication with Singapore ATC on the assigned VHF frequency at all times.

1.2.4 The pilot-in-command of the test flight shall adhere to ATC instructions at all times. Test flight manoeuvres are subject to ATC clearance, real-time coordination and traffic.

1.2.5 Procedures for application to conduct test 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.

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[However, within Singapore, all flights whether IFR or VFR shall be regulated in accordance with instrument flight rules.] (see note 2 below).

1.3.6 ATC will acknowledge:

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

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

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

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

1.4 Persons on board (POB)

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

1.5 DATA LINK Communication and Surveillance

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

J1	CPDLC ATN VDL Mode 2
J2	CPDLC FANS 1/A 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 8) must insert one or more of the following letters in Item 10b of their flight plan to indicate serviceable SUR equipment and capabilities available:

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

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

1.6 RNAV Approved Aircraft

1.6.1 Aircraft flying on RNAV routes A464, A576, B470, G334, L625, L642, L644, L649, M646, M751, M753, M758, M761, M767, M768, M771, M772, M774, N875, N884, N891, N892 and Y514 (see ENR 1.8 sub-section 2.2) 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/.

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1.6.2 Aircraft flying on RNAV routes L642 (CHEUNG CHAU-MERSING), L644 (DUDIS-KIKOR), L649 (DAKIX-LAXOR), M771 (MERSING-CHEUNG CHAU), M772 (ASISU-LAXOR), N892 (HENGCHUN-MERSING), L625 (TOMAN-MEVIN), N884 (MERSING-MANILA) and M767 (JOMALIG-TOMAN) (see ENR 1.8 sub-section 3.1) must be RNP 10 approved and shall indicate in their flight plan:

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

1.6.3 Operators of aircraft unable to meet the RNP 10 requirements (see ENR 1.8 sub-section 3.2) and wishing to operate at or above FL290 on RNAV routes specified in paragraph 1.6.2 shall annotate their flight plan as follows:

Item 18 - insert "RMK/REQ FL (insert level)" where FL = the preferred flight level (subject to ATC co-ordination)

1.6.4 Operators of aircraft approved for RNP 1 (P-RNAV) operations shall also 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 Singapore FIR, aircraft operators should also consult AIP Indonesia GEN 1.2 Entry, Transit and Departure of Aircraft at https://aimindonesia.dephub.go.id for Indonesia's requirements for flights intending to enter, depart, and/or overfly its sovereign airspace. Please note that this AIP's reference to these requirements is without prejudice to Singapore's legal position on such requirements.

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ENR 1.11 ADDRESSING OF FLIGHT PLAN MESSAGES

1 Flight movement messages relating to traffic into or via the Singapore FIR 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 Singapore FIR (WSJC)	WSJCZQZX
	Inbound to Singapore Changi Airport (WSSS)	WSJCZQZX
	Outbound from Singapore Changi Airport (WSSS)	WSSSZPZX
	Inbound to Seletar Airport (WSSL)	WSJCZQZX WSSLZPZX
	Outbound from Seletar Airport (WSSL)	WSSLZPZX
	Inbound to/Outbound from Paya Lebar Airport (WSAP)	WSJCZQZX WSAPZPZX
	Inbound to/Outbound from Tengah Airport (WSAT)	WSJCZQZX 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	AM LOST	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”.

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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	YOU LAAND	Land at this aerodrome
PROCEED	PRO-SEED	You may proceed
[@] In the second column, syllables to be emphasized are underlined.		

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 INTERCEPTING AIRCRAFT AND RESPONSES BY INTERCEPTED AIRCRAFT

Series	INTERCEPTING Aircraft Signals	Meaning	INTERCEPTED 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. If it is decided to release the intercepted aircraft, the intercepting aircraft uses the Series 2 signals prescribed for intercepting aircraft.	Understood, follow me. 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

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

1.1.2 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.

3.4 The Duty Air Traffic Control Officer will complete the “Air Traffic Incident Report Form” on receipt of the initial report and forward it as soon as possible to the Chief Air Traffic Control Officer as well as to the operating agency concerned, unless it is apparent that the reporting pilot has already done so.

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4 INVESTIGATION

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

5 CO-ORDINATION/INVESTIGATION AUTHORITY

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

Co-ordination/Investigation Authority	Area Of Responsibility
Director-General of Civil Aviation Civil Aviation Authority of Singapore Singapore Changi Airport P O Box 1 Singapore 918141	Within Singapore FIR, the airspace within Kuala Lumpur FIR for which Singapore ACC is responsible for providing ATS and the airspace above the South China Sea Corridor. (Refer to pages ENR 2.1-1 to ENR 2.1-4)

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

6.1 Wake Vortex

6.1.1 Pilots experiencing any wake vortex encounters within the Singapore Flight Information Region should report such encounters by filling out the Wake Vortex Encounter Reporting Form and submitting the form to CAAS. The contact address, facsimile and e-mail address can be found on the form.

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

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

7 INDEX OF REPORTING FORMS APPENDED TO THIS SECTION

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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.)

_____

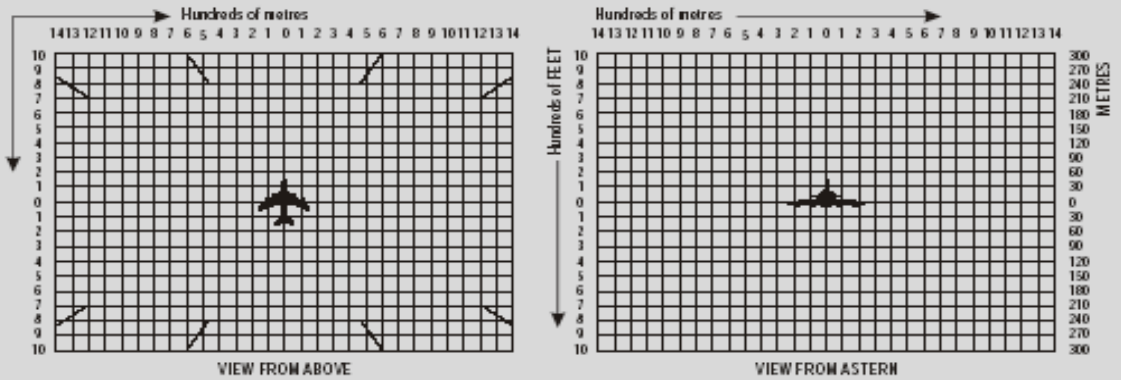
_____

_____

_____

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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WAKE VORTEX ENCOUNTER REPORTING FORM FOR PILOTS		
Date and Time	Date of incident	
	Time (UTC)	
Aircraft Type	Make	
	Model	
	Series	
Altitude	Height	☐ m or ☐ ft
	Altitude	☐ m or ☐ ft
	Flight level	
Geographical Position	Location	
	State	
	Airport	
	Runway	☐ L ☐ C ☐ R
Details	Phase of flight	☐ take-off ☐ initial climb ☐ climb ☐ cruise ☐ descent ☐ approach ☐ final ☐ touch-down ☐ taxiing ☐ other
	Were you turning?	☐ yes ☐ no ☐ L ☐ R
	Which holding pattern were you in, if any?	
	Were you:	☐ high ☐ low ☐ on the glide path
	Were you:	☐ left of ☐ right of ☐ on the centre-line
	Weight:	kg
	IAS	kts
	Heading	degrees
Other	What led you to suspect wake vortex as the cause of the disturbance?	
Did you experience vertical acceleration?	☐ yes ☐ no	Please describe:
What was the change in attitude? Please estimate angle.	Pitch: Roll: Yaw:	

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Was there any change in altitude?	☐ yes ☐ no ☐ n/a
Was there buffeting?	☐ yes ☐ no ☐ n/a
Was there stall warning?	☐ yes ☐ no ☐ n/a
Was the autopilot engaged?	☐ yes ☐ no ☐ n/a
What control action was taken?	☐ none ☐ go-around ☐ runway change ☐ other Please describe briefly:
Could you see the aircraft suspected of generating the wake vortex?	☐ yes ☐ no ☐ n/a
If yes, what was it?	Make – Model – Series -
Where was it relative to your position?	Separation distance: Clock reference:
Were you aware of the preceding aircraft type before the encounter?	☐ yes ☐ no ☐ n/a

Please submit the completed form to CAAS via fax: +65 65423869 or via post to:

Victor Tan Yong Meng
Head (ATS Regulation)
Civil Aviation Authority of Singapore
P. O. Box 1, Singapore Changi Airport,
Singapore 918141

or email to: victor_tan@caas.gov.sg

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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 070000N 1030000E 070000N 1080000E 103000N 1140000E 082500N 1163000E 021500N 1083000E 010000N 1083000E 010000N 1085400E, thence south along the coastline of Borneo to 001500N 1090000E to Equator 1090000E Equator 1080000E 005000S 1060000E Equator 1051000E Equator 1044600E, thence around the arc of a circle radius 100NM centred on Singapore Island to 013900N 1021000E 011300N 1033000E 011700N 1033600E, thence east along the international boundary of Singapore/Peninsular Malaysia, thence along 012000N to 012000N 1042000E 023600N 1044500E 034000N 1034000E 045000N 1034400E 064500N 1024000E 070000N 1030000E. **UNL** **GND/MSL**	SINGAPORE ACC	SINGAPORE RADAR English H24	255.4MHz Primary 123.7 MHz 133.25MHz 134.4MHz 133.8MHz 134.2MHz 134.35 MHz Secondary 127.3 MHz 135.8MHz 128.1MHz 133.35MHz 133.6 MHz 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 lying between Kuala Lumpur and Kota Kinabalu Flight Information Regions, shall be vested in the Kuala Lumpur ACC. The airspace bounded by a line from 023600N 1044500E to 020000N 1070000E and thereafter along 020000N in the Singapore and Kota Kinabalu FIR boundary, thence along this boundary to 060000N 1132000E thence along 060000N to the Singapore and Kuala Lumpur FIR boundary thence along the boundary to 023600N 1044500E and from surface level to FL150 west of longitude 105E and, from surface level to FL200 east of longitude 105E. (Ref ANP-ASIA/PAC, Rec 7/4) 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 3.3.

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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 123.7 MHz 133.8 MHz Secondary 127.3 MHz	
ATS ROUTES W401 and G579 a. W401 [Airspace between KK 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 2 000ft ALT	SINGAPORE ACC	SINGAPORE RADAR English H24	Primary 123.7 MHz 133.8 MHz Secondary 127.3 MHz	*Upper limit FL450 from HOSBA [34 DME SJ R-079 (24 DME VTK R-103)] Lower limit varies from 2 000ft to 3 500ft ALT.
ALL AIRWAYS WITHIN THE SINGAPORE FIR, KUALA LUMPUR FIR AND ITS TRANSFER AREAS AND KOTA KINABALU FIR (see subsection ENR 3.1)	SINGAPORE ACC	SINGAPORE RADAR English H24	Primary 133.25MHz 123.7 MHz 133.8 MHz Secondary 135.8MHz 127.3 MHz	Airspaces within the Kuala Lumpur FIR under the control of Singapore ACC are depicted in diagrams in AIP pages: ENR 2.1-11 for AWY A464 ENR 2.1-13 for AWY B469
OCEANIC CONTROL AREA WITHIN SINGAPORE FIR (CTA) 011800N 1035330E 011138N 1040740E 011510N 1042610E 011525N 1042950E 010235N 1043405E 002500N 1074200E Equator 1083600E to Equator 1080000E to 005000S 1060000E and thence along the Singapore/Jakarta FIR boundary to intersect the western boundary of G579 drawn on a 7.5° deg tolerance from SJ DVOR/DME FL460 6 000ft ALT	SINGAPORE ACC	SINGAPORE RADAR English H24	134.4MHz (PRI) 128.1MHz (SRY) 255.4MHz	Portion of Airways A464, A576, B469, B470 and G579 are within these lateral limits.

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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
TANJUNG PINANG TMA 002448N 1043700E follow the circle radius 30NM from TI NDB (0055.0N 10432.0E) anti-clockwise until 010342N 1050018E 005612N 1053200E thence along the circle with radius 60NM from TI NDB (0055.0N 10432.0E) clockwise until 000224N 1050206E 002448N 1043700E 10 000ft 3000 FT **TANJUNG PINANG NORTH CONTROL ZONE (CTR)** 012000N 1041224E 011305N 1042029E 010942N 1043500E thence along the circle radius 27NM from BTM VOR/DME clockwise until 004236N 1041654E 005315N 1040335E 010018N 1035530E 012000N 1041224E 3 000ft GND/MSL **TANJUNG PINANG SOUTH CONTROL ZONE (CTR)** 004236N 1041654E follow the circle radius 27NM from BTM VOR/DME anti-clockwise until 010942N 1043500E 010342N 1050018E thence along the circle radius 30NM from TI NDB clockwise until 002448N 1043700E 004236N 1041654E 6 000ft GND/MSL	TANJUNG PINANG APPROACH CONTROL OFFICE (APP)	TANJUNG PINANG APPROACH English H24	130.2MHz	Tanjung Pinang Approach Control Office (APP) shall be responsible for the provision of Air Traffic Control Service to controlled flights within Tanjung Pinang TMA/CTR. Position Reporting Procedures Aircraft operating within or about to enter Tanjung Pinang CTR shall report position: a. Over Tanjung Pinang TMA boundary. b. Over any other point or time as instructed by ATC. VFR Flights 1. Flight Information and alerting service shall only be provided to VFR flight operating within Tanjung Pinang CTR/TMA on request. VFR flight requesting this service shall report intended action and comply with the position or as required by ATC. 2. No aircraft shall operate under VFR within Tanjung Pinang TMA/CTR until prior authorization has been obtained from Tanjung Pinang Approach. Altimeter Setting Procedures The ICAO Standard Altimeter Setting Procedures shall be used by aircraft operating within Tanjung Pinang CTR: Transition Level: FL130 Transition Altitude: 11 000ft

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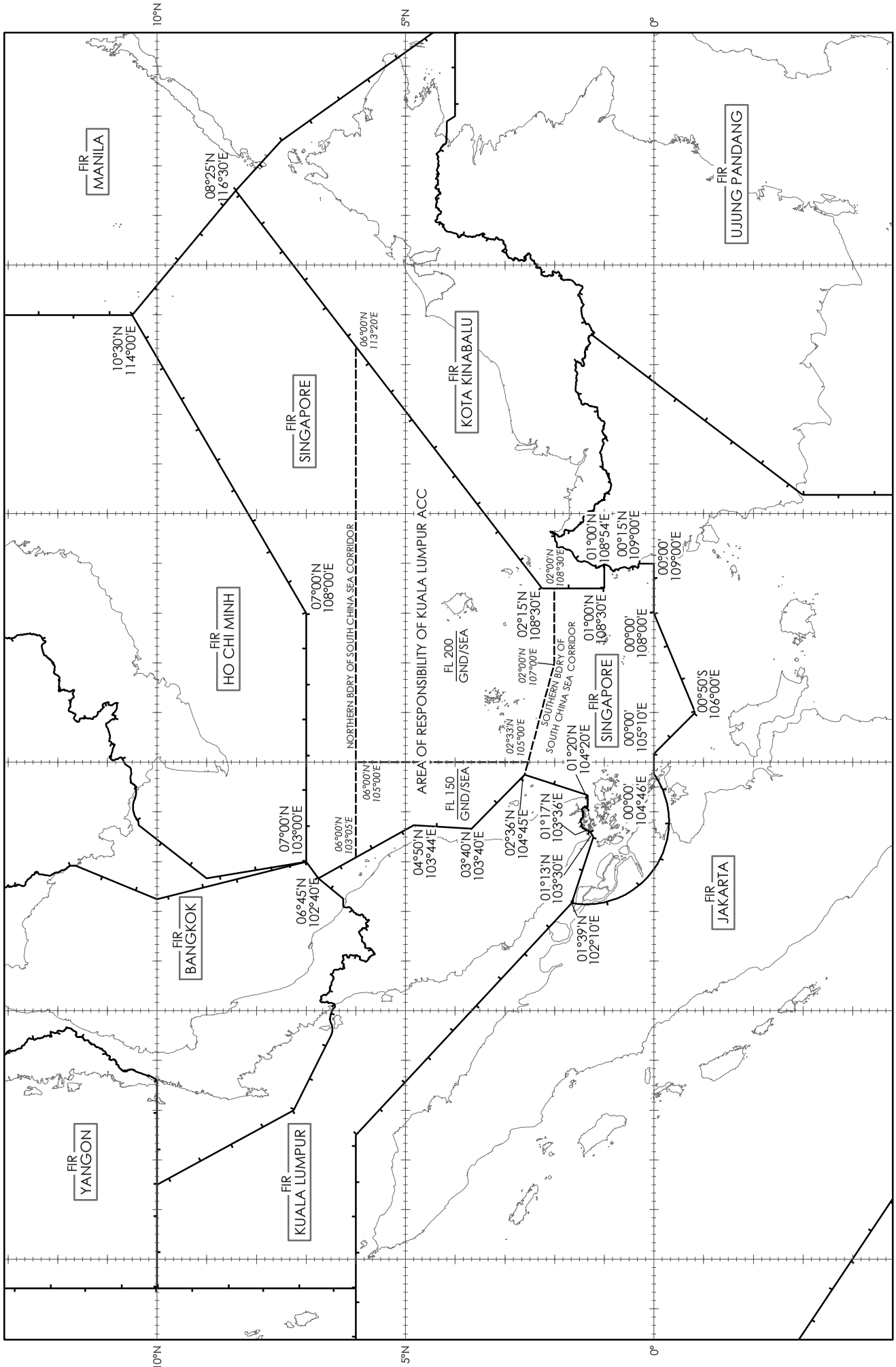
SINGAPORE AND ADJACENT FLIGHT INFORMATION REGIONS



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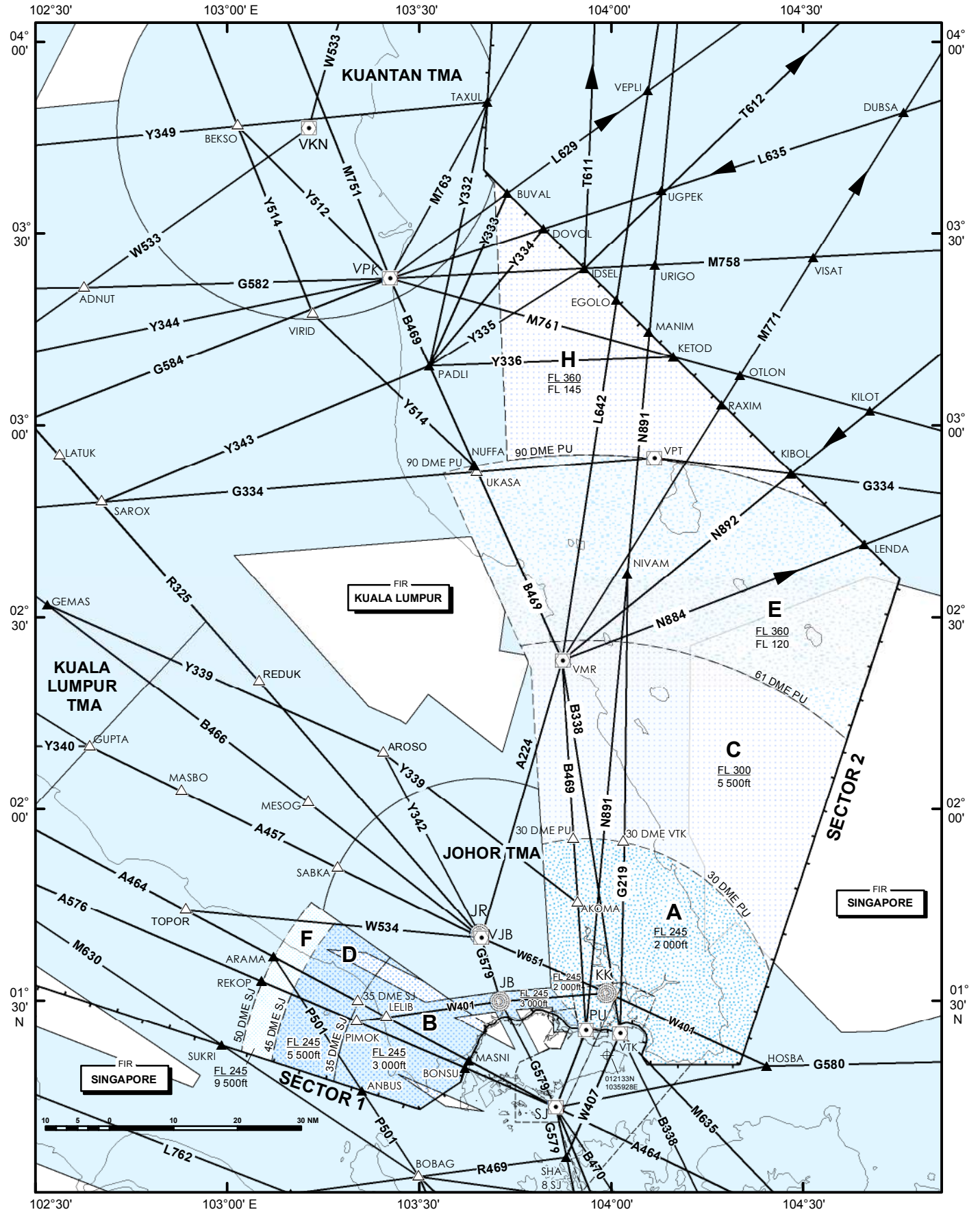
AIRSPACE DIVISION KUALA LUMPUR/SINGAPORE AREAS CONTROL CENTRES



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CHANGES : New ATS Route Y512 added.

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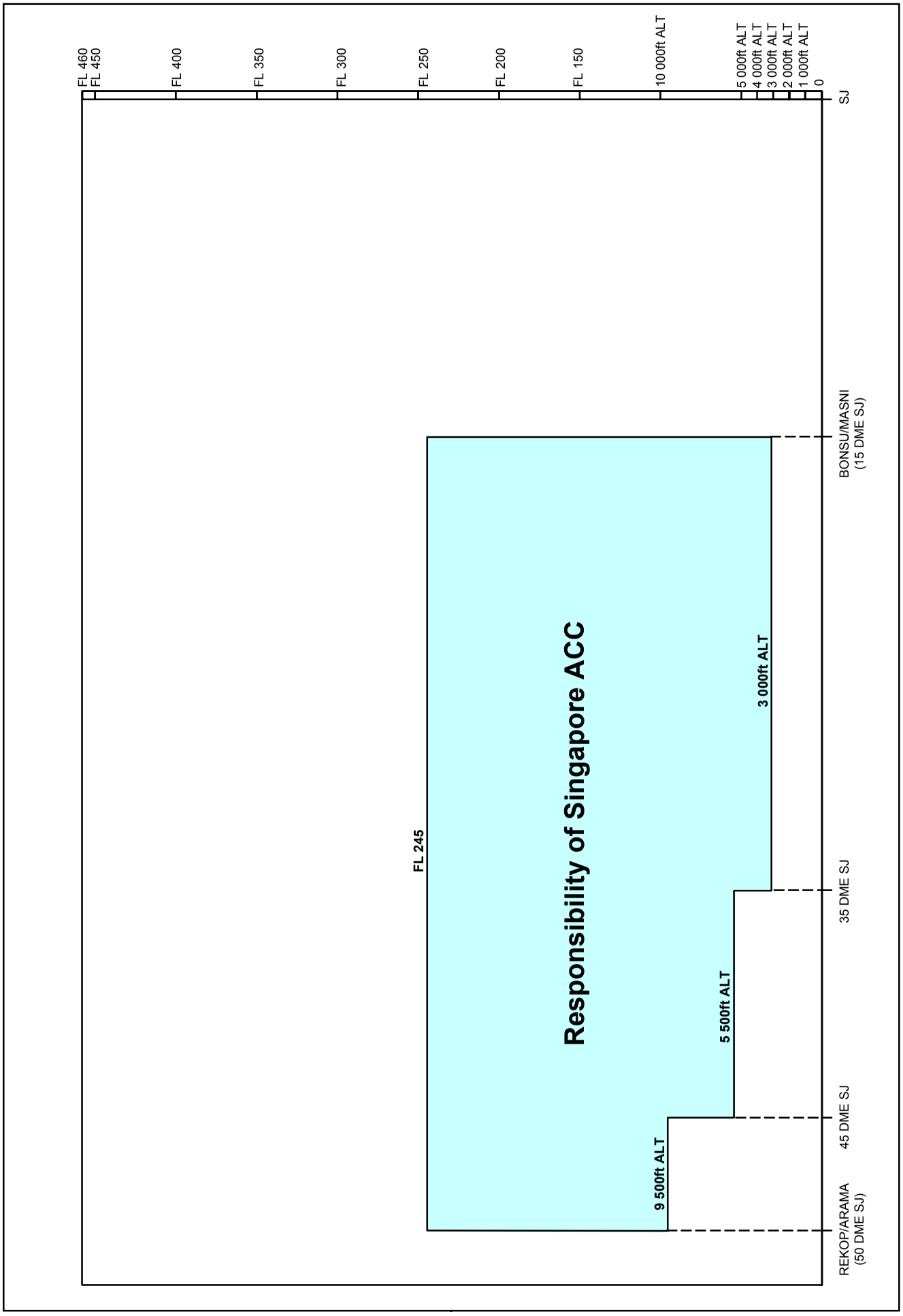
LONGITUDINAL CROSS-SECTION OF SECTOR 1
SJ-REKOP/ARAMA (50 DME SJ)



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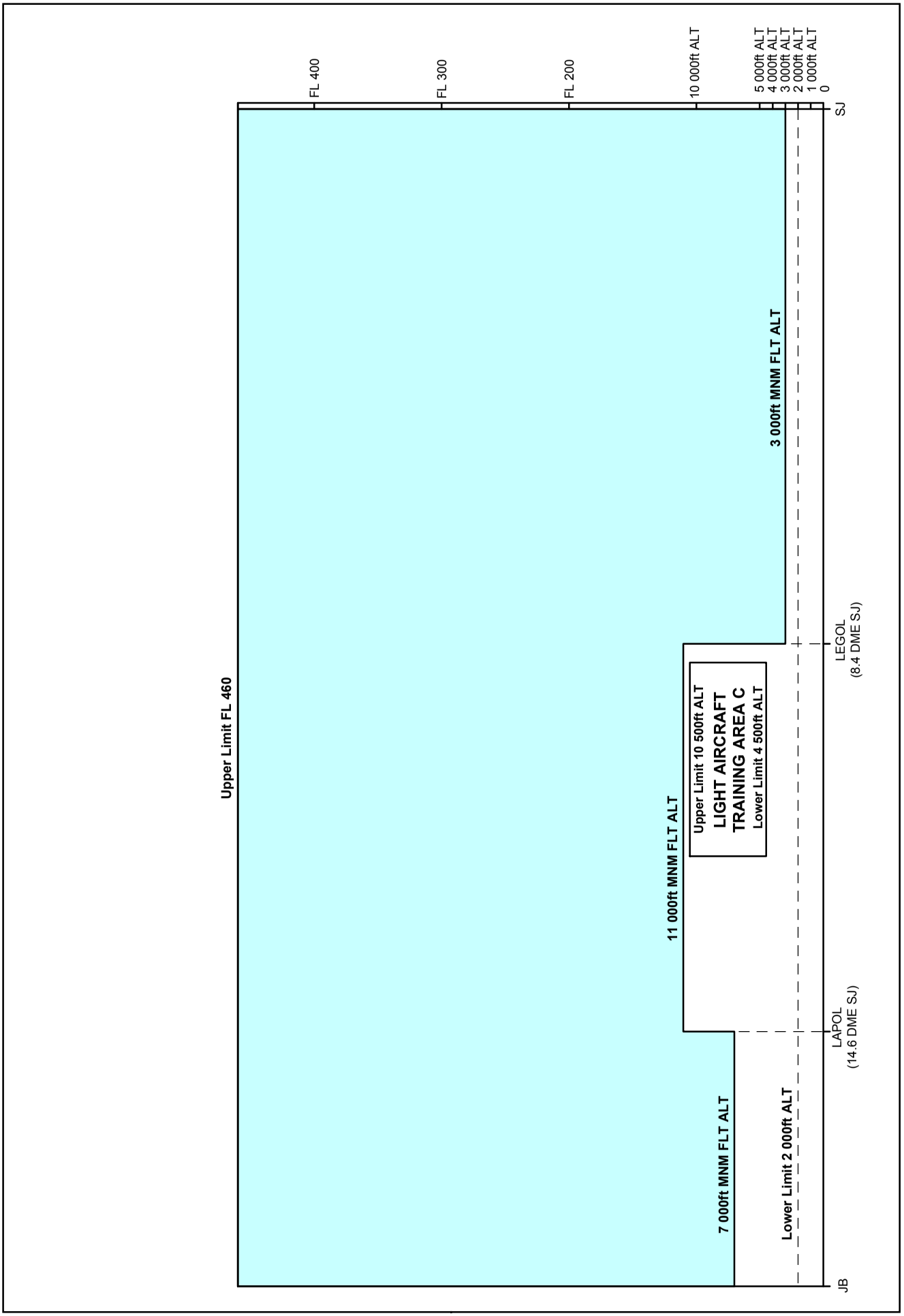
LONGITUDINAL CROSS-SECTION OF G579 FROM JB TO SJ



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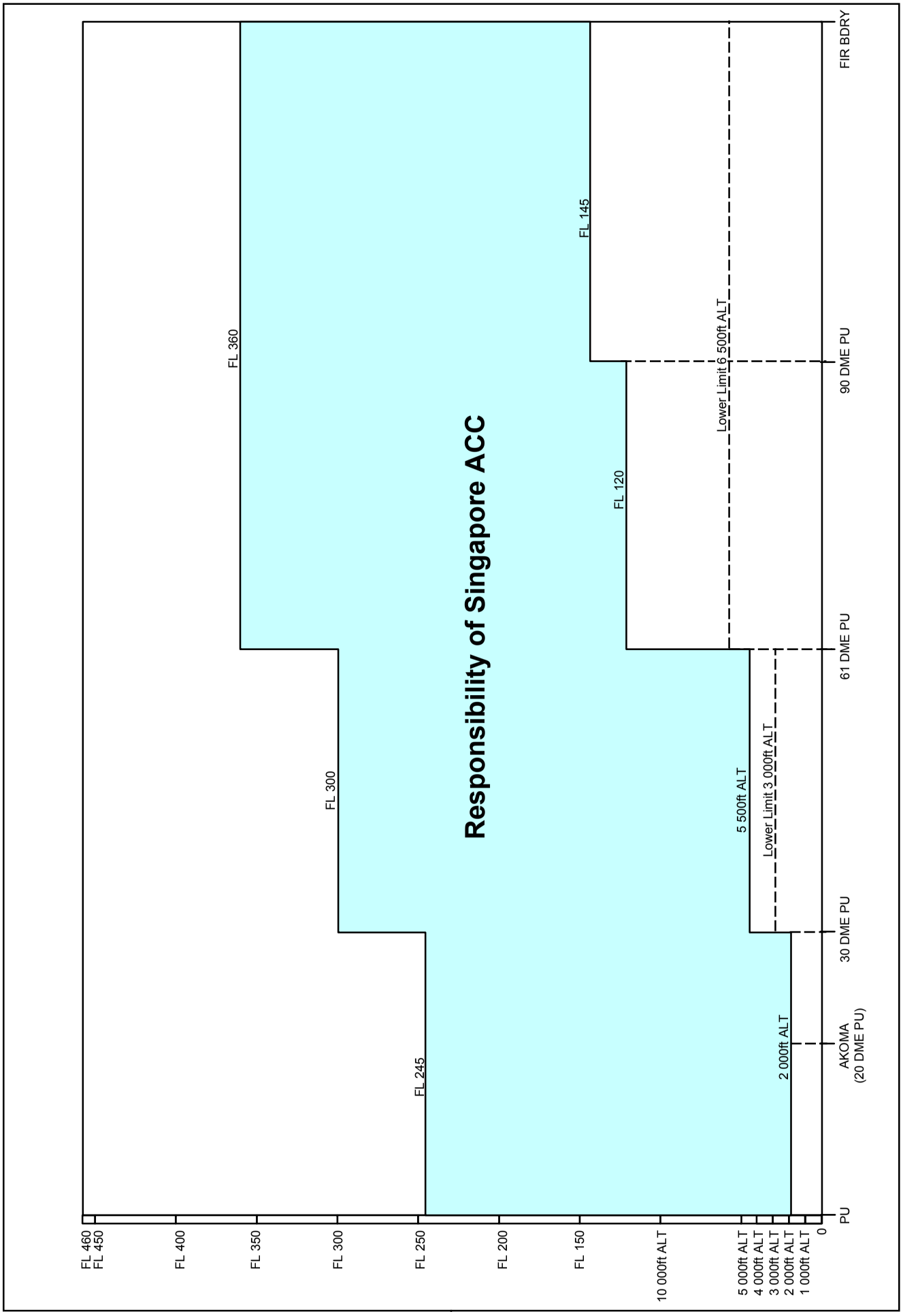
LONGITUDINAL CROSS-SECTION OF SECTOR 2
PU-SINGAPORE/LUMPUR FIR BOUNDARY



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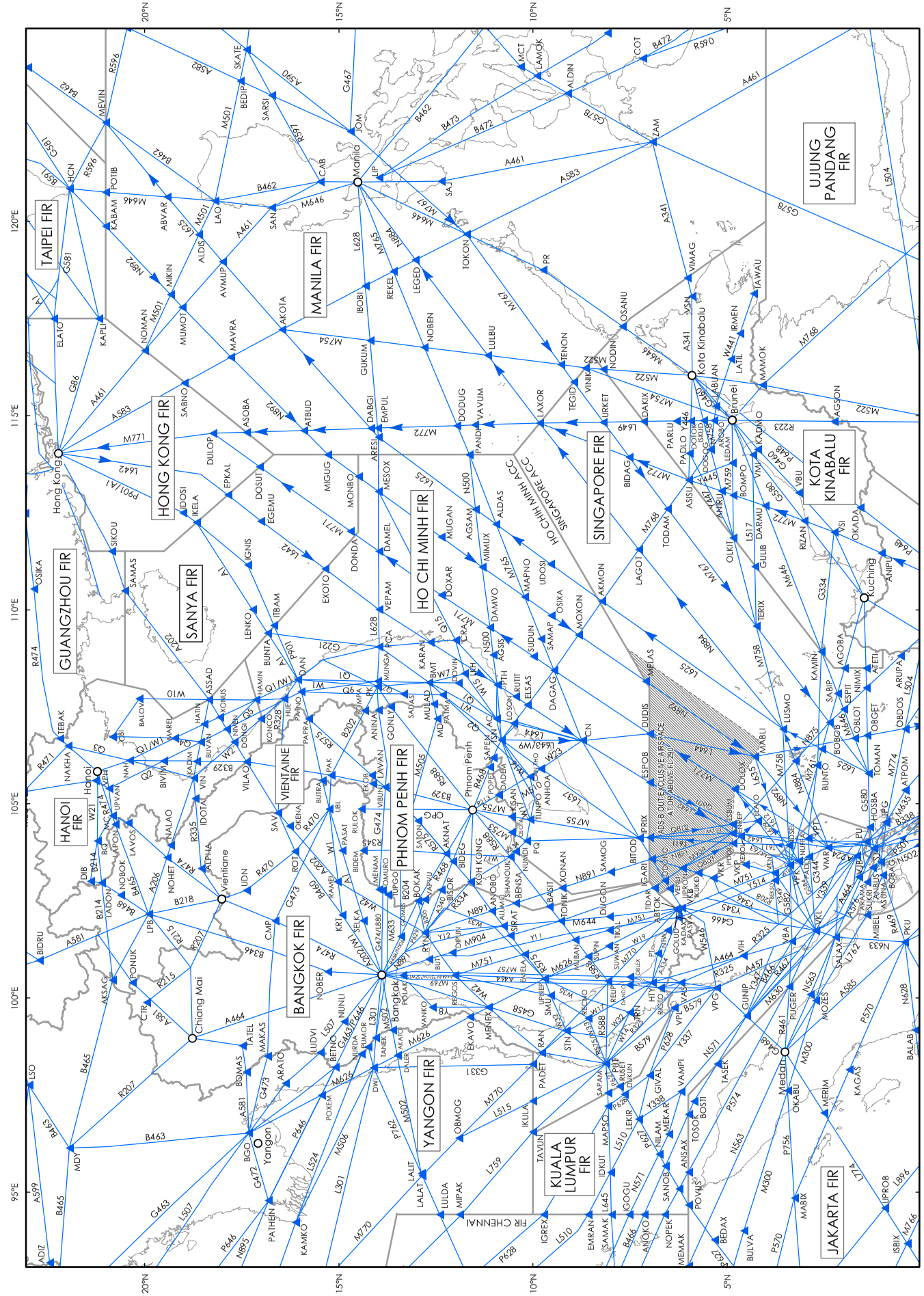
ATS ROUTE STRUCTURE WITHIN SINGAPORE & ADJACENT FIRs



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ENR 2.2 OTHER REGULATED AIRSPACE

NIL (not applicable).

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ENR 3 ATS ROUTES

ENR 3.1 ATS 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*	*FL series* ↓	*FL series* ↑	*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)	013950.4N 1033939.2E								
	196° / 016°	45.3NM		FL 460 / 5500 FT ALT	6000 FT	10	Odd(1)	Even(1)	[Class A –ABV FL150 Class B –BLW FL150]
MERSING DVOR/DME (VMR) (58 DME PU)	022318N 1035218E								

Route Designator {RNP Type}	*[Route Usage Notes]*								
Significant Point Name	*Significant Point Coordinates*								*Remarks*
{RNP Type}	*Track MAG* ↓ ↑	*Dist NM*	*(COP)*	*Upper limit / Lower limit*	*MNM FLT ALT*	*Lateral limits NM*	*FL series* ↓	*FL series* ↑	*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)	013950.4N 1033939.2E								
	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. 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	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7	8	9	10
A464	*Route availability:* (1) H24								
▲ ARAMA (50 DME SJ) (Delegated airspace BDRY)	013654N 1030712E								
	117° / 297°	14.9NM		FL 460 / 3500 FT ALT	5500 FT	10	Odd(1)		[Class A –ABV FL150 Class B –BLW FL150] (2)
∆ 35DME	012954N 1032024E								
	118° / 298°	5.0NM		FL 460 / 3000 FT ALT	5500 FT	10	Odd(1)		[Class A –ABV FL150 Class B –BLW FL150] (2)
∆ LELIB	012729N 1032450E								
	117° / 297°	14.6NM		FL 460 / 3000 FT ALT	5500 FT	10	Odd(1)		[Class A –ABV FL150 Class B –BLW FL150] (2)
▲ MASNI (FIR BDRY)	012037N 1033746E								
	118° / 298°	15.3NM		FL 460 / 3000 FT ALT	5500 FT	10	Odd(1)		[Class A –ABV FL150 Class B –BLW FL150] (2)
▲ SINJON DVOR/DME (SJ)	011319N 1035120E								
	114° / 294°	44.0NM		FL 460 / 2000 FT ALT	6000 FT		Odd(1)	Even(1)	[Class A –ABV FL150 Class B –BLW FL150] (3) (4)
▲ TANJUNG PINANG VOR/DME (TPG)	005413N 1043052E								

Route Remarks:
Flight Planning:
Default STAR for FLT landing at WSSS shall be ARAMA 1A or ARAMA 1B. When traffic permits, ATC will offer LELIB 3B for WSSS RWY 20.

Singapore ACC FREQ:
P133.25 MHz S128.1 MHz

Point/Segment Remarks:
(2) 5NM either side of track to SJ Singapore ACC FREQ: P133.25MHz S135.8MHz
(3) within the lateral limits of the OCA. 15min longitudinal separation minima will apply in OCA A464/A576.
(4) Eastbound aircraft to reach 6,000ft ALT when 25NM SE of SJ.

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Route Designator {RNP Type} / Significant Point Name	[Route Usage Notes]								
	Significant Point Coordinates								Remarks
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit / Lower limit	MNM FLT ALT	Lateral limits NM	FL series ↓	FL series ↑	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)	011319N 1035120E								

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	FL series ↓	FL series ↑	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]
Δ 20DME (20 DME 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]
▲ TEKONG DVOR/DME (VTK)	012455N 1040120E								(3)
	153° 333°	39.8NM		FL 460 3500 FT ALT	4000 FT		Odd(1)	Even(1)	[Class A –ABV FL150 Class B –BLW FL150]
Δ IDMAS (40 DME VTK)	004900N 1041848E								
	153° 333°	56.1NM		FL 460 3500 FT ALT	4000 FT		Odd(1)	Even(1)	[Class A –ABV FL150 Class B –BLW FL150]
FIRJ4 (WSJC/WIIZ FIR BDRY)	000124S 1044405E								(2)
	152° 332°	17.4NM		FL 460 3500 FT ALT	4000 FT		Odd(1)	Even(1)	[Class A –ABV FL150 Class B –BLW FL150]
▲ ANITO	001700S 1045200E								

Point/Segment Remarks:
(2) Not a REP
(3) 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*	*(COP)*	*Upper limit* / *Lower limit*	*MNM FLT ALT*	*Lateral limits NM*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
B466	*Route availability:* (1) H24								
▲ JOHOR BAHRU DVOR/DME (VJB)	013950.4N 1033939.2E								
	308° / 128°	34.3NM		FL 460 / 4500 FT ALT	5000 FT	20	Even(1)		[Class A –ABV FL150 Class B –BLW FL150]
∆ MESOG	020103N 1031240E								
Route Remarks: Flight Planning Flight planning not permitted between VJB and GEMAS.									

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Route Designator {RNP Type} / Significant Point Name	[Route Usage Notes]								
	Significant Point Coordinates								Remarks
{RNP Type}	Track MAG ↓ ↑	Dist NM	(COP)	Upper limit / Lower limit	MNM FLT ALT	Lateral limits NM	FL series ↓	FL series ↑	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								*(4)*
	335° / 155°	14.9NM		FL 460 / 7500 FT ALT	8000 FT	10	Odd*(1)*	Even*(1)*	[Class A –ABV FL150 Class B –BLW FL150]
∆ PADLI	030918N 1033133E								
	335° / 155°	17.1NM		FL 460 / 7500 FT ALT	8000 FT	10	Odd*(1)*	Even*(1)*	[Class A –ABV FL150 Class B –BLW FL150]
▲ 90DME (90 DME PU)	025341N 1033836E								
	335° / 155°	11.0NM		FL 460 / 7500 FT ALT	8000 FT	10	Odd*(1)*	Even*(1)*	[Class A –ABV FL150 Class B –BLW FL150]
▲ BIKTA	024337N 1034308E								
	335° / 155°	22.2NM		FL 460 / 7500 FT ALT	8000 FT	10	Odd*(1)*	Even*(1)*	[Class A –ABV FL150 Class B –BLW FL150]
▲ MERSING DVOR/DME (VMR) (58 DME PU)	022318N 1035218E								
	356° / 176°	27.9NM		FL 460 / 3000 FT ALT	4000 FT		Odd*(1)*	Even*(1)*	[Class A –ABV FL150 Class B –BLW FL150] *(2)*
∆ 30DME (30 DME PU)	015520N 1035405E								
	356° / 176°	9.9NM		FL 460 / 2000 FT ALT	4000 FT		Odd*(1)*	Even*(1)*	[Class A –ABV FL150 Class B –BLW FL150] *(2)*
∆ AKOMA (20 DME PU)	014522N 1035443E								
	356° / 176°	10.0NM		FL 460 / 2000 FT ALT	4000 FT		Odd*(1)*	Even*(1)*	[Class A –ABV FL150 Class B –BLW FL150] *(2)*
∆ 10DME (10 DME PU)	013523N 1035522E								
	356° / 176°	10.0NM		FL 460 / GND	4000 FT		Odd*(1)*	Even*(1)*	[Class A –ABV FL150 Class B –BLW FL150] *(2)*
▲ PAPA UNIFORM DVOR/DME (PU)	012523.99N 1035559.74E								*(5)*
	201° / 021°	12.9NM		FL 460 / 3000 FT ALT	4000 FT		Odd*(1)*	Even*(1)*	[Class A –ABV FL150 Class B –BLW FL150] *(3)*
▲ SINJON DVOR/DME (SJ)	011319N 1035120E								
	157° / 337°	30.2NM		FL 460 / 2000 FT ALT	4000 FT	10	Odd*(1)*		[Class A –ABV FL150 Class B –BLW FL150]
∆ BAVAL (30 DME SJ)	004518N 1040242E								
	159° / 339°	61.7NM		FL 460 / 2000 FT ALT	5000 FT	10	Odd*(1)*		[Class A –ABV FL150 Class B –BLW FL150]
∆ FIRJ1 (WSJC/WIIZ FIR BDRY)	001230S 1042424E								
	148° / 328°	19.4NM		FL 460 / 2000 FT ALT	5000 FT	10	Odd*(1)*		[Class A –ABV FL150 Class B –BLW FL150]
▲ SINGKEP NDB (NE)	002858.79S 1043433.57E								

Route Remarks:
Flight Planning
Flights overflying Singapore to destinations beyond Jakarta FIR are to flight plan via B470 ANITO

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

Point/Segment Remarks:
(2) **Lateral Limits:**
The eastern and western airway sectors are enclosed by a line joining
022830N 1035504E 015100N 1041436E 013542N 1041442E 012550N 1040109E
to a point 5NM west of PU DVOR/DME and northwards to a point 5NM west of VMR DVOR/DME.
(3) Within the lateral limits of Paya Lebar CTR.
(4) Eastbound Flight (report FL and flight condition over North CTR boundary). Westbound Flight (report FL and flight condition over VPK).
(5) Kuala Lumpur/Singapore FIR BDRY APRX 0.5NM 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	(COP)	Upper limit / Lower limit	MNM FLT ALT	Lateral limits NM	FL series ↓	FL series ↑	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)	011319N 1035120E								
	145° / 325°	30.1NM		FL 460 / 2000 FT ALT	3000 FT		Odd(1)	Even(1)	[Class A –ABV FL150 Class B –BLW FL150] (2)
Δ UDONI (30 DME SJ)	004818N 1040806E								
	145° / 325°	60.9NM		FL 460 / 2000 FT ALT	5000 FT		Odd(1)	Even(1)	[Class A –ABV FL150 Class B –BLW FL150] (2)
FIRJ2 (WSJC/WIIZ FIR BDRY)	000224S 1044205E								(3)
	145° / 325°	17.6NM		FL 460 / 2000 FT ALT	5000 FT		Odd(1)	Even(1)	[Class A –ABV FL150 Class B –BLW FL150] (2)
▲ ANITO	001700S 1045200E								

Route Remarks:
Singapore ACC FREQ:
P134.4MHz S128.1MHz

Point/Segment Remarks:

(2) **Lateral Limits:**
The lateral limits of this airway commence from 5NM either side of a line joining SJ DVOR/DME to OI NDB funnelling out from the SJ DVOR/DME on a 7½° tolerance to intersect the boundary of a similarly projected airway from OI NDB but on a 12° tolerance.
One way routeing from Singapore to Soekarno-Hatta and to destinations beyond. Two-way routeing Singapore/Pangkal Pinang for flights below FL200.

(3) Not a REP.
Reduced separation minima will be applied on B470 south of ANITO between RNAV-equipped aircraft using MNT.

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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	FL series ↓	FL series ↑	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	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7	8	9	10
G334	*Route availability:* (1) H24								
Δ PULAU TIOMAN VOR/DME (VPT)	025459N 1040639E								
	096° 276°	21.6NM		FL 285 FL 240	FL 250	20 NM	Odd(1)	Even(1)	[Class A]
▲ KIBOL (WMFC/WSJC FIR BDRY)	025229N 1042805E								
	097° 277°	92.7NM		FL 285 FL 240	FL 250	20 NM	Odd(1)	Even(1)	[Class A]
▲ BUNTO	024008N 1055953E								
	091° 271°	175.9NM		FL 285 FL 240	FL 250	20 NM	Odd(1)	Even(1)	[Class A]
▲ KAMIN (WSJC/WBFC FIR BDRY)	023442N 1085536E								

Route Remarks:
Tolerances of airway infringe WMD222 ASAHAN (activated by NOTAM – Military activities)

10 min longitudinal separation between RNAV-equipped aircraft applying Mach Number Technique.

15 min longitudinal separation between other aircraft.

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

ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover 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	(COP)	Upper limit / Lower limit	MNM FLT ALT	Lateral limits NM	FL series ↓	FL series ↑	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)	013950.4N 1033939.2E								
	343° / 163°	10.3NM		FL 460 / 6500 FT ALT	7000 FT	3	Odd(1)	Even(1)	[Class A –ABV FL150 Class B –BLW FL150]
▲ JAYBEE NDB (JB)	012959.77N 1034241.82E (Johor Bahru)								(4)
	332° / 152°	4.0NM		FL 460 / 2000 FT ALT	7000 FT	3	Odd(1)	Even(1)	[Class A –ABV FL150 Class B –BLW FL150]
LAPOL	012622N 1034435E								(5)
	333° / 153°	6.1NM		FL 460 / 2000 FT ALT	11000 FT	3	Odd(1)	Even(1)	[Class A –ABV FL150 Class B –BLW FL150]
LEGOL	012053N 1034723E								(5)
	333° / 153°	8.4NM		FL 460 / 2000 FT ALT	3000 FT	3	Odd(1)	Even(1)	[Class A –ABV FL150 Class B –BLW FL150]
▲ SINJON DVOR/DME (SJ)	011319N 1035120E								(3)
	347° / -	30.2NM		FL 460 / 2000 FT ALT	4000 FT			Even(1)	[Class A –ABV FL150 Class B –BLW FL150] (2)
∆ REMES	004342N 1035735E								
	348° / -	27.7NM		FL 460 / 2000 FT ALT	5000 FT			Even(1)	[Class A –ABV FL150 Class B –BLW FL150] (2)
▲ REPOV	001623N 1040300E								
	348° / -	32.8NM		FL 460 / 2000 FT ALT	5000 FT			Even(1)	[Class A –ABV FL150 Class B –BLW FL150] (2)
FIRJ3 (WSJC/WIIZ FIR BDRY)	001606S 1040918E								(5)
	346° / -	18.4NM		FL 460 / 2000 FT ALT	5000 FT			Even(1)	[Class A –ABV FL150 Class B –BLW FL150] (2)
▲ PARDI (ABM NE)	003400S 1041300E								

Route Remarks:
Unidirectional route (Northbound) for flights from Jakarta FIR to Singapore FIR and beyond. Bi-directional route between Palembang and Singapore below FL200.

Point/Segment Remarks:

(2) **Lateral Limits**
(PLB VOR/SJ DVOR/DME):
The lateral limits commence from 5NM either side of line joining PLB VOR to SJ DVOR/DME funnelling out from PLB VOR on a 7.5° tolerance to intersect the boundary of an AWY similarly projected from SJ DVOR/DME on a 7.5° tolerance.

(3) All FLT between SJ and JB are to avoid at all times WSR38 which overlaps the eastern edge of the airway.

(4) Kuala Lumpur/Singapore FIR boundary is approximately 2NM south of JB.

(5) Not a REP

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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	FL series ↓	FL series ↑	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)	011319N 1035120E								
	079° / 259°	33.7NM		FL 460 / 2000 FT ALT	3000 FT	10 NM	Odd(1)	Even(1)	[Class A – ABV FL150 Class B – BLW FL150]
▲ HOSBA (R079/34 DME SJ) (R103/24 DME VTK)	011948N 1042418E								
	088° / 268°	83.1NM		FL 460 / 6500 FT ALT	7000 FT		Odd(1)	Even(1)	[Class A] (2)
▲ TOMAN	012147N 1054717E								
	088° / 268°	58.3NM		FL 460 / 6500 FT ALT	7000 FT		Odd(1)	Even(1)	[Class A] (2)
▲ OBGET	012307N 1064531E								
	088° / 268°	74.0NM		FL 460 / 6500 FT ALT	7000 FT		Odd(1)	Even(1)	[Class A] (2)
▲ NIMIX	012452N 1075926E								
	088° / 268°	30.6NM		FL 460 / 6500 FT ALT	7000 FT		Odd(1)	Even(1)	[Class A] (2)
▲ ATETI (FIR BDRY)	012540N 1083000E								

Route Remarks:
10 min longitudinal separation based on the availability of navigational aids which permit frequent determination of position and speed.

Portion of G580 within Singapore FIR between ATETI and 1080000E has been delegated to Kuching ACC for provision of ATS.

Kuching ACC FREQ:
134.5MHz

Point/Segment Remarks:
(2) **Lateral Limits**:
5 NM on the northern side of line joining HOSBA to ATETI funnelling out at an angle of 15° from HOSBA to 20 NM towards ATETI.
20 NM on the southern side of line joining HOSBA to ATETI.
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	(COP)	Upper limit / Lower limit	MNM FLT ALT	Lateral limits NM	FL series ↓	FL series ↑	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

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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*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
R325	*Route availability:* (1) H24								
Δ REDUK	021957N 1030459E								
	319° 139°	52.9NM		FL 460 5500 FT ALT	6000 FT	8	Odd*(1)*	Even*(1)*	[Class A – ABV FL150 Class B – BLW FL150]
▲ JOHOR BAHRU DVOR/DME (VJB)	013950.4N 1033939.2E								
Route Remarks: Flight planning not permitted for northbound FLT departing from Singapore to airports beyond Kuala Lumpur operating above FL200.									

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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*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7	8	9	10
R469	*Route availability:* (1) H24								
▲ TAROS (FIR BDRY)	004200N 1021607E								
	071° 251°	56.7NM		FL 460 9500 FT ALT	10000 FT	8	Odd(1)	Even(1)	[Class A – ABV FL150 Class B – BLW FL150]
▲ ASUNA (R252/44 DME SJ)	005948N 1030954E								
	082° 262°	20.2NM		FL 460 5500 FT ALT	6000 FT	8	Odd(1)	Even(1)	[Class A – ABV FL150 Class B – BLW FL150]
∆ BOBAG (R243/24 DME SJ)	010230N 1032954E								
	082° 262°	23.2NM		FL 460 5500 FT ALT	6000 FT	8	Odd(1)	Even(1)	[Class A – ABV FL150 Class B – BLW FL150]
▲ SAMKO (R168/8 DME SJ)	010529.5N 1035254.9E								
Route Remarks: 15 min longitudinal separation. Singapore ACC FREQ: P133.25MHz, S135.8MHz									

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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	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7	8	9	10
W401	*Route availability:* (1) H24								
▲ HOSBA (R079/34 DME SJ) (R103/24 DME VTK)	011948N 1042418E								
	294° 114°	27.4NM		FL 245 2000 FT ALT	7000 FT	5	Even(1)	Odd(1)	[Class A – ABV FL150 Class B – BLW FL150]
▲ KONG KONG NDB (KK)	013117.76N 1035923.69E								
	265° 085°	9.7NM		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]
▲ JAYBEE NDB (JB)	012959.77N 1034241.82E (Johor Bahru)								
	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								
	261° 081°	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.

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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*	*FL series* ↓	*FL series* ↑	*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°	21.0NM		FL 250 3000 FT ALT	4000 FT	3	Even(1)	Odd(1)	[Class A – ABV FL150 Class B – BLW FL150]
▲ SAMKO (8 DME SJ)	010529.5N 1035254.9E								

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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*	*FL series* ↓	*FL series* ↑	*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)	013950.4N 1033939.2E								

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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*	*FL series* ↓	*FL series* ↑	*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)	013950.4N 1033939.2E								
	294° / 114°	21.4NM		FL 200 / 2500 FT ALT	3000 FT	3	Odd(1)	Even(1)	[Class A – ABV FL150 Class B – BLW FL150]
▲ KONG KONG NDB (KK)	013117.76N 1035923.69E								

Charts

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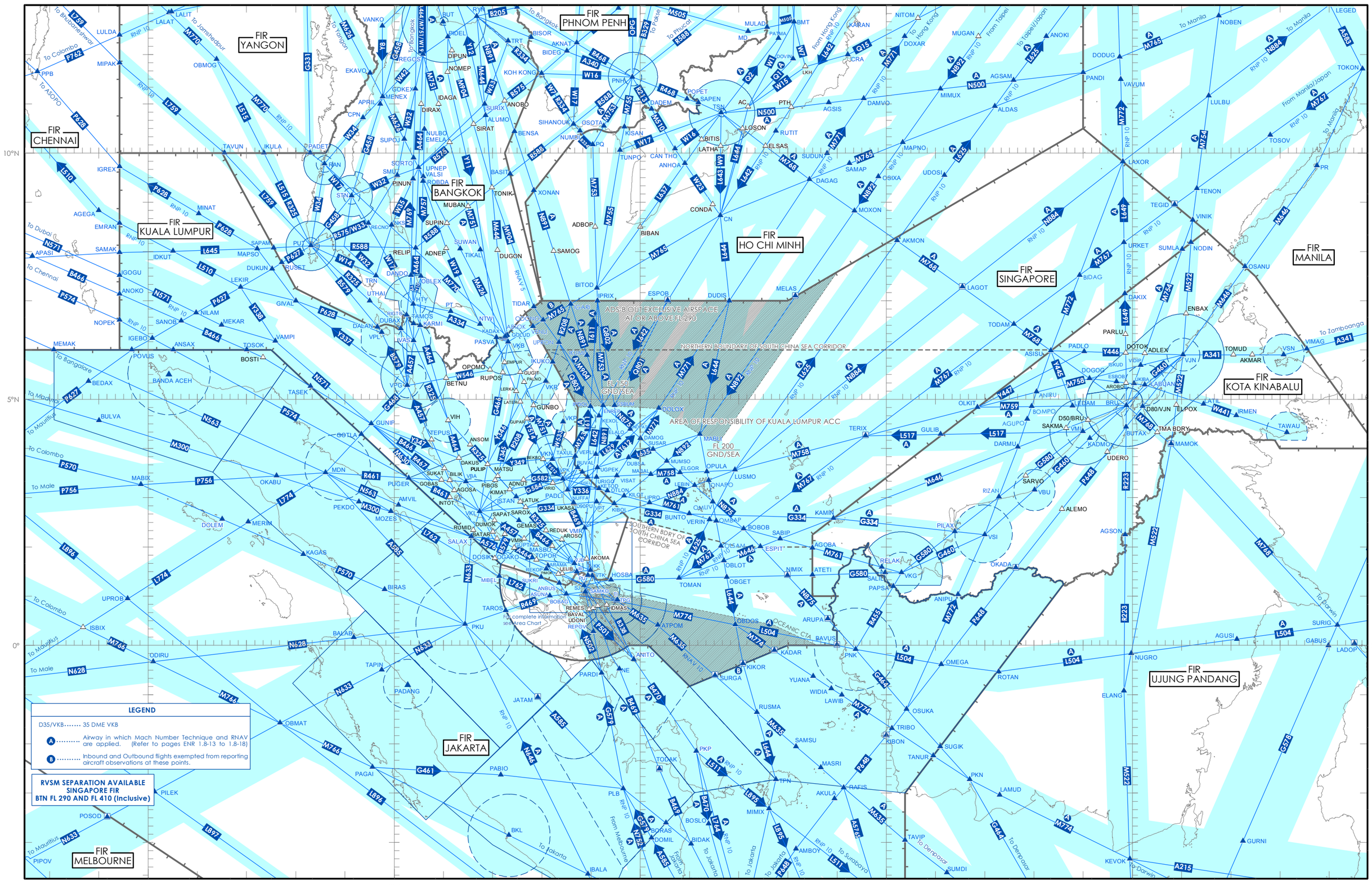
AIR TRAFFIC SYSTEM CHART



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CHANGES : New ATS Route Y512 added.

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ENR 3.2 UPPER ATS ROUTES

NIL (not applicable).

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ENR 3.3 AREA NAVIGATION (RNAV) ROUTES

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit / Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
L504	*Route availability:* (1) H24					
▲ OBDOS	002503N 1065551E					
		126.9NM	FL 460 / FL 145	Odd(1)	Even(1)	[Class A] (2)
▲ BAVUS (WSJC/WIIZ FIR BDRY)	000000N 1090000E					

Route Remarks:
Lateral Limits:
25NM either side of line joining OBDOS to BAVUS.

Singapore ACC FREQ:
P134.4 MHz
S128.1 MHz

ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover within the Singapore FIR.

Flight Planning:
Flights overflying Singapore to destinations north of Kuala Lumpur and Subang are to flight plan via BAVUS L504 OBDOS M774 TPG A464 SJ G579 VJB Y342 AROSO Y339.

Flights overflying Singapore to land at Kuala Lumpur and Subang are to flight Plan via BAVUS L504 OBDOS M774 TPG A464 SJ G579 VJB A457.

Point/Segment Remarks:
(2) NIL

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
L517	*Route availability:* (1) H24					
▲ TERIX	041521N 1093456E					*(2)*
		92.0NM	FL 460 / FL 240		Even*(1)*	[Class A]
▲ GULIB (WSJC/WBFC FIR BDRY)	041714N 1110633E					*(3)*

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) NIL
(3) VMI 269°
173NM

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Route Designator {RNP Type} / Significant Point Name	[Route Usage Notes] Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
L625	*Route availability:* (1) H24					
▲ AKMON	081254N 1101306E					*(6)*
(10)	035° / -	340.6NM	FL 460 / FL 135			[Class A] *(2) (3)*
▲ LUSMO	033341N 1065534E					*(7)*
(10)	027° / -	67.5NM	FL 460 / FL 135			[Class A] *(2) (3) (4)*
▲ VERIN	023332N 1062425E					*(6)*
(10)	027° / -	80.5NM	FL 460 / FL 245			[Class A] *(2) (5)*
▲ TOMAN	012147N 1054717E					*(6)*

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.

Point/Segment Remarks:
(2) **Lateral Limits:**
10NM either side of line joining TOMAN to LUSMO and 25NM either side of the line joining LUSMO to AKMON.
(3) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover within the Singapore FIR.
(4) Segment from VERIN to LUSMO use:
P134.7 MHz
S134.15 MHz
(5) Segment from TOMAN to VERIN use:
P134.2 MHz
S133.35 MHz
(6) NIL
(7) VMR 069°
196.3NM

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*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] (2)
▲ NOPAT	042313N 1044756E					
		52.2NM	FL 460 / FL 240		Odd(1)	[Class A] (2)
▲ VEPLI	035223N 1040542E					
		27.2NM	FL 460 / FL 240		Odd(1)	[Class A] (2)
▲ BUVAL (WSJC/WMFC FIR BDRY)	033622N 1034341E					
		22.6NM	FL 460 / FL 240		Odd(1)	[Class A] (2)
▲ 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:
(2) NIL

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Route Designator {RNP Type} / Significant Point Name	[Route Usage Notes] Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	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] (2)
▲ SUSAR	035848N 1051547E					
		31.6NM	FL 460 / FL 240	Even(1)		[Class A] (2)
▲ DUBSA	034901N 1044540E					
		39.7NM	FL 460 / FL 240	Even(1)		[Class A] (2)
▲ UGPEK	033647N 1040752E					
		19.4NM	FL 460 / FL 240	Even(1)		[Class A] (2)
▲ DOVOL (WSJC/WMFC FIR BDRY)	033047N 1034923E					
		25.2NM	FL 460 / FL 240	Even(1)		[Class A] (2)
▲ 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:
(2) NIL

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Route Designator {RNP Type}	[Route Usage Notes]					
Significant Point Name	Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
L642	*Route availability:* (1) H24					
▲ ESPOB (VVTS/WSJC FIR BDRY)	070000N 1053318E					*(7)*
(10)		149.2NM	FL 460 / FL 135			[Class A] *(2) (3) (4)*
▲ ENREP	045223N 1041442E					*(8)*
(10)		60.4NM	FL 460 / FL 135	Odd*(1)*	Even*(1)*	[Class A] *(5)*
▲ VEPLI	035223N 1040542E					*(9)*
(10)		33.0NM	FL 460 / FL 135	Odd*(1)*	Even*(1)*	[Class A] *(5)*
▲ EGOLO (WSJC/WMFC FIR BDRY)	031934N 1040047E					*(10)*
(10)		25.1NM	FL 460 / FL 135	Odd*(1)*	Even*(1)*	[Class A] *(6)*
▲ ROBMO	025440N 1035700E					*(11)*
(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.

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:
P134.35MHz
S133.6MHz
(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) NIL
(8) VMR 008°
150.0NM
(9) VMR 008°
89.7NM
(10) VMR 008°
56.6NM
(11) VMR 008°
31.6NM

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Route Designator {RNP Type} / Significant Point Name	Significant Point Coordinates		[Route Usage Notes]			Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
L644	*Route availability:* (1) H24					
▲ DUDIS (WSJC/VVTS FIR BDRY)	070000N 1064836E					*(7)*
(10)	192° / -	165.8NM	FL 460 / FL 240	Odd*(1)*		[Class A] *(2) (3)*
▲ MABLI	041717N 1061247E					*(7)*
(10)	169° / -	45.9NM	FL 460 / FL 240	Odd*(1)*		[Class A] *(4)*
▲ OPULA	033155N 1062118E					*(7)*
(10)	169° / -	10.8NM	FL 460 / FL 240	Odd*(1)*		[Class A] *(4)*
▲ ONAPO	032116N 1062318E					*(7)*
(10)	169° / -	26.4NM	FL 460 / FL 240	Odd*(1)*		[Class A] *(4)*
▲ OMLIV	025512N 1062812E					*(7)*
(10)	169° / -	24.2NM	FL 460 / FL 240	Odd*(1)*		[Class A] *(5)*
▲ OMBAP	023116N 1063242E					*(7)*
(10)	169° / -	30.7NM	FL 460 / FL 240	Odd*(1)*		[Class A] *(5)*
▲ OLSAM	020059N 1063824E					*(7)*
(10)	169° / -	18.3NM	FL 460 / FL 240	Odd*(1)*		[Class A] *(5)*
▲ OBLOT	014256N 1064147E					*(7)*
(10)	169° / -	20.1NM	FL 460 / FL 240	Odd*(1)*		[Class A] *(5)*
▲ OBGET	012307N 1064531E					*(7)*
(10)	169° / -	107.2NM	FL 460 / FL 240	Odd*(1)*		[Class A] *(6)*
▲ KIKOR (WSJC/WIIZ FIR BDRY)	002244S 1070524E					*(7)*

Route Remarks:

Lateral Limits:

25NM either side of line joining DUDIS to KIKOR.

Available only for flights departing from Hong Kong or north of Hong Kong to Jakarta.

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:
P134.35 MHz
S133.6 MHz

(4) Segment from MABLI to OMLIV use:
P134.7 MHz
S134.15 MHz

(5) Segment from OMLIV to OBGET use:
P134.2 MHz
S133.35 MHz

(6) Segment from OBGET to KIKOR use:
P134.4 MHz
S128.1 MHz

(7) NIL

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
L649	*Route availability:* (1) H24					
▲ LAXOR (WSJC/RPHI FIR BDRY)	094937N 1144829E					
(10)		98.0NM	FL 460 / FL 240		Even(1)	[Class A]
▲ URKET (WSJC/WBFC FIR BDRY)	081130N 1145000E					(2)
(10)		62.0NM	FL 460 / FL 240		Even(1)	[Class A]
▲ DAKIX (WBFC/WSJC FIR BDRY)	070854N 1145054E					(3)

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) NIL
(3) BRU 359°
136NM

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Route Designator {RNP Type}	[Route Usage Notes]					
Significant Point Name	Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
L762	*Route availability:* (1) H24					
▲ ASUNA	005948N 1030954E					(2)
(10)		66.2NM	FL 460 / 9500 FT ALT	Odd(1)	Even(1)	[Class A]
▲ MIBEL (WIIZ/WSJC FIR BDRY)	012351N 1020816E					(2)

Route Remarks:
Lateral Limits:
10NM either side of line joining ASUNA and MIBEL

Available only for aircraft departing or arriving at airports within Singapore FIR.

Singapore ACC FREQ:
P133.25MHz
S135.8MHz

Flight Planning:
Westbound - Aircraft originating only from airports within Singapore FIR to Medan and destinations beyond Jakarta FIR.

Eastbound - Aircraft to destinations within Singapore FIR only.

Point/Segment Remarks:
(2) NIL

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*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					*(2)*
		27.5NM	FL 460 FL 135	Even*(1)*	Odd*(1)*	[Class A - ABV FL150 Class B - BLW FL150]
▲ NODIN (WSJC/WBFC FIR BDRY)	081100N 1161142E					*(2)*

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:
(2) NIL

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit / Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
M630	*Route availability:* (1) H24					
▲ SUKRI	012306N 1025904E					
(5)		37.3NM	FL 460 / 5500 FT ALT	Odd(1)		[Class A - ABV FL150 Class B - BLW FL150]
∆ BOBAG	010230N 1032954E					(2)
(5)		61.3NM	FL 460 / 5500 FT ALT	Odd(1)		[Class A - ABV FL150 Class B - BLW FL150]
▲ TANJUNG PINANG VOR/DME (TPG)	005413N 1043052E					

Route Remarks:
Lateral Limits:
11.5NM either side of line joining SUKRI to TPG.

Flight departing from aerodromes in Peninsular Malaysia and overflying WSJC are restricted to FL270 and above at waypoint SUKRI if the planned cruising level is FL270 or higher.

Flight Planning:
Southbound flight planning permitted for flights from Kuala Lumpur and airports beyond which are overflying beyond Singapore. Flights landing at Singapore Changi Airport to flight plan on A464.

Singapore ACC FREQ:
P133.25 MHz
S135.8 MHz

Point/Segment Remarks:
(2) NIL

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit / Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
M635	*Route availability:* (1) H24					
▲ TEKONG DVOR/DME (VTK)	012455N 1040120E					*(4)*
(10)		42.5NM	FL 460 / 5500 FT ALT	Odd*(1)*	Even*(1)*	[Class A - ABV FL150 Class B - BLW FL150] *(2)*
▲ TANJUNG PINANG VOR/DME (TPG)	005413N 1043052E					
(10)		58.5NM	FL 460 / 5500 FT ALT	Odd*(1)*	Even*(1)*	[Class A - ABV FL150 Class B - BLW FL150] *(3)*
▲ ATPOM	002425N 1052114E					
(10)		93.1NM	FL 460 / 5500 FT ALT	Odd*(1)*	Even*(1)*	[Class A - ABV FL150 Class B - BLW FL150] *(2)*
◪ SURGA (WSJC/WIIZ FIR BDRY)	003657S 1063119E					

Route Remarks:
Lateral Limits:
25NM either side of line joining VTK to SURGA.

Singapore ACC FREQ:
P134.4 MHz
S128.1 MHz

Flight Planning:
Flights overflying Singapore to destinations north of Kuala Lumpur and Subang are to flight plan via SURGA M635 TPG A464 SJ G579 VJB Y342 AROSO Y339.

Flights overflying Singapore to land at Kuala Lumpur and Subang are to flight plan via SURGA M635 TPG A464 SJ G579 VJB A457.

Point/Segment Remarks:
(2) NIL
(3) TPG 120.5°
58.5NM
(4) 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}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
M646	*Route availability:* (1) H24					
▲ KAMIN (WBFC/WSJC FIR BDRY)	023442N 1085536E					
		69.6NM	FL 460 / FL 240	Even(1)	Odd(1)	[Class A] (2)
▲ SABIP	020940N 1075044E					
		26.1NM	FL 460 / FL 240	Even(1)	Odd(1)	[Class A] (2)
▲ ESPIT	020011N 1072624E					
		47.9NM	FL 460 / FL 240	Even(1)	Odd(1)	[Class A] (2)
▲ OBLOT	014256N 1064147E					
		58.5NM	FL 460 / FL 240	Even(1)	Odd(1)	[Class A] (2)
▲ TOMAN	012147N 1054717E					

Route Remarks:
Lateral Limits:
25NM either side of TOMAN to KAMIN.

ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between SABIP and KAMIN) within the Singapore FIR.

Singapore ACC FREQ:
P134.2 MHz
S133.35 MHz

Point/Segment Remarks:
(2) NIL

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
M753	*Route availability:* (1) H24					
▲ IPRIX (VVTS/WSJC FIR BDRY)	070000N 1040754E					
		127.2NM	FL 460 / FL 155	Odd(1)	Even(1)	[Class A] (2)
▲ ENREP	045223N 1041442E					

Route Remarks:
Singapore ACC FREQ:
P134.35 MHz
S133.6 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.

Lateral Limits:
25NM either side of line joining ENREP to IPRIX.

Point/Segment Remarks:
(2) NIL

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Route Designator {RNP Type}		*[Route Usage Notes]*					
	Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}		*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*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} / Significant Point Name	[Route Usage Notes] Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M758	*Route availability:* (1) H24					
▲ PEKAN DVOR/DME (VPK)	032259N 1032524E					
		30.4NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (3)
▲ IDSEL (WMFC/WSJC FIR BDRY)	032432N 1035544E					
		11.1NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (4)
▲ URIGO	032505N 1040647E					
		24.8NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (4)
▲ VISAT	032620N 1043134E					
		41.1NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (4)
▲ MABAL	032826N 1051236E					
		35.7NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (4)
▲ ELGOR	033014N 1054818E					
		67.4NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (4)
▲ LUSMO	033341N 1065534E					
		164.6NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (2)
◪ TERIX	041521N 1093456E					
		140.5NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (2) (5)
▲ OLKIT (WSJC/WBFC FIR BDRY)	045010N 1115118E					

Route Remarks:
Lateral Limits:
10NM either side of line joining VPK DVOR/DME to IDSEL and 25NM either side of line joining IDSEL to OLKIT.

Point/Segment Remarks:
(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between LUSMO and OLKIT) within the Singapore FIR.
(3) Segment from VPK to IDSEL use:
P123.7 MHz
S127.3 MHz
(4) Segment from IDSEL to LUSMO use:
P134.7 MHz
S134.15 MHz
(5) VJN 255°
258.0NM

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Route Designator {RNP Type} / Significant Point Name	[Route Usage Notes] Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M761	*Route availability:* (1) H24					
▲ PEKAN DVOR/DME (VPK)	032259N 1032524E					
		46.0NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (3)
▲ KETOD (WMFC/WSJC FIR BDRY)	031042N 1040942E					
		10.8NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (4)
▲ OTLON	030752N 1042006E					
		21.0NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (4)
▲ KILOT	030217N 1044023E					
		32.3NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (4)
▲ LIPRO	025342N 1051128E					
		118.8NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (5)
▲ BOBOB	022206N 1070558E					
		46.5NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (5)
▲ SABIP	020940N 1075044E					
		40.8NM	FL 460 / FL 240	Odd(1)	Even(1)	[Class A] (2) (5) (6)
▲ AGOBA (WSJC/WBFC FIR BDRY)	015840N 1083000E					

Route Remarks:

Lateral Limits:

10NM either side of line joining VPK DVOR/DME to KETOD and 25NM either side of line joining KETOD to AGOBA.

Portion of M761 within Singapore FIR between AGOBA and 1080000E has been delegated to Kuching ACC for provision of ATS.

Kuching ACC FREQ:
134.5 MHz

Point/Segment Remarks:

(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between SABIP and AGOBA) within the Singapore FIR.

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

(4) Segment from KETOD to LIPRO use:
P134.7 MHz
S134.15 MHz

(5) Segment from LIPRO to AGOBA use:
P134.2 MHz
S133.35 MHz

(6) VKG 285°
112.7NM

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
M763	*Route availability:* (1) H24					
▲ ENREP	045223N 1041442E					*(2)*
		70.3NM	FL 460 / FL 240	Even*(1)*	Odd*(1)*	[Class A]
▲ TAXUL (WMFC/WSJC FIR BDRY)	035035N 1034037E					*(2)*
		31.4NM	FL 460 / FL 240	Even*(1)*	Odd*(1)*	[Class A]
▲ PEKAN DVOR/DME (VPK)	032259N 1032524E					

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:
(2) NIL

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Route Designator {RNP Type}	[Route Usage Notes]					
Significant Point Name	Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	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}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit / Lower limit*	*FL series* ↓	*FL series* ↑	*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					*(2)*
(10)		242.5NM	FL 460 / FL 205			[Class A]
▲ TODAM	063138N 1123536E					*(2)*
(10)		225.5NM	FL 460 / FL 205			[Class A]
◪ TERIX	041521N 1093456E					*(2)*
(10)		186.8NM	FL 460 / FL 205			[Class A]
▲ BOBOB	022206N 1070558E					*(2)*
(10)		99.0NM	FL 460 / FL 205			[Class A]
▲ TOMAN	012147N 1054717E					*(2)*

Route Remarks:
Lateral Limits:
25NM either side of line joining TOMAN to TEGID.

ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between TEGID and BOBOB) within the Singapore FIR.

Singapore ACC FREQ:
P134.2 MHz
S133.35 MHz

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) NIL

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Route Designator {RNP Type}	[Route Usage Notes]					
Significant Point Name	Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M768	*Route availability:* (1) H24					
▲ AKMON	081254N 1101306E					*(2)*
		96.9NM	FL 460 / FL 135	Odd*(1)*	Even*(1)*	[Class A]
▲ LAGOT	071632N 1113243E					*(2)*
		76.9NM	FL 460 / FL 135	Odd*(1)*	Even*(1)*	[Class A]
▲ TODAM	063138N 1123536E					*(2)*
		55.4NM	FL 460 / FL 135	Odd*(1)*	Even*(1)*	[Class A]
▲ ASISU (WSJC/WBFC FIR BDRY)	055906N 1132046E					*(3)*

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) NIL
(3) BRU 305°
113.3NM

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit / Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
M771	*Route availability:* (1) H24					
▲ DUDIS (WSJC/VVTS FIR BDRY)	070000N 1064836E					*(7)*
(10)		156.2NM	FL 460 / FL 135			[Class A] *(2) (3)*
▲ DOLOX	044841N 1052247E					*(8)*
(10)		42.5NM	FL 460 / FL 135			[Class A] *(4)*
▲ DAMOG	041225N 1050014E					*(9)*
(10)		27.5NM	FL 460 / FL 135			[Class A] *(4)*
▲ DUBSA	034901N 1044540E					*(10)*
(10)		26.6NM	FL 460 / FL 135			[Class A] *(5)*
▲ VISAT	032620N 1043134E					*(11)*
(10)		21.7NM	FL 460 / FL 135			[Class A] *(5)*
▲ OTLON	030752N 1042006E					*(12)*
(10)		5.4NM	FL 460 / FL 135			[Class A] *(5)*
▲ RAXIM (WMFC/WSJC FIR BDRY)	030318N 1041713E					*(13)*
(10)		47.0NM	FL 460 / FL 135			[Class A] *(6)*
▲ MERSING DVOR/DME (VMR)	022318N 1035218E					

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:
P134.35 MHz
S133.6 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) NIL
(8) VMR 031°
170.6NM
(9) VMR 031°
128.1NM
(10) VMR 032°
100.6NM
(11) VMR 032°
74.0NM
(12) VMR 032°
52.4NM
(13) VMR 032°
47.0NM

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Route Designator {RNP Type}	[Route Usage Notes]					
Significant Point Name	Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M772	*Route availability:* (1) H24					
▲ LAXOR (WSJC/RPHI FIR BDRY)	094937N 1144829E					*(2)*
(10)	020° / -	147.5NM	FL 460 / FL 240		Even*(1)*	[Class A]
▲ BIDAG	073101N 1135544E					*(2)*
(10)	020° / -	97.9NM	FL 460 / FL 240		Even*(1)*	[Class A]
▲ ASISU (WBFC/WSJC FIR BDRY)	055906N 1132046E					*(3)*

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) NIL
(3) BRU 305°
113.3NM

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Route Designator {RNP Type}	[Route Usage Notes]					
Significant Point Name	Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M774	*Route availability:* (1) H24					
▲ TANJUNG PINANG VOR/DME (TPG)	005413N 1043052E					*(2)*
		148.1NM	FL 460 / 5500 FT ALT	Odd*(1)*	Even*(1)*	[Class A-ABV FL150 Class B-BLW FL150]
▲ OBDOS	002503N 1065551E					*(3)*
(10)		57.5NM	FL 460 / 5500 FT ALT	Odd*(1)*	Even*(1)*	[Class A-ABV FL150 Class B-BLW FL150]
KADAR (WSJC/WIIZ FIR BDRY)	000647S 1074342E					*(2)*

Route Remarks:
Lateral Limits:
25NM either side of line joining TPG to KADAR.

Singapore ACC FREQ:
P134.4 MHz
S128.1 MHz

Flight Planning:
Flights overflying Singapore to destinations north of Kuala Lumpur and Subang are to flight plan via KADAR M774 TPG A464 SJ G579 VJB Y342 AROSO Y339.

Flights overflying Singapore to land at Kuala Lumpur and Subang are to flight plan via KADAR M774 TPG A464 SJ G579 VJB A457.

Point/Segment Remarks:
(2) NIL
(3) TPG 101.3°
148.1NM

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Route Designator {RNP Type}	[Route Usage Notes]					
Significant Point Name	Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
M904	*Route availability:* (1) H24					
▲ TIDAR (WSJC/VTBB FIR BDRY)	065230.15N 1024959.82E					
		20.0NM	FL 460 / 6500 FT ALT	Odd(1)	Even(1)	[Class A (FL290 and ABV)] (2)
▲ ODONO	063613.82N 1030129.41E					
		33.0NM	FL 460 / FL 145	Odd(1)	Even(1)	[Class A (FL290 and ABV)] (2)
▲ UPRON	060903.41N 1032039.98E					
		93.0NM	FL 460 / FL 245	Odd(1)	Even(1)	[Class A (FL290 and ABV)] (2)
▲ ENREP	045223N 1041442E					

Route Remarks:
Singapore ACC FREQ:
P134.35 MHz
S133.6 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.

Lateral Limits: 25NM

Point/Segment Remarks:
(2) NIL

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
N502	*Route availability:* (1) H24					
▲ BOBAG (R243/24 DME SJ)	010230N 1032954E					*(2)*
	335° / -	105.3NM	FL 460 / FL 275		Even*(1)*	
▲ PARDI	003400S 1041300E					*(2)*

Route Remarks:
Lateral Limits:
10NM on the western side and 5NM on the eastern side of line joining BOBAG to PARDI.

Singapore ACC FREQ:
P134.4 MHz
S128.1 MHz

Point/Segment Remarks:
(2) NIL

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Route Designator {RNP Type} / Significant Point Name	[Route Usage Notes] Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
N875	*Route availability:* (1) H24					
▲ ENREP	045223N 1041442E					*(6)*
		44.1NM	FL 460 / FL 245	Odd*(1)*	Even*(1)*	[Class B] *(3)*
▲ NOPAT	042313N 1044756E					*(6)*
		16.3NM	FL 460 / FL 245	Odd*(1)*	Even*(1)*	[Class B] *(3)*
▲ DAMOG	041225N 1050014E					*(6)*
		20.6NM	FL 460 / FL 245	Odd*(1)*	Even*(1)*	[Class B] *(3)*
▲ SUSAR	035848N 1051547E					*(6)*
		21.8NM	FL 460 / FL 245	Odd*(1)*	Even*(1)*	[Class B] *(4)*
▲ MUMSO	034420N 1053213E					*(6)*
		21.3NM	FL 460 / FL 245	Odd*(1)*	Even*(1)*	[Class B] *(4)*
▲ ELGOR	033014N 1054818E					*(6)*
		23.6NM	FL 460 / FL 245	Odd*(1)*	Even*(1)*	[Class B] *(4)*
▲ LEBIN	031438N 1060604E					*(6)*
		79.5NM	FL 460 / FL 245	Odd*(1)*	Even*(1)*	[Class B] *(5)*
▲ BOBOB	022206N 1070558E					*(6)*
		29.9NM	FL 460 / FL 245	Odd*(1)*	Even*(1)*	[Class B] *(5)*
▲ ESPIT	020011N 1072624E					*(6)*
		48.3NM	FL 460 / FL 245	Odd*(1)*	Even*(1)*	[Class B] *(5)*
▲ NIMIX	012452N 1075926E					*(6)*
		72.4NM	FL 460 / FL 245	Odd*(1)*	Even*(1)*	[Class B] *(2)*
▲ ARUPA	003140N 1084846E					*(7)*

Route Remarks:
Lateral Limits:
25NM either side of line joining ENREP to ARUPA.

Point/Segment Remarks:
(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between NIMIX and ARUPA) within the Singapore FIR.
(3) Segment from ENREP to SUSAR use:
P123.7 MHz
S127.3 MHz
(4) Segment from SUSAR to LEBIN use:
P134.7 MHz
S134.15 MHz
(5) Segment from LEBIN to NIMIX use:
P134.2 MHz
S133.35 MHz
(6) NIL
(7) PNK 316°
49.6NM

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Route Designator {RNP Type}	[Route Usage Notes]					
Significant Point Name	Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	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					*(5)*
(10)		246.6NM	FL 460 / 6500 FT ALT			[Class A] *(2)*
◭ LAGOT	071632N 1113243E					*(5)*
(10)		354.3NM	FL 460 / 6500 FT ALT			[Class A] *(2)*
▲ LUSMO	033341N 1065534E					*(6)*
(10)		53.0NM	FL 460 / 6500 FT ALT			[Class A] *(3)*
▲ LEBIN	031438N 1060604E					*(7)*
(10)		58.5NM	FL 460 / 6500 FT ALT			[Class A] *(3)*
▲ LIPRO	025342N 1051128E					*(8)*
(10)		34.2NM	FL 460 / 6500 FT ALT			[Class A] *(3)*
▲ LENDA (WSJC/WMFC FIR BDRY)	024124N 1043932E					*(9)*
(10)		50.6NM	FL 460 / 6500 FT ALT			[Class A] *(4)*
▲ MERSING DVOR/DME (VMR)	022318N 1035218E					

Route Remarks:

Lateral Limits:

5NM either side of line joining VMR DVOR/DME to LUSMO funnelling out at an angle of 5° from VMR to 25NM of either side of track. It then continues at this width until LAXOR.

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.

Not available for flight planning between VMR and LUSMO. Flight Plan via TOMAN L625 LUSMO.

Point/Segment Remarks:

(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between LUSMO and LAXOR) within the Singapore FIR.

(3) Segment from LUSMO to LENDA use:
P134.7 MHz
S134.15 MHz

(4) Segment from LENDA to VMR use:
P133.8 MHz
S127.3 MHz

(5) NIL

(6) VMR 069°
196.3NM

(7) VMR 069°
143.3NM

(8) VMR069°
84.8NM

(9) VMR 069°
50.6NM

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Route Designator {RNP Type}	[Route Usage Notes]					
Significant Point Name	Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
N891	*Route availability:* (1) H24					
▲ IGARI	065612N 1033506E					*(6)*
		65.4NM	FL 460 / FL 155	Odd*(1)*	Even*(1)*	[Class A] *(2)*
▲ IKUMI	055338N 1035509E					*(6)*
		64.0NM	FL 460 / FL 155	Odd*(1)*	Even*(1)*	[Class A] *(2)*
▲ ENREP	045223N 1041442E					*(7)*
		75.5NM	FL 460 / FL 155	Odd*(1)*	Even*(1)*	[Class A] *(3)*
▲ UGPEK	033647N 1040752E					*(8)*
		11.7NM	FL 460 / FL 155	Even*(1)*	Odd*(1)*	[Class A] *(3)*
▲ URIGO	032505N 1040647E					*(9)*
		10.6NM	FL 460 / FL 155	Even*(1)*	Odd*(1)*	[Class A] *(3)*
▲ MANIM (WMFC/WSJC FIR BDRY)	031431N 1040553E					*(10)*
		2.6NM	FL 460 / FL 155	Even*(1)*	Odd*(1)*	[Class A] *(4)*
▲ OBDAB	031153N 1040538E					*(11)*
		106.4NM	FL 460 / FL 155	Even*(1)*	Odd*(1)*	[Class A] *(4)*
▲ PAPA UNIFORM DVOR/DME (PU)	012523.99N 1035559.74E					*(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

Lateral Limits:
5NM either side of line joining PU DVOR/DME to ENREP funnelling out at an angle of 5° from PU to 25NM of either side of track. It then continues at this width until WSJC/VVTS FIR BDRY.

Point/Segment Remarks:
(2) Segment from IGARI to ENREP use:
P134.35 MHz
S133.6 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.
(6) NIL
(7) PU 005°
206.8NM
(8) PU 005°
131.3NM
(9) PU 005°
119.6NM
(10) PU 005°
109.0NM
(11) PU 005°
106.4NM

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit / Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
N892	*Route availability:* (1) H24					
MELAS (VVTS/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	025229N 1042805E					*(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					

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.

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:
P134.35 MHz
S133.6 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} / Significant Point Name	[Route Usage Notes] Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ / ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
P501	*Route availability:* (1) H24					
▲ ARAMA (50DME SJ) (delegated airspace BDRY)	013654N 1030712E					*(6)*
	146° / -	25.0NM	FL 460 / 9500 FT ALT	Odd*(1)*		[Class A-ABV FL150 Class B-BLW FL150] *(2) (3)*
▲ ANBUS (WMFC/WSJC FIR BDRY)	011556N 1032102E					*(6)*
	146° / -	16.0NM	FL 460 / 9500 FT ALT	Odd*(1)*		[Class A-ABV FL150 Class B-BLW FL150] *(2) (3)*
▲ BOBAG (R243/24 DME SJ)	010230N 1032954E					*(6)*
	133° / -	114.1NM	FL 460 / FL 275	Odd*(1)*		*(4) (5)*
▲ ANITO	001700S 1045200E					*(6)*

Point/Segment Remarks:

(2) **Lateral Limits:**
10NM on the western side and 5NM on the eastern side of line joining ARAMA to BOBAG.

(3) Singapore ACC FREQ:
P133.25 MHz
S135.8 MHz

(4) **Lateral Limits:**
10NM on the western side and 5NM on the eastern side of line joining BOBAG to ANITO.

(5) Singapore ACC FREQ:
P134.4 MHz
S128.1 MHz

(6) NIL

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
Q801	*Route availability:* (1) H24					
▲ ESPOB (VVTS/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.

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:
P134.35 MHz
S133.6 MHz

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit / Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
Q802	*Route availability:* (1) H24					
▲ IPRIX (VVTS/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:
P134.35 MHz
S133.6 MHz

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
Q803	*Route availability:* (1) H24					
▲ UPRON	060903.41N 1032039.98E					
		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:
P134.35 MHz
S133.6 MHz

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
T611	*Route availability:* (1) H24					
▲ IPRIX (VVTS/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

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*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

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Route Designator {RNP Type}	[Route Usage Notes]					
Significant Point Name	Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
Y332	*Route availability:* (1) H24					
▲ TAXUL (WSJC/WMFC FIR BDRY)	035035N 1034037E					(2)
	192° / -	42.1NM	FL 460 / FL 245	Even(1)		
▲ PADLI	030918N 1033133E					(2)

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:
(2) NIL

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
Y333	*Route availability:* (1) H24					
▲ BUVAL (WMFC/WSJC FIR BDRY)	033622N 1034341E					*(2)*
	024° / -	29.5NM	FL 460 / FL 245		Odd*(1)*	
▲ PADLI	030918N 1033133E					*(2)*

Route Remarks:
Lateral Limits:
10NM either side of line joining PADLI to BUVAL.

Singapore ACC FREQ:
P123.7 MHz
S127.3 MHz

Point/Segment Remarks:
(2) NIL

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ / ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
Y334	*Route availability:* (1) H24					
▲ DOVOL (WSJC/WMFC FIR BDRY)	033047N 1034923E					*(2)*
	219° / -	27.8NM	FL 460 / FL 245	Even*(1)*		
▲ PADLI	030918N 1033133E					*(2)*

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:
(2) NIL

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*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					
	057° / 237°	28.5NM	FL 460 / FL 245	Even(1)	Odd(1)	(2)
▲ 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:
(2) NIL

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*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					
	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

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Route Designator {RNP Type}	[Route Usage Notes]					
Significant Point Name	Significant Point Coordinates					Remarks
{RNP Type}	Initial Track MAG ↓ ↑	Great Circle Dist NM	Upper limit / Lower limit	FL series ↓	FL series ↑	Controlling unit Frequency {Airspace class} Remarks
1	2	3	4	5	6	7
Y339	*Route availability:* (1) H24					
Δ AKOMA (20 DME PU)	014522N 1035443E					
(5)		38.3NM	FL 460 / 5500 FT ALT	Even(1)		[Class A-ABV FL150 Class B-BLW FL150]
Δ AROSO	020846N 1032421E					

Route Remarks:
Lateral Limits:
11.5NM either side of line joining AKOMA to AROSO.

Flight Planning
Flight planning permitted for flights departing from or overflying Singapore to destinations north of Kuala Lumpur and Subang airports.
Flight planning to operate at FL220 and below to flight plan on A457.

Singapore ACC FREQ:
P133.25 MHz
S135.8 MHz

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Route Designator {RNP Type}		*[Route Usage Notes]*					
	Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}		*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit* / *Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		2	3	4	5	6	7
Y342		*Route availability:* (1) H24					
▲	JOHOR BAHRU DVOR/DME (VJB)	013950.4N 1033939.2E					
(5)			32.6NM	FL 460 / 4500 FT	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.

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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Initial Track MAG* ↓ ↑	*Great Circle Dist NM*	*Upper limit / Lower limit*	*FL series* ↓	*FL series* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
Y514	*Route availability:* (1) H24					
Δ VIRID	031728.05N 1031318.04E					
(2)		34.57	FL 460 / FL 235	Odd(1)		[Class A] (2)
▲ NUFFA	025341.40N 1033829.80E					

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:
(2) NIL

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ENR 3.4 HELICOPTER ROUTES

1 HELICOPTER OPERATIONS OVER SINGAPORE ISLAND

1.1 INTRODUCTION

1.1.1 The rapid building development in many parts of Singapore has made it necessary for helicopter operations to be more stringently regulated in order to enhance safety. All helicopter operators are required to adhere strictly to the following procedures.

1.2 RESTRICTED AREA -SINGLE-ENGINE HELICOPTER OPERATIONS RESTRICTED

1.2.1 Single-engine helicopters are restricted from operating over and within the city area enclosed in the triangle bounded by the following locations:

a. South of Rochor River/Kallang River (011817N 1035205E);
b. Shenton Way/Keppel Road (011623N 1035045E); and
c. Scotts Road/Orchard Road (011818N 1034954E).

Part of this triangle lies within the existing Restricted Area WSR38 (see charts ENR 3.4-5 and ENR 3.4-7).

1.3 ROUTEINGS

1.3.1 All helicopters must fly over water or use routes approved by the CAAS. There are two over-water and one over-land helicopter routes.

1.3.2 These helicopter routes are to be flown in VMC and in daylight hours. They could either be flown separately or in combination (see chart ENR 3.4-5).

1.4 OVER-WATER ROUTES

1.4.1 One of the two over-water routes is to the north of Singapore Island for helicopter flights into and out of Seletar Aerodrome. The other route is along the southern shore of Singapore. They are as described below.

1.4.1.1 **Heli-Route Alpha**

This route covers the area from Johor Causeway eastbound over water along Selat Johor, following the coastline of Singapore Island via the northern contour of Pulau Ubin and along the eastern coastline, down to Bedok Jetty (011819N 1035632E) and vice versa. Within the vicinity of Changi Naval Base (CNB), transiting helicopters are to keep laterally clear by tracking along the following markers located about 1km from the Naval Base (see table below and diagram on page ENR 3.4-2).

	Markers Description	*Coordinates*	*Remarks*
a)	CHANGI BEACON	011909N 1040206E	White lights, 3 flashes every 15 sec
b)	BUOY CNB-04	011844N 1040224E	Yellow buoy, 3m above waterline Yellow lights, 1 flash every 2 sec
c)	BUOY CNB-03	011809N 1040224E	Yellow buoy, 3m above waterline Yellow lights, 1 flash every 2 sec
d)	BUOY CNB-02	011806N 1040100E	Yellow buoy, 3m above waterline Yellow lights, 1 flash every 2 sec
e)	BUOY CNB-01	011829N 1040059E	Yellow buoy, 3m above waterline Yellow lights, 1 flash every 2 sec
f)	Singapore Armed Forces Yacht Club Jetty	011851N 1040058E	Yellow lights, 3 lamp posts along jetty
Note: Pilots are to adhere strictly to the above transit routes.			

Height: Minimum 200ft AMSL or as specified by the appropriate air traffic control authority.

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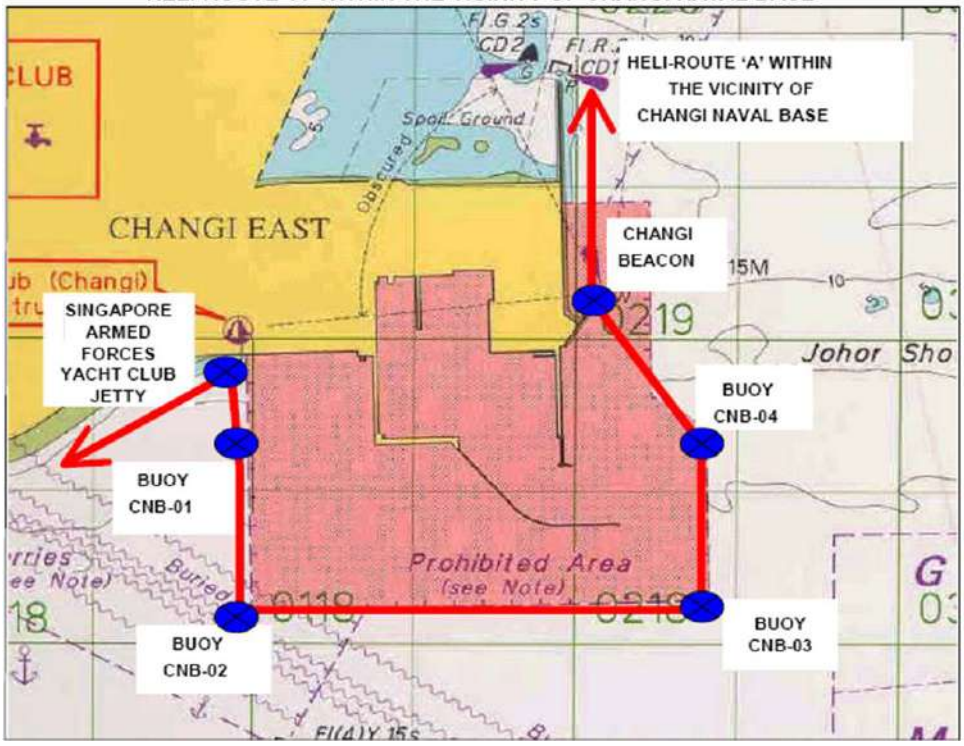
HELI-ROUTE 'A' WITHIN THE VICINITY OF CHANGI NAVAL BASE



1.4.1.2 **Heli-Route Bravo**

Originates from Bedok Jetty (011819N 1035632E), following the coastline of Singapore Island via the southern tip and contour of Sentosa towards Tuas and vice versa.

Height : Minimum 200ft AMSL or as specified by the appropriate air traffic control authority.

1.5 OVER-LAND ROUTE

1.5.1 The over-land transit route established to facilitate helicopter movements across the Singapore Island is as follows:

1.5.1.1 **Heli-Route Charlie**

Originates from Johor Causeway, southbound to Murnane Reservoir (012104N1034710E) along the eastern side of Bukit Timah Expressway. From Murnane Reservoir to Pandan Reservoir (011855N1034436E) and vice versa. To avoid overflying built-up areas en-route by routing over open areas / nature reserve areas. Height: Minimum 1,500ft AMSL or as specified by the appropriate air traffic control authority.

1.6 CONDITIONS GOVERNING THE USE OF HELI-ROUTE CHARLIE

1.6.1 The over-land route is established based on evidence of ground features and is therefore subject to CAAS's review. Approval to use the route is given with the following conditions:

a. The operator is fully satisfied that the route can be flown within the flight capability of the helicopter and that there are adequate suitable emergency landing sites along the route when in use. It remains the responsibility of the operator to ensure that his pilots are familiar with the route and the conditions governing them.
b. The route is to be flown in VMC and in daylight hours.
c. Prior ATC clearance from the appropriate controlling authority must be obtained.

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1.7 FLIGHTS OPERATING OUTSIDE THE ESTABLISHED ROUTEINGS

1.7.1 With the exception of an emergency situation, at all times, a helicopter shall not be operated within the Changi Control Zone or overland and outside of Heli-Route Charlie, unless prior permission has been obtained from the Director-General, CAAS.

1.7.2 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.

1.7.3 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.

1.8 FLIGHT PLAN REQUIREMENTS

1.8.1 For Flight Plan requirements, refer to ENR 1.10 FLIGHT PLANNING.

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2 PROCEDURES FOR THE CONTROL OF HELICOPTER OPERATIONS AT SINGAPORE CHANGI AIRPORT

2.1 APPROACH AND DEPARTURE PROCEDURES

2.1.1 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.

2.1.2 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.

2.1.3 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.

2.1.4 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.

2.2 GROUND OR AIR TAXIING

2.2.1 After landing, the helicopter is required either to ground or air taxi via the taxiways into its allocated aircraft stand.

2.2.2 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.

2.3 ALLOCATION OF AIRCRAFT STANDS

2.3.1 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.

2.3.2 Helicopter ferrying passengers will normally be allocated remote aircraft stands, i.e. stands without aerobridges.

2.4 RADIO FAILURE PROCEDURE

2.4.1 In the event of radio failure, the helicopter affected if on the ground shall not take-off

2.4.2 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 1.1-12, Appendix ‘A’.

2.5 NIGHT OPERATIONS BY HELICOPTERS

2.5.1 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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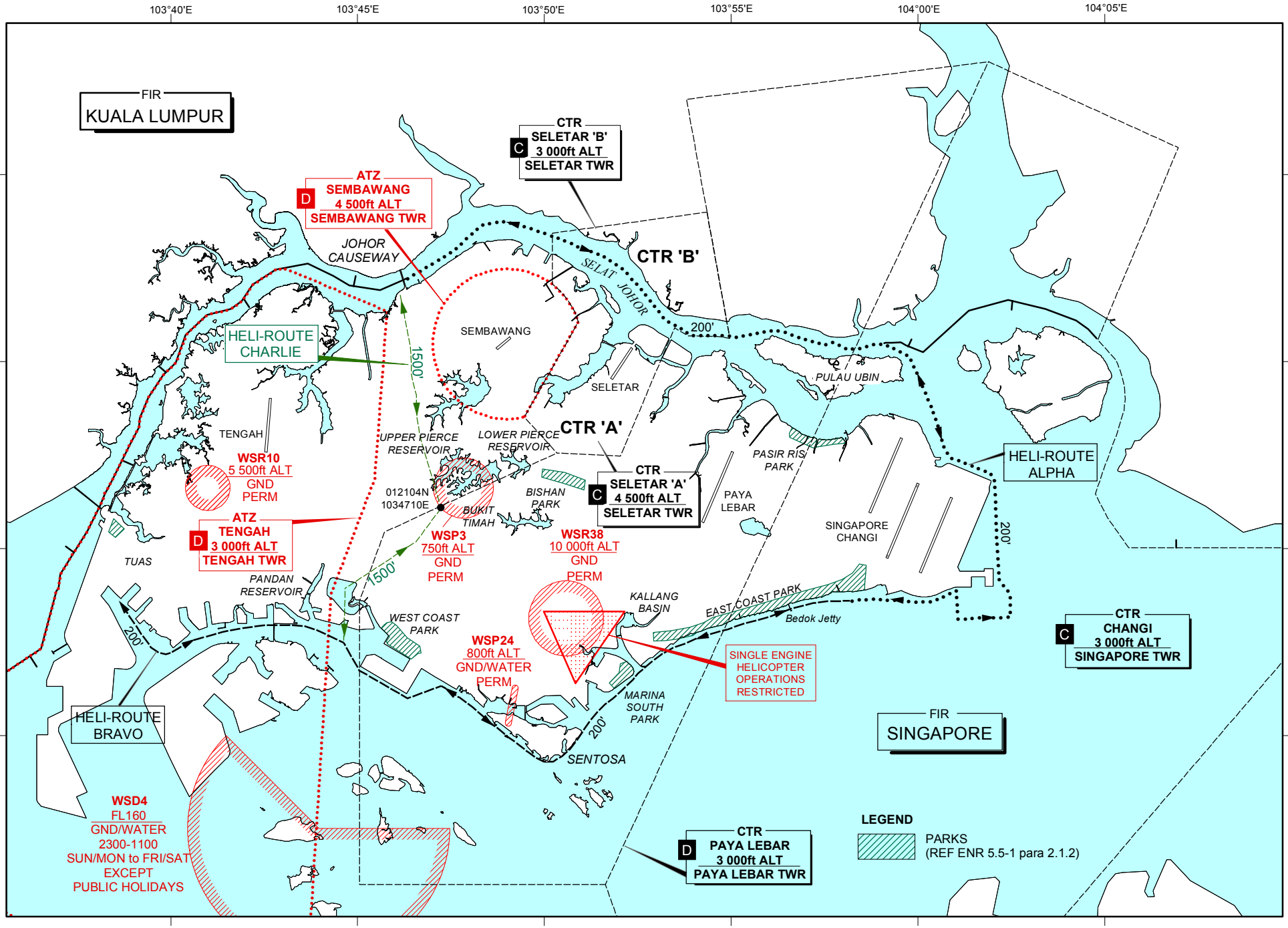
HELICOPTER ROUTES IN VMC



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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

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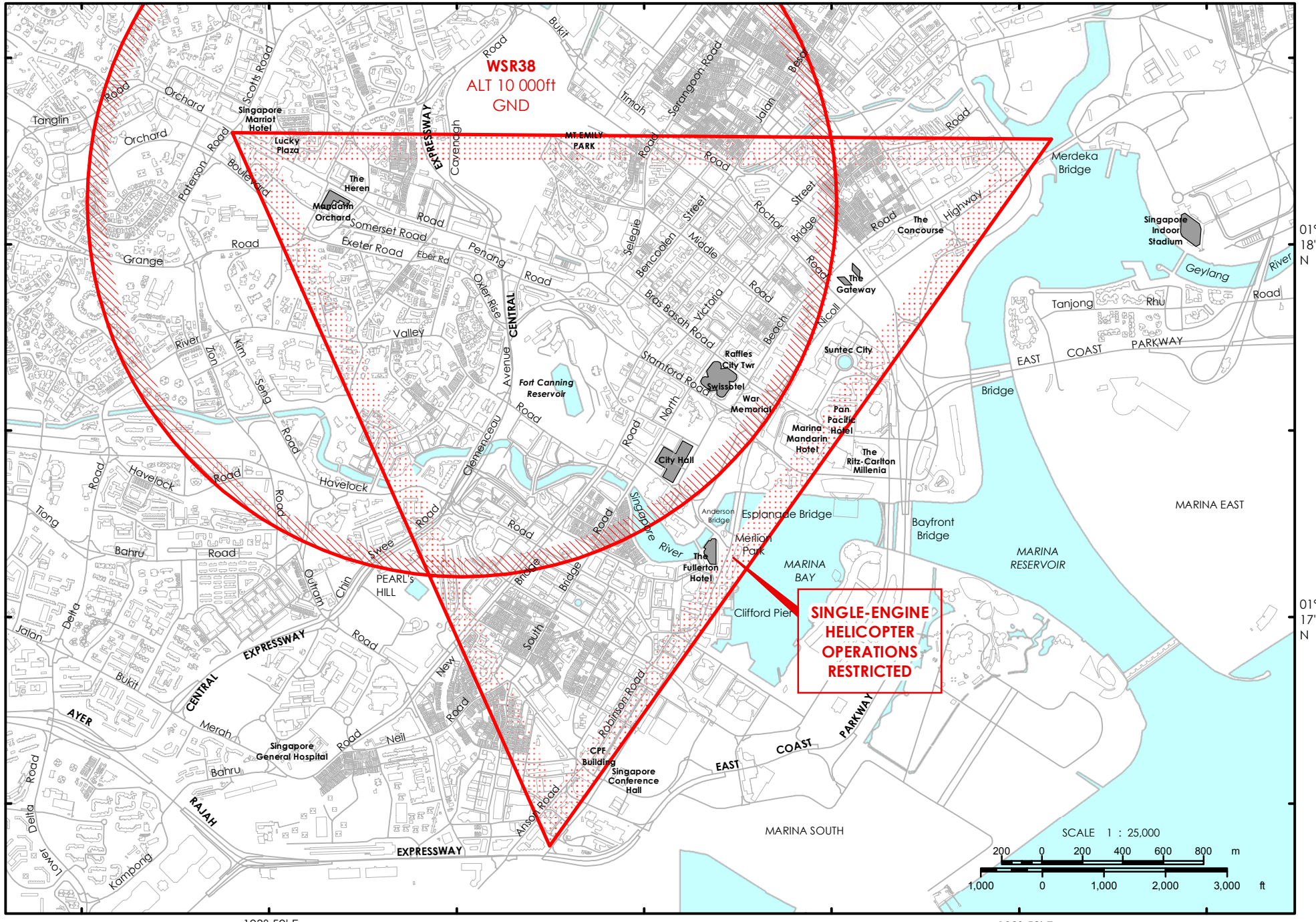
RESTRICTED AREA-SINGLE-ENGINE HELICOPTER OPERATIONS RESTRICTED



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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 (011600N 1034340E) on track of 110° MAG to the northern tip of Lazarus Island (SINJON). Thereafter, the track is 089° MAG to Point “E1” (10 DME SJ) and then direct to NEXUS [34 DME SJ R-077 (23 DME VTK R-100)] (012048N 1042424E).

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 (011545N 1034200E) 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” (011221N 1040121E) and then direct to SIERRA (011830N 1042600E).

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 (011045N 1035356E). 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.

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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.

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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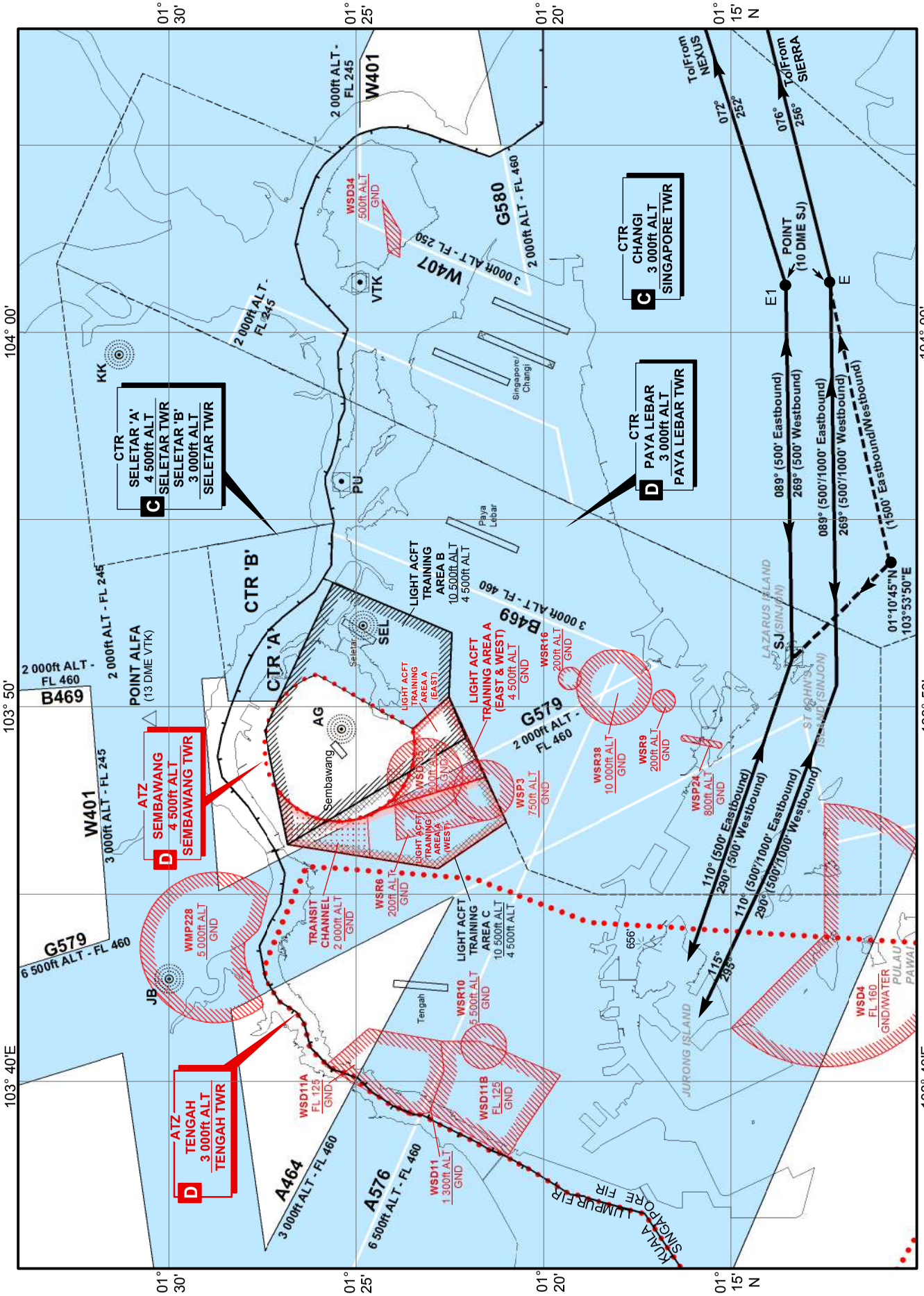
VMC CROSSING BY MILITARY AIRCRAFT



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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

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ENR 3.6 ENROUTE HOLDING

HLDG ID/FIX/WPT Coordinates	*INBD TR (°Mag)*	*Direction of Procedure Turn*	*MAX IAS*	*MNM-MAX HLDG Level*	*Time (min)*	*Controlling Unit and Frequency*
1	2	3	4	5	6	7
BOBAG 38.6 DME VTK R-234.7 24.0 DME SJ R-243.2 010230N 1032954E	083	Right	250kt*	FL 140 6000 FT ALT	1	Singapore ACC 124.05 MHz (PRI) 124.6 MHz (SRY)
BOBAG 38.6 DME VTK R-234.7 24.0 DME SJ R-243.2 010230N 1032954E	083	Right	250kt*	FL 180 FL 150	1	Singapore ACC 133.25 MHz (PRI) 135.8 MHz (SRY)
ELALO 041240N 1043329E	174	Left	300kt	FL 350 FL 280	1.5	Singapore ACC 123.7 MHz (PRI) 127.3 MHz (SRY)
HOSBA (HHA) - Low Level 34 DME SJ R-079 24 DME VTK R-103 011947.8N 1042417.5E	259	Right	230kt*	FL 140 7000 FT ALT	1	Singapore ACC 120.3 MHz (PRI) 124.6 MHz (SRY)
HOSBA (HHA) - High Level 34 DME SJ R-079 24 DME VTK R-103 011947.8N 1042417.5E	259	Right	265kt*	FL 250 FL 150	1.5	Singapore ACC 134.4 MHz (PRI) 128.1 MHz (SRY) 255.4 MHz
IKIMA - High Level 67.9 DME VTK R-127.6 70.5 DME SJ R-115.1 004314N 1045500E	291	Right	250kt*	FL 250 FL 150	1.5	Singapore ACC 134.4 MHz (PRI) 128.1 MHz (SRY)
KARTO - High Level 93.5 DME VTK R-098.3 102.6 DME SJ R-091.1 011124N 1053343E	269	Left	280kt*	FL 310 FL 260	1.5	Singapore ACC 134.2 MHz (PRI) 133.35 MHz(SRY)
KILOT 030217N 1044023E	227	Left	250kt	FL 270 FL 220	1.5	Singapore ACC 134.7 MHz (PRI) 134.15 MHz (SRY)
LAMA - Low Level 7 DME PU R-024 013149.5N 1035850.3E	204	Right	230kt*	FL 140 2500 FT ALT	1	Singapore ACC 120.3 MHz (PRI) 124.6 MHz (SRY)
LAVAX - Low Level 36 DME SJ R-095.5 010950N 1042714E	269	Left	220kt	FL 140 7000 FT ALT	1	Singapore ACC 120.3 MHz (PRI) 124.6 MHz (SRY)
MABAL - High Level 142.1 DME VTK R-030.1 157.2 DME SJ R-031.2 032826N 1051236E	231	Left	300kt*	FL 350 FL 280	1.5	Singapore ACC 123.7 MHz (PRI) 127.3 MHz (SRY)
NYLON (NHA) - Low Level 13 DME VTK R-023 013656.9N 1040623.8E	203	Left	220kt*	FL 140 3000 FT ALT	1	Singapore ACC 120.3 MHz (PRI) 124.6 MHz(SRY)
NYLON (NHA) - High Level 13 DME VTK R-023 013656.9N 1040623.8E	203	Left	265kt*	FL 250 FL 150	1.5	Singapore ACC 120.3 MHz (PRI) 124.6 MHz (SRY)
REMES- Low Level 30 DME SJ R-168 004342N 1035735E	348	Right	220kt	FL 140 6000 FT ALT	1	Singapore ACC 120.3 MHz (PRI) 124.6 MHz (SRY)
REPOV- High Level 68.2 DME VTK R-178.6 57.9 DME SJ R-168.3 001623N 1040300E	348	Left	250kt*	FL 250 FL 150	1.5	Singapore ACC 134.4 MHz (PRI) 128.1 MHz(SRY)

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HLDG ID/FIX/WPT Coordinates	*INBD TR (˚Mag)*	*Direction of Procedure Turn*	*MAX IAS*	*MNM-MAX HLDG Level*	*Time (min)*	*Controlling Unit and Frequency*
1	2	3	4	5	6	7
SAMKO (SHA)- Low Level 8 DME SJ R-168 21 DME VTKR-203.5 010529.5N 1035254.9E	348	Left	220kt*	FL 140 4000 FT ALT	1	Singapore ACC 120.3 MHz (PRI) 124.6 MHz (SRY)
SAMKO (SHA)- High Level 8 DME SJ R-168 21 DME VTK R-203.5 010529.5N 1035254.9E	348	Left	265kt*	FL 250 FL 150	1.5	Singapore ACC 120.3 MHz (PRI) 124.6 MHz (SRY)
SINJON - Low Level SJ DVOR/DME 011319.28N 1035120.08E	348	Right	230kt*	FL 140 4500 FT ALT	1	Singapore ACC 120.3 MHz (PRI) 124.6 MHz (SRY)

* Maximum speed of 280kt in conditions of turbulence subject to ATC clearance.

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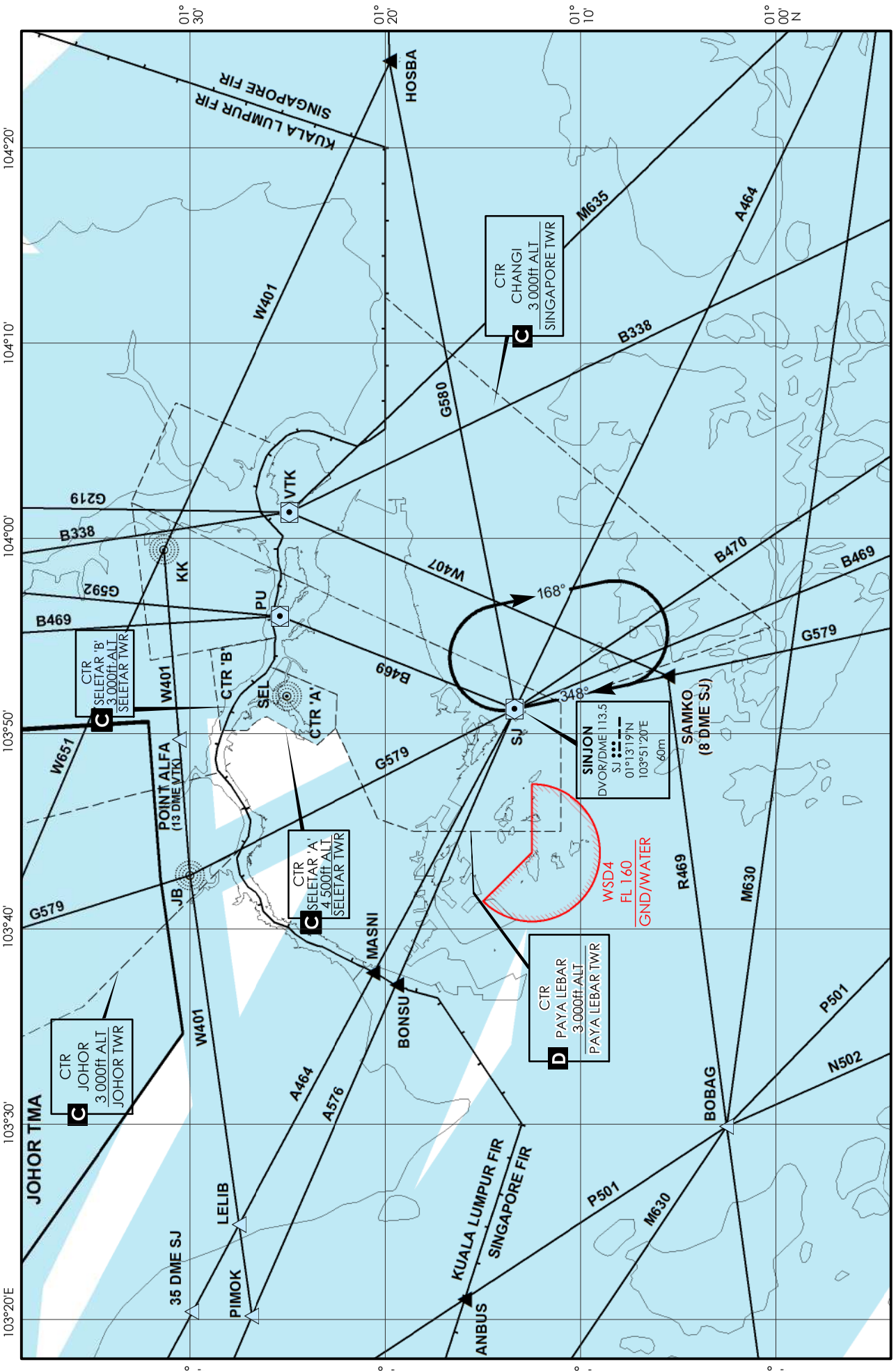
SINJON DVOR/DME LOW LEVEL HOLDING AREA



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CHANGES : Reprint.

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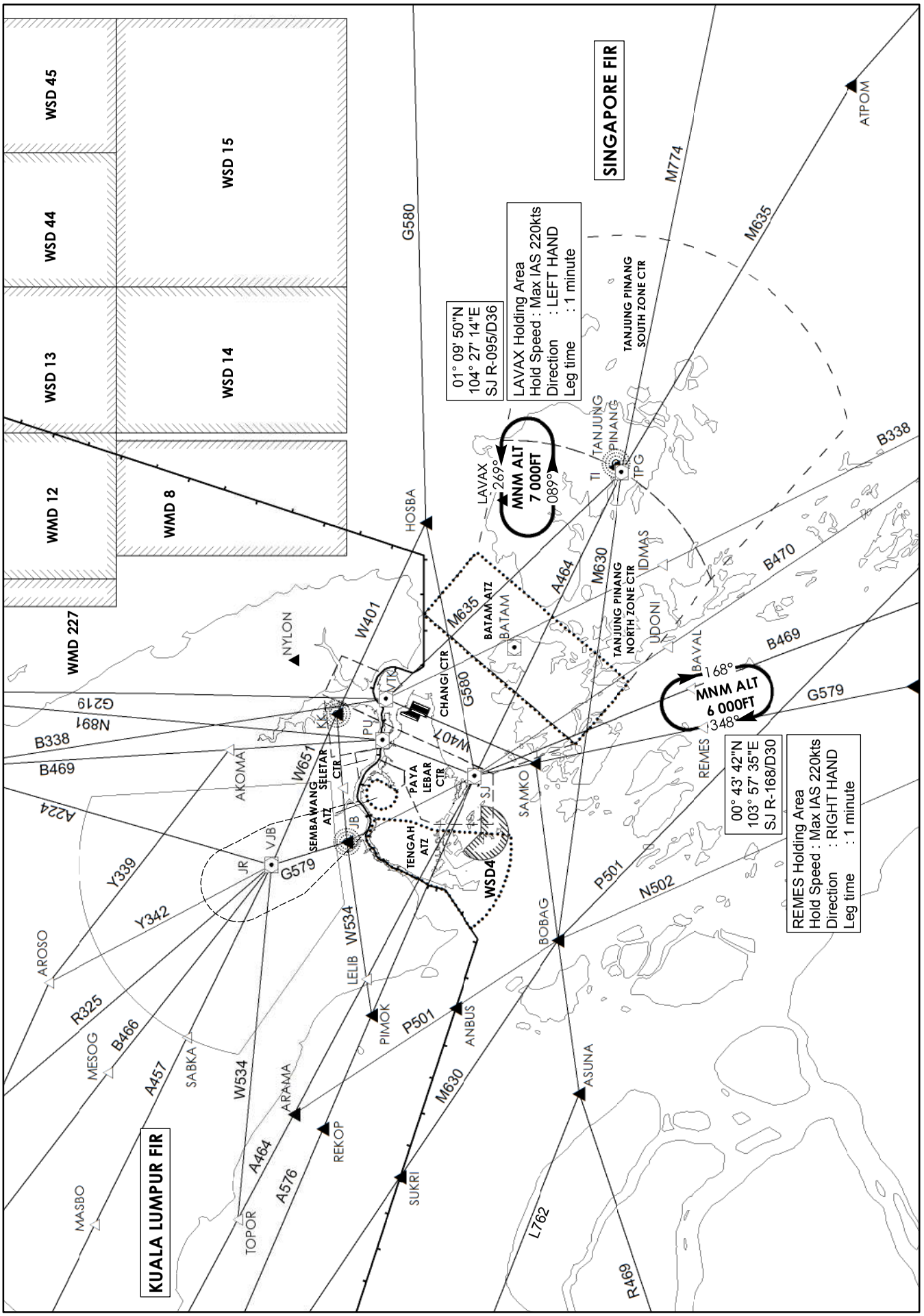
REMES AND LAVAX LOW LEVEL HOLDING AREAS



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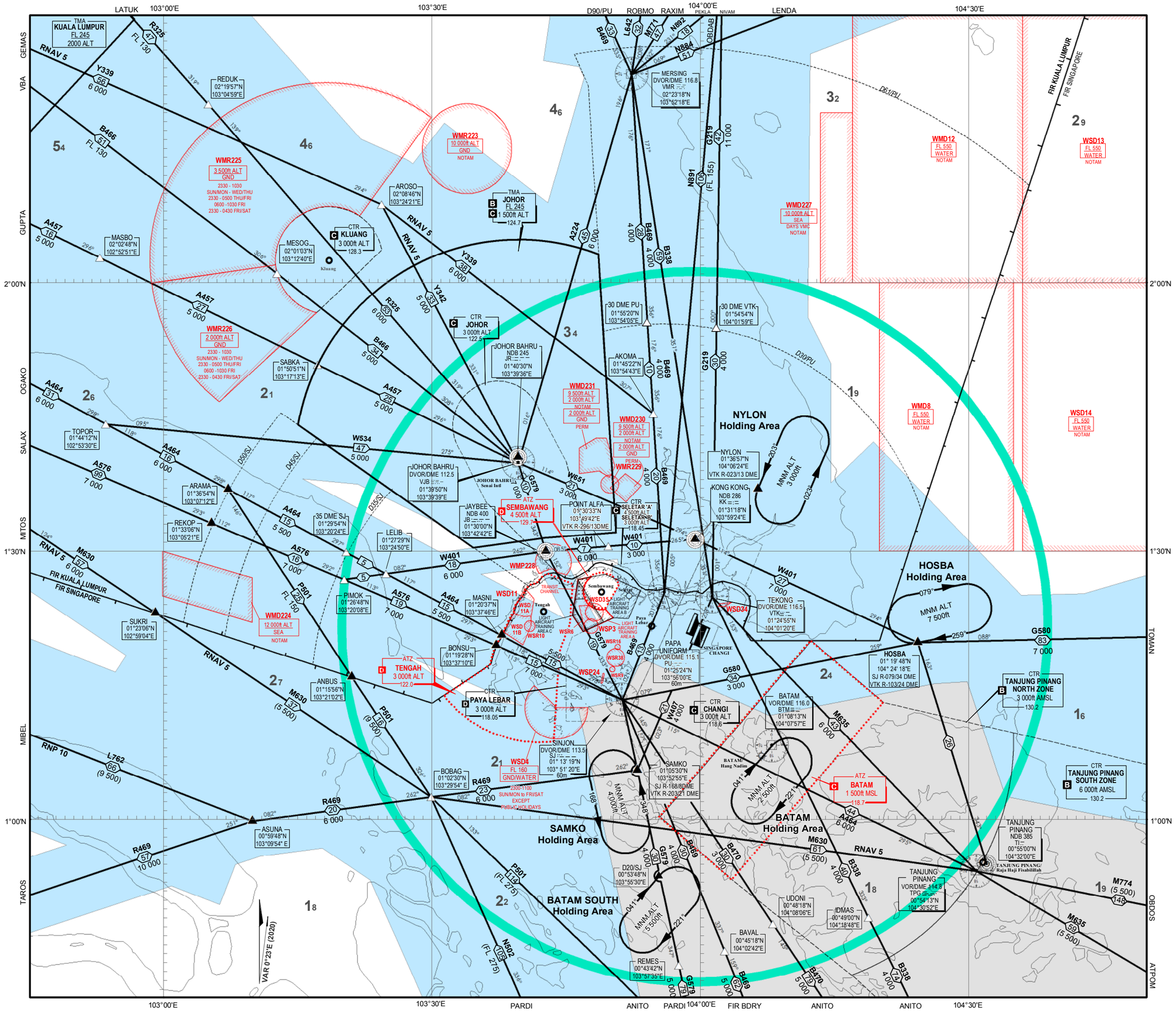
AREA CHART - ICAO

SINGAPORE/JOHOR AIRSPACE COMPLEX
LOW LEVEL HOLDING AREAS



LEGEND

Terminal Control Area (TMA)	Name of TMA; Airspace Classification; Upper Limit; Lower Limit; Radio frequency(ies) — e.g. TMA JOHOR, B FL 145, C 1 500ft, 124.7
Control Zone (CTR)	Name of CTR; Airspace Classification; Upper Limit; Radio frequency(ies) — e.g. CTR CHANGI, C, 3 000ft, 118.6m
Aerodrome Traffic Zone (ATZ)	Name of ATZ; Airspace Classification; Upper Limit; Radio frequency(ies) — e.g. 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 — e.g. B469, 20, 4 000/FL 160, (4 000)/(FL 160)
Oceanic Control Area (OCA)	
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 — e.g. SINJON DVOR/DME 113.5, SJ 01° 13' 21"N 103° 51' 15"E, 60m
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 — e.g. 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 **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-18 AND AD-2-WSSS-STAR-1 TO AD-2-WSSS-STAR-9, AD-2-WSSS-STAR-11, AD-2-WSSS-STAR-13 TO AD-2-WSSS-STAR-21

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

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	200ft ALT / GND	Permanently Active as in ENR 5
WSR16	Helicopter Operations	200ft 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
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

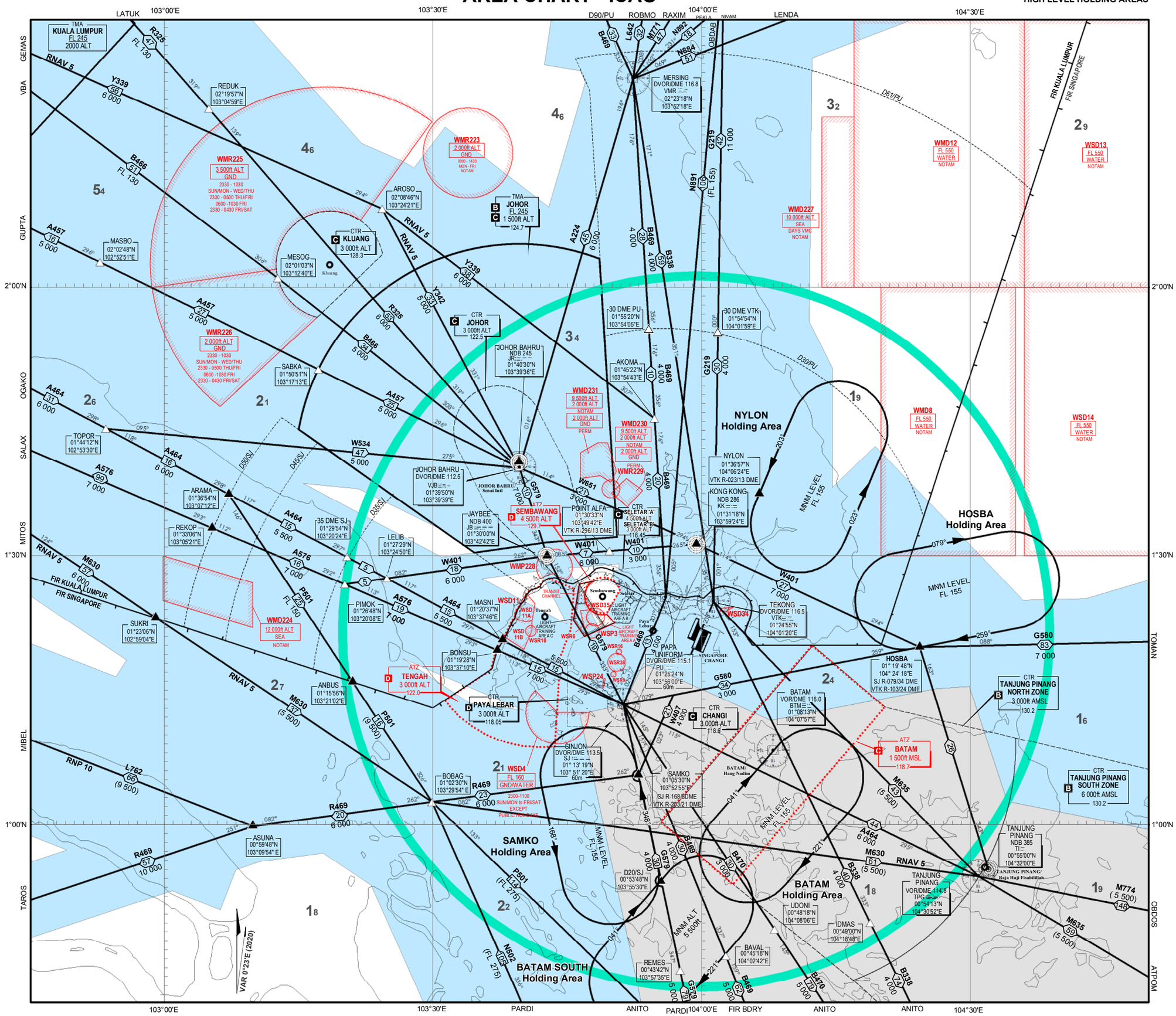
i) PILOTS FLYING AT LOW ALTITUDES SHOULD WATCH OUT FOR POSSIBLE HAZARDS SUCH AS MODEL AIRCRAFT AND KITES, ESPECIALLY WHEN FLYING NEAR PARKS AND OPEN GROUND.

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.

AREA CHART - ICAO

SINGAPORE/JOHOR AIRSPACE COMPLEX
HIGH LEVEL HOLDING AREAS



LEGEND

Terminal Control Area (TMA)
Name of TMA
Airspace Classification
Upper Limit
Lower Limit
Radio frequency(ies)
Example: TMA JOHOR B FL 145 C 1 500ft 124.7

Control Zone (CTR)
Name of CTR
Airspace Classification
Upper Limit
Radio frequency(ies)
Example: CTR C CHANGI 3 000ft 118.6m

Aerodrome Traffic Zone (ATZ)
Name of ATZ
Airspace Classification
Upper Limit
Radio frequency(ies)
Example: ATZ D TENGAH 3 000ft 122.0

ATS Routes
Route designator
Distance in nautical miles
Minimum flight altitude (ft)/flight level
Lower limit (ft)/flight level
Example: B469 20 4 000/FL 160 (4 000)/(FL 160)

Oceanic Control Area (OCA)

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
Example: SINJON DVOR/DME 113.5 SJ 01° 13' 21"N 103° 51' 15"E 60m

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
Example: WSD13 FL 400 WATER NOTAM
NOTE :- See flip side for details of designated areas

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		ARR	128.025
	APP	DEP	120.3
		ARR	119.3
		APP	124.05
	TWR		118.6
			118.25

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

Nautical Miles 10 0 10 20 30 40
Kilometers 10 0 10 20 30 40 50 60 70 80

PROHIBITED, RESTRICTED AND DANGER AREAS

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WSP3	-	750ft ALT / GND	Permanently Active as in ENR 5
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* In Transit Channel

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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.

ENR 4 RADIO NAVIGATION AIDS/SYSTEMS

ENR 4.1 RADIO NAVIGATION AIDS - ENROUTE

Name of station (VOR/VAR)	*Id*	*Frequency (CH)*	*Hours of operation*	*Co-ordinates*	*ELEV DME antenna*	*Remarks*
1	2	3	4	5	6	7
BATAM/ HANG NADIM VOR/DME	BTM	116.0 MHz (CH 107X)	from 00:00 to 12:00	010812.77N 1040757.32E	-	Operating Authority: Directorate-General of Civil Aviation, Indonesia. PPR outside OPR HR. EM: A2A (DVOR/DME)
BATAM/ HANG NADIM NDB	BM	370 kHz	from 00:00 to 12:00	010716.54N 1040638.07E	-	Operating Authority: Directorate-General of Civil Aviation, Indonesia. PPR outside OPR HR. EM: Non/A2A (NDB)
JAYBEE NDB	JB	400 kHz	H24	012959.77N 1034241.82E (Johor Bahru)	-	BRG 298° DIST 19.6km from ARP Seletar. Coverage 50NM. Unusable 285°-060° beyond 20NM. Bearing fluctuations greater than +/- 10° may be observed in sector 138° to 148°. EM: A0/A2
JOHOR BAHRU DVOR/DME	VJB	112.5 MHz (CH 72X)	H24	013950.4N 1033939.2E	43.07 M	Operating Authority: Department of Civil Aviation Malaysia
JOHOR BAHRU NDB	JR	245 kHz	H24	014030N 1033936E	-	Operating Authority: Department of Civil Aviation Malaysia EM: A0/A2 (NDB)
KONG KONG NDB	KK	286 kHz	H24	013117.76N 1035923.69E	-	BRG 049° DIST 17.7km from ARP Seletar. Coverage 50NM. Unusable 270°-010° beyond 30NM. Bearing fluctuations greater than +/- 10° may be observed in sector 048° to 052°. EM: A0/A2
MERSING DVOR/DME	VMR	116.8 MHz (CH 115X)	H24	022318N 1035218E	-	Operating Authority: Department of Civil Aviation Malaysia. 50w
PAPA UNIFORM DVOR/DME	PU	115.1 MHz (CH 98X)	H24	012523.99N 1035559.74E	Antenna HGT: 190 FT AMSL	BRG 020° DIST 9km from THR RWY 02 (Paya Lebar). MAINT Period: Third WED of EV month BTN 0200-0600 Coverage 200NM. EM: F1
PAYA LEBAR TACAN	PLA	(CH 110X)	BTN 2300-1100 SUN/MON to THU/FRI; BTN 2300-0500 FRI/SAT; PPR from RSAF HQ via Paya Lebar OPS at other times.	012224N 1035451E	-	BRG 015° DIST 1.5km from ARP. MAINT Period: Second THU of EV month BTN 0001-1100
SELETAR NDB	SEL	220 kHz	H24	012449N 1035210E	-	BRG 152° DIST 0.44km from ARP. Coverage 50NM. EM: A0/A2
SEMBAWANG NDB	AG	325 kHz	H24	012524N 1034924E	-	BRG 198° DIST 0.54km from ARP. MAINT Period: Second FRI of EV month BTN 0200-0400. Coverage 30NM. EM: A3
SINJON DVOR/DME	SJ	113.5 MHz (CH 82X)	H24	011319N 1035120E	Antenna HGT: 150 FT AMSL	BRG 201° DIST 14.5km from THR RWY 02 (Paya Lebar Airport). MAINT Period: Third THU of EV month BTN 0200-0600. Coverage 200NM. EM: F1
TANJUNG PINANG NDB	TI	385 kHz	from 00:00 to 14:00	005511N 1043134E	-	Operating Authority: Directorate-General of Civil Aviation, Indonesia. EM: Non/A2A (NDB)

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Name of station (VOR/VAR)	*Id*	*Frequency (CH)*	*Hours of operation*	*Co-ordinates*	*ELEV DME antenna*	*Remarks*
1	2	3	4	5	6	7
TANJUNG PINANG VOR/DME	TPG	114.8 MHz (CH 95X)	from 00:00 to 14:00	005413N 1043052E	-	Operating Authority: Directorate-General of Civil Aviation, Indonesia. Coverage 40NM.
TEKONG DVOR/DME	VTK	116.5 MHz (CH 112X)	H24	012455N 1040120E	Antenna HGT: 150 FT AMSL	BRG 023° DIST 6.4km from THR RWY 20C (Singapore Changi Airport). MAINT Period: Third FRI of EV month BTN 0200-0600. Coverage 200NM. EM:F1
TENGAH TACAN	TNG	(CH 86X)	BTN 2300-1100 SUN/MON to THU/FRI; BTN 2300-0500 FRI/SAT; PPR from RSAF HQ via Tengah OPS at other times.	012336N 1034242E	-	BRG 043° DIST 0.55km from ARP. MAINT Period: Second SAT of EV month BTN 0001-0900.

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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 DESIGNATIONS FOR SIGNIFICANT POINTS

Name-code designator	*Co-ordinates*	*ATS route or other route*	*Terminal Area*
1	2	3	4
ABVIP	010008N 1035032E		SID-WSSS
ABVON	012028.18N 1035827.03E		IAC-WSSS
ADMIM	005733N 1033033E		SID-WSSS
ADNIK	011651.19N 1035655.43E		IAC-WSSS
AGOBA	015840N 1083000E	M761	
AGROT	010108N 1035808E		SID-WSSS
AGVAR	014719N 1034145E		SID-WSSS
AKIPO	011356.27N 1035541.59E		IAC-WSSS
AKMET	015355N 1034339E		SID-WSSS
AKMON	081254N 1101306E	L625, M768	
AKOMA	014522N 1035443E	B469, Y339	SID-WSSS, IAC-WSSS
ANBUS	011556N 1032102E	P501	
ANITO	001700S 1045200E	B338, B470, P501	SID-WSSS
ANUMA	011053.11N 1035424.35E		IAC-WSSS
APIPA	010618.43N 1035228.35E		IAC-WSSS
ARAMA	013654N 1030712E	A464, P501	STAR-WSSS
AROSO	020846N 1032421E	Y339, Y342	SID-WSSS
ARUPA	003140N 1084846E	N875	
ASISU	055906N 1132046E	M768, M772	
ASUNA	005948N 1030954E	R469, L762	STAR-WSSS
ATETI	012540N 1083000E	G580	
ATKAX	000512N 1065946E		SID-WSSS
ATPOM	002425N 1052114E	M635	
ATRUM	013256N 1040057E		SID-WSSS
BAVAL	004518N 1040242E	B469	
BAVUS	000000N 1090000E	L504	
BETBA	013302N 1035331E		STAR-WSSS
BIBVI	024336N 1040618E		STAR-WSSS
BIDAG	073101N 1135544E	M772	
BIDUS	013554.05N 1035754.86E		IAC-WSSS, STAR-WSSS
BIKTA	024337N 1034308E	B469	
BIPOP	013122N 1041018E		IAC-WSSS, STAR-WSSS
BOBAG	010230N 1032954E	R469, M630, N502, P501	HLDG ID, SID-WSSS, STAR-WSSS
BOBOB	022206N 1070558E	M761, M767, N875	
BOKIP	010421N 1034353E		SID-WSSS, STAR-WSSS

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Name-code designator	Co-ordinates	ATS route or other route	Terminal Area
1	2	3	4
BONSU	011928N 1033710E	A576	
BUNTO	024008N 1055953E	G334	
BUVAL	033622N 1034341E	L629, Y333	
DAKIX	070854N 1145054E	L649	
DAMOG	041225N 1050014E	M771, N875	
DIVSA	011105N 1040303E		SID-WSSS
DOGRA	010525N 1041423E		SID-WSSS
DOKTA	012606N 1041040E		SID-WSSS
DOLOX	044841N 1052247E	L629, M771, T612	
DONDI	011252N 1035855E		SID-WSSS
DOSNO	004757N 1041409E		SID-WSSS
DOSPA	011459N 1040441E		SID-WSSS
DOVAN	011938N 1041249E		STAR-WSSS
DOVOL	033047N 1034923E	L635, Y334	
DUBSA	034901N 1044540E	L635, M771	
DUDIS	070000N 1064836E	L644, M771	
EGOLO	031934N 1040047E	L642	
EGORA	013621.37N 1040607.23E		IAC-WSSS
ELALO	041240N 1043329E	Q802, Q803	HLDG ID, STAR-WSSS
ELALU	013439.87N 1040524.21E		IAC-WSSS
ELBEB	012844.66N 1040254.38E		IAC-WSSS
ELBEX	013148.96N 1040314.18E		IAC-WSSS
ELGAP	012820.28N 1040146.15E		IAC-WSSS
ELGOR	033014N 1054818E	M758, N875	
ELMIN	012549.68N 1040140.51E		IAC-WSSS
EMTAP	011655.88N 1035657.47E		IAC-WSSS
ENLES	010931.51N 1035349.83E		IAC-WSSS
ENREP	045223N 1041442E	L642, M753, M763, M904, N875, N891	
ENSUN	012602.56N 1040048.10E		IAC-WSSS
ERVOT	011120.09N 1035435.85E		IAC-WSSS
ESBIT	012212.07N 1040008.64E		IAC-WSSS
ESBUM	045210N 1042830E	Q801, Q802	
ESLUX	011844.31N 1035840.44E		IAC-WSSS
ESPIT	020011N 1072624E	M646, N875	
ESPOB	070000N 1053318E	L642, Q801	
EXOMO	010425.49N 1040933.17E		IAC-WSSS
GULIB	041714N 1110633E	L517	

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Name-code designator	Co-ordinates	ATS route or other route	Terminal Area
1	2	3	4
HOSBA	011948N 1042418E	G580, W401	HLDG ID
IBIVA	011351N 1035637E		SID-WSSS
IBIXU	011621N 1035740E		SID-WSSS
IBULA	005036N 1043600E		STAR-WSSS
IDMAS	004900N 1041848E	B338	
IDSEL	032432N 1035544E	M758, T611, T612, Y335	
IDUNA	012305.80N 1035933.58E		IAC-WSSS
IDURO	012639.84N 1040103.94E		IAC-WSSS
IDVAS	012934.66N 1040217.75E		IAC-WSSS
IGARI	065612N 1033506E	R208, M765, N891	
IGNON	010847N 1041257E		STAR-WSSS
IGULA	013232.27N 1040332.66E		IAC-WSSS
IKAGO	003816N 1052931E		STAR-WSSS
IKIMA	004314N 1045500E		HLDG ID, STAR-WSSS
IKUKO	054512N 1031324E	R208	
IKUMI	055338N 1035509E	N891	
IPDOL	045111N 1035920E	Q803, T611	
IPNAK	013711.93N 1040530.83E		IAC-WSSS
IPRIX	070000N 1040754E	M753, Q802, T611	
KADAR	000647S 1074342E	M774	SID-WSSS
KAKSA	011702.58N 1035757.92E		IAC-WSSS
KAMIN	023442N 1085536E	G334, M646	
KANLA	034556N 1043606E		STAR-WSSS
KARTO	011124N 1053343E		HLDG ID, STAR-WSSS,
KASPO	011507.15N 1035709.20E		IAC-WSSS
KETOD	031042N 1040942E	M761, Y336	
KEXAS	011019N 1044818E		STAR-WSSS
KEXOL	043930N 1040942E	Q803	
KIBOL	025229N 1042805E	G334, N892	
KIKOR	002244S 1070524E	L644	
KILOT	030217N 1044023E	M761, N892	STAR-WSSS
KIMER	011105.74N 1035527.30E		IAC-WSSS
LAGOT	071632N 1113243E	M768, N884	
LAGUS	011915.29N 1035854.00E		IAC-WSSS
LAPOL	012622N 1034435E	G579	
LASIN	011538.25N 1035722.39E		IAC-WSSS
LAVAX	010950N 1042714E		HLDG ID, STAR-WSSS,

Name-code designator	Co-ordinates	ATS route or other route	Terminal Area
1	2	3	4
LAXOR	094937N 1144829E	L649, M772, N884	
LEBIN	031438N 1060604E	N875, N884	
LEDOX	011642N 1035651E		SID-WSSS
LEGOL	012053N 1034723E	G579	
LELIB	012729N 1032450E	A464, W401	SID-WSSS, STAR-WSSS
LELON	011243.51N 1035608.62E		IAC-WSSS
LENDA	024124N 1043932E	N884	
LEPNA	010648.29N 1035338.82E		IAC-WSSS
LETGO	011411N 1035548E		SID-WSSS
LIDVA	010505.67N 1035255.38E		IAC-WSSS
LIPRO	025342N 1051128E	M761, N884	
LUSMO	033341N 1065534E	L625, M758, N884	
LUXOL	011802.73N 1035823.38E		IAC-WSSS
MABAL	032826N 1051236E	M758, N892	HLDG ID, STAR-WSSS
MABLI	041717N 1061247E	L635, L644, N892	
MANIM	031431N 1040553E	N891	
MASBO	020248N 1025251E	A457	SID-WSSS
MASNI	012037N 1033746E	A464	
← MELAS	070518N 1080912E	N892	
MESOG	020103N 1031240E	B466	
MIBEL	012351N 1020816E	L762	
MUMSO	034420N 1053213E	N875, N892	
NIMIX	012452N 1075926E	G580, N875	
NIVAM	023650N 1040228E	G219	
NODIN	081100N 1161142E	M522	
NOPAT	042313N 1044756E	L629, N875	
NUFFA	025341.40N 1033829.80E	Y514	
NYLON	013656.90N 1040623.80E		HLDG ID, IAC-WSSS, SID-WSSS, STAR-WSSS
OBDAB	031153N 1040538E	N891	
OBDOS	002503N 1065551E	L504, M774	STAR-WSSS
OBGET	012307N 1064531E	G580, L644	
OBLOT	014256N 1064147E	L644, M646	
ODONO	063613.82N 1030129.41E	M904	
OLKIT	045010N 1115118E	M758	
OLSAM	020059N 1063824E	L644	
OMBAP	023116N 1063242E	L644	
OMLIV	025512N 1062812E	L644	

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Name-code designator	Co-ordinates	ATS route or other route	Terminal Area
1	2	3	4
ONAPO	032116N 1062318E	L644	
OPULA	033155N 1062118E	L644	
OTLON	030752N 1042006E	M761, M771	
PADLI	030918N 1033133E	B469, Y332, Y333, Y334, Y335, Y336	
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	,
POSUB	012725N 1040748E		STAR-WSSS,
RAXIM	030318N 1041713E	M771	
REDUK	021957N 1030459E	R325	
REKOP	013306N 1030521E	A576	
REMES	004342N 1035735E	G579	HLDG ID, STAR-WSSS
REPOV	001623N 1040300E	G579	HLDG ID, STAR-WSSS
ROBMO	025440N 1035700E	L642	
RUVIK	011422N 1042033E		SID-WSSS, STAR-WSSS
SABIP	020940N 1075044E	M646, M761	
SABKA	015051N 1031713E	A457	SID-WSSS
SAMKO	010529.5N 1035254.9E	R469, W407	HLDG ID, STAR-WSSS,
SANAT	010749N 1035930E		STAR-WSSS,
SUKRI	012306N 1025904E	M630	
SUMLA	080242N 1160054E	M754	
SURGA	003657S 1063119E	M635	
SUSAR	035848N 1051547E	L635, N875	
TAROS	004200N 1021607E	R469	
TAXUL	035035N 1034037E	M763, Y332	
TEGID	085656N 1155143E	M767	
TERIX	041521N 1093456E	L517, M758, M767	
TIDAR	065230.15N 1024959.82E	M904	
TODAM	063138N 1123536E	M767, M768	
TOKIM	012933N 1040315E		SID-WSSS
TOMAN	012147N 1054717E	G580, L625, M646, M767	SID-WSSS, STAR-WSSS
TOPOM	012955N 1040227E		SID-WSSS
TOPOR	014412N 1025330E	W534	

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Name-code designator	Co-ordinates	ATS route or other route	Terminal Area
1	2	3	4
UDONI	004818N 1040806E	B470	
UGPEK	033647N 1040752E	L635, N891	
UPRON	060903.41N 1032039.98E	M904, Q803	
URIGO	032505N 1040647E	M758, N891	
VABRI	013114.96N 1040357.78E		IAC-WSSS
VENIX	002156S 1060521E		SID-WSSS
VENLI	062848N 1024900E	M765	
VENPA	002141N 1044955E		SID-WSSS
VEPLI	035223N 1040542E	L629, L642	,
VERIN	023332N 1062425E	L625	
VILEV	012729.10N 1040222.42E		IAC-WSSS
VINIK	083830N 1161348E	M522, M754	
VIRID	031728.05N 1031318.04E	Y514	
VISAT	032620N 1043134E	M758, M771	

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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 012500N 1034854E	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 012209.20N 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 (011615N 1034909E) and Sentosa Island (011519N 1034858E) 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)
RESTRICTED AREAS		
WSR6 Area bounded by 012355N 1034626E to 012359.0N 1034734.1E then along the boundaries of WSD35 and WSP3 to 012130.00N 1034658.37E.	200 FT ALT GND	Helicopter Operations. Active: Permanent.
WSR9 A circle, 0.3NM radius centred at 011647N 1035009E.	200 FT ALT GND	Helicopter Operations. Active: Permanent.
WSR10 A circle, 0.6NM radius, centred at 012136.2197N 1034055.3795E.	5500 FT ALT GND	Active: Permanent.
WSR16 A circle, 0.3NM radius centred at 011918N 1035045E.	200 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/JB 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.	10000 FT ALT 3000 FT ALT	Training. Active: 2230-1030 SUN-MON to FRI-SAT (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		
WMR223 KANGAR KAHANG A circle, 5NM radius, centred at 021500N 1033354E	10000 FT ALT GND	Parachute Dropping. Active: by NOTAM. Controlling Authority: Kluang Tower 128.3 MHz/122.4 MHz. (refer to AIP Malaysia)
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 020730N 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 128.3 MHz and 122.4 MHz 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)
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.	FL 160 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 (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 (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 (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 012419N 1040332E 012349N 1040240E 012351N 1040200E.	500 FT ALT GND	Rifle Range Active: Permanent
WSD35 NEE SOON A circle, 1NM radius, centred at 012310N 1034809E.	900 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	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)

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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		
WMD230 ULU TIRAM (SOUTH) 013720N 1035324E 013840N 1035135E 013704N 1034954E 013530N 1035140E.	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)
WMD231 ULU TIRAM (NORTH) 013815N 1034950E 013927N 1035028E 014238N 1034929E 014239N 1034822E 014133N 1034627E 013840N 1034627E 013858N 1034840E.	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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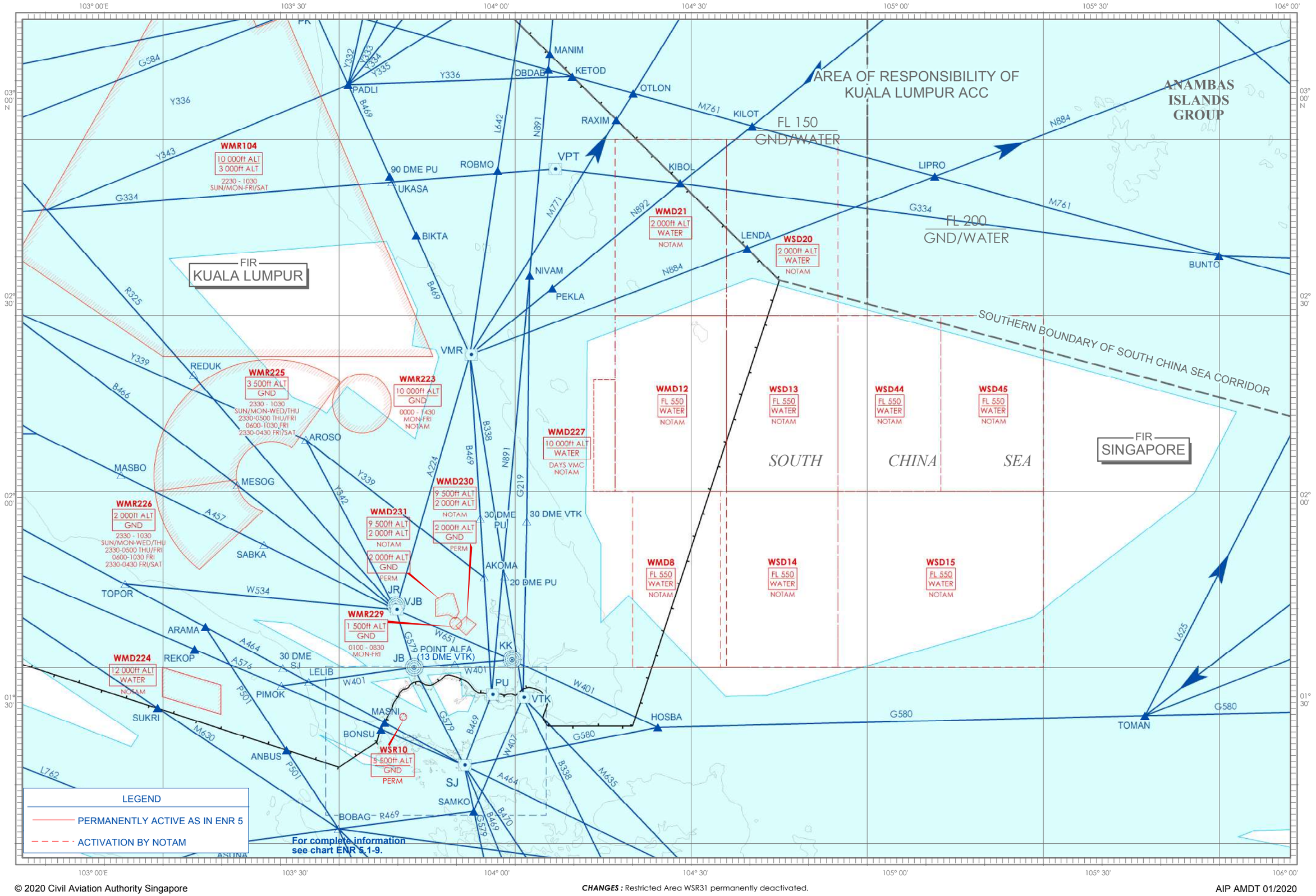
PROHIBITED, RESTRICTED AND DANGER AREAS - CHART 1



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CHANGES : Restricted Area WSR31 permanently deactivated.

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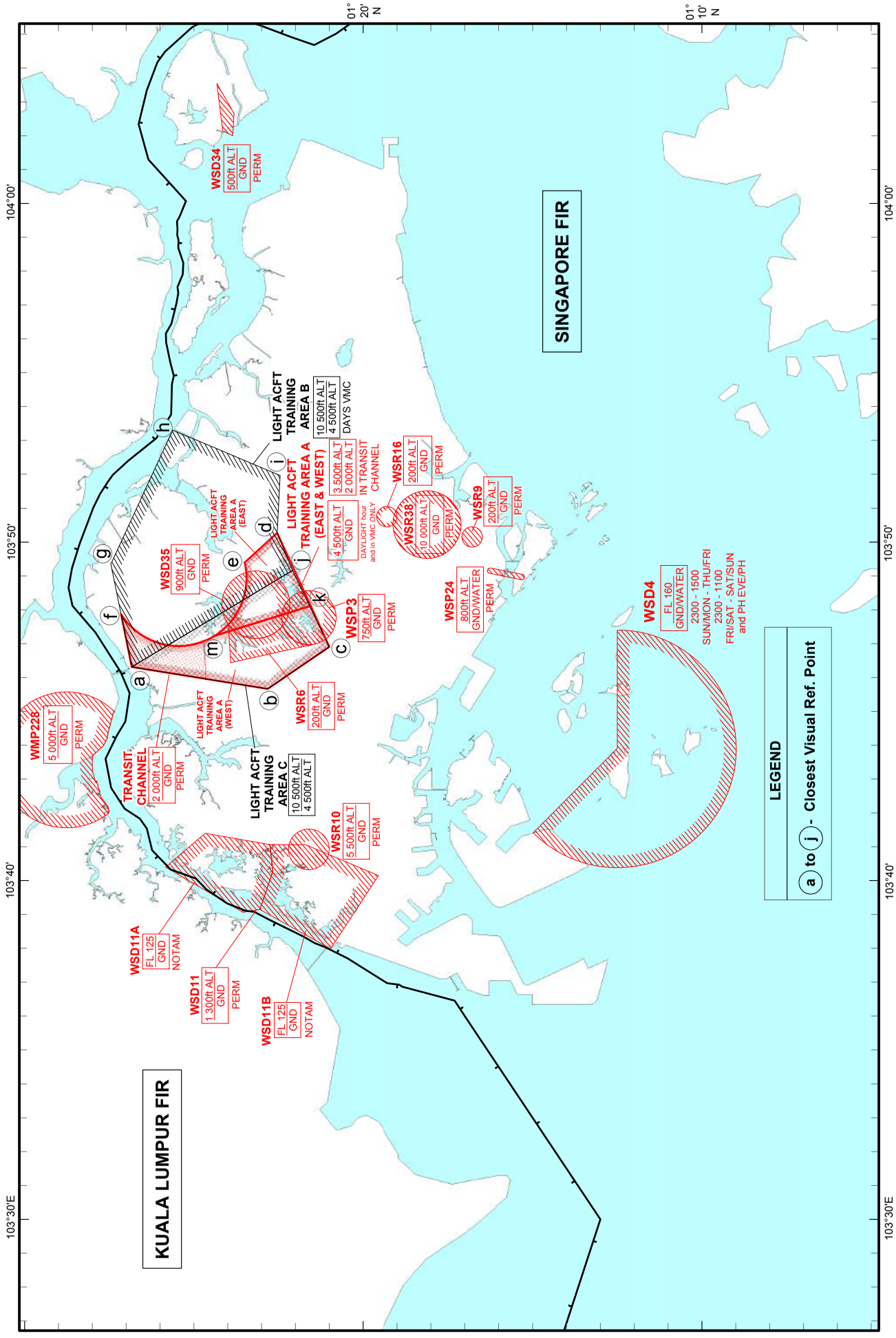
PROHIBITED, RESTRICTED AND DANGER AREAS - CHART 2



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CHANGES : Restricted Area WSR2 permanently deactivated..

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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 test 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 @ (Mayflower Garden) (d) 012327N 1034922E @ (Sembawang ATZ bdry) and along the bdry of Sembawang ATZ (e) 012714N 1034752E @ (Admiralty Road West/Attap Valley Road) (f) 012650N 1034619E @ (Woodlands Customs Checkpoint) (a)	4 500ft ALT GND 3 500ft ALT 2 000ft ALT# Maximum Usable ALT: 4 000ft	# Above Transit Channel (see chart ENR 3.5-3) @ Closest Visual Reference Point (see chart ENR 5.1-9) Daylight 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	

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Name and Lateral limits	*Upper Limit* *Lower Limit*	Remarks Time of Act
1	2	3
LIGHT AIRCRAFT TRAINING AREA C		
012650N 1034619E 012249N 1034540E 012100N 1034654E 012205N 1034910E 012650N 1034619E	10 500ft 4 500ft Maximum Usable ALT: 10 000ft Minimum Usable ALT: 5 000ft	The minimum flight altitude over Light Aircraft Training Area C is 11,000ft.
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 HAZARD

1 OTHER ACTIVITIES OF 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 AERO MODELLING AND KITE FLYING

1.1 General Warning

1.1.1 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.

1.1.2 The location of some of the parks in Singapore where kite and aero model flying 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 aero model flying 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 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 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 1330-1345 daily searchlight display and laser shows will take place at 011658N 1035138E (within Paya Lebar CTR). Additional show time will be BTN 1500-1515 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: 011828.092N 1034706.884E, 011831.855N 1034726.944E, 011734.453N 1034758.093E, 011720.214N 1034727.096E, 011754.341N 1034657.173E.

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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 .....
AIRCRAFT TYPE _____
AIRCRAFT REGISTRATION _____

DATE: Day .....
Month ..... Year .....
TIME OF INCIDENT **(L)** ..... **(UTC)** .....

Dawn / Day / Dusk / Night

AERODROME NAME .....
RUNWAY USED _____
HEIGHT AGL..... ft **SPEED (IAS)..... kt**
APRX LOC _____

PHASE OF FLIGHT

- ☐ Unknown
- ☐ Taxi
- ☐ Take-off run
- ☐ Climb
- ☐ En-route
- ☐ Descend
- ☐ Approach
- ☐ 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

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ENROUTE CHART - ICAO

LEGEND

- **Aerodrome**
- **Flight Information Region (FIR)** — Name of FIR; Upper Limit; Lower Limit; Unit providing service. Example: FIR SINGAPORE / UNL / GND/WATER / ACC SINGAPORE
- **Terminal Control Area (TMA)** — Name of TMA; Airspace Classification; Upper Limit; Lower Limit; Radio Frequency (ies). Example: TMA KUCHING / A / B / C / FL 250 / 3 000ft / 134.5 120.2
- **Control Zone (CTR)** — Name of CTR; Airspace Classification; Upper Limit; Radio Frequency (ies). Example: CTR KUCHING / C / 3 000ft / 120.2
- **ATS route** — Route designator; Magnetic track; Distance in nautical miles; Minimum flight altitude (Mt)/flight level; Lower limit (Mt)/flight level; Required navigation performance. Example: L642 / 032° / 122 / 7 000 FL 140 / RNP 10 / (7 000)(FL 140)
- **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; Nationality letter; Vertical limits. Example: W5D8 / FL 400 / WATER
  Note : Restricted airspace outside Singapore FIR are not shown
- **Collocated VOR and DME navigation aids (VOR/DME)** — Compass rose orientated on the chart to Magnetic North
- **Identification for radio navigation aids (NAVAID)** — Name; NAVAID, frequency, identification or call sign; Geographical coordinates in WGS-84 version; Elevation of DME site (to the nearest 30m). Example: SINJON / DVOR/DME 113.5 / 01°13'19"N 103°51'20"E / 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 cultactors in the quadrilateral. It is represented in thousands and hundreds of feet above mean sea level.

Example : 3 500 feet **35**

- **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	**MANIM**
03 50.35N	03 14.31N
103 40.37E	104 05.53E
BUVAL	**KETOD**
03 36.22N	03 10.42N
103 43.41E	104 09.42E
DOVOL	**RAXIM**
03 30.47N	03 03.18N
103 49.23E	104 17.13E
IDSEL	**KIBOL**
03 24.32N	02 52.29N
103 55.44E	104 28.05E
EGOLO	**LENDA**
03 19.34N	02 41.24N
104 00.47E	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 2015

COMMUNICATION FACILITIES

SINGAPORE (ACC) SINGAPORE RADAR	P123.7	S127.3	For Awy B469, G219, G334, L629, L635, L642, M751, M758, M761, M763, M771, N884, N891 & N892 in the vicinity of VMR and VPK.
	133.8 (0000-1430)		
	P133.25	S135.8	For Awy A457, A464, A576, B466 R325 (all northbound) and R469
	P134.2	S133.35	For Awy B348, G580, L644 & M767.
	P134.4 255.4	S128.1	For Awy A464, A576, G579 (all southbound), B470, L644, N875 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 : New ATS Route Y512 added.
ATS Routes M751, Y346 and Y514 revised.

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(2860) SINGAPORE ISLAND

WORLD AERONAUTICAL CHART
ICAO 1:1,000,000

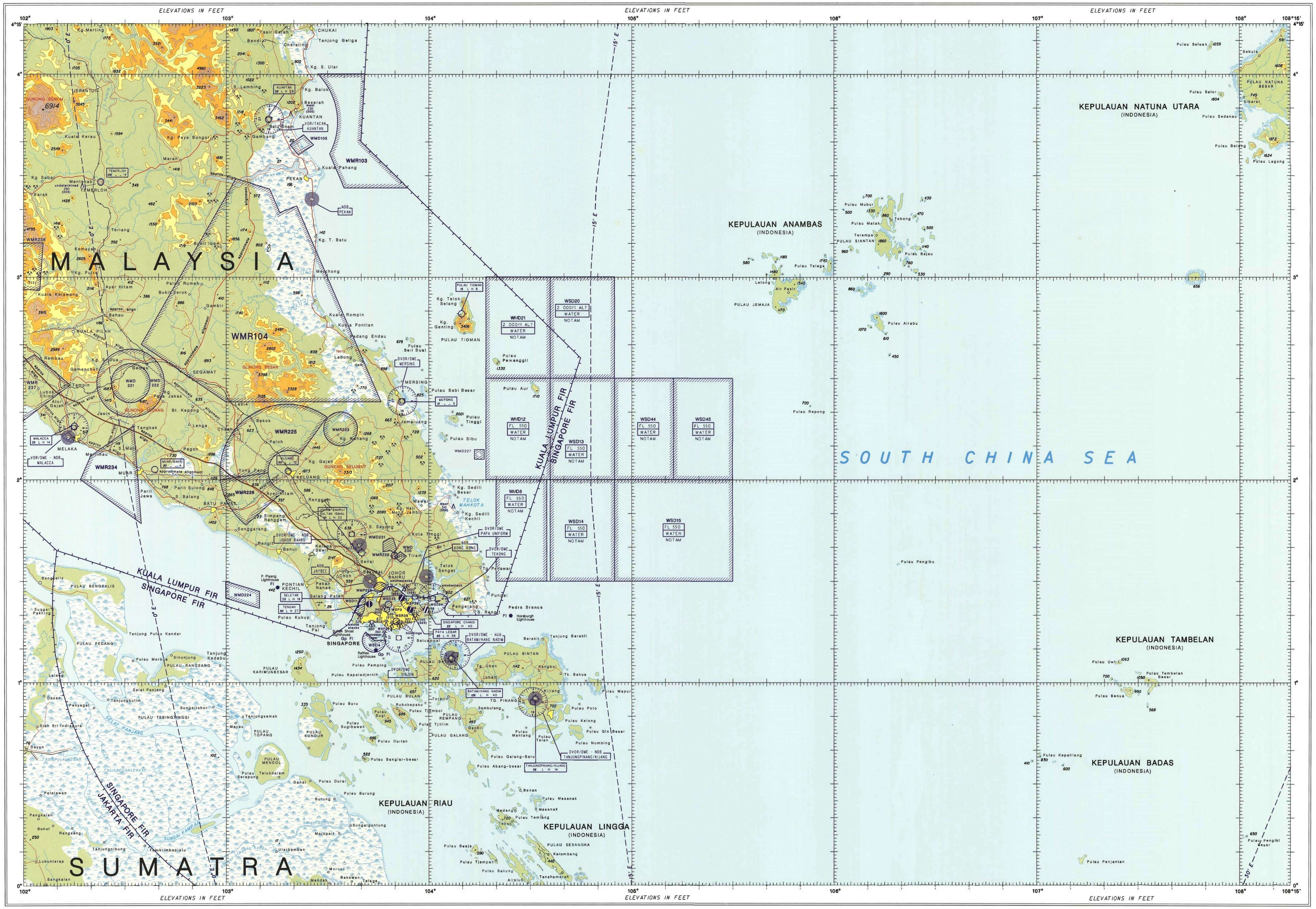
HYPSOMETRIC TINTS

Feet / Metres: over 4000 — over 1219; 2000 — 610; 1000 — 305; 500 — 152; SEA LEVEL

CONVERSION TABLE

Feet / Metres: 20,000 — 6,096; 18,000; 16,000 — 5,000; 14,000; 12,000 — 4,000; 10,000 — 3,000; 8,000; 6,000 — 2,000; 4,000 — 1,000; 2,000; 500 — 152

Feet / Metres: 150 — 45.7; 140; 130 — 40; 120 — 35; 110; 100 — 30; 90 — 25; 80; 70 — 20; 60; 50 — 15; 40; 30 — 10; 20; 10 — 3



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KILOMETRES 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.

PROJECTION

Lambert Conformal Conic Projection
Standard Parallels 0°40' and 3°20'
Spheroid - World Geodetic System 1984 (WGS84)

NOTE

Due to congestion in the Singapore area, only selected Navigation Aids and Restricted Airspace are shown.

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.

MAGNETIC INFORMATION FOR THE YEAR 2000

Aeronautical Information: Jan 1999 (with Parallel updates in Jan 2020)

CHANGES: Restricted Areas WSR2 and WSR31 removed incorporation of hand amendments ref AIP AMDT 01/2017, GEN 0.5.

Primary road
Secondary road
Expressway
Single railway
Spot elevation accurate, approximate — 586 ×440
Highest known elevation — 6914
Contour — 1000

City or large town
Town, village
Small river, large river
Lake, dam
Pipeline
Swamp
Coral Reef, Mine
Sand, rock awash

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)

913 Elevation of top above mean sea level (AMSL)
(780) Height of top above ground level (AGL)

All reported vertical obstructions cannot be portrayed due to chart scale. Obstructions shown are at least 200 feet AGL. In and around major populated places the pattern is further reduced to enhance clarity.

CAUTION

Vertical obstructions have been extracted from the most reliable sources available. However, there is no assurance that all are shown or that their locations or heights are exact.

RADIO NAVIGATION AIDS

NDB PEKAN — NDB
DVOR/DME TEKONG — VOR/DME
VOR/TACAN KUANTAN — VOR/TAC

VISUAL AIDS

Marine light

● Fl, ● Gp Fl — Flashing, Group Flashing

Marine lights are white unless colours are stated.

MISCELLANEOUS

Transmission line
Isogonic line — 3° E
Prohibited, Restricted or Danger area

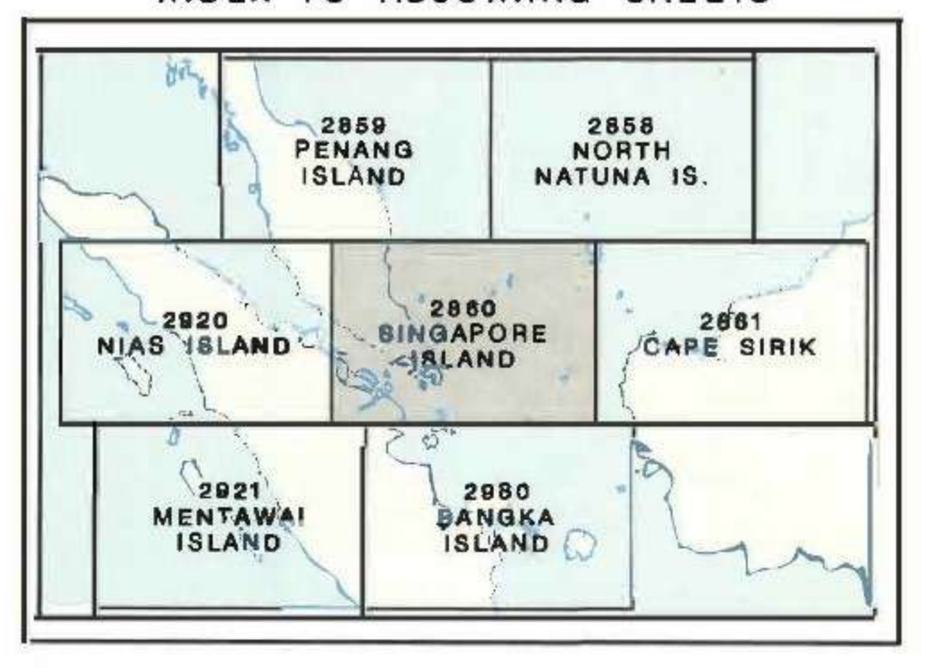
GLOSSARY

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

Compiled by Civil Aviation Authority of Singapore and SAF Mapping Unit from the following sources:

(a) Digital Chart of the World, Edition 1, July 1992
(b) 1 : 50, 000 Topographic Map of Singapore (1998)
(c) Magnetic Information for the year 2000, as supplied by the Geodetic Branch, Military Survey, UK
(d) Aeronautical Information as supplied by the Civil Aviation Authority of Singapore
(e) ONC L-10, Edition 7GSGS

INDEX TO ADJOINING SHEETS



(2860) SINGAPORE ISLAND

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Part 3 — AERODROMES (AD)

AD 0

AD 0.1 PREFACE

NIL (not applicable).

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AD 0.2 RECORD OF AIP AMENDMENTS

NIL (not applicable).

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AD 0.3 RECORD OF AIP SUPPLEMENTS

NIL (not applicable).

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AD 0.4 CHECKLIST OF AIP PAGES

NIL (not applicable).

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AD 0.5 LIST OF HAND AMENDMENTS TO THE AIP

NIL (not applicable).

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AD 0.6 TABLE OF CONTENTS TO PART 3

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

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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.

1.1.1 As there are no heliports, section AD 3 has been omitted.

1.2 AERODROMES ADMINISTRATION

The administration of the civil aerodromes is the responsibility of the Civil Aviation Authority of Singapore.

1.2.1 REGULATIONS CONCERNING AIRPORT USE

1.2.1.1 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.

1.2.2 LANDINGS MADE ELSEWHERE OTHER THAN AT ALTERNATE AIRPORTS

1.2.2.1 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.

1.2.2.2 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.

1.2.3 TRAFFIC OF PERSONS AND VEHICLES ON AERODROMES

1.2.3.1 Demarcation of Zones

1.2.3.1.1 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.

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1.2.3.2 Movement of Persons

1.2.3.2.1 Access to the security area is authorised only under conditions prescribed by CAAS.

1.2.3.2.2 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.

1.2.3.2.3 The movement of persons having access to the security area is subject to the special rules laid down by CAAS.

1.2.3.3 Movement of Vehicles

1.2.3.3.1 The movement of vehicles in the security area is strictly limited to specially approved vehicles driven by authorised persons.

1.2.3.3.2 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.

1.2.3.4 Policing

1.2.3.4.1 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

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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.

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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6 OTHERS

6.1 Dissemination of Information on Wet Runways

The presence of water on a runway will be reported on RTF using the following descriptions:

DAMP	- the surface shows a change of colour due to moisture
WET	- the surface is soaked but there is no standing water
STANDING WATER	- for aeroplane performance purposes, a runway where more than 25 percent of the runway surface area (whether in isolated areas or not) within the required length and width being used is covered by water more than 3mm deep.

When a runway is reported as DAMP or WET, subject to any notification to the contrary, pilots may assume that an acceptable level of runway wheel braking friction is available. When a runway is reported as having STANDING WATER, wheel braking may be affected by aquaplaning and appropriate operational adjustments should be considered.

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AD 1.2 RESCUE AND FIRE FIGHTING SERVICES

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.

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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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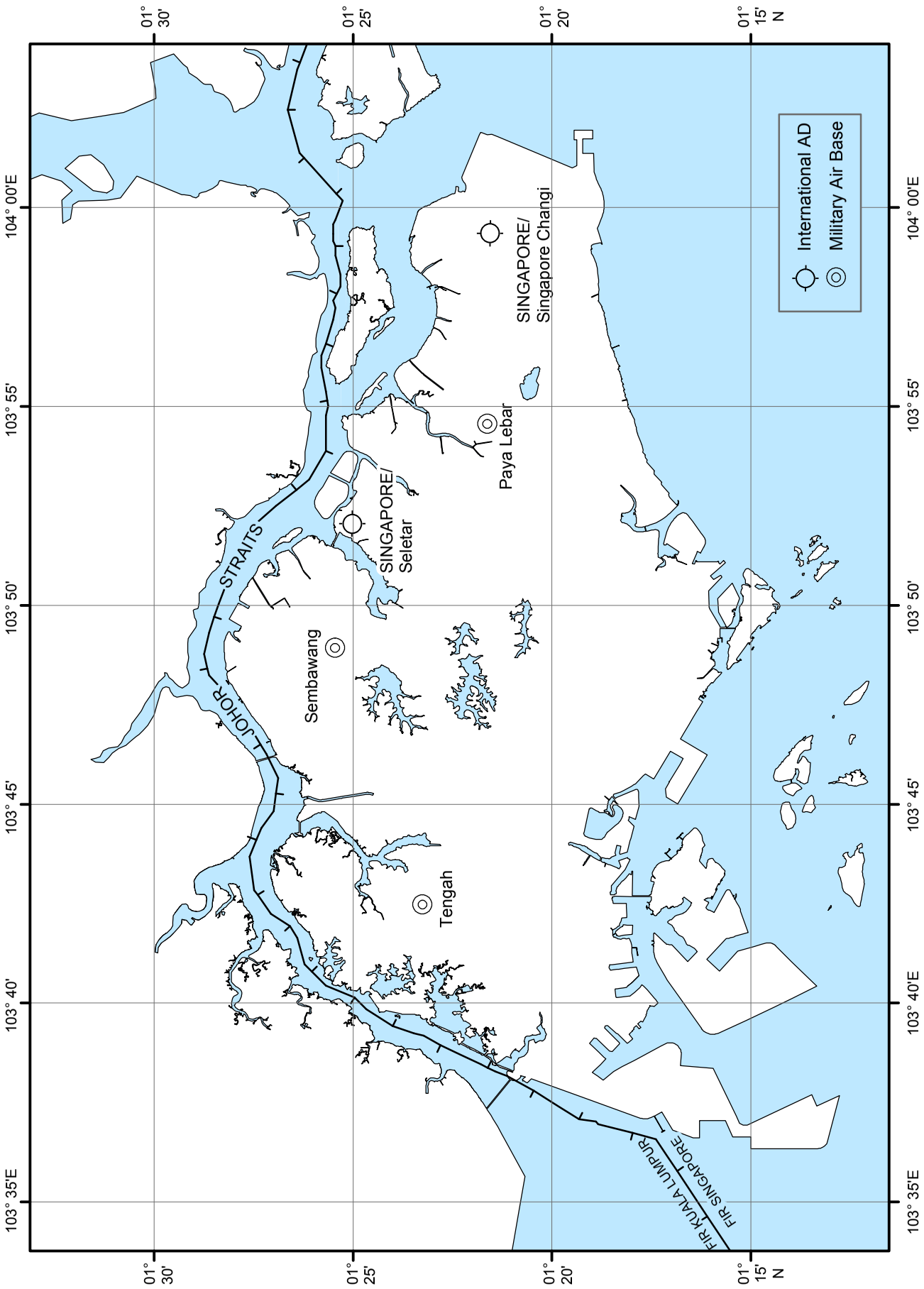
AERODROME INDEX - CHART



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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 2019	5 years from the date of certification	Code 4F
Seletar WSSL	Certified	1 July 2019	5 years from the date of certification	Code 3C
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*	6.66 M / 32.8℃
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 CAT II 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

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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.
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_2 recharging facilities.

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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.

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WSSS AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

1	*Apron surface and strength*	Concrete surface, strength PCN 85/R/B/W/U
2	*Taxiway width, surface and strength*	Minimum width 23m for all taxiways TWY W1, W9, E1, E3, E11 and EP (between E10 and E11) – Concrete surface; strength PCN 85/R/B/W/U TWY A (between A1 and A2, and between A11 and A12), A1, A2, A11, A12, TWY B (between B1 and B2, and between B13 and B14), B1, B2, B13, B14 - Concrete surface; strength PCN 90/R/B/W/T TWY J and TWY K (between TWY K2 and TWY J12) – Asphalt surface; strength PCN 80/F/B/X/T TWY P1 (between N and N5) and all other TWYs A, B, J, K – Asphalt surface; strength PCN 82/F/B/X/T All other taxiways – Asphalt surface, strength PCN 72/F/B/W/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 P1 and TXL N5 centreline before the open drain.
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

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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. Guidelines at apron. 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. Aircraft stand manoeuvring guidance lights are provided at aircraft stands at Terminal 3, Terminal 4 and South Aprons.
2	RWY and TWY markings and LGT.
	RWY 02L/02C and RWY 20C RWY LGT: refer to WSSS AD 2.14 and WSSS AD 2.15. TWY LGT: Blue LGT on TWY curved edges, selected straight TWY edge sections and apron TWY edges only. Blue TWY edge markers along selected straight TWY edge sections. Red stop bar at TWY INT controllable on/off. Red stop bar LGT at TWY HLDG PSN entrances to RWY are controllable on/off and are supplemented with elevated RWY guard LGT at the sides. Internally/externally lighted mandatory or information TWY signboards. Yellow TWY centreline markings, supplemented by 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 MARKING AIDS: THR, touchdown zone, centreline, side stripe, RWY designations, aiming point markings, TWY centreline, taxi holding positions - all taxiways, apron guide lines. For positions of aircraft nosewheel in relation to stopbar and description of the Safegate Aircraft Docking Guidance System - refer to WSSS AD 2.9.
	RWY 20R RWY LGT: refer to WSSS AD 2.14 and WSSS AD 2.15. TWY LGT: same as for RWY 02L/02C and RWY 20C. MARKING AIDS: Pre-threshold centreline, transverse stripe for displaced THR, RWY designations, THR, touchdown zone, aiming point marking, RWY centreline and stripe marking aids.
	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, yellow taxiway centreline markings, supplemented by 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.
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.

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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 of Singapore Changi Airport.

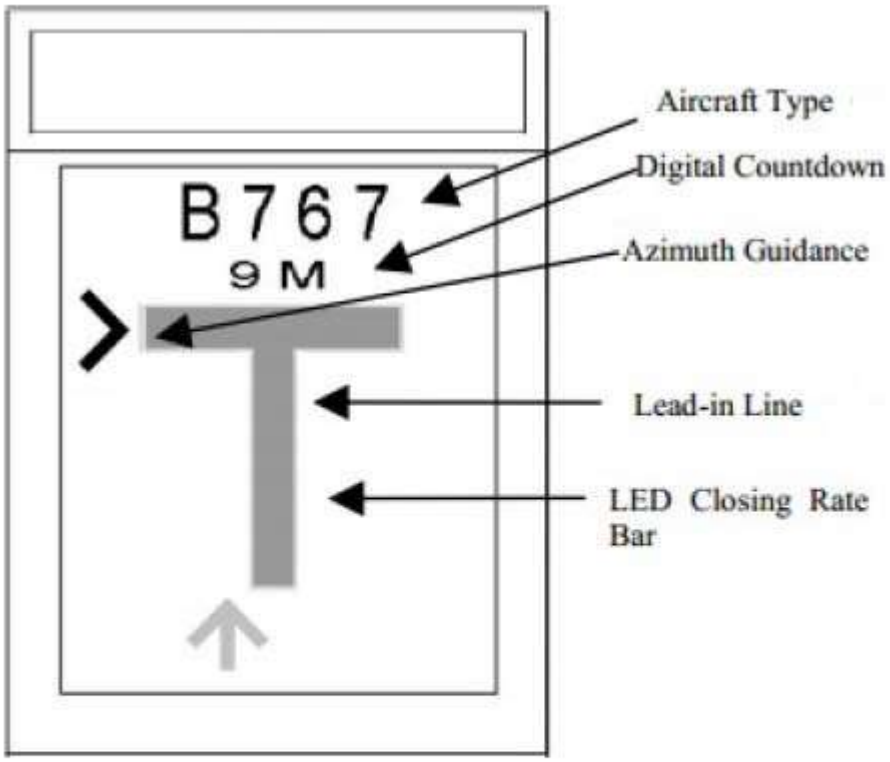
1.2 DESCRIPTION OF SYSTEM

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.

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 shows the Display and Laser Scanning Unit mounted on the terminal in front of the aircraft stand.

LED DISPLAY AND LASER SCANNING UNIT



Safedock Type 1

Figure A

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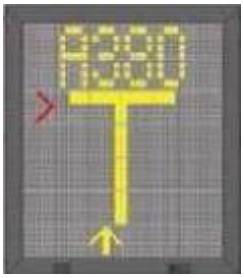
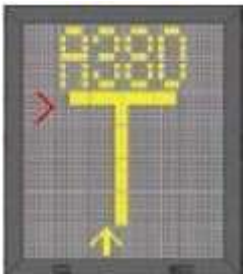
1.3 DOCKING PROCEDURES

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.	
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.	
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.	
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.	
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.	

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Description	Display on ADGS
Checking of STOP Position • If the aircraft stops at the correct position, “OK” will be displayed after a few seconds.	
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.	
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”.	
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”.	  

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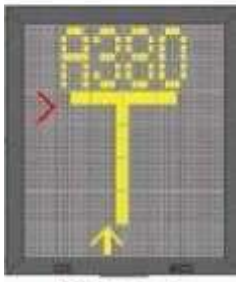
1.4 SAFETY MEASURES

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.	
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).	 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.	
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.	 Figure 1

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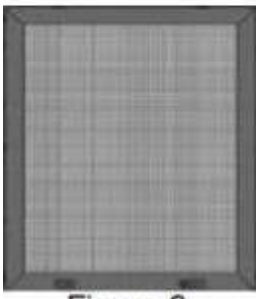
Description	Display on ADGS
Overshooting • To avoid overshooting, pilots are advised to approach the stop position slowly and observe the closing rate information displayed. Pilots should stop the aircraft immediately when seeing the “STOP” or “WAIT” display or when given the stop sign by the aircraft marshaller or is unsure of the information displayed during the docking process.	 
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.	 Figure 1  Figure 2

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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.

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 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 it pushes back. 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).

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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).

4 AIRFIELD GROUND LIGHTING CONTROL AND MONITORING SYSTEM (AGLCMS) 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 Ground Lighting Control and Monitoring 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.

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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 RWY 02L TKOF	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 1290m from THR RWY 20R
2)	RWY 20C APCH RWY 02C TKOF	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 2630m from THR RWY 20C.
3)	RWY 02L/20R APCH RWY 02L/20R TKOF RWY 02C/20C APCH RWY 02C/20C TKOF	ILS LLZ co-located with LLZ antennae.	Within the RWY strip.
4)	RWY 20R APCH	Two antennae, HGT 72ft AMSL, marked and LGTD	012311N 1035928E
5)	RWY 20R APCH	Antenna, HGT 88ft AMSL, marked and LGTD	012315N 1035931E
6)	RWY 02L APCH	Antenna, HGT 82ft AMSL, marked and LGTD	012051N 1035827E
7)	RWY 02L APCH	Pole, HGT 128ft AMSL, marked and LGTD	011859N 1035748E
8)	RWY 02L APCH	Pole, HGT 160ft AMSL, marked and LGTD	012058N 1035814E
9)	RWY 02L APCH	Pole, HGT 131ft AMSL, marked and LGTD	012038N 1035848E
10)	RWY 20L APCH RWY 02R TKOF	Mast HGT ranging from 98ft and above	Shipping channel APPX 2310m from THR RWY 20L
11)	RWY 02R APCH RWY 20L TKOF	ILS LLZ (South), 26ft AMSL	011909.5N 1035954.7E
12)	RWY 02R APCH RWY 20L TKOF	LLZ Building (South), 27ft AMSL	Within Approach
13)	RWY 02R APCH RWY 20L TKOF	MM Building (South), 27ft AMSL	Within Approach / Takeoff
14)	RWY 20L APCH RWY 02R TKOF	ILS LLZ (North), 26ft AMSL	012131.5N 1040054.7E
15)	RWY 20L APCH RWY 02R TKOF	LLZ Building (North), 28ft AMSL	Within Approach
16)	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)	Surface wind direction sleeves	Located at each end of RWY adjacent to GP antenna
2)	RWY 02R Anemometer, 47ft AMSL	012105.7N 1040048.5E
3)	RWY 20L Anemometer, 48ft AMSL	011931.7N 1040008.8E
4)	RWY 02L Anemometer, 48ft AMSL	012110.5N 1035840.2E
5)	RWY 20R Anemometer, 44ft AMSL	012222.7N 1035910.9E
6)	RWY 02C Anemometer, 46ft AMSL	011955.4N 1035915.4E
7)	RWY 20C Anemometer, 44ft AMSL	012128.1N 1035954.6E
8)	RWY 02R GP Antenna, 67ft AMSL	012108.9N 1040049.4E
9)	RWY 20L GP Antenna, 67ft AMSL	011929.1N 1040007.3E
10)	RWY 02L GP Antenna, 67ft AMSL	012108.5N 1035839.1E
11)	RWY 20R GP Antenna, 67ft AMSL	012225.5N 1035912.2E
12)	RWY 02C GP Antenna, 67ft AMSL	011951.6N 1035914.7E
13)	RWY 20C GP Antenna, 67ft AMSL	012131.3N 1035956.6E
14)	Antenna, HGT 82ft AMSL, marked and LGTD	012036N 1035819E
15)	Antenna, HGT 85ft AMSL, marked and LGTD	012039N 1035821E

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IN CIRCLING AREA AND AT AERODROME		
Obstacles type, ELEV, Markings/LGT		**Location of Obstacles**
16)	Antenna, HGT 78ft AMSL, marked and LGTD	012042N 1035823E
17)	Antenna, HGT 82ft AMSL, marked and LGTD	012053N 1035827E
18)	Antenna, HGT 78ft AMSL, marked and LGTD	012049N 1035826E
19)	FOD detection mast, HGT 29ft AMSL	012130.9N 1035955.5E
20)	FOD detection mast, HGT 29ft AMSL	012124.0N 1035953.1E
21)	FOD detection mast, HGT 29ft AMSL	012114.0N 1035948.9E
22)	FOD detection mast, HGT 29ft AMSL	012108.6N 1035946.6E
23)	FOD detection mast, HGT 29ft AMSL	012056.5N 1035941.5E
24)	FOD detection mast, HGT 29ft AMSL	012045.5N 1035936.9E
25)	FOD detection mast, HGT 29ft AMSL	012033.7N 1035931.9E
26)	FOD detection mast, HGT 29ft AMSL	012028.6N 1035929.7E
27)	FOD detection mast, HGT 29ft AMSL	012016.8N 1035924.8E
28)	FOD detection mast, HGT 29ft AMSL	012005.0N 1035919.7E
29)	FOD detection mast, HGT 29ft AMSL	011959.1N 1035917.3E
30)	FOD detection mast, HGT 29ft AMSL	011952.4N 1035913.9E
31)	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
32)	FOD detection mast, HGT 45ft AMSL	012108.4N 1040049.3E
33)	FOD detection mast, HGT 45ft AMSL	012103.4N 1040047.4E
34)	FOD detection mast, HGT 45ft AMSL	012054.9N 1040043.8E
35)	FOD detection mast, HGT 45ft AMSL	012052.8N 1040042.9E
36)	FOD detection mast, HGT 45ft AMSL	012027.8N 1040032.0E
37)	FOD detection mast, HGT 45ft AMSL	012027.2N 1040031.8E
38)	FOD detection mast, HGT 45ft AMSL	012004.5N 1040022.5E
39)	FOD detection mast, HGT 45ft AMSL	012003.3N 1040022.0E
40)	FOD detection mast, HGT 45ft AMSL	011954.2N 1040018.2E
41)	FOD detection mast, HGT 45ft AMSL	011943.2N 1040013.6E
42)	FOD detection mast, HGT 45ft AMSL	011934.4N 1040009.8E
43)	FOD detection mast, HGT 45ft AMSL	011929.5N 1040007.5E
Remarks: Obstacles are shown on the AOC, IAC and VAC.		

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WSSS AD 2.11 METEOROLOGICAL INFORMATION PROVIDED

1	*Associated MET Office*	Singapore Changi (WSSS)
2	*Hours of service*	H24
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)

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WSSS AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

Designations RWY NR	TRUE BRG	Dimensions of RWY	Strength (PCN) and surface of RWY and SWY	THR coordinates and RWY end coordinates (THR Geoid Undulation)	THR Elevation and highest elevation of TDZ of precision APCH RWY
1	2	3	4	5	6
02L	023.02°	4000 M X 60 M	72/F/B/W/U Grooved Bituminous Concrete	THR coordinates: 012056.27N 1035838.82E RWY end coordinates: 012256.13N 1035929.42E (10.24 M)	6.66 M 6.23 M
20R (Threshold displaced by 740m southwards)	203.02°	4000 M X 60 M	72/F/B/W/U Grooved Bituminous Concrete	THR coordinates: 012233.95N 1035920.06E RWY end coordinates: 012056.27N 1035838.82E (10.25 M)	4.01 M 4.31 M
02C	023.02°	4000 M X 60 M	72/F/B/W/U Bituminous Concrete	THR coordinates: 011943.51N 1035905.86E RWY end coordinates 012143.37N 1035956.46E (10.27 M)	4.22 M 4.52 M
20C	203.02°	4000 M X 60 M	72/F/B/W/U Bituminous Concrete	THR coordinates: 012143.37N 1035956.46E RWY end coordinates 011943.51N 1035905.86E (10.30 M)	4.48 M 4.56 M
02R	023.01°	4000 M X 60 M	82/F/B/X/T Grooved Bituminous concrete	THR coordinates: 011920.59N 1035959.45E RWY end coordinates 012120.45N 1040050.05E (10.32 M)	4.80 M 4.82 M
20L	203.01°	4000 M X 60 M	82/F/B/X/T Grooved Bituminous concrete	THR coordinates: 012120.45N 1040050.05E RWY end coordinates 011920.59N 1035959.45E (10.36 M)	4.79 M 4.80 M

Slope of RWY-SWY Transverse / Longitudinal	SWY Dimensions (m)	CWY Dimensions (m)	STRIP dimensions (m)	Dimensions of RESA (m)	Locations and description of ARST system	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	4240 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 1.35% / 0.01% SWY 1.41% / 0.09%	60 X 60	60 X 150	4240 X 280	240 X 150	Not Applicable	Yes
RWY 20C 1.35% / 0.01% SWY 1.46% / 0.42%	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

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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 20L 1.25% / 0% SWY 1.22% / 0%	60 X 60	60 X 150	4240 X 280	240 X 150	Not Applicable	Yes

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) **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 and 0800-1059UTC daily. 4) **Scheduled Closure of RWY 02C/20C** a. BTN 1700-2100UTC on every 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 and 0800-1059UTC daily. 5) **Scheduled Closure of RWY 02R/20L** 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 and 0800-1059UTC daily. 6) **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. 30-minute maintenance will be conducted BTN 1915-1945UTC III. RWY 02R/20L: i. 5-minute inspection conducted BTN 2330-2335UTC ii. 60-minute maintenance will be conducted BTN 2000-2100UTC

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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	
20C	Not applicable	4000	4060	4060	4000	NIL
	E2	3808	3868	3868	Not applicable	
	E3	3421	3481	3481	Not applicable	
	E4	2721	2781	2781	Not applicable	
02C	Not applicable	4000	4060	4060	4000	NIL
	E10	3842	3902	3902	Not applicable	
	E9	3329	3389	3389	Not applicable	
	E8	3197	3257	3257	Not applicable	
	E7	2551	2611	2611	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

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 follow: 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 follow: From THR to 600m from RWY end: White, 600m to RWY end: Amber.	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
20R	CAT I 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 (20.0m), 3 White LGT and 1 Red LGT (22.6m), 4 White LGT (25.0m). 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 follow: 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
02C	CAT I High Intensity reduced approach lighting (810m) consisting of centreline barrettes showing variable White, 1 crossbar, 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.	NIL	Inset High Intensity centreline lights (longitudinal spacing at 30m apart) as follow: 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 follow: From THR to 600m from RWY end: White, 600m to RWY end: Amber.	Red	Elevated Red
20C	CAT II High Intensity reduced approach lighting (720m) 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 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	Inset High Intensity centreline lights (longitudinal spacing at 30m apart) as follow: 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 follow: From THR to 600m from RWY end: White, 600m to RWY end: Amber.	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
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	Elevated 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	Elevated Red

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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
2	*LDI location and LGT* *Anemometer location and LGT*	Pressure tube anemometer and wind vane situated 345m west of middle of RWY 02L/20R. Cup anemometers and wind vanes at ends and middle of both runways. Windsocks at ends of both runways. Transmissometers at both ends and in the middle of both runways 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

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WSSS AD 2.18 ATS COMMUNICATION FACILITIES

Service Designation	Call sign	*Frequency (P-Pri, S-Sec)*	Hours of operation	Remarks
ACC	Singapore Radar	P123.7 MHz S127.3 MHz	H24	for ATS Routes B469, G219, G334, R208, L625, L629, L635, L642, L644, M751, M753, M758, M761, M763, M771, N875, N884, N891, N892 and Y514.
		133.8 MHz	0000-1430	
		P134.7 MHz S134.15 MHz	H24	for ATS Routes G334, L625, L644, M758, M761, M771, N875, N884 and N892.
		P133.25 MHz S135.8 MHz	H24	for ATS Routes A457, A464, A576, B466, L762, M630, R325 and R469.
		P134.2 MHz S133.35 MHz		for ATS Routes G334. G580, L625, L644, M646 M767 and N875.
		P134.4 MHz S128.1 MHz		for ATS Routes B338, B469, B470, G579, L504, L644, M635, M774, N502, N875 , P501 and in area in the immediate vicinity of Singapore.
	Singapore Control	P134.35 MHz S133.6 MHz	H24	for 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), 045223N 1041442E (ENREP), 045000N 1034400E, thence north along the Singapore FIR boundary to 070000N 1080000E.
	Singapore Radio	6556 kHz 11297 kHz	H24	SEA 1, Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
		5655 kHz 8942 kHz 11396 kHz		SEA 2, Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
		6556 kHz		SEA 3, Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
APP	Singapore Departure	P120.3 MHz S121.625 MHz	H24	DEP from all airports in Singapore.
	Singapore Arrival	P119.3 MHz S119.4 MHz S119.55 MHz		TAR - Intermediate and final approach to Singapore Changi AP.
	Singapore Approach	P124.05 MHz S124.6 MHz S126.3 MHz	2100-1700	TAR - flow control service provided for ARR/DEP ACFT. Intermediate approach to Singapore Changi AP and other airports in Singapore.
TWR	Singapore Tower	118.6 MHz	H24	for TKOF/LDG. for ACFT operating on RWY 02L/20R for vehicular movements on RWY 02L/20R
		118.25 MHz		for ACFT operating on RWY 02C/20C for vehicular movements on RWY 02C/20C
		131.4 MHz		for ACFT operating on RWY 02R/20L for vehicular movements on RWY 02R/20L

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Service Designation	Call sign	*Frequency (P-Pri, S-Sec)*	Hours of operation	Remarks
TWR	Singapore Ground	124.3 MHz	1600-0000 0000-1600	for push-back / taxiing of all aircraft for ground movement of aircraft (including towing aircraft) west of Terminal 3
		121.725 MHz	0000-1700 2100-0000	for push-back / taxiing of all aircraft for ground movement of aircraft (including towing aircraft) east of Terminal 2
		121.85 MHz	0000-1800 2300-0000	for push-back / taxiing of all aircraft for ground movement of aircraft (including towing aircraft) north of Terminal 1
		121.00 MHz	H24	for ground emergency
		122.55 MHz		for push-back / taxiing of all aircraft for ground movement of aircraft (including towing aircraft) of Terminal 4
		125.65 MHz		for push-back / taxiing of all aircraft for ground movement of aircraft (including towing aircraft) west of Terminal 4
		127.275 MHz		for taxiing of all aircraft for ground movement of aircraft (including towing aircraft) west of RWY 02R/20L and east of RWY 02C/20C
	Singapore Delivery	121.65 MHz	H24	for Pre-flight check/ATC clearance
		119.6 MHz	0030-0230 1200-1300	for issuance of ATC clearance
	Changi Tower / Changi Apron	121.9 MHz	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 aircraft on tow and vehicular movements on the runway when the runway is closed for maintenance. All personnel operating the radio station on board an aircraft that is on the ground in Changi Airport should possess the Aircraft Radio Operator Approval (AROA) or other equivalent certification.
	Changi East Tower	119.675 MHz	H24	Request for vehicular movements on taxiways, excluding runway, east of RWY 02C/20C including taxiways K and J east of taxiway junction K/K1 or J/J1 would be regulated by Changi East Tower. For aircraft 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 aircraft that is on the ground in Changi Airport should possess the Aircraft Radio Operator Approval (AROA) or other equivalent certification.
	Changi East Ground	120.95 MHz	Not for use, unless with prior coordination	For start-up / taxiing of all aircraft

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Service Designation	Call sign	*Frequency (P-Pri, S-Sec)*	Hours of operation	Remarks
D-ATIS	Changi Airport Departure Information	128.6 MHz	H24	(broadcasting with half hourly updated MET INFO) 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
	Changi Airport Arrival Information	128.025 MHz	H24	
ATIS	Changi East Information (02R/ 20L)	139.95 MHz	Not for use, unless with prior coordination	NIL

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WSSS AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of aid and Variation	IDENT	Frequency	OPR Hour	Position of Transmitting Antenna Coordinates	DME Transmitting Antenna Elevation / Remarks
1	2	3	4	5	6 & 7
SINJON DVOR/DME	SJ	113.5 MHz CH82X	H24	011319.28N 1035120.08E	201° MAG 14.5km from THR RWY 02 (Paya Lebar). Antenna HGT: 194ft AMSL. Coverage 200NM. EM: F1. Maintenance period: Third Thursday of every month between 0200-0600
TEKONG DVOR/DME	VTK	116.5 MHz CH112X	H24	012455.36N 1040120.17E	023° MAG 6.4km from THR RWY 20C (Singapore Changi). Antenna HGT: 150ft AMSL. Coverage 200NM. EM: F1 Maintenance Period: Third Friday of every month between 0200-0600
RWY 20C ILS LLZ	ICC	109.7MHz	H24	011932.48N 1035901.21E	Located 368m (1207ft) from THR RWY 02C, along RWY centreline. Course width 3.38°. EM: A0/A2.
RWY 20C ILS GP	-	333.2MHz	H24	012131.70N 1035955.79E	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: 17m (56ft). EM: A0/A2.
RWY 20C ILS DME	ICC	CH34X	H24	012131.70N 1035955.79E	DME co-located with GP. EM: P9.
RWY 20C ILS MM	-	75MHz	H24	012212.17N 1040008.60E	Located 960m (3150ft) from THR RWY 20C along extended centreline of RWY. No back beam.
RWY 02C ILS LLZ	ICE	108.3MHz	H24	012154.39N 1040001.14E	Located 368m (1207ft) from THR RWY 20C, along RWY centreline. Course width 3.38°. EM: A0/A2.
RWY 02C ILS GP	-	334.1MHz	H24	011952.09N 1035913.75E	Located 338m (1109ft) from THR RWY 02C on left side of RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS Reference Datum: 17m (56ft). EM: A0/A2.
RWY 02C ILS DME	ICE	CH20X	H24	011952.09N 1035913.75E	DME co-located with GP. EM: P9.
RWY 02C ILS MM	-	75MHz	H24	011915.04N 1035853.83E	Located 945m (3100ft) 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.

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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 LLZ	ICW	110.9MHz	H24	012307.03N 1035934.03E	Located 1105m (3625ft) from displaced THR RWY 20R, along centreline of RWY. Course width 2.81°. EM:A0/A2.
RWY 02L ILS GP	-	330.8MHz	H24	012108.35N 1035838.86E	Located 343m (1125ft) from THR RWY 02L on left side of RWY, 143m (469ft) from RWY centreline. GP angle 3°. HGT of ILS Reference Datum: 17m (56ft). EM:A0/A2.
RWY 02L ILS DME	ICW	CH46X	H24	012108.35N 1035838.86E	DME co-located with GP. EM:P9.
RWY 02L ILS MM	-	75MHz	H24	012027.54N 1035826.68E	Located 957m (3140ft) from THR RWY 02L along extended centreline of RWY. No back beam.
RWY 20L ILS LLZ	ICZ	108.55MHz	H24	011909.54N 1035954.79E	Located 367m (1204ft) from THR RWY 02R, along RWY centreline. Course width 2.80°. EM: A0/A2.
RWY 20L ILS GP	-	329.75MHz	H24	012108.89N 1040049.38E	Located 335m (1099ft) from THR RWY 20L on left side of the RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS REF datum: 16.8m (55ft). EM: A0/A2.
RWY 20L ILS DME	ICZ	CH22Y	H24	012108.89N 1040049.38E	DME co-located with GP. EM: P9.
RWY 20L ILS MM	-	75MHz	H24	012149.37N 1040102.55E	Located 968m (3176ft) from THR RWY 20L, along extended centreline of the RWY.
RWY 02R ILS LLZ	ICX	110.5MHz	H24	012131.46N 1040054.70E	Located 367m (1204ft) from THR RWY 20L, along RWY centreline. Course width 2.80°. EM: A0/A2.
RWY 02R ILS GP	-	329.6MHz	H24	011929.11N 1040007.26E	Located 335m (1099ft) from THR RWY 02R on right side of the RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS REF datum: 16.2m (53ft). EM: A0/A2.
RWY 02R ILS DME	ICX	CH42X	H24	011929.11N 1040007.26E	DME co-located with GP EM: P9
RWY 02R ILS MM	-	75MHz	H24	011851.60N 1035947.22E	Located 974m (3196ft) from THR RWY 02R, along extended centreline of the RWY.

WSSS AD 2.20 LOCAL TRAFFIC REGULATIONS

1 DESIGNATION OF PAYA LEBAR AIRPORT AS AN ALTERNATE AERODROME FOR SINGAPORE CHANGI AIRPORT

Please refer to section WSAP AD 2.20 for details.

2 WRONG APPROACHES AND LANDINGS OF AIRCRAFT BOUND FOR SINGAPORE CHANGI AND PAYA LEBAR AIRPORTS

2.1 INTRODUCTION

2.1.1 The attention of all pilots is drawn to the existence of Paya Lebar Airport close to Singapore Changi Airport. The runway at Singapore Changi Airport is orientated in the same true bearing as the runway at Paya Lebar Airport i.e. 023°/203°. Due to the close proximity of these two runways, pilots are cautioned against mistaking Paya

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Lebar Airport for the runway of Singapore Changi Airport and thus making an inadvertent visual landing or approach to land at Paya Lebar.

2.1.2 Erroneous approaches or landings usually occurred during the hours of darkness. In almost every instance, the weather prevailing at the time of the incident was generally good or fair.

2.1.3 There is intensive local flying at Paya Lebar and Seletar during the day and night. Thus, the risk of collision is very great if a wrong approach is made to any of the above two airports. Likewise, wrong approaches into Singapore Changi Airport can also be disastrous.

2.2 POINTS TO BEAR IN MIND WHEN APPROACHING SINGAPORE CHANGI AIRPORT OR PAYA LEBAR

2.2.1 The following points are highlighted to serve as a guide to assist pilots in making a correct approach into Singapore Changi Airport or Paya Lebar Airport and should be remembered and followed:

a. The runways at Singapore Changi Airport and Paya Lebar Airport are identically aligned on 02/ 20. Therefore exercise extreme vigilance when leaving NYLON or SAMKO Holding Areas inbound and maintain correct tracks to the respective runways as listed below.

b. Adhere strictly to IFR procedures even in VMC which calls for a procedure turn over NYLON Holding Area or SAMKO Holding Area as prescribed.

c. Make full use of all available navigational and landing aids available and positively identify every aid used.

d. Switch to the correct ILS localizer frequency at Singapore Changi Airport under all conditions.

2.3 AERODROME CHARACTERISTICS OF SINGAPORE CHANGI AND PAYA LEBAR AIRPORTS

2.3.1 Tabulated below are details of aerodrome characteristics of Singapore Changi Airport and Paya Lebar Airport which indicate the similarities and significant differences for ease of identification by pilots operating into these two airports.

Aeronautical Service	**PAYA LEBAR Airport**	**SINGAPORE CHANGI Airport**	**Significant Differences and Remarks**
Magnetic heading of RWY	02/20	02L/20R 02C/20C 02R/20L	Exercise caution due to similar RWY alignment
Approach Lights	RWY 02 Modified Calvert High INTST with centreline and 3 crossbars. High INTST white LGT with brilliancy control and sequenced flashing lights.	RWY 02L Precision APCH LGT CAT II. Extended centreline with red side row barettes, 2 crossbars, 2 APCH beacons and sequenced flashing lights.	
	RWY 20 Modified Calvert High INTST with centreline and 3 crossbars. High INTST white LGT with brilliancy control and sequenced flashing lights.	RWY 20R Precision APCH LGT CAT I. Centreline barettes flashing white, 2 APCH beacons and sequenced flashing lights. (refer to chart AD-2-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	

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WSSS AD 2.21 NOISE ABATEMENT PROCEDURES

1.1 To alleviate the problem of noise, all aircraft on AWY G579 between SINJON (SJ) and JAYBEE (JB) 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 AND GROUND PROCEDURES

1 LOW VISIBILITY PROCEDURES (LVP) FOR CATEGORY II ILS OPERATIONS

1.1 Introduction

1.1.1 Category II ILS approaches will be made available at Singapore Changi Airport to authorised flights during prolonged periods of low visibility, except during thunderstorms. RVR minima for CAT II ILS operations is limited to 350m due to runway and taxiway light spacing requirements on the airfield.

1.2 Authorisation for Category II ILS Approaches

1.2.1 Operators who wish to conduct Category II ILS operations at Singapore Changi Airport must have obtained operational approval from the relevant State of Operator and be authorised by the Civil Aviation Authority of Singapore.

1.3 Category II ILS Runways

1.3.1 At Singapore Changi Airport, Category II ILS approaches are available only on RWY 02L and RWY 20C, which are also equipped with precision approach Category II lighting system. When required, pilots making Category II ILS approaches to Singapore Changi Airport should refer to the procedures in the Instrument Approach Charts AD-2-WSSS-IAC-1 to AD-2-WSSS-IAC-11 and the Precision Approach Terrain Charts for RWY 02L and RWY 20C at AD-2-WSSS-PATC-1 and AD-2-WSSS-PATC-2 respectively.

1.4 Initiation of Category II ILS Operations

1.4.1 Preparations will be made to implement LVP for Category II ILS operations at Singapore Changi Airport during prolonged period of low visibility, except during thunderstorms, when the RVR drops below 800 metres.

1.4.2 Availability of the Category II ILS approaches will be made known through NOTAM and ATIS broadcasts as well as air traffic control radio communications.

1.4.3 During LVP operations, aircraft will not be cleared for Category II ILS approach if any of the ILS or approach/runway lights fall below Category II requirements. Aircraft will not be cleared for landing if the Touchdown Zone RVR is unserviceable.

1.5 ILS Sensitive Areas

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

1.6 Termination of LVP for Category II ILS Operations

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

1.7 Operations of flights Not Authorised for Category II ILS Operations

1.7.1 During Category II ILS operations, if the RVR is 550 metres or above, flights not authorised for Category II ILS operations may continue to make approaches and land. Airlines planning to operate flights not authorised for Category II ILS operations into Changi shall monitor the METAR to ascertain the RVR values when launching their flights and be prepared to divert if the RVR is below 550 metres.

2 RUNWAY UTILISATION

2.1 Runway-in-use

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

2.2 Departures

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

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

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

2.3 Clearance for Immediate Take-Off

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

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

2.4 Arrivals - Minimum Runway Occupancy Time (ROT)

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

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

2.4.3 To enhance planning, pilots can make reference to the Landing Exit Distance (LED), information below which is measured from threshold to tangent point where the exit taxiway centreline starts to curve away from the runway centreline:

RWY	Exit Taxiway (LED in metres)	Remarks
20R	**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	**E6*** (**1948**), **E7*** (**2391**) and E8 (3152)	
20L	**A7* (1750)**, **A8* (2225)** and A9* (2700)	
02L	**W5*** (**1966**), **W4*** (**2491**) and W3* (2876)	
02C	**E5*** (**2055**), **E4*** (**2565**) and E3* (3267)	
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 E4 for RWY 02C or TWY E7 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 E4 for RWY 02C or TWY E7 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.

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4.5 TOBT shall be updated through the following systems:

a. Airport Operations Centre System (AOCS) A-CDM web based portal; or
b. Gate Message Input Display (GMID) at boarding rooms;

4.6 AO/GHA is encouraged to update TOBT through ONLY one of the above systems in order to avoid any chance of a miscommunication.

4.7 TOBT information is available through the following channels:

a. AOCS A-CDM portal;
b. GMID;
c. Aircraft Docking Guidance System (ADGS) at contact stands;
d. Radio communication with GHA or AO.

4.8 The Pre-Departure Sequencer (PDS) will calculate the TSAT automatically by taking into account factors such as TOBT, calculated take-off time (CTOT), variable taxi times (VTT), wake turbulence category, departure separation, etc. A pre-departure sequence is determined from the calculated TSATs, thus the accuracy of TOBT is vital to an optimal TSAT.

4.9 Flights with an invalid or expired TOBT will be instructed by ATC to update TOBT when requesting for clearance. For non-compliant flights, delays can be expected. AO or GHA are strongly encouraged to update TOBT as soon as any expected delay to the aircraft readiness for pushback is made available to avoid unnecessary hold-ups.

4.10 TSAT information is available through the following channels:

a. AOCS A-CDM portal;
b. GMID;
c. ADGS at contact stands;
d. Radio communication with GHA or AO;
e. ATC - Upon issuance of ATC clearance (for flights parked at aircraft stands without ADGS).

5 A-CDM START-UP PROCEDURES

5.1 Pilot shall ensure aircraft is ready for pushback at TOBT.

5.2 Pilot to maintain communication with the AO / GHA as they are responsible for updating the TOBT. Notify the AO / GHA to update the TOBT if it is expected to differ by 5 minutes or more.

5.3 Pilot utilising the DCL service on selected routes shall request for ATC clearance through 'Request for Departure Clearance Downlink' (RCD) message no earlier than 20 minutes before TOBT. Refer to WSSS AD 2.22 paragraph 8.4 on the applicable routes for DCL service and procedures.

5.4 Pilot using voice request to contact Ground Movement Planner (Clearance Delivery) and request for ATC clearance within 5 minutes of TOBT using the following phraseology:

- Callsign
- Destination
- Proposed flight level and alternate level, if any
- Parking position

a. Pilot shall only request for ATC clearance provided aircraft is ready to pushback at TOBT.

5.5 Regardless of clearance through voice or datalink, all departing aircraft must report to Clearance Delivery when ready for push within 5 minutes of TOBT.

5.6 ATC will advise the pilot whether the proposed flight level or other alternate flight level is available and an ATC clearance will be issued accordingly. If pre-departure coordination with an adjacent unit or centre is required, the pilot will be instructed to standby.

5.7 ATC will update TSAT changes if any, during issuance of ATC clearances. Note that TSAT displayed on ADGS may not be final and can be revised due to en-route clearance restrictions, ground congestion or flow measures.

5.8 Pilot shall request for pushback from Ground Movement Control within 5 minutes of TSAT after obtaining ATC clearance, or as directed by ATC.

a. ATC may swap pushback sequence based on real-time readiness of aircrafts to maximise apron and runway capacity and reduce the overall delay to traffic as and when required.
b. At the end of pushback, the departing aircraft must have all engines started and be ready to taxi immediately, unless otherwise instructed by ATC.

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

5.9 If a flight is unable to pushback by TSAT + 5 minutes due to the aircraft being unready, ATC clearance and TSAT will be cancelled. Pilot must notify the AO / GHA to update the TOBT for a new TSAT before requesting for a new ATC clearance. This also applies to aircraft returning back to blocks after pushback.

a. ATC will inform the aircraft when a clearance is cancelled using the phraseology; "(Callsign of aircraft) your ATC clearance and TSAT is cancelled (reason). Update TOBT before requesting for new clearance".
b. Flight may also have its ATC clearance cancelled if it develops a technical problem after pushback and is unable to taxi for prolonged duration.

5.10 Non-compliance of initial TSAT may result in an aircraft losing its existing position in the pre- departure sequence. Delay can be expected as a result of re-sequencing based on new TOBT input.

5.11 If delay in pushback is due to ground traffic movement or ATC clearance restrictions, the ATC clearance and TSAT will remain valid even if it exceeds TSAT + 5 minutes. TOBT need not be updated for such situations.

5.12 In the event that A-CDM mode of operations need to be cancelled due to any reason, the termination will be communicated to relevant parties through email by the airport operator and a NOTAM will be issued by ATC. Pilot shall follow the non-CDM procedures detailed in para 13.

5.13 Quick overview of WSSS start-up for pilots

Definitions of commonly used terms

- **Target Off-Block Time (TOBT)** - The time that an AO or GHA estimates that an aircraft will be ready, all doors closed, boarding bridge removed, pushback vehicle available and ready to start-up / pushback immediately upon receipt of ATC clearance.
- **Target Start-up Approval Time (TSAT)** - The time provided by ATC that an aircraft can expect start-up / pushback approval.

TOBT and TSAT requirements

- Irrespective of the TSAT, the aircraft must be ready for departure at the TOBT +/- 5 minutes as the TSAT may be revised forward at short notice.
- Any time the TOBT or TSAT cannot be met, or an earlier departure is required, the TOBT must be updated expeditiously by the aircraft operator or ground handler.

ATC Clearance

- ATC Clearance on selected ATS routes can be requested via Data Link Departure Clearance (DCL) at TOBT- 20 minutes.
- If DCL is not available, ATC Clearance should be requested via Clearance Delivery at TOBT +/-5 minutes.

Start-up / Pushback Clearance

- Pilots must be ready for start-up / pushback at TOBT +/- 5 minutes.
- Pilots should request start-up / pushback clearance at TSAT +/- 5 minutes.

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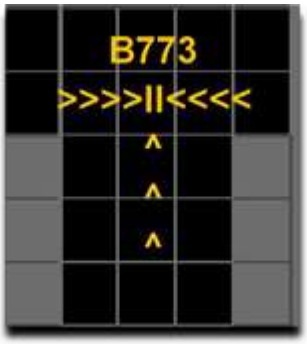
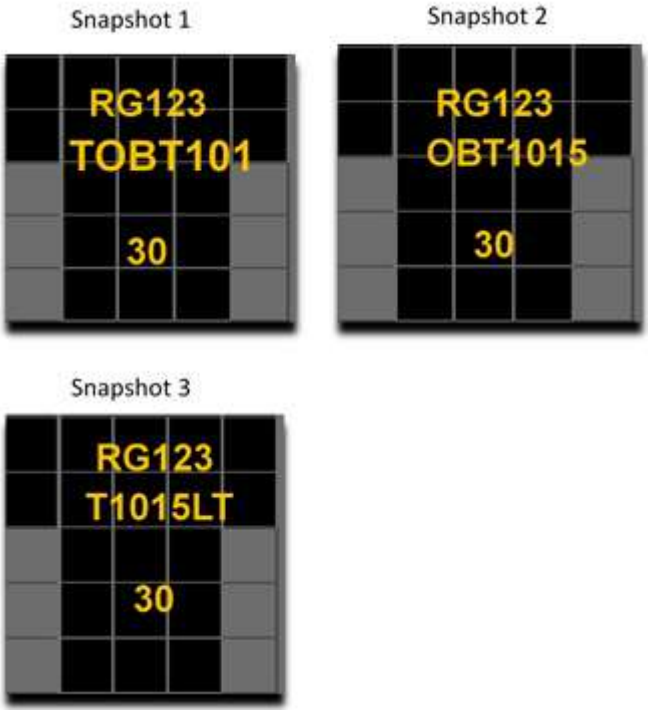
6 A-CDM INFORMATION VIA AIRCRAFT DOCKING GUIDANCE SYSTEM (ADGS)

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.

Aircraft Docking Guidance System (ADGS)	
Description	**Display on ADGS**
Aircraft arrival to stand • No change in existing functionality and display	
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	

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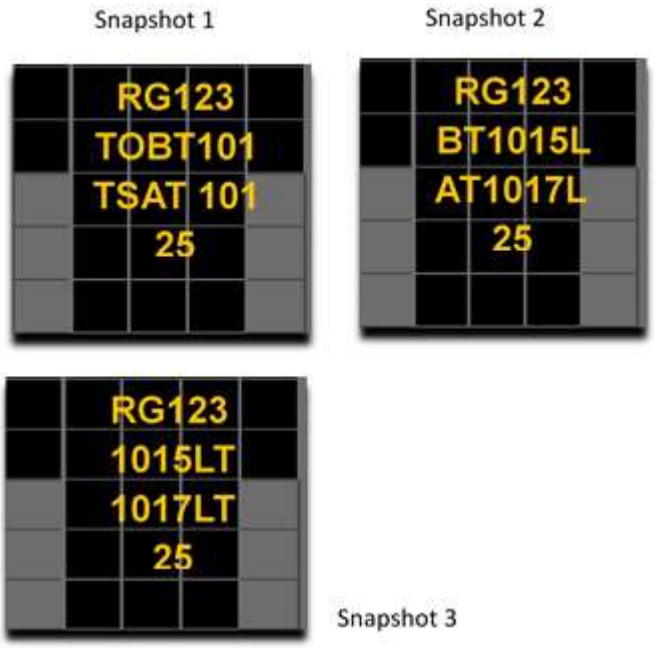
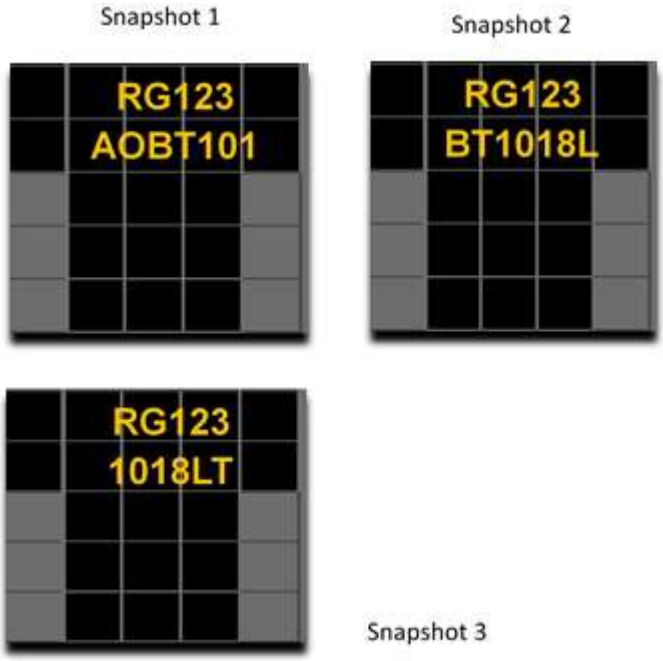
Aircraft Docking Guidance System (ADGS)	
Description	**Display on ADGS**
25 minutes prior to TOBT • ADGS will display TSAT derived by PDS • As ADGS can only display up to 7 characters per line, the displayed message will be scrolling. • TSAT timings may change as the PDS is continuously optimising push back times based on real time traffic conditions	
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.

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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)

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.

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8.15 ATC will check for TOBT compliance and update pilot of any revisions in departure clearance and flow restrictions before handing the flight over to Ground frequency for start-up and pushback.

8.16 ATC will cancel the clearance issued and send a "revert to voice procedures" message if pilot does not report ready for push within 5 minutes of TSAT.

9 ASSIGNMENT OF FLIGHT LEVELS TO AIRCRAFT DEPARTING FROM SINGAPORE CHANGI AIRPORT

9.1 Assignment of flight levels to departing aircraft is made on a best-planned-best-served basis (with reference to TOBT for ATC clearance request detailed in para 5.4). Aircraft will normally be assigned the level requested unless an alternate level is offered after coordination with the adjacent ATC centres.

9.2 Departing flights from Singapore requesting FL280 or FL320 on L759, M770, N571, N571/N877 or P628 will be cleared as follows:

a. Aircraft departing Singapore will be cleared to FL280;
b. Succeeding aircraft on the same route will be cleared to FL280 with 10min longitudinal separation provided there is no closing speed with the preceding aircraft;
c. Additional longitudinal separation as appropriate shall be imposed by ATC when the succeeding aircraft is faster than the preceding aircraft on the same route;
d. The first aircraft from either Singapore or Kuala Lumpur to be over GUNIP on N571 or N571/N877, the Kuala Lumpur/Bangkok FIR boundary on M770 or L759 and VPL on P628 can expect its requested flight level

10 DELAY IN PUSHBACK AND/OR TAXIING DUE TO OTHER AIRCRAFT

10.1 Delays may be expected for the second aircraft to pushback and to taxi when two or more aircraft are parked either adjacent to one another or close together. However, it will retain its ATC clearance even if the 5 minutes grace period allowed for under para 5.9 is exceeded.

Note: The TSAT may not be able to predict delays arising from apron congestion as traffic movement on ground is dynamic and situations may change on a real time basis depending on aircraft readiness. ATC will facilitate pushback as soon as possible when traffic permits.

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

11.1 The ATC clearance may require an aircraft to arrive at a reporting point at a specified time and level or to depart a number of minutes behind a preceding traffic to establish the appropriate longitudinal separation. Such delay will not deprive a departing aircraft of its ATC clearance even though the 5 minutes grace period allowed for under para 5.9 is exceeded.

12 DELAY DUE TO OVERFLIGHTS

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

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

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b. ATC will revert to the gate hold procedures stated in para 14 and issue estimated pushback times accordingly.

14 GATE HOLD PROCEDURES FOR DEPARTING AIRCRAFT (DURING NON-CDM MODE OF OPERATIONS)

14.1 Whenever there are about five to seven departing aircraft at the runway holding point, subsequent pushback of departures will be regulated such that the Ground Movement Planner (GMP) on VHF frequency 121.65MHz will start to issue pilots with Expected Pushback Time (EPT) as TSAT used in A-CDM operations is not available. The determination of EPT will take into account an aircraft's parking stand as well as taxi time to the runway-in-use holding point.

14.2 When an EPT is issued, pilots will be instructed to either remain on GMP frequency or to monitor Singapore Ground Control (frequencies 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz or 125.65MHz). It should be noted that when instructed to monitor the Singapore Ground frequencies, pilots shall not establish contact with the Singapore Ground Control, rather, pilots shall maintain listening watch on the assigned Singapore Ground Control frequency and wait for pushback instruction. This is to prevent unnecessary frequency congestion.

14.3 A flight issued with an EPT but chooses to commence pushback before the assigned time will be allowed to do so subject to traffic. However, the flight should not expect an earlier departure time as the planned pre-departure sequence will be maintained.

14.4 In a situation when a departing aircraft is occupying a gate that has been assigned to an arriving aircraft, the departing aircraft will be instructed by GMP to contact Singapore Ground Movement Control for pushback for the purpose of better gate utilisation.

14.5 To maximise runway utilisation, departure sequence will be planned on the basis of increasing runway throughput so as to enhance overall efficiency.

15 GROUND MOVEMENT PLANNER ON VHF 121.65MHz

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

16 GROUND MOVEMENT CONTROL ON VHF 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz, 125.65MHz AND 127.275MHz

16.1 This frequency shall be used for aircraft start-up/push-back clearance.

16.2 Unless otherwise instructed by ATC, the pilot-in-command shall prior to starting engines listen out on the Ground Movement Control frequency on 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz or 125.65MHz.

16.3 The pilot-in-command shall:

a. Request and obtain taxi instructions prior to taxiing;
Note: ATC clearance, including the assigned SSR code will normally be issued prior to push back. Pilot shall squawk the SSR code immediately when airborne.

b. Change from Ground Movement Control frequency to the Runway Control frequency when instructed (118.6MHz, 118.25MHz or 131.4MHz). It should be noted that when instructed to monitor Singapore Tower frequencies, pilots shall not establish contact with Singapore Tower; rather, pilots shall maintain a listening watch on the assigned Singapore Tower frequency and wait for instruction. This is to prevent unnecessary frequency congestion.

16.4 Departing aircraft will be instructed when to change from 118.6MHz, 118.25MHz or 131.4MHz to Singapore Departure frequency 120.3MHz.

16.5 In the case of the aircraft having landed, the pilot-in-command shall change from 118.6MHz, 118.25MHz or 131.4MHz to 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz, 125.65MHz or 127.275MHz immediately upon instructed by ATC after clearing the runway. He shall maintain watch on 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz, 125.65MHz or 127.275MHz for taxiing and parking instructions until he arrives at his aircraft stand.

17 TAXIING

17.1 Taxi clearance given by Singapore Ground Movement Control will relate to movement on the manoeuvring area, but excluding the marshalling area.

17.2 Aircraft taxiing on the manoeuvring area will be regulated by ATC to avoid or reduce possible conflict and will be provided with traffic information and alerting service. ATC shall apply taxiing clearance limits whenever necessary.

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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.

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 E10 or E11

RWY 02L - TWY W8, W9 or W10

RWY 20L – TWY A1, A2 or A3

RWY 20C - TWY E1, E2

RWY 20R - TWY W1, W2

18.2 The pilot-in-command shall not take-off or land without a clearance from Aerodrome Control.

18.3 The pilot-in-command shall not run-up on the runway in use unless authorised by Aerodrome Control. Engine run-ups in the holding pan or taxiway holding point clear of the runway in use may be carried out subject to approval by Aerodrome Control.

18.4 After landing, the pilot-in-command shall vacate the runway by the shortest suitable route and to contact Singapore Ground Movement Control who will issue specific taxi route instructions to its assigned aircraft stand.

18.5 Aircraft with radio communication failure shall vacate the runway and stop on the taxiway and watch for light signals from Aerodrome Control.

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

19.1 INTRODUCTION

19.1.1 The SIDs and STARs for Singapore Changi Airport require aircraft to be GNSS-equipped and approved with navigation systems that meet the ICAO RNAV-1 navigation specification in accordance to the ICAO Performance Based Navigation Manual (Doc 9613).

19.1.2 To avoid proliferation of SIDs and STARs, the basic RNAV SIDs and STARs follow similar tracks as the RNAV-1 (GNSS) SIDs and STARs using the same set of SIDs and STARs identification.

19.1.3 Operators / pilots who are not approved to operate on the RNAV-1 (GNSS) SIDs and STARs shall notify ATC and operate on the alternate basic RNAV SIDs and STARs or expect radar vectors from ATC.

19.2 ARRIVALS

19.2.1 Arriving aircraft from the various ATS routes shall plan for the respective RNAV-1 STARs with the associated flight planning requirement as shown below:

ATS Route	RNAV-1 STAR	Remarks and Flight Planning Requirement
A464 (southbound to Singapore)	ARAMA	Default STAR shall be ARAMA. 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

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ATS Route	RNAV-1 STAR	Remarks and Flight Planning Requirement
L504	OBDOS	NIL
L642	ELALO	ESPOB Q801 Q802 ELALO
L762	ASUNA	NIL
M635	SURGA	NIL
M646	KARTO	NIL
Y514	Not applicable	Y514 NUFFA PIBAP PASPU. After PASPU, expect radar vectors.
M753	ELALO	IPRIX Q802 ELALO
M767	KARTO	NIL
M774	OBDOS	NIL
M904	ELALO	UPRON Q803 ELALO
N891	ELALO	N891 ENREP direct ELALO
N892	MABAL	NIL
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.		

19.2.2 All RNAV-1 (GNSS) STARs terminate at the initial approach fix (IAF). Arrivals can expect radar vectors for approach to the respective runways.

19.3 DEPARTURES

19.3.1 All departing aircraft will be cleared on the appropriate RNAV-1 (GNSS) SIDs or radar departure to join the planned ATS route and shall climb initially to 3,000ft.

19.3.2 RNAV-1 (GNSS) SIDs will be assigned to departures from Singapore Changi Airport that flight plan on the following ATS routes:

ATS Route	RNAV-1 SID	Remarks and Flight Planning Requirements
A457	MASBO	NIL
B470	ANITO	NIL
G580 / M646	TOMAN	NIL
L504	BAVUS	NIL
L625 / N884	TOMAN	NIL
L762	ADMIM	NIL
M635	VENIX	NIL
M751	MERSING	NIL
M753	MERSING	VMR L642 ENREP M753 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.
M774	KADAR	NIL
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	ADMIM	NIL
Y339	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.

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.

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19.5 OPERATORS' PROCEDURES

19.5.1 The operator shall ensure that in-flight procedures, crew manuals and training programmes are established in accordance with RNAV-1 (GNSS) navigation requirements.

19.5.2 Pilots shall inform ATC when on-board equipment does not meet the RNAV-1 (GNSS) navigation requirements. Pilots can then expect radar vector from ATC.

20 COORDINATES OF SID/STAR WAYPOINTS (WGS84 DATUM)

Name	Latitude	Longitude	Radius/Distance from VTK	Radius/DIstance from SJ
ABVIP	010008N	1035032E	VTK R-203.5/ D27.0	SJ R-183.5 / D13.2
ADMIM	005733N	1033033E	VTK R-228.4/ D41.2	SJ R-232.8 / D26.1
AGROT	010108N	1035808E	VTK R-187.7 / D24.0	SJ R-150.8 / D14.0
AGVAR	014719N	1034145E	VTK R-318.8 / D29.8	SJ R-344.3 / D35.3
AKMET	015355N	1034339E	VTK R-328.6 / D34.0	SJ R-349.3 / D41.3
AKOMA	014522N	1035443E	VTK R-342.0 / D21.4	SJ R-006.2 / D32.0
ALFA	013033N	1034942E	VTK R-295.7 / D12.9	SJ R-354.8 / D17.2
ANITO	001700S	1045200E	VTK R-153.4 / D113.4	SJ R-146.0 / D108.6
ARAMA	013654N	1030712E	VTK R-282.4 / D55.5	SJ R-298.0 / D50.0
AROSO	020846N	1032421E	VTK R-319.9 / D57.4	SJ R-334.0/ D61.7
ASUNA	005948N	1030954E	VTK R-244.1 / D57.3	SJ R-252.0 / D43.6
ATKAX	000512N	1065946E	VTK R-113.9 / D195.5	SJ R-109.7 / D200.6
ATRUM	013256N	1040057E	VTK R-357.3 / D8.0	SJ R-026.1 / D21.8
BAVUS	000000N	1090000E	VTK R-105.9 / D310.5	SJ R-103.4 / D317.3
BETBA	013302N	1035331E	VTK R-316.1/ D11.3	SJ R-006.3 / D19.8
BIBVI	024336N	1040618E	VTK R-003.5 / D78.4	SJ R-009.6 / D91.1
BIDUS	013554N	1035755E	VTK R-326.0 / D13.2	SJ R-006.9 / D22.6
BIPOP	013122N	1041018E	VTK R-054.5 / D11.0	SJ R-046.8 / D26.2
BOBAG	010230N	1032954E	VTK R-234.7 / D38.6	SJ R-243.2 / D24.0
BOKIP	010421N	1034353E	VTK R-220.5 / D27.0	SJ R-219.5 / D11.6
BTM	010813N	1040758E	VTK R-158.2 / D17.9	SJ R-107.0 / D17.5
DIVSA	011105N	1040303E	VTK R-172.9 / D13.9	SJ R-100.8 / D11.9
DOGRA	010525N	1041423E	VTK R-146.2 / D23.5	SJ R-108.9 / D24.4
DOKTA	012606N	1041040E	VTK R-083.0 / D9.4	SJ R-057.0 / D23.2
DONDI	011252N	1035855E	VTK R-191.3/ D12.3	SJ R-093.4 / D7.6
DOSNO	004757N	1041409E	VTK R-160.8 / D39.0	SJ R-137.8 / D34.1
DOSPA	011459N	1040441E	VTK R-161.4 / D10.5	SJ R-082.9 / D13.5
DOVAN	011938N	1041249E	VTK R-114.6 / D12.7	SJ R-073.9 / D22.5
ELALO	041240N	1043329E	VTK R-010.6 / D169.9	SJ R-013.4 / D183.3
HOSBA	011948N	1042418E	VTK R-102.5 / D23.6	SJ R-079.0 / D33.7
IBIVA	011351N	1035637E	VTK R-203.1/ D12.0	SJ R-084.3 / D5.3
IBIXU	011621N	1035740E	VTK R-203.2 / D9.3	SJ R-064.4 / D7.0
IBULA	005036N	1043600E	VTK R-134.5 / D48.7	SJ R-116.8 / D50.2
IGNON	010847N	1041257E	VTK R-144.1 / D19.8	SJ R-101.8 / D22.2
IKAGO	003816N	1052931E	VTK R-117.7 / D99.8	SJ R-109.5 / D104.4
IKIMA	004314N	1045500E	VTK R-127.6 / D67.9	SJ R-115.1 / D70.5
JB (JAYBEE)	013000N	1034242E	VTK R-285.1 / D19.3	SJ R-332.6 / D18.6
KADAR	000647S	1074342E	VTK R-112.4 / D240.5	SJ R-109.0/ D245.8
KANLA	034556N	1043606E	VTK R-013.8 / D144.5	SJ R-016.5 / D158.3
KARTO	011124N	1053343E	VTK R-098.3 / D93.5	SJ R-091.1 / D102.6
KEXAS	011019N	1044818E	VTK R-107.2 / D49.2	SJ R-093.0 / D57.2
KILOT	030217N	1044023E	VTK R-022.0 / D104.5	SJ R-024.4 / D119.0
LAVAX	010950N	1042714E	VTK R-120.1 / D30.0	SJ R-095.5 / D36.2
LEDOX	011642N	1035651E	VTK R-208.6 / D9.4	SJ R-058.5 / D6.5
LELIB	012729N	1032450E	VTK R-274.0 / D36.6	SJ R-298.0 / D30.0
LETGO	011411N	1035548E	VTK R-207.3 / D12.1	SJ R-079.1 / D4.6
MABAL	032826N	1051236E	VTK R-030.1 / D142.1	SJ R-031.2 / D157.2
MASBO	020248N	1025251E	VTK R-299.0 / D78.3	SJ R-310.2 / D76.6

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Name	Latitude	Longitude	Radius/Distance from VTK	Radius/DIstance from SJ
MIBEL	012351N	1020816E	VTK R-269.5 / D113.2	SJ R-275.8 / D103.7
NYLON	013657N	1040624E	VTK R-023.0 / D13.0	SJ R-032.9 / D30.0
OBDOS	002503N	1065551E	VTK R-108.9 / D184.5	SJ R-104.7 / D190.7
PALGA	011059N	1034759E	VTK R-223.8 / D19.3	SJ R-235.1 / D4.1
PAMSI	010459N	1034845E	VTK R-212.3 / D23.6	SJ R-197.2 / D8.7
PASPU	015915N	1040618E	VTK R-008.3 / D34.5	SJ R-018.3 / D48.1
PIBAP	023023N	1040618E	VTK R-004.4 / D65.3	SJ R-011.1 / D78.1
POSUB	012725N	1040748E	VTK R-069.0 / D6.9	SJ R-049.8 / D21.7
PU	012524N	1035600E	VTK R-275.2 / D5.4	SJ R-021.1 / D13.0
REMES	004342N	1035735E	VTK R-185.2 / D41.2	SJ R-167.9 / D30.2
REPOV	001623N	1040300E	VTK R-178.6 / D68.2	SJ R-168.3 / D57.9
RUVIK	011422N	1042033E	VTK R-118.8 / D21.9	SJ R-088.0 / D29.2
RWY 02C DER	012152N	1040000E	VTK R-203.5 / D3.3	SJ R-046.0 / D12.2
RWY 02L DER	012305N	1035933E	VTK R-224.1 / D2.5	SJ R-040.6 / D12.8
RWY 20C DER	011935N	1035902E	VTK R-203.3 / D5.8	SJ R-051.5 / D10.0
RWY 20R DER	012047N	1035835E	VTK R-213.7 / D4.9	SJ R-044.8 / D10.4
SABKA	015051N	1031713E	VTK R-300.4/ D51.2	SJ R-317.7 / D50.7
SAMKO	010530N	1035255E	VTK R-203.5 / D21.1	SJ R-168.0 / D8.0
SANAT	010749N	1035930E	VTK R-186.1 / D17.1	SJ R-123.7 / D9.9
SJ (SINJON)	011319N	1035120E	-	-
SURGA	003657S	1063119E	VTK R-129.1 / D193.3	SJ R-124.6 / D194.3
TOKIM	012933N	1040315E	VTK R-022.7 / D5.0	SJ R-036.7 / D20.1
TOMAN	012147N	1054717E	VTK R-091.7 / D106.2	SJ R-085.9 / D116.5
TOPOM	012955N	1040227E	VTK R-012.8 / D5.1	SJ R-034.2 / D20.0
VENIX	002156S	1060521E	VTK R-130.6 / D163.5	SJ R-125.3 / D164.3
VENPA	002141N	1044955E	VTK R-142.3 / D79.6	SJ R-131.2 / D78.1
VMR	022318N	1035218E	VTK R-351.2 / D58.8	SJ R-000.9 / D69.6
VTK (TEKONG)	012455N	1040120E	-	-

21 SID / STAR PHRASEOLOGIES

21.1 SID / STAR phraseologies allow ATC and pilot to communicate and understand detailed clearance information that would otherwise require long and potentially complex transmissions. To eliminate safety risk due to a mismatch between ATC and pilot expectations when SID / STAR phraseologies are used, and what certain terms may mean, ICAO has published Amendment 7-A to Doc 4444, PANS- ATM to harmonise the core phraseologies that positively reinforce the lateral, vertical and speed requirements embedded in a SID or STAR that will continue to apply, unless explicitly cancelled or amended by the controller.

21.2 The core phraseologies are:

i. CLIMB VIA SID TO (level)
ii. DESCEND VIA STAR TO (level)

21.3 These require the aircraft to:

i. Climb / descend to the cleared level in accordance with published level restrictions;
ii. Follow the lateral profile of the procedure; and
iii. Comply with published speed restrictions or ATC-issued speed control instructions as applicable.

21.4 Phraseologies for removal of speed or level restrictions are:

i. CLIMB VIA SID TO (level), CANCEL SPEED RESTRICTION(S)
ii. DESCEND VIA STAR TO (level), CANCEL LEVEL RESTRICTION(S) AT (point(s))

21.5 These phraseologies mean that:

i. The lateral profile of the procedure continue to apply and
ii. Speed or level restrictions which have not been referred to will continue to apply.

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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 ARRIVING AIRCRAFT

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

23 LIGHT AIRCRAFT OPERATIONS

23.1 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.

23.2 Flight notification shall be given by filing a flight plan.

23.3 All such operations will be regulated in accordance with IFR procedures.

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 3,500ft till Glide Path Interception for Runway 20R / 02L and 2,500ft 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 when intercepting the ILS:

a. 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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or

b. to intercept ILS

"**TURN LEFT (RIGHT) HEADING (three digits) MAINTAIN (altitude) CLEARED FOR ILS APPROACH RUNWAY (number) LEFT (CENTRE / RIGHT)**"

24.2.7 Aircraft can expect to maintain speed 180kt 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.).

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WSSS AD 2.24 CHARTS RELATED TO AN AERODROME

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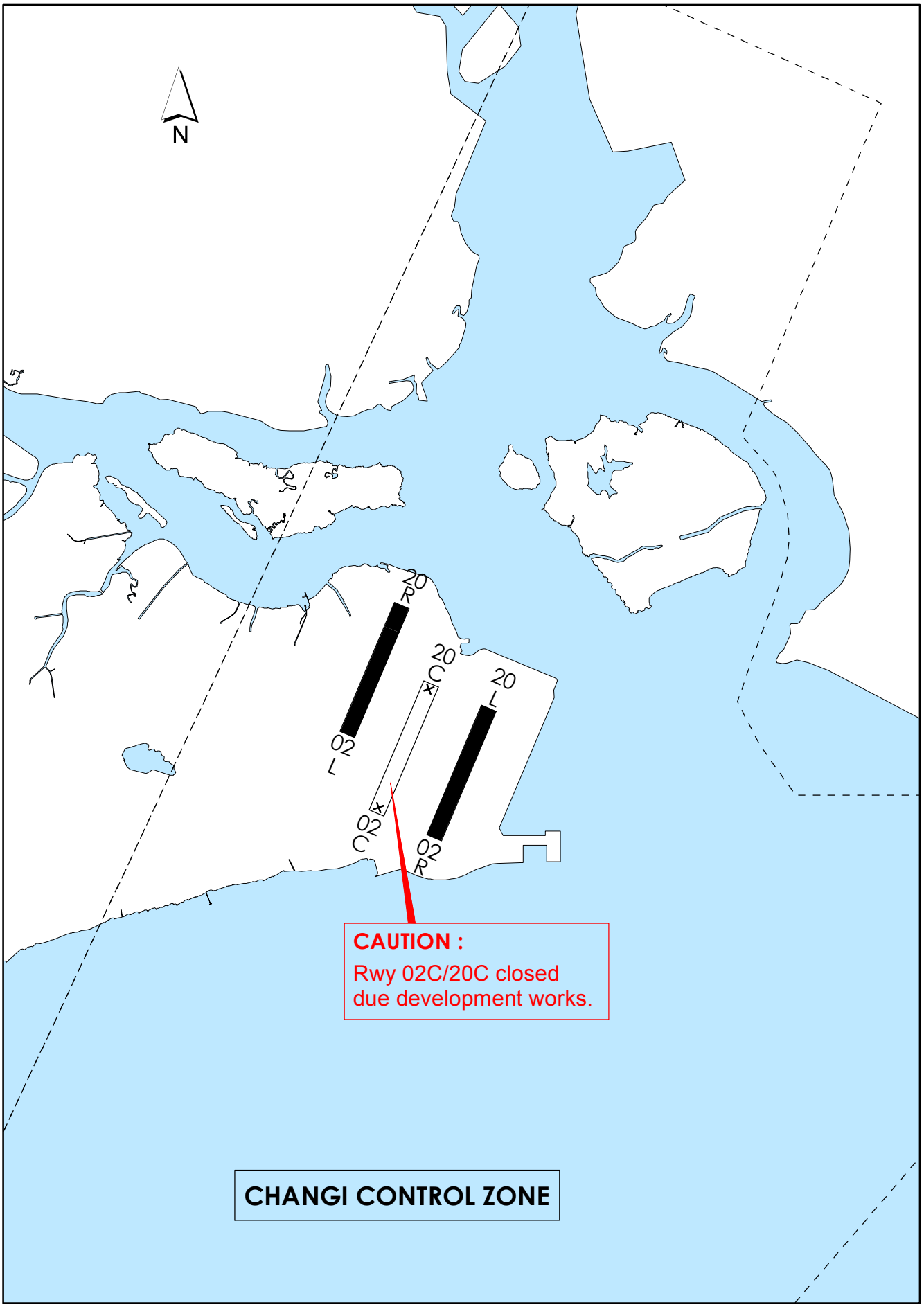
LOCATION OF RUNWAY 02R/20L IN RELATION TO RUNWAY 02L/20R AND RUNWAY 02C/20C



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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

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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	20.0m	19.8m	19.8m	19.7m	19.7m
3 White lights and 1 red light	24.0m	22.6m	23.7m	23.7m	23.6m	23.6m
4 White lights	26.4m	25.0m	26.2m	26.2m	26.0m	26.0m

* MEHT . Minimum Eye Height Over the Threshold.
Note . Aircraft with eye-to-wheel height greater than 8 metres are advised to fly with 2 white lights and 2 red lights visible so as to achieve sufficient wheel clearance.

RWY	DIRECTION	THR	GEOID UNDULATION	BEARING STRENGTH
02L	023°	01 20 56.27N 103 58 38.82E	10.24m	PCN 72/F/B/W/U
20R (DISP THR)	203°	01 22 33.95N 103 59 20.06E	10.25m	
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	PCN 82F/B/X/T
20L	203°	01 21 20.45N 104 00 50.05E	10.36m	

TAXIWAYS — BEARING STRENGTH
PCN 85/R/B/W/U - Taxiways W1, W9, E1, E3, E11 and EP (between E10-E11)
PCN 80 F/B/X/T - Taxiways J and K (between Taxiways K2 and J12)
PCN 90 R/B/W/T - Taxiways A (between A1 and A2, and between A11 and A12), A1, A2, A11, A12, B (between B1 and B2, and between B13 and B14), B1, B2, B13, B14.
PCN 82 F/B/X/T - Taxiway P1 (between N and N5) and all other A, B, J, K Taxiways.
PCN 72/F/B/W/U - All other Taxiways

APRONS — BEARING STRENGTH
PCN 85/R/B/W/U

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.

AREA CLOSED FOR CHANGI EAST CONSTRUCTION WORKS
(INCLUDING RUNWAY 02C/20C)

ANNUAL CHANGE NEGLIGIBLE VAR 0° 23'E (2020)

All FOD Detection Masts east of Runway 02R/20L is under construction.

LEGEND

- Aircraft Stands and Taxiways Markings
- Runway Centre Line Lights
- Runway Edge Lights
- White Touchdown Zone Lights
- Blue Taxiway Edge Lights
- Green Taxiway CentreLine Lights
- Cat II 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

Metres 100 0 100 200 300 400 500 600 700 800 900 1000 Metres

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Changes : South Pump House Substation renamed.
New AES access road linking interim Fire Station 2 to TWY EP added.

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 55.87	103 58 55.25	5.37m (17.62ft)
	A19	01 20 55.26	103 58 57.13	5.40m (17.72ft)
	A20	01 20 56.09	103 58 58.83	5.45m (17.88ft)
	A21	01 20 57.10	103 59 00.80	5.49m (18.01ft)
T3 NORTH APRON	B1	01 21 26.86	103 59 08.37	4.82m (15.81ft)
	B2	01 21 28.18	103 59 06.82	4.68m (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	5.09m (16.70ft)
	B9	01 21 42.19	103 59 16.16	5.13m (16.83ft)
	B10	01 21 44.47	103 59 17.12	5.10m (16.73ft)
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	5.07m (16.63ft)
	C13	01 21 49.64	103 59 24.75	5.05m (16.57ft)
	C15	01 21 51.90	103 59 25.71	5.05m (16.57ft)
	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	5.09m (16.70ft)
	D32	01 21 46.73	103 59 31.07	5.08m (16.67ft)
	D34	01 21 49.03	103 59 32.04	5.07m (16.63ft)
	D35	01 21 50.87	103 59 32.82	5.02m (16.47ft)
	D36	01 21 51.98	103 59 34.52	5.06m (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 24.15	103 59 32.67	4.71m (15.45ft)
	E11	01 21 25.57	103 59 34.37	4.78m (15.68ft)
	E12	01 21 27.20	103 59 36.42	4.75m (15.58ft)
	E20	01 21 24.36	103 59 27.08	5.04m (16.54ft)
	E22	01 21 26.64	103 59 28.04	5.07m (16.63ft)
	E24	01 21 29.01	103 59 29.06	5.09m (16.70ft)
	E24L	01 21 28.32	103 59 28.77	5.10m (16.73ft)
	E24R	01 21 29.53	103 59 29.28	5.08m (16.67ft)
	E26	01 21 31.19	103 59 29.96	5.08m (16.67ft)
	E27	01 21 33.56	103 59 30.96	5.07m (16.62ft)
	E27L	01 21 32.79	103 59 30.86	5.03m (16.48ft)
	E27R	01 21 34.20	103 59 30.91	5.12m (16.80ft)
	E28	01 21 35.74	103 59 31.89	5.08m (16.67ft)

INS COORDINATES FOR AIRCRAFT STANDS AND PRE-FLIGHT ALTIMETER CHECK LOCATIONS

LOCATION	STAND NR	NORTH LAT	EAST LONG	ELEVATION
T2 CENTRAL APRON	E1	01 21 20.02	103 59 25.58	4.91m (16.11ft)
	E2	01 21 19.28	103 59 27.30	4.90m (16.08ft)
	E3	01 21 18.44	103 59 29.27	4.82m (15.81ft)
	E4	01 21 18.10	103 59 31.70	4.80m (15.75ft)
	E5	01 21 19.56	103 59 33.72	4.90m (16.08ft)
	E6	01 21 21.22	103 59 35.93	4.84m (15.88ft)
	E7	01 21 22.48	103 59 37.46	4.73m (15.52ft)
	F30	01 21 14.71	103 59 23.33	4.92m (16.14ft)
	F31	01 21 13.87	103 59 25.30	4.91m(16.11ft)
	F32	01 21 13.03	103 59 27.26	4.85m (15.91ft)
	F33	01 21 11.30	103 59 28.54	4.91m (16.11ft)
	F34	01 21 08.98	103 59 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 56.91	103 59 15.50	5.77m (18.93ft)
EAST REMOTE APRON	200	01 20 47.83	103 59 11.67	6.23m (20.44ft)
	200L	01 20 46.91	103 59 11.92	6.29m (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 47.91	103 59 18.88	4.74m (15.55ft)
	208	01 20 49.48	103 59 19.54	4.74m (15.55ft)
	209	01 20 51.06	103 59 20.21	4.75m (15.58ft)
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 33.05	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)
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)
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)

INS COORDINATES FOR AIRCRAFT STANDS AND PRE-FLIGHT ALTIMETER CHECK LOCATIONS

LOCATION	STAND NR	NORTH LAT	EAST LONG	ELEVATION
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 10.00	103 59 52.53	2.43m (7.97ft)
	609	01 22 12.95	103 59 55.04	2.91m (9.55ft)
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 33.61	103 58 47.20	5.01m (16.44ft)
	466	01 20 34.53	103 58 45.05	5.01m (16.44ft)
	467	01 20 27.32	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 02.07	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 11.26	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 P1/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 EP 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 C6 (behind aircraft stands F50 to F54) can only be used by aircraft with maximum wingspan 65m (towing and pushback exempted).

9) Taxilane L5 can only be used by aircraft with maximum wingspan 36m.

10) TWY L8, L9 and L10 can only be used by aircraft with maximum wingspan 65m.

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

12) Pilots are advised to apply speed limit of 20 knots when taxiing along TWY SOUTH CROSS 1 and SOUTH CROSS 2.

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.

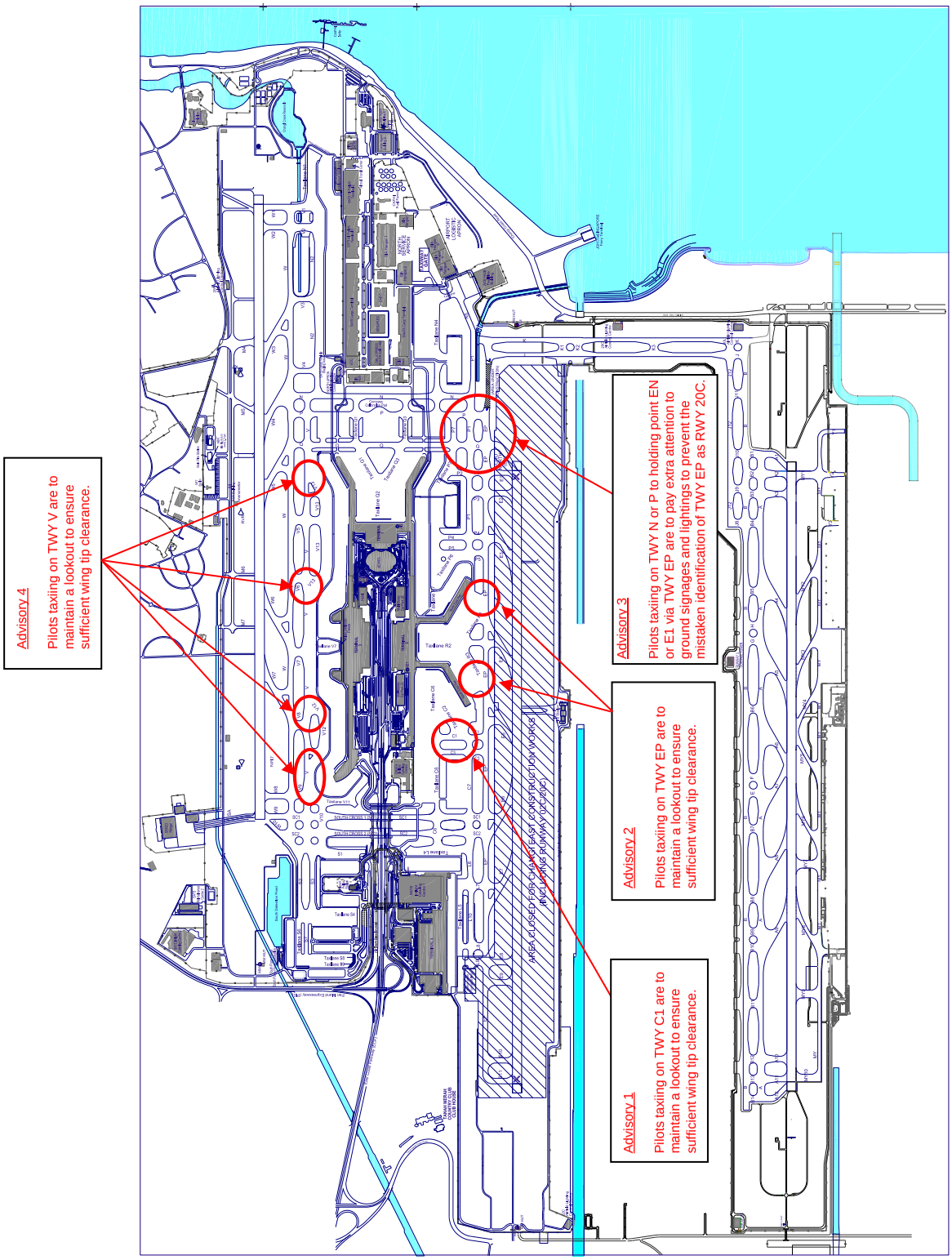
RADIO ALTIMETER OPERATIONS AREA

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.

TOTAL AIRCRAFT PARKING POSITIONS : 230

AERODROME ADVISORY CHART



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Changes : Decommissioned Navaid Buildings and equipments along Runway 02C/20C removed. East Perimeter Road revised.

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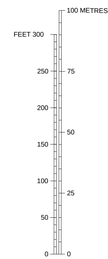
DIMENSIONS AND ELEVATIONS IN METRES

AERODROME OBSTACLE CHART - ICAO
TYPE A (OPERATING LIMITATIONS)

SINGAPORE/Singapore Changi

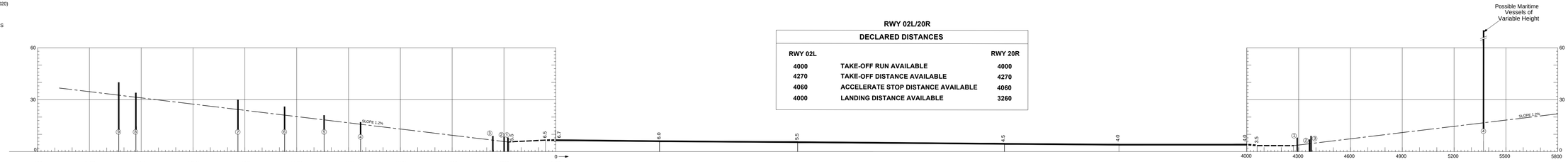
MAGNETIC VARIATION 23°E (2020)

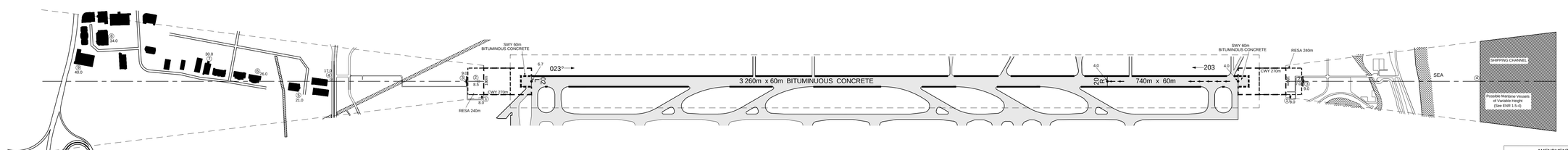


VERTICAL SCALE 1:1000

RWY 02L/20R

DECLARED DISTANCES		
RWY 02L		**RWY 20R**
4000	**TAKE-OFF RUN AVAILABLE**	**4000**
4270	**TAKE-OFF DISTANCE AVAILABLE**	**4270**
4060	**ACCELERATE STOP DISTANCE AVAILABLE**	**4060**
4000	**LANDING DISTANCE AVAILABLE**	**3260**





LEGEND

LOCALISER ANTENNA	
BUILDING	
IDENTIFICATION NUMBER	
LAMP POST, PRECISION APPROACH LIGHT	
ROAD	

HORIZONTAL SCALE 1:10,000

ORDER OF ACCURACY
HORIZONTAL : ±1m
VERTICAL : ±1m

AMENDMENT RECORD

NO.	DATE	ENTERED BY

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CHANGES : Magnetic Variation revised.

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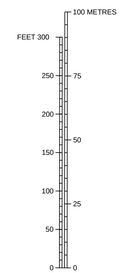
DIMENSIONS AND ELEVATIONS IN METRES

AERODROME OBSTACLE CHART - ICAO
TYPE A (OPERATING LIMITATIONS)

SINGAPORE/Singapore Changi

MAGNETIC VARIATION 23°E (2020)

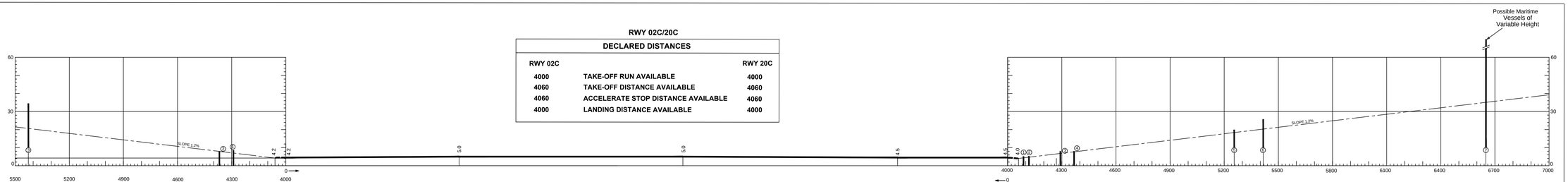


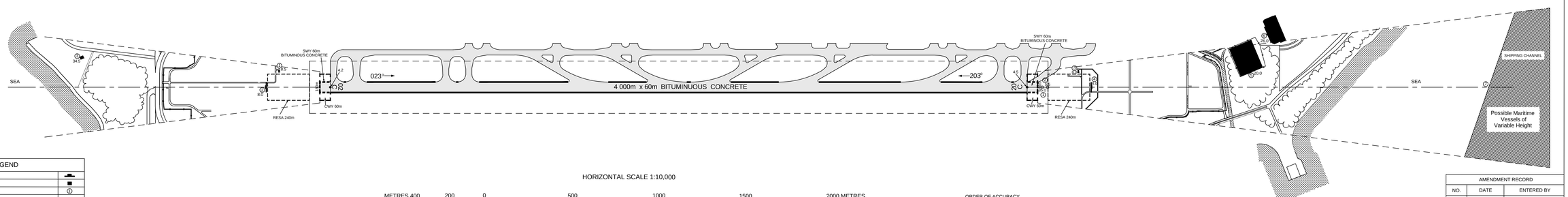
VERTICAL SCALE 1:1000

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

LEGEND	
LOCALISER ANTENNA	
BUILDING	
IDENTIFICATION NUMBER	
PRECISION APPROACH LIGHT	
ROAD	
TREE CANOPY	
FENCE	

ORDER OF ACCURACY
HORIZONTAL : ±1m
VERTICAL : ±1m

AMENDMENT RECORD		
NO.	DATE	ENTERED BY

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CHANGES : Reprint

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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 Tekong Kechil

Pulau Tekong Reservoir

Pulau Tekong

Pulau Ubin

Possible Maritime Vessels of Variable Height

WSD34
GND - 500 ft ALT

CENTRE-LINE OF SHIPPING CHANNEL

APPROACH SURFACE SLOPE 1:50

TRANSITIONAL SURFACE SLOPE 1:7

R 20

CAFHI Jetty

RESA 240m

CWY 270m

SWY 60m BITUMINOUS CONCRETE

Displaced Threshold

203°

Changi Ferry Terminal

C 20

TWR 81m

SWY 60m GROOVED BITUMINOUS CONCRETE

L 20

023°

02 L

02 C

02 R

CAUTION : Rwy 02C/20C closed due development works.

CONICAL SURFACE Slope 1:20

Bedok Reservoir

Jetty

MHT

INNER HORIZONTAL SURFACE 49m

Tanah Merah Ferry Terminal

Bedok Jetty

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	

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NO	DATE	ENTERED BY

HORIZONTAL SCALE 1 : 20,000

Meters 1000 500 0 1000 2000 3000 4000 5000

Feet 1000 0 5000 10000 15000 20000

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CHANGES : Obstacles at Runway 02R/20L added.
Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

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)

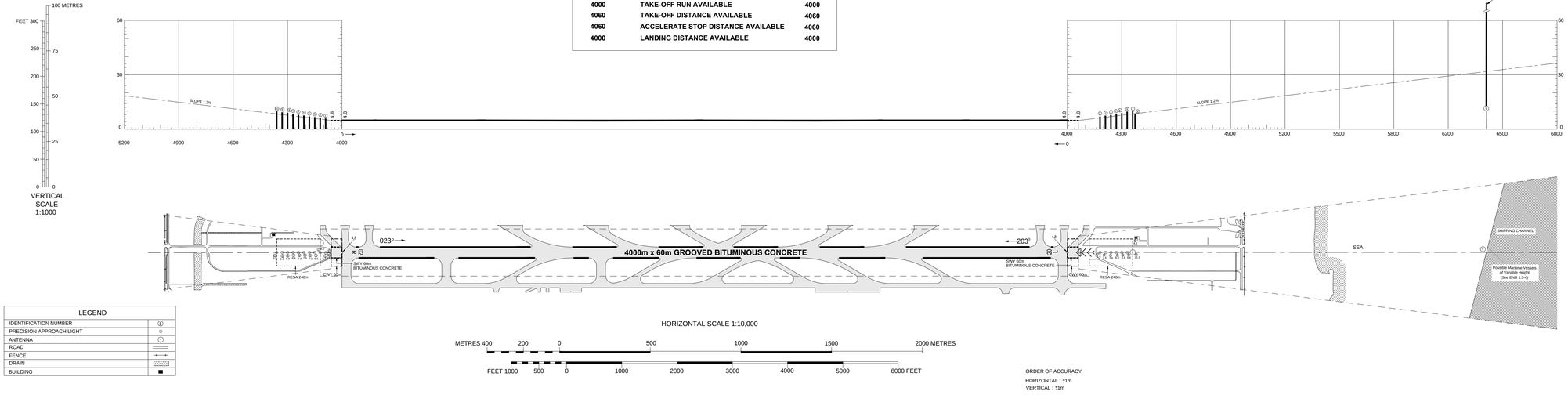
SINGAPORE/Singapore Changi

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

ORDER OF ACCURACY
HORIZONTAL : ±1m
VERTICAL : ±1m

LEGEND	
IDENTIFICATION NUMBER	①
PRECISION APPROACH LIGHT	○
ANTENNA	⊙
ROAD	═══
FENCE	-·-·-
DRAIN	▨
BUILDING	■

AMENDMENT RECORD		
NO.	DATE	ENTERED BY

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CHANGES : Reprint.

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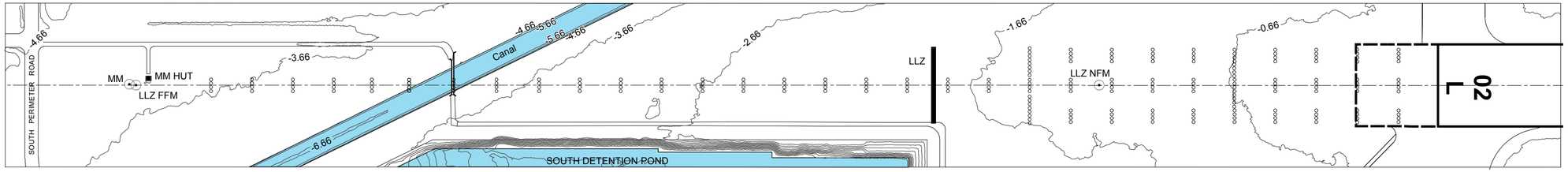
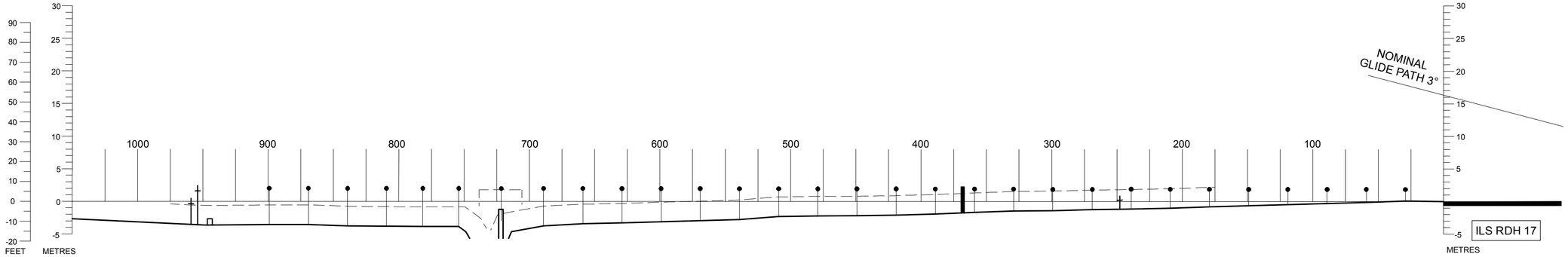
PRECISION APPROACH TERRAIN CHART - ICAO

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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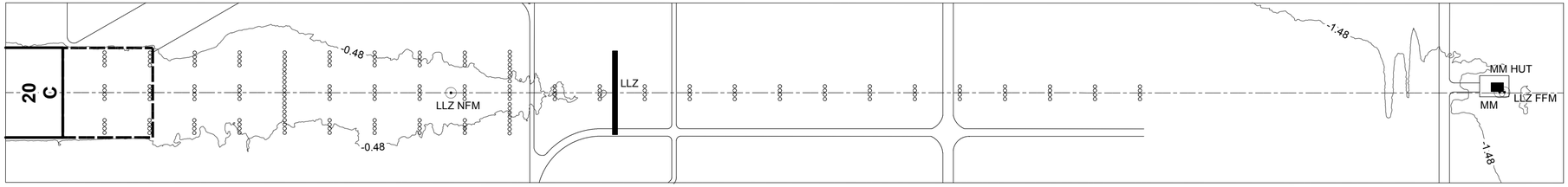
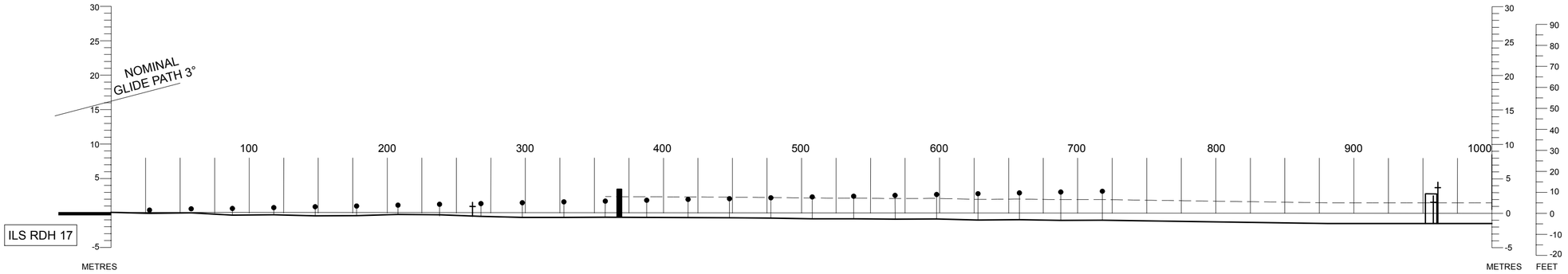
PRECISION APPROACH TERRAIN CHART - ICAO

SINGAPORE/Singapore Changi

RWY 20C

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	-0.48
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 : Reprint.

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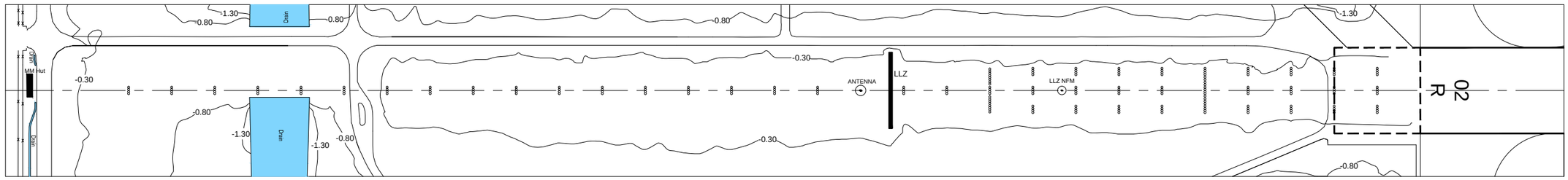
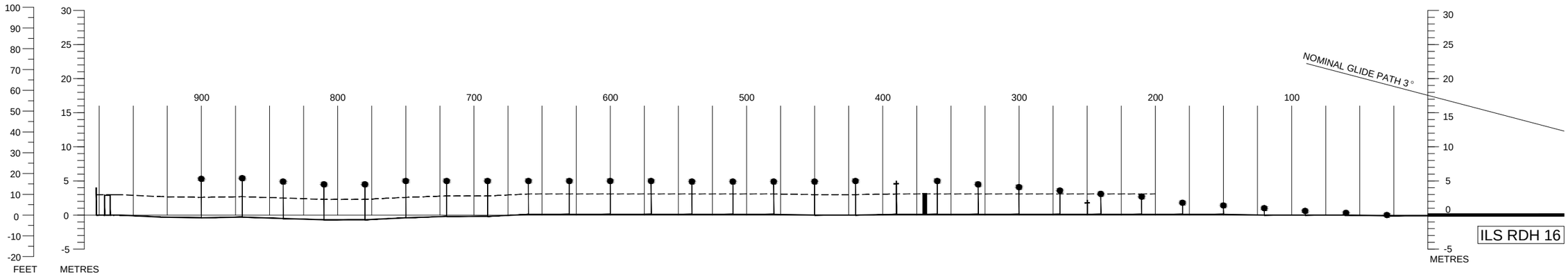
DISTANCES AND HEIGHTS IN METRES

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

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 : New Chart
Runway 02R/20L open for civil flights.

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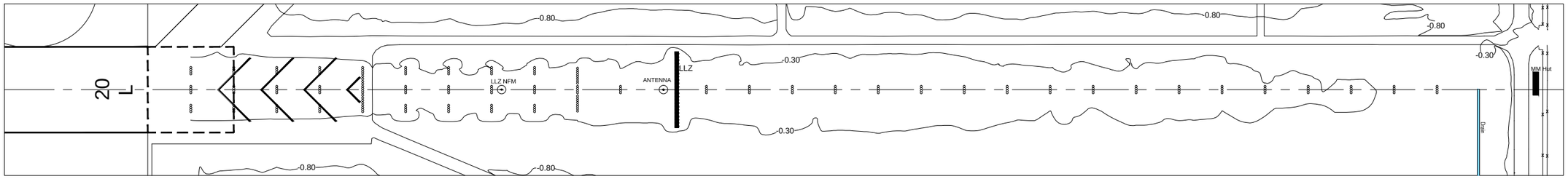
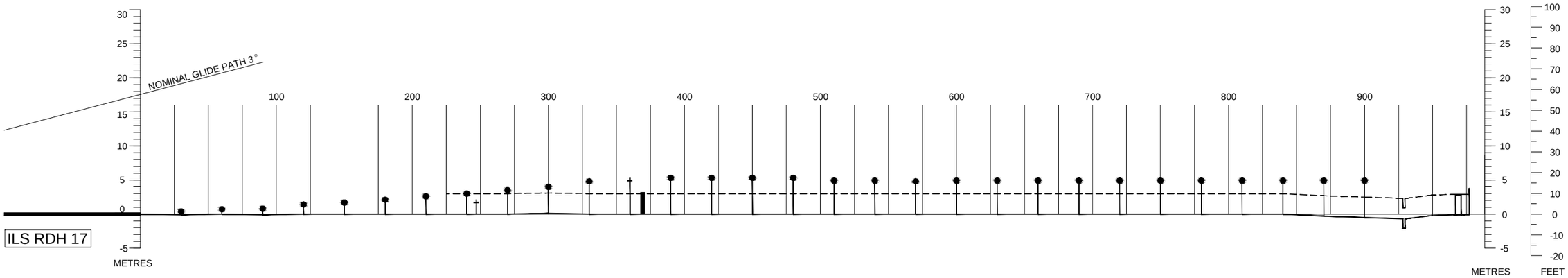
DISTANCES AND HEIGHTS IN METRES

PRECISION APPROACH TERRAIN CHART - ICAO

SINGAPORE/Singapore Changi
RWY 20L





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	
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 : New Chart
Runway 02R/20L open for civil flights.

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STANDARD DEPARTURE CHART RNAV (GNSS) - INSTRUMENT (SID)

TWR	118.6
APP	120.3
	124.05
ACC	134.4

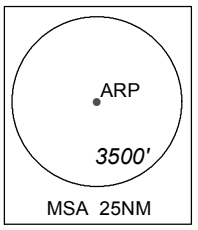
TRANSITION ALTITUDE
11 000ft

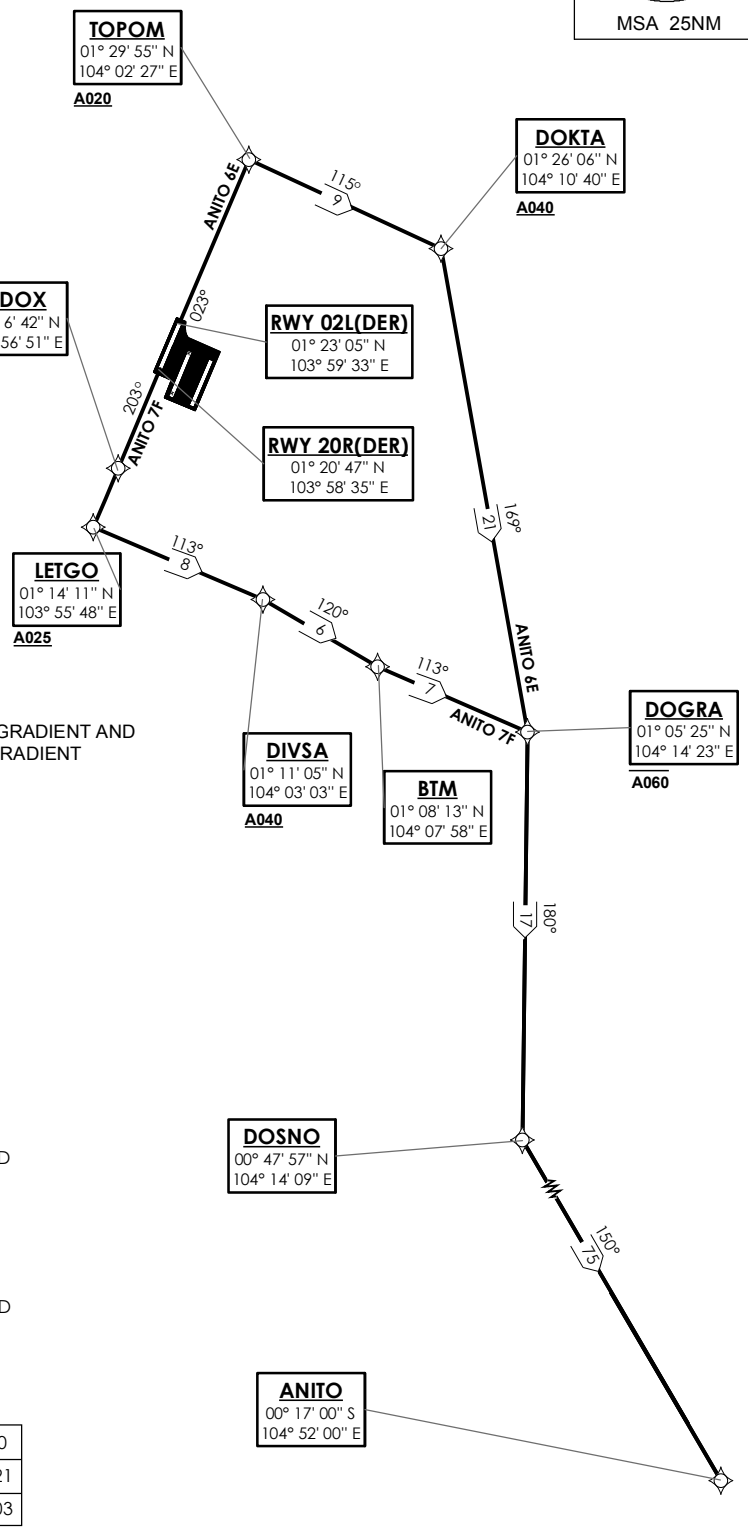
D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02L/20R
ANITO DEPARTURES
ANITO 6E (R02L)
ANITO 7F (R20R)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM





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 TO EXPECT RADAR VECTORING, IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A] - FOR RWY 02L MINIMUM CLIMB GRADIENT AND PARAGRAPH 3.4.2 - FOR RWY 20R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

GENERAL INFORMATION

INITIAL CLIMB 3000FT

ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02L

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 3.3%.

RWY 20R

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 : Runway 02C/20C closed - ref AIP SUP 102/20.

ANITO 6E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOPOM on course 023° at or above 2000ft, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To ANITO.	TOPOM [M023; A020+; R] - DOKTA [A040+; R] - DOGRA [A060-; R] - DOSNO [L] - ANITO	CF TF TF TF TF	N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOPOM	-	023(023.4)	-0.4	R	A020+	-	RNAV1
TF	DOKTA	-	115(115.4)	-0.4	R	A040+	-	RNAV1
TF	DOGRA	-	169(169.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	ANITO	-	150(150.4)	-0.4	-	-	-	RNAV1

ANITO 7F (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. To LETGO at or above 2500ft, turn left. To DIVSA at or above 4000ft, turn right. To BTM, turn left. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To ANITO.	LEDOX [M203; A015+] - LETGO [A025+; L] - DIVSA [A040+; R] - BTM [L] - DOGRA [A060-; R] - DOSNO [L] - ANITO	CF TF TF TF TF TF TF	N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	R	A040+	-	RNAV1
TF	BTM	-	120(120.4)	-0.4	L	-	-	RNAV1
TF	DOGRA	-	113(113.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	ANITO	-	150(150.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02L -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20R -** 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/20C
ANITO DEPARTURES
ANITO 6A (R02C)
ANITO 7B (R20C)

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

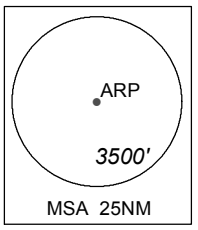
NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND TO EXPECT RADAR VECTORING, IF NECESSARY

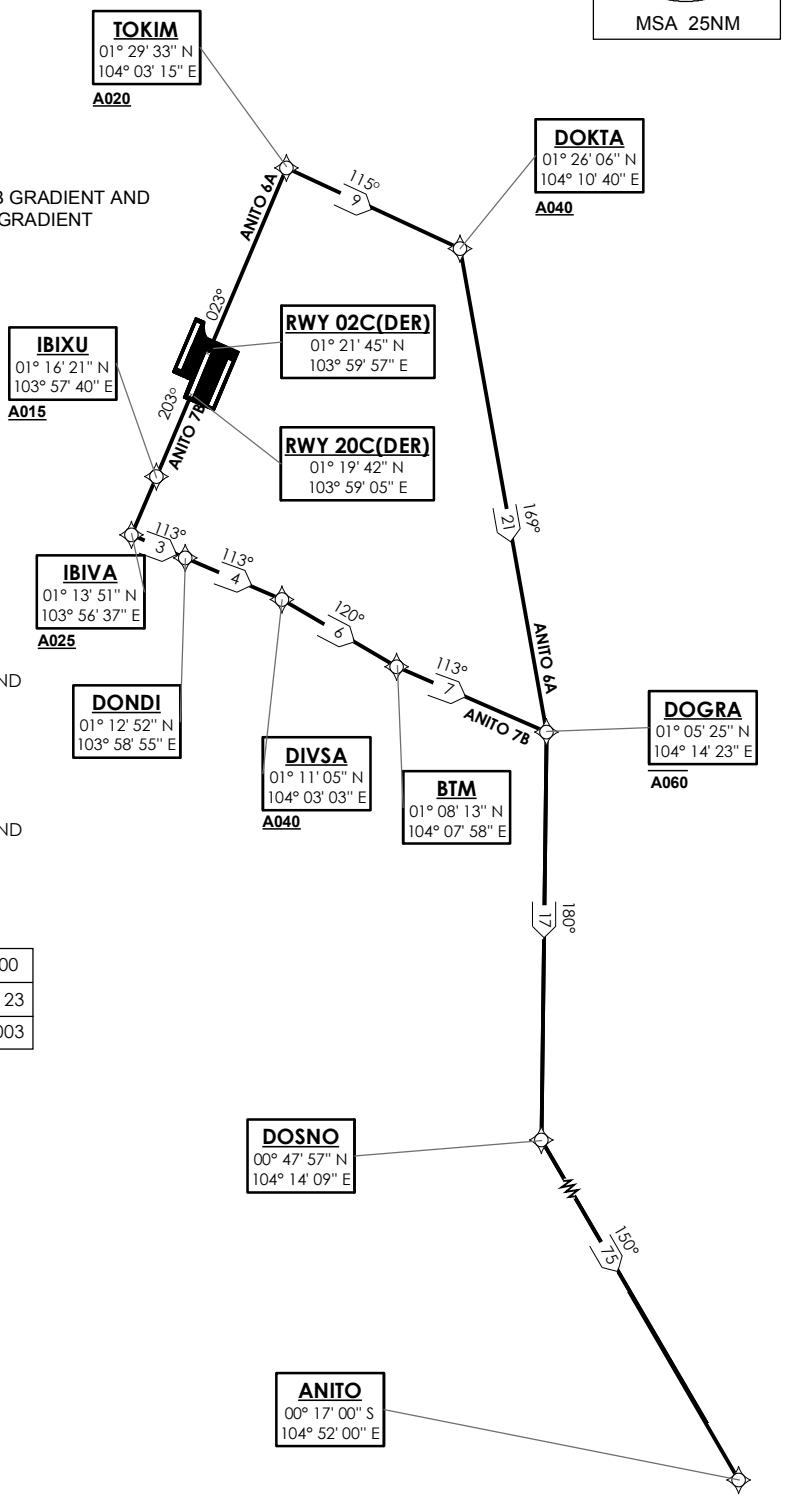
NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT AND PARAGRAPH 3.4.1 - FOR RWY 20C MINIMUM CLIMB GRADIENT

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





GENERAL INFORMATION

INITIAL CLIMB 3000FT

ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C

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 3.3%.

RWY 20C

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	1062	1416	1769	2123
3.3% V/V (fpm)	251	334	501	668	835	1003

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.

ANITO 6A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOKIM on course 023° at or above 2000ft, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To ANITO.	TOKIM [M023; A020+; R] -	CF	N
	DOKTA [A040+; R] -	TF	N
	DOGRA [A060-; R] -	TF	N
	DOSNO [L] -	TF	N
	ANITO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOKIM	-	023(023.4)	-0.4	R	A020+	-	RNAV1
TF	DOKTA	-	115(115.4)	-0.4	R	A040+	-	RNAV1
TF	DOGRA	-	169(169.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	ANITO	-	150(150.4)	-0.4	-	-	-	RNAV1

ANITO 7B (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. To IBIVA at or above 2500ft, turn left. To DONDI. To DIVSA at or above 4000ft, turn right. To BTM, turn left. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To ANITO.	IBIXU [M203; A015+] -	CF	N
	IBIVA [A025+; L] -	TF	N
	DONDI -	TF	N
	DIVSA [A040+; R] -	TF	N
	BTM [L] -	TF	N
	DOGRA [A060-; R] -	TF	N
	DOSNO [L] -	TF	N
	ANITO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DONDI	-	113(113.4)	-0.4	-	-	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	R	A040+	-	RNAV1
TF	BTM	-	120(120.4)	-0.4	L	-	-	RNAV1
TF	DOGRA	-	113(113.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	ANITO	-	150(150.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02C -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20C -** 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
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
DEP 128.6

SINGAPORE/Singapore Changi
RWY 02L/20R
ADMIM DEPARTURES
ADMIM 1E (R02L)
ADMIM 3F (R20R)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

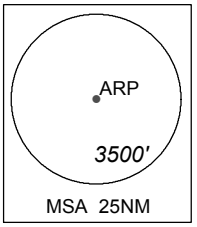
NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID
PROFILE SHALL INFORM ATC
PRIOR TO DEPARTURE AND TO
EXPECT RADAR VECTORING,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.2 [A] - FOR RWY 02L MINIMUM CLIMB GRADIENT AND
PARAGRAPH 3.4.2 - FOR RWY 20R 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.

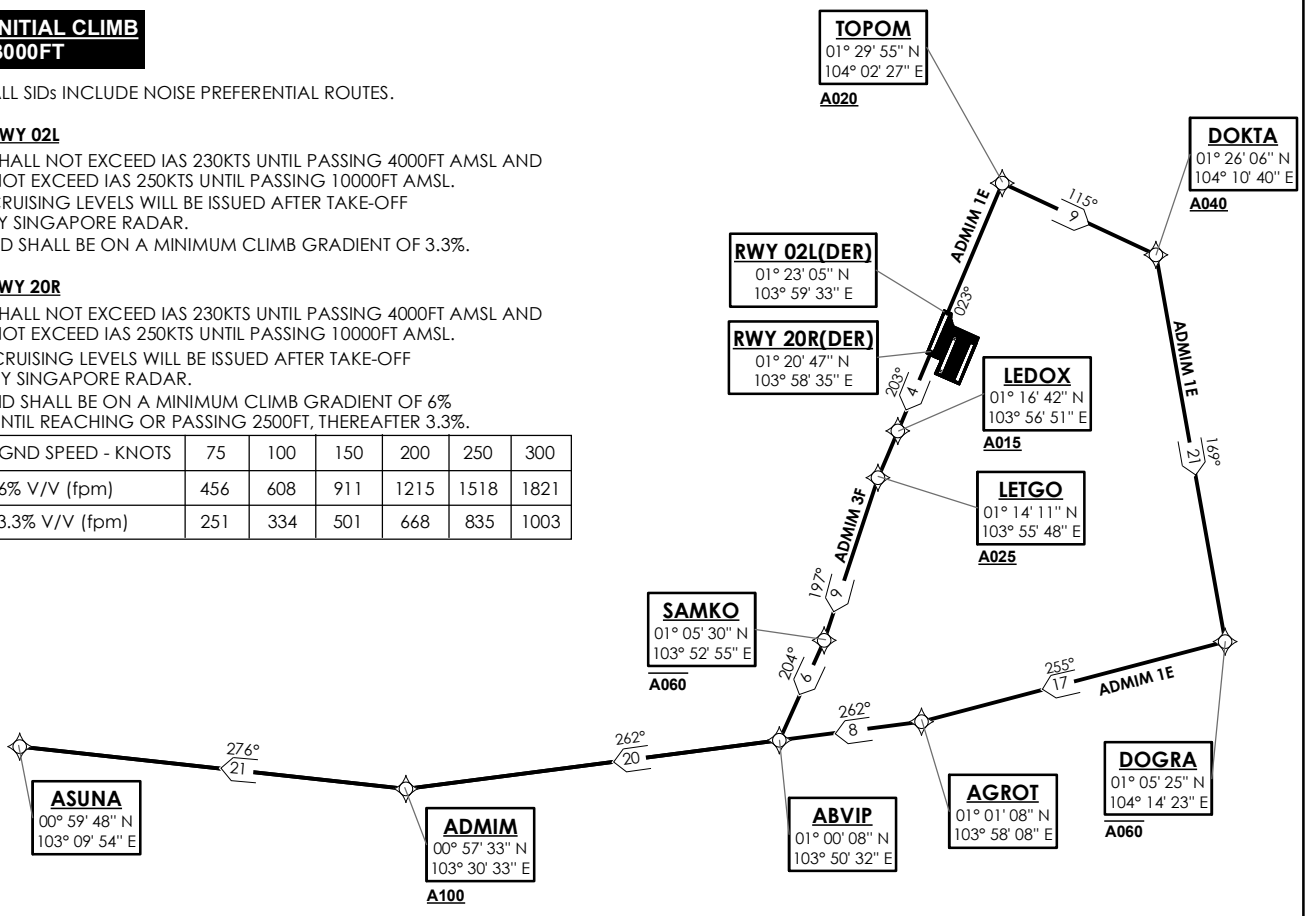
RWY 02L

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 3.3%.

RWY 20R

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 : Runway 02C/20C closed - ref AIP SUP 102/20.

ADMIM 1E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOPOM on course 023° at or above 2000ft, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To AGROT, turn right. To ABVIP. To ADMIM at or above 10000ft, turn right. To ASUNA.	TOPOM [M023; A020+; R] - DOKTA [A040+; R] - DOGRA [A060-; R] - AGROT [R] - ABVIP - ADMIM [A100+; R] - ASUNA	CF TF TF TF TF TF TF	N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOPOM	-	023(023.4)	-0.4	R	A020+	-	RNAV1
TF	DOKTA	-	115(115.4)	-0.4	R	A040+	-	RNAV1
TF	DOGRA	-	169(169.4)	-0.4	R	A060-	-	RNAV1
TF	AGROT	-	255(255.4)	-0.4	R	-	-	RNAV1
TF	ABVIP	-	262(262.4)	-0.4	-	-	-	RNAV1
TF	ADMIM	-	262(262.4)	-0.4	R	A100+	-	RNAV1
TF	ASUNA	-	276(276.4)	-0.4	-	-	-	RNAV1

ADMIM 3F (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. To LETGO at or above 2500ft, turn left. To SAMKO at or below 6000ft, turn right. To ABVIP, turn right. To ADMIM at or above 10000ft, turn right. To ASUNA.	LEDOX [M203; A015+] - LETGO [A025+; L] - SAMKO [A060-; R] - ABVIP [R] - ADMIM [A100+; R] - ASUNA	CF TF TF TF TF TF	N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	SAMKO	-	197(197.4)	-0.4	R	A060-	-	RNAV1
TF	ABVIP	-	204(204.4)	-0.4	R	-	-	RNAV1
TF	ADMIM	-	262(262.4)	-0.4	R	A100+	-	RNAV1
TF	ASUNA	-	276(276.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02L -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20R -** 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

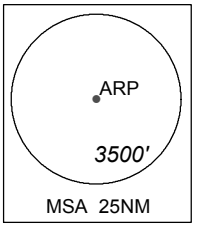
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C/20C
ADMIM DEPARTURES
ADMIM 1A (R02C)
ADMIM 3B (R20C)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



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 AND
PARAGRAPH 3.4.1 - FOR RWY 20C 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.

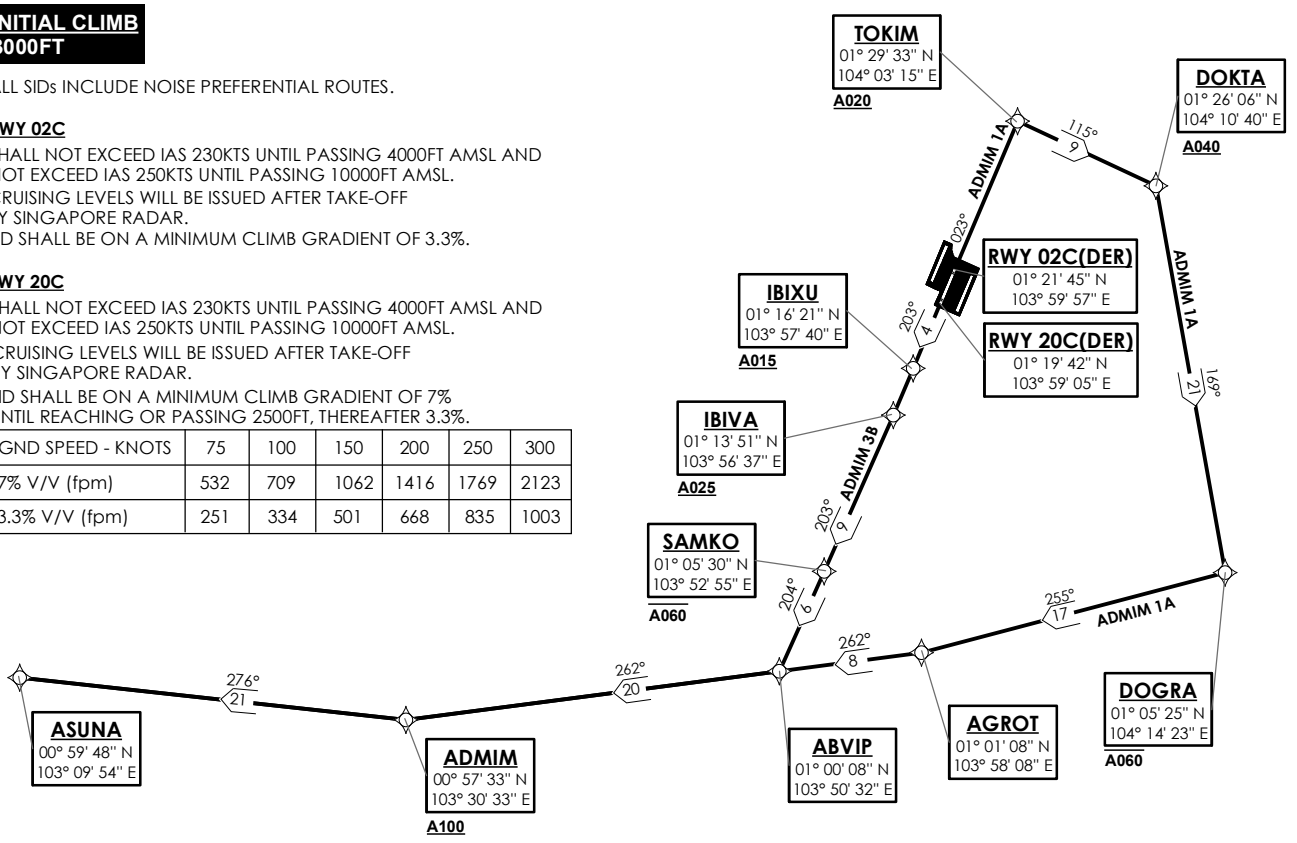
RWY 02C

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 3.3%.

RWY 20C

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	1062	1416	1769	2123
3.3% V/V (fpm)	251	334	501	668	835	1003



NOT TO SCALE

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.

ADMIM 1A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOKIM on course 023° at or above 2000ft, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To AGROT, turn right. To ABVIP. To ADMIM at or above 10000ft, turn right. To ASUNA.	TOKIM [M023; A020+; R] - DOKTA [A040+; R] - DOGRA [A060-; R] - AGROT [R] - ABVIP - ADMIM [A100+; R] - ASUNA	CF TF TF TF TF TF TF	N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOKIM	-	023(023.4)	-0.4	R	A020+	-	RNAV1
TF	DOKTA	-	115(115.4)	-0.4	R	A040+	-	RNAV1
TF	DOGRA	-	169(169.4)	-0.4	R	A060-	-	RNAV1
TF	AGROT	-	255(255.4)	-0.4	R	-	-	RNAV1
TF	ABVIP	-	262(262.4)	-0.4	-	-	-	RNAV1
TF	ADMIM	-	262(262.4)	-0.4	R	A100+	-	RNAV1
TF	ASUNA	-	276(276.4)	-0.4	-	-	-	RNAV1

ADMIM 3B (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. To IBIVA at or above 2500ft. To SAMKO at or below 6000ft, turn right. To ABVIP, turn right. To ADMIM at or above 10000ft, turn right. To ASUNA.	IBIXU [M203; A015+] - IBIVA [A025+] - SAMKO [A060-; R] - ABVIP [R] - ADMIM [A100+; R] - ASUNA	CF TF TF TF TF TF	N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	-0.4	-	A025+	-	RNAV1
TF	SAMKO	-	203(203.4)	-0.4	R	A060-	-	RNAV1
TF	ABVIP	-	204(204.4)	-0.4	R	-	-	RNAV1
TF	ADMIM	-	262(262.4)	-0.4	R	A100+	-	RNAV1
TF	ASUNA	-	276(276.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02C -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20C -** 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
APP 120.3
124.05
ACC 134.2

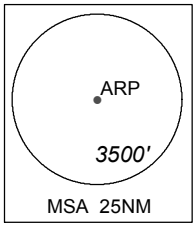
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02L/20R
TOMAN DEPARTURES
TOMAN 2E (R02L)
TOMAN 4F (R20R)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



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 TO EXPECT RADAR VECTORING, IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A] - FOR RWY 02L MINIMUM CLIMB GRADIENT AND PARAGRAPH 3.4.2 - FOR RWY 20R 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.

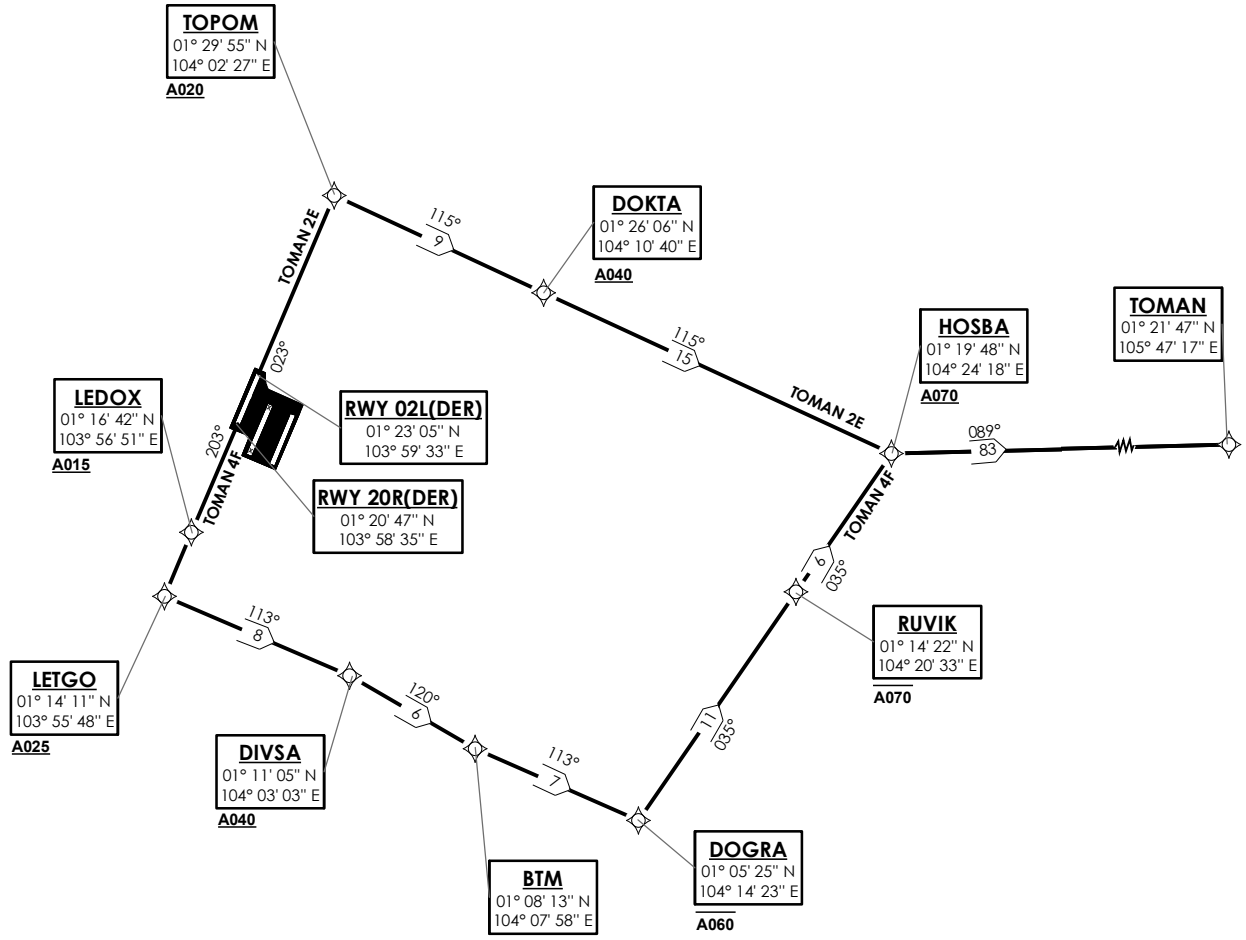
RWY 02L

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 3.3%.

RWY 20R

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 : Runway 02C/20C closed - ref AIP SUP 102/20.

TOMAN 2E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOPOM on course 023° at or above 2000ft, turn right. To DOKTA at or above 4000ft. To HOSBA at or above 7000ft, turn left. To TOMAN.	TOPOM [M023; A020+; R] - DOKTA [A040+] - HOSBA [A070+; L] - TOMAN	CF TF TF TF	N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOPOM	-	023(023.4)	-0.4	R	A020+	-	RNAV1
TF	DOKTA	-	115(115.4)	-0.4	-	A040+	-	RNAV1
TF	HOSBA	-	115(115.4)	-0.4	L	A070+	-	RNAV1
TF	TOMAN	-	089(089.4)	-0.4	-	-	-	RNAV1

TOMAN 4F (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. To LETGO at or above 2500ft, turn left. To DIVSA at or above 4000ft, turn right. To BTM, turn left. To DOGRA at or below 6000ft, turn left. To RUVIK at or below 7000ft. To HOSBA at or above 7000ft, turn right. To TOMAN.	LEDOX [M203; A015+] - LETGO [A025+; L] - DIVSA [A040+; R] - BTM [L] - DOGRA [A060-; L] - RUVIK [A070-] - HOSBA [A070+; R] - TOMAN	CF TF TF TF TF TF TF TF	N N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	R	A040+	-	RNAV1
TF	BTM	-	120(120.4)	-0.4	L	-	-	RNAV1
TF	DOGRA	-	113(113.4)	-0.4	L	A060-	-	RNAV1
TF	RUVIK	-	035(035.4)	-0.4	-	A070-	-	RNAV1
TF	HOSBA	-	035(035.4)	-0.4	R	A070+	-	RNAV1
TF	TOMAN	-	089(089.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02L -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20R -** 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/20C
TOMAN DEPARTURES
TOMAN 2A (R02C)
TOMAN 4B (R20C)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

NOTE: RADAR REQUIRED

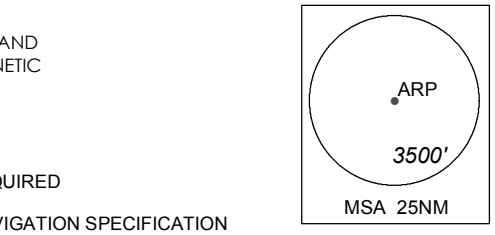
NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

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 AND
PARAGRAPH 3.4.1 - FOR RWY 20C 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.

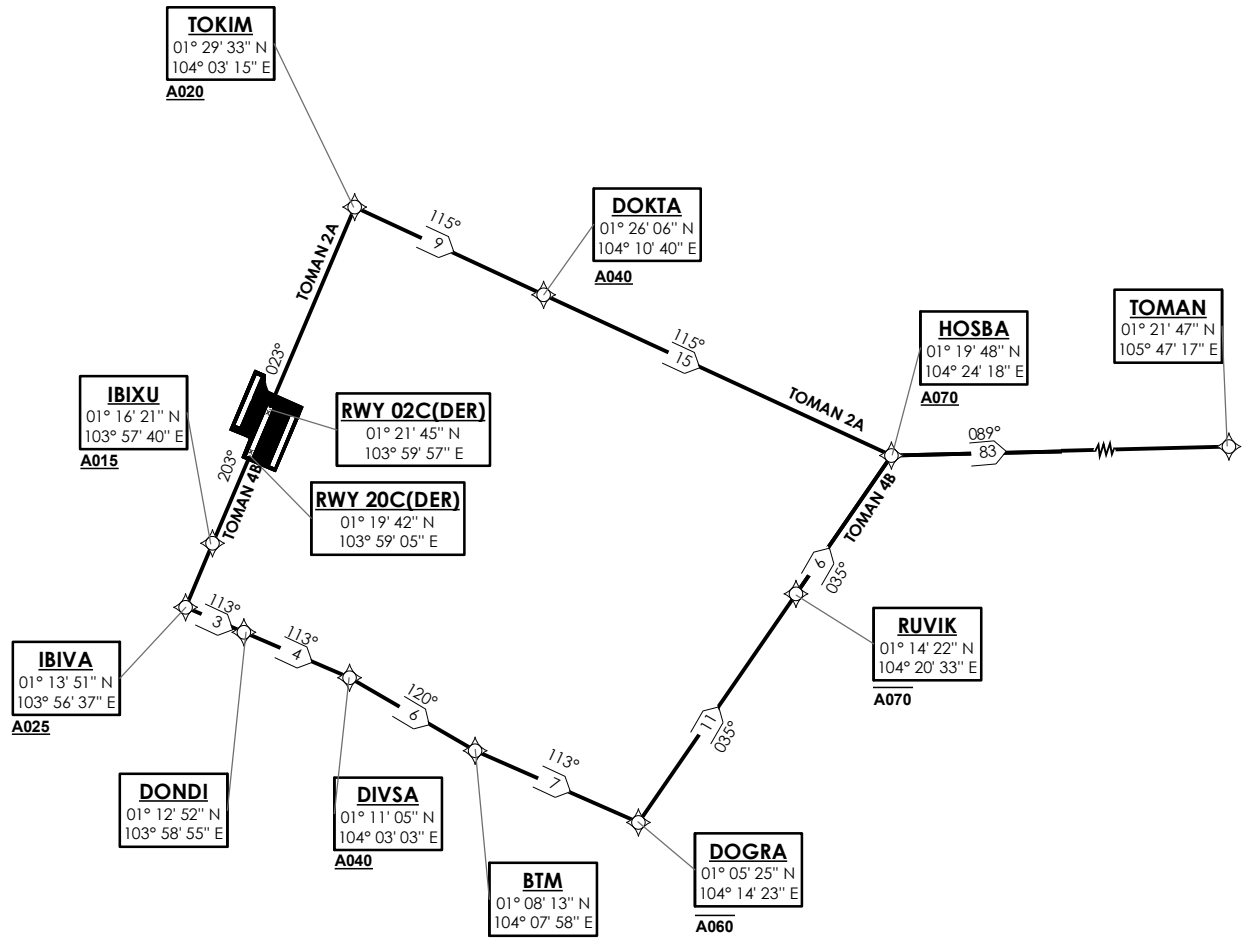
RWY 02C

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 3.3%.

RWY 20C

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	1062	1416	1769	2123
3.3% V/V (fpm)	251	334	501	668	835	1003



NOT TO SCALE

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.

TOMAN 2A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOKIM on course 023° at or above 2000ft, turn right. To DOKTA at or above 4000ft. To HOSBA at or above 7000ft, turn left. To TOMAN.	TOKIM [M023; A020+; R] - DOKTA [A040+] - HOSBA [A070+; L] - TOMAN	CF TF TF TF	N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOKIM	-	023(023.4)	-0.4	R	A020+	-	RNAV1
TF	DOKTA	-	115(115.4)	-0.4	-	A040+	-	RNAV1
TF	HOSBA	-	115(115.4)	-0.4	L	A070+	-	RNAV1
TF	TOMAN	-	089(089.4)	-0.4	-	-	-	RNAV1

TOMAN 4B (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. To IBIVA at or above 2500ft, turn left. To DONDI. To DIVSA at or above 4000ft, turn right. To BTM, turn left. To DOGRA at or below 6000ft, turn left. To RUVIK at or below 7000ft. To HOSBA at or above 7000ft, turn right. To TOMAN.	IBIXU [M203; A015+] - IBIVA [A025+; L] - DONDI - DIVSA [A040+; R] - BTM [L] - DOGRA [A060-; L] - RUVIK [A070-] - HOSBA [A070+; R] - TOMAN	CF TF TF TF TF TF TF TF TF	N N N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DONDI	-	113(113.4)	-0.4	-	-	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	R	A040+	-	RNAV1
TF	BTM	-	120(120.4)	-0.4	L	-	-	RNAV1
TF	DOGRA	-	113(113.4)	-0.4	L	A060-	-	RNAV1
TF	RUVIK	-	035(035.4)	-0.4	-	A070-	-	RNAV1
TF	HOSBA	-	035(035.4)	-0.4	R	A070+	-	RNAV1
TF	TOMAN	-	089(089.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02C -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20C -** 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
APP	120.3
	124.05
ACC	134.4

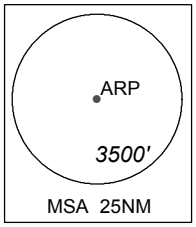
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02L/20R
BAVUS DEPARTURES
BAVUS 1E (R02L)
BAVUS 3F (R20R)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



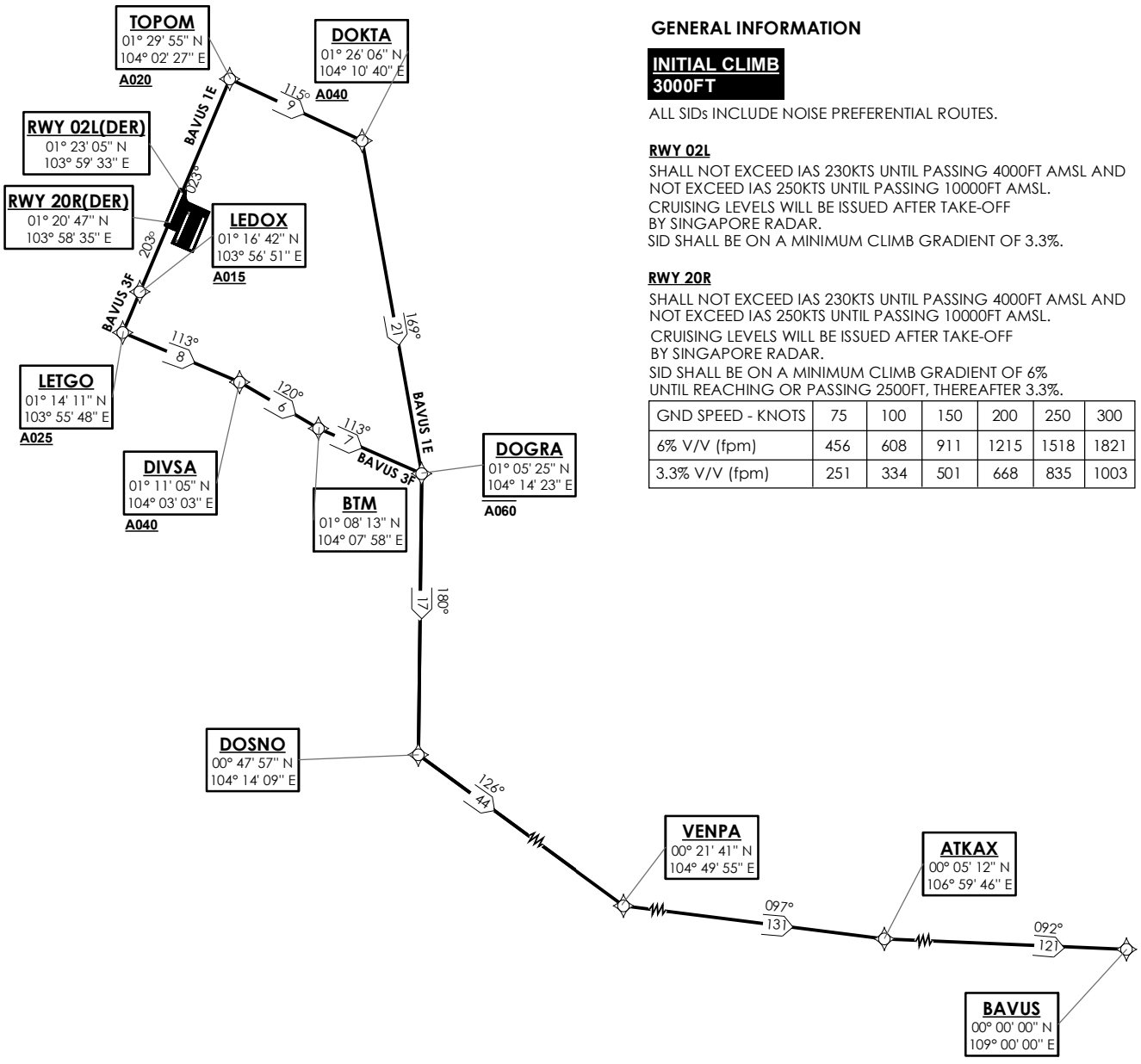
NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID
PROFILE SHALL INFORM ATC
PRIOR TO DEPARTURE AND TO
EXPECT RADAR VECTORING,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.2 [A] - FOR RWY 02L MINIMUM CLIMB GRADIENT AND
PARAGRAPH 3.4.2 - FOR RWY 20R 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 02L

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 3.3%.

RWY 20R

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 : Runway 02C/20C closed - ref AIP SUP 102/20.

BAVUS 1E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOPOM on course 023° at or above 2000ft, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To ATKAX, turn left. To BAVUS.	TOPOM [M023; A020+; R] -	CF	N
	DOKTA [A040+; R] -	TF	N
	DOGRA [A060-; R] -	TF	N
	DOSNO [L] -	TF	N
	VENPA [L] -	TF	N
	ATKAX [L] -	TF	N
	BAVUS	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOPOM	-	023(023.4)	-0.4	R	A020+	-	RNAV1
TF	DOKTA	-	115(115.4)	-0.4	R	A040+	-	RNAV1
TF	DOGRA	-	169(169.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	VENPA	-	126(126.4)	-0.4	L	-	-	RNAV1
TF	ATKAX	-	097(097.4)	-0.4	L	-	-	RNAV1
TF	BAVUS	-	092(092.4)	-0.4	-	-	-	RNAV1

BAVUS 3F (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. To LETGO at or above 2500ft, turn left. To DIVSA at or above 4000ft, turn right. To BTM, turn left. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To ATKAX, turn left. To BAVUS.	LEDOX [M203; A015+] -	CF	N
	LETGO [A025+; L] -	TF	N
	DIVSA [A040+; R] -	TF	N
	BTM [L] -	TF	N
	DOGRA [A060-; R] -	TF	N
	DOSNO [L] -	TF	N
	VENPA [L] -	TF	N
	ATKAX [L] -	TF	N
	BAVUS	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	R	A040+	-	RNAV1
TF	BTM	-	120(120.4)	-0.4	L	-	-	RNAV1
TF	DOGRA	-	113(113.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	VENPA	-	126(126.4)	-0.4	L	-	-	RNAV1
TF	ATKAX	-	097(097.4)	-0.4	L	-	-	RNAV1
TF	BAVUS	-	092(092.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02L -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20R -** 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

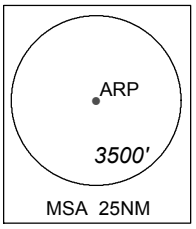
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C/20C
BAVUS DEPARTURES
BAVUS 1A (R02C)
BAVUS 3B (R20C)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



NOTE: RADAR REQUIRED

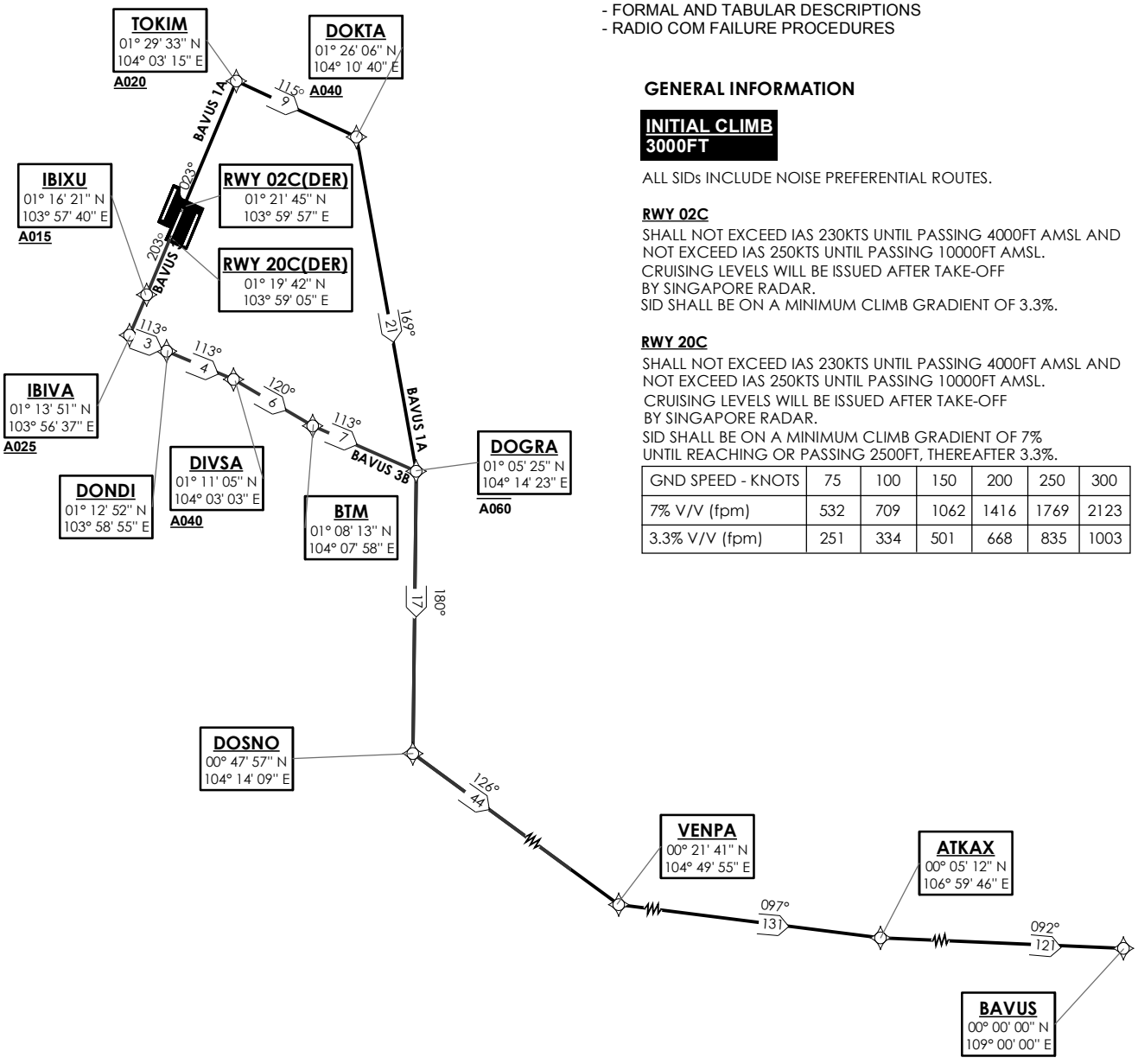
NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

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 AND
PARAGRAPH 3.4.1 - FOR RWY 20C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



NOT TO SCALE

GENERAL INFORMATION

INITIAL CLIMB 3000FT

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C

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 3.3%.

RWY 20C

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	1062	1416	1769	2123
3.3% V/V (fpm)	251	334	501	668	835	1003

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.

BAVUS 1A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOKIM on course 023° at or above 2000ft, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To ATKAX, turn left. To BAVUS.	TOKIM [M023; A020+; R] -	CF	N
	DOKTA [A040+; R] -	TF	N
	DOGRA [A060-; R] -	TF	N
	DOSNO [L] -	TF	N
	VENPA [L] -	TF	N
	ATKAX [L] -	TF	N
	BAVUS	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOKIM	-	023(023.4)	-0.4	R	A020+	-	RNAV1
TF	DOKTA	-	115(115.4)	-0.4	R	A040+	-	RNAV1
TF	DOGRA	-	169(169.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	VENPA	-	126(126.4)	-0.4	L	-	-	RNAV1
TF	ATKAX	-	097(097.4)	-0.4	L	-	-	RNAV1
TF	BAVUS	-	092(092.4)	-0.4	-	-	-	RNAV1

BAVUS 3B (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. To IBIVA at or above 2500ft, turn left. To DONDI. To DIVSA at or above 4000ft, turn right. To BTM, turn left. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To ATKAX, turn left. To BAVUS.	IBIXU [M203; A015+] -	CF	N
	IBIVA [A025+; L] -	TF	N
	DONDI -	TF	N
	DIVSA [A040+; R] -	TF	N
	BTM [L] -	TF	N
	DOGRA [A060-; R] -	TF	N
	DOSNO [L] -	TF	N
	VENPA [L] -	TF	N
	ATKAX [L] -	TF	N
	BAVUS	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DONDI	-	113(113.4)	-0.4	-	-	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	R	A040+	-	RNAV1
TF	BTM	-	120(120.4)	-0.4	L	-	-	RNAV1
TF	DOGRA	-	113(113.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	VENPA	-	126(126.4)	-0.4	L	-	-	RNAV1
TF	ATKAX	-	097(097.4)	-0.4	L	-	-	RNAV1
TF	BAVUS	-	092(092.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02C -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20C -** 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
APP 120.3
124.05
ACC 133.25

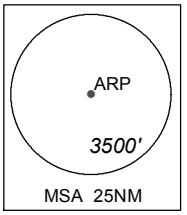
TRANSITION ALTITUDE
11 000ft

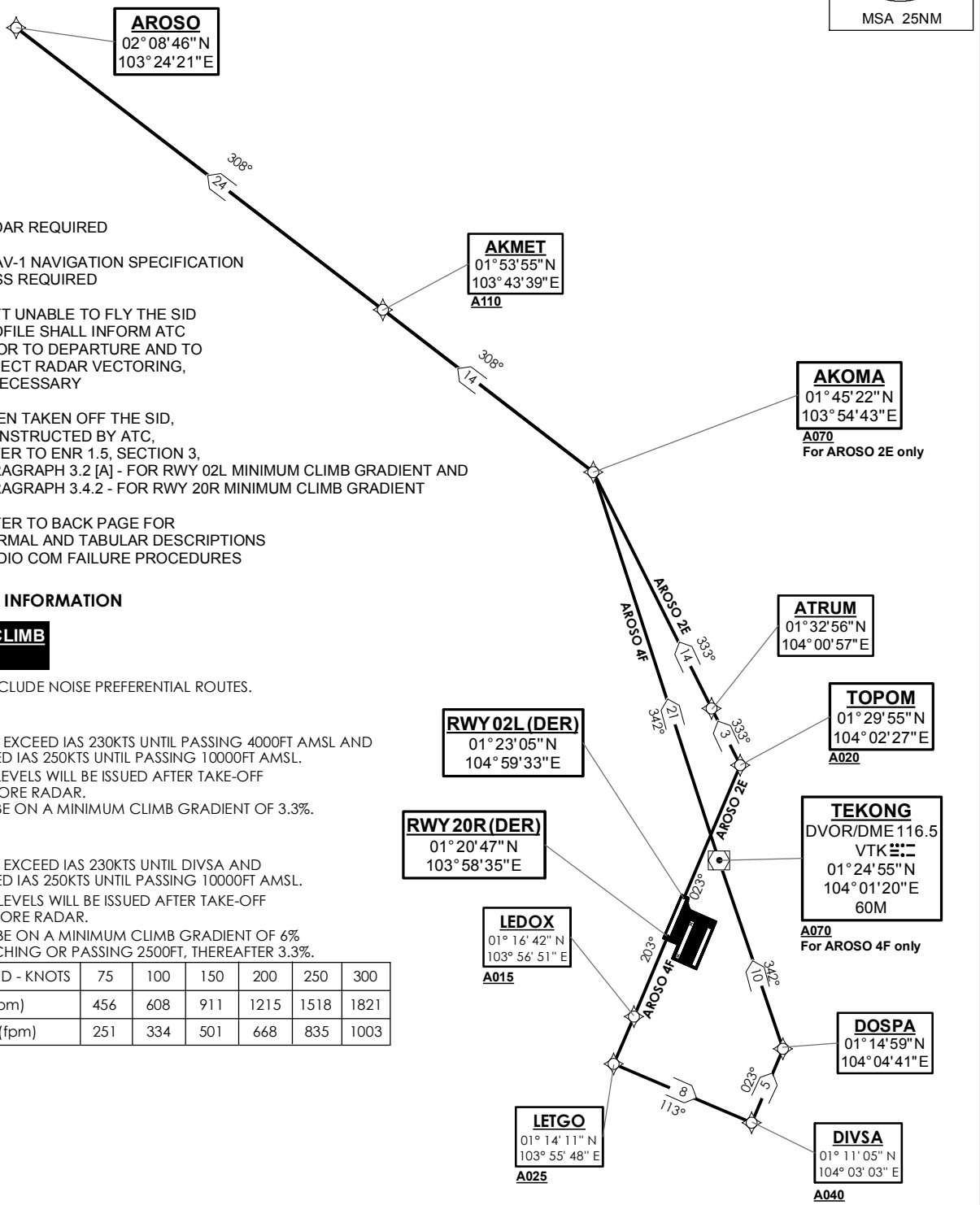
D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02L/20R
AROSO DEPARTURES
AROSO 2E (R02L)
AROSO 4F (R20R)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM





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 TO EXPECT RADAR VECTORING, IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A] - FOR RWY 02L MINIMUM CLIMB GRADIENT AND PARAGRAPH 3.4.2 - FOR RWY 20R 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 02L

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 3.3%.

RWY 20R

SHALL NOT EXCEED IAS 230KTS UNTIL DIVSA 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 : Runway 02C/20C closed - ref AIP SUP 102/20.

AROSO 2E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOPOM on course 023° at or above 2000ft, turn left. To ATRUM. To AKOMA at or above 7000ft, turn left. To AKMET at or above 11000ft. To AROSO.	TOPOM [M023; A020+; L] - ATRUM - AKOMA [A070+; L] - AKMET [A110+] - AROSO	CF TF TF TF TF	N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOPOM	-	023(023.4)	-0.4	L	A020+	-	RNAV1
TF	ATRUM	-	333(333.4)	-0.4	-	-	-	RNAV1
TF	AKOMA	-	333(333.4)	-0.4	L	A070+	-	RNAV1
TF	AKMET	-	308(308.4)	-0.4	-	A110+	-	RNAV1
TF	AROSO	-	308(308.4)	-0.4	-	-	-	RNAV1

AROSO 4F (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. To LETGO at or above 2500ft, turn left. To DIVSA at or above 4000ft, speed 230kts, turn left. To DOSPA, turn left. To VTK at or above 7000ft. To AKOMA, turn left. To AKMET at or above 11000ft. To AROSO.	LEDOX [M203; A015+] - LETGO [A025+; L] - DIVSA [A040+; K230; L] - DOSPA [L] - VTK [A070+] - AKOMA [L] - AKMET [A110+] - AROSO	CF TF TF TF TF TF TF TF	N N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	L	A040+	K230	RNAV1
TF	DOSPA	-	023(023.4)	-0.4	L	-	-	RNAV1
TF	VTK	-	342(342.4)	-0.4	-	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	-0.4	L	-	-	RNAV1
TF	AKMET	-	308(308.4)	-0.4	-	A110+	-	RNAV1
TF	AROSO	-	308(308.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02L -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20R -** 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
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02L/20R
MASBO DEPARTURES
MASBO 2E (R02L)
MASBO 4F (R20R)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

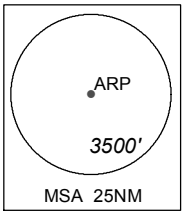
NOTE: RADAR REQUIRED

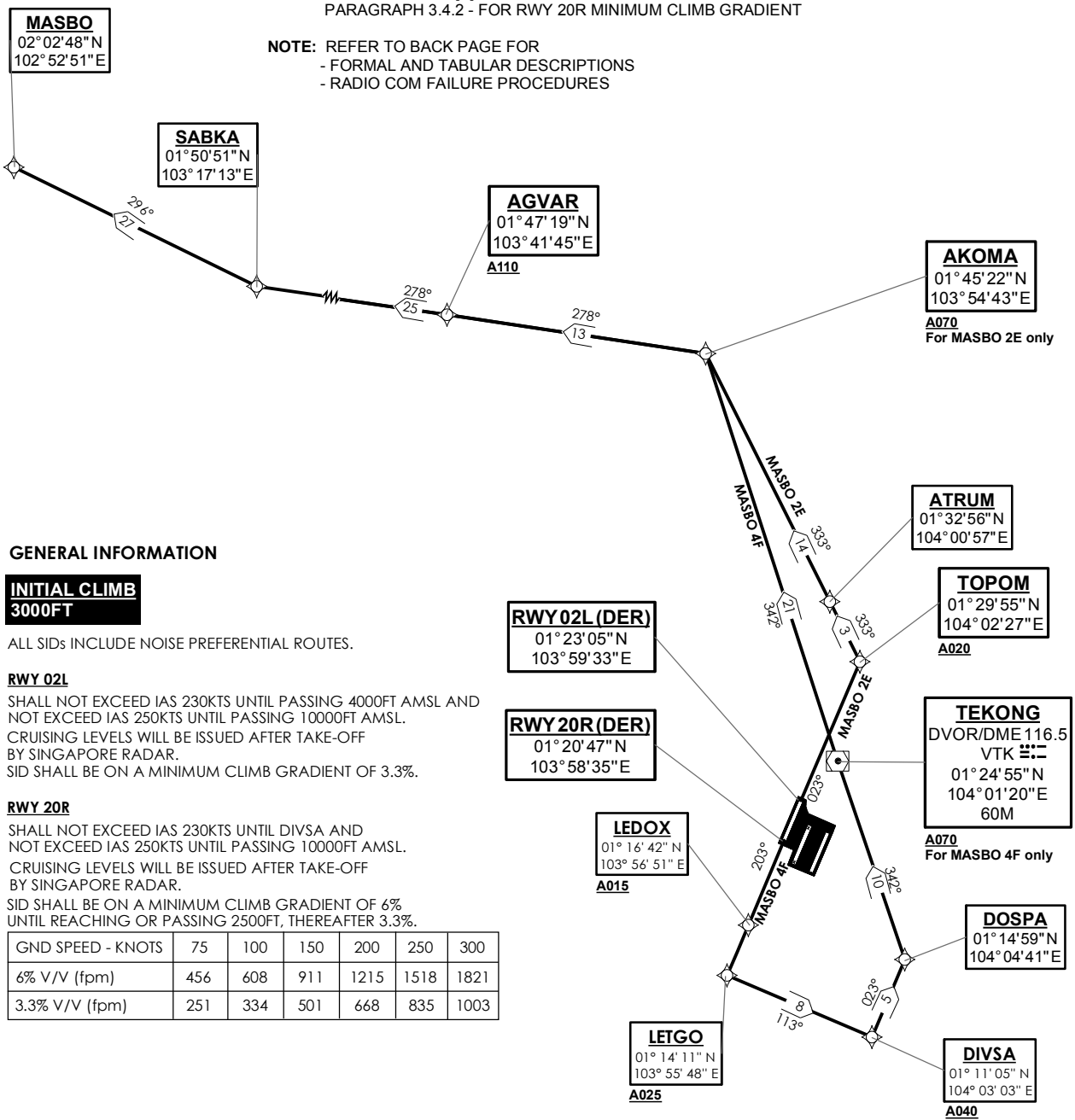
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND TO EXPECT RADAR VECTORING, IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A] - FOR RWY 02L MINIMUM CLIMB GRADIENT AND PARAGRAPH 3.4.2 - FOR RWY 20R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES





NOT TO SCALE

GENERAL INFORMATION

INITIAL CLIMB 3000FT

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02L

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 3.3%.

RWY 20R

SHALL NOT EXCEED IAS 230KTS UNTIL DIVSA 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 : Runway 02C/20C closed - ref AIP SUP 102/20.

MASBO 2E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOPOM on course 023° at or above 2000ft, turn left. To ATRUM. To AKOMA at or above 7000ft, turn left. To AGVAR at or above 11000ft. To SABKA, turn right. To MASBO.	TOPOM [M023; A020+; L] -	CF	N
	ATRUM -	TF	N
	AKOMA [A070+; L] -	TF	N
	AGVAR [A110+] -	TF	N
	SABKA [R] -	TF	N
	MASBO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOPOM	-	023(023.4)	-0.4	L	A020+	-	RNAV1
TF	ATRUM	-	333(333.4)	-0.4	-	-	-	RNAV1
TF	AKOMA	-	333(333.4)	-0.4	L	A070+	-	RNAV1
TF	AGVAR	-	278(278.4)	-0.4	-	A110+	-	RNAV1
TF	SABKA	-	278(278.4)	-0.4	R	-	-	RNAV1
TF	MASBO	-	296(296.4)	-0.4	-	-	-	RNAV1

MASBO 4F (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. To LETGO at or above 2500ft, turn left. To DIVSA at or above 4000ft, speed 230kts, turn left. To DOSPA, turn left. To VTK at or above 7000ft. To AKOMA, turn left. To AGVAR at or above 11000ft. To SABKA, turn right. To MASBO.	LEDOX [M203; A015+] -	CF	N
	LETGO [A025+; L] -	TF	N
	DIVSA [A040+; K230; L] -	TF	N
	DOSPA [L] -	TF	N
	VTK [A070+] -	TF	N
	AKOMA [L] -	TF	N
	AGVAR [A110+] -	TF	N
	SABKA [R] -	TF	N
	MASBO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	L	A040+	K230	RNAV1
TF	DOSPA	-	023(023.4)	-0.4	L	-	-	RNAV1
TF	VTK	-	342(342.4)	-0.4	-	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	-0.4	L	-	-	RNAV1
TF	AGVAR	-	278(278.4)	-0.4	-	A110+	-	RNAV1
TF	SABKA	-	278(278.4)	-0.4	R	-	-	RNAV1
TF	MASBO	-	296(296.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02L -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20R -** 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

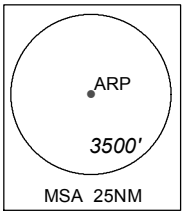
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C/20C
AROSO DEPARTURES
AROSO 2A (R02C)
AROSO 4B (R20C)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



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 AND PARAGRAPH 3.4.1 - FOR RWY 20C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

AROSO
02°08'46"N
103°24'21"E

308° 24

AKMET
01°53'55"N
103°43'39"E
A110

308° 14

AKOMA
01°45'22"N
103°54'43"E
A070
For AROSO 2A only

AROSO 4B

332° 18

AROSO 2A

342° 21

TOKIM
01°29'33"N
104°03'15"E
A020

RWY 02C (DER)
01°21'45"N
103°59'57"E

RWY 20C (DER)
01°19'42"N
103°59'05"E

TEKONG
DVOR/DME 116.5
VTK
01°24'55"N
104°01'20"E
60M
A070
For AROSO 4B only

023°

IBIXU
01° 16' 21" N
103° 57' 40" E
A015

203° AROSO 4B 342° 10

DOSPA
01°14'59"N
104°04'41"E

023° 5

3 113°

4 113°

IBIVA
01° 13' 51" N
103° 56' 37" E
A025

DONDI
01° 12' 52" N
103° 58' 55" E

DIVSA
01° 11' 05" N
104° 03' 03" E
A040

GENERAL INFORMATION

INITIAL CLIMB 3000FT

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C

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 3.3%.

RWY 20C

SHALL NOT EXCEED IAS 230KTS UNTIL DIVSA 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	1062	1416	1769	2123
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.

AROSO 2A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOKIM on course 023° at or above 2000ft, turn left. To AKOMA at or above 7000ft, turn left. To AKMET at or above 11000ft. To AROSO.	TOKIM [M023; A020+; L] - AKOMA [A070+; L] - AKMET [A110+] - AROSO	CF TF TF TF	N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOKIM	-	023(023.4)	-0.4	L	A020+	-	RNAV1
TF	AKOMA	-	332(332.4)	-0.4	L	A070+	-	RNAV1
TF	AKMET	-	308(308.4)	-0.4	-	A110+	-	RNAV1
TF	AROSO	-	308(308.4)	-0.4	-	-	-	RNAV1

AROSO 4B (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. To IBIVA at or above 2500ft, turn left. To DONDI. To DIVSA at or above 4000ft, speed 230kts, turn left. To DOSPA, turn left. To VTK at or above 7000ft. To AKOMA, turn left. To AKMET at or above 11000ft. To AROSO.	IBIXU [M203; A015+] - IBIVA [A025+; L] - DONDI - DIVSA [A040+; K230; L] - DOSPA [L] - VTK [A070+] - AKOMA [L] - AKMET [A110+] - AROSO	CF TF TF TF TF TF TF TF TF	N N N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DONDI	-	113(113.4)	-0.4	-	-	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	L	A040+	K230	RNAV1
TF	DOSPA	-	023(023.4)	-0.4	L	-	-	RNAV1
TF	VTK	-	342(342.4)	-0.4	-	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	-0.4	L	-	-	RNAV1
TF	AKMET	-	308(308.4)	-0.4	-	A110+	-	RNAV1
TF	AROSO	-	308(308.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02C -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20C -** 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/20C
MASBO DEPARTURES
MASBO 2A (R02C)
MASBO 4B (R20C)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

NOTE: RADAR REQUIRED

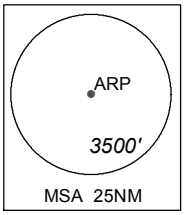
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

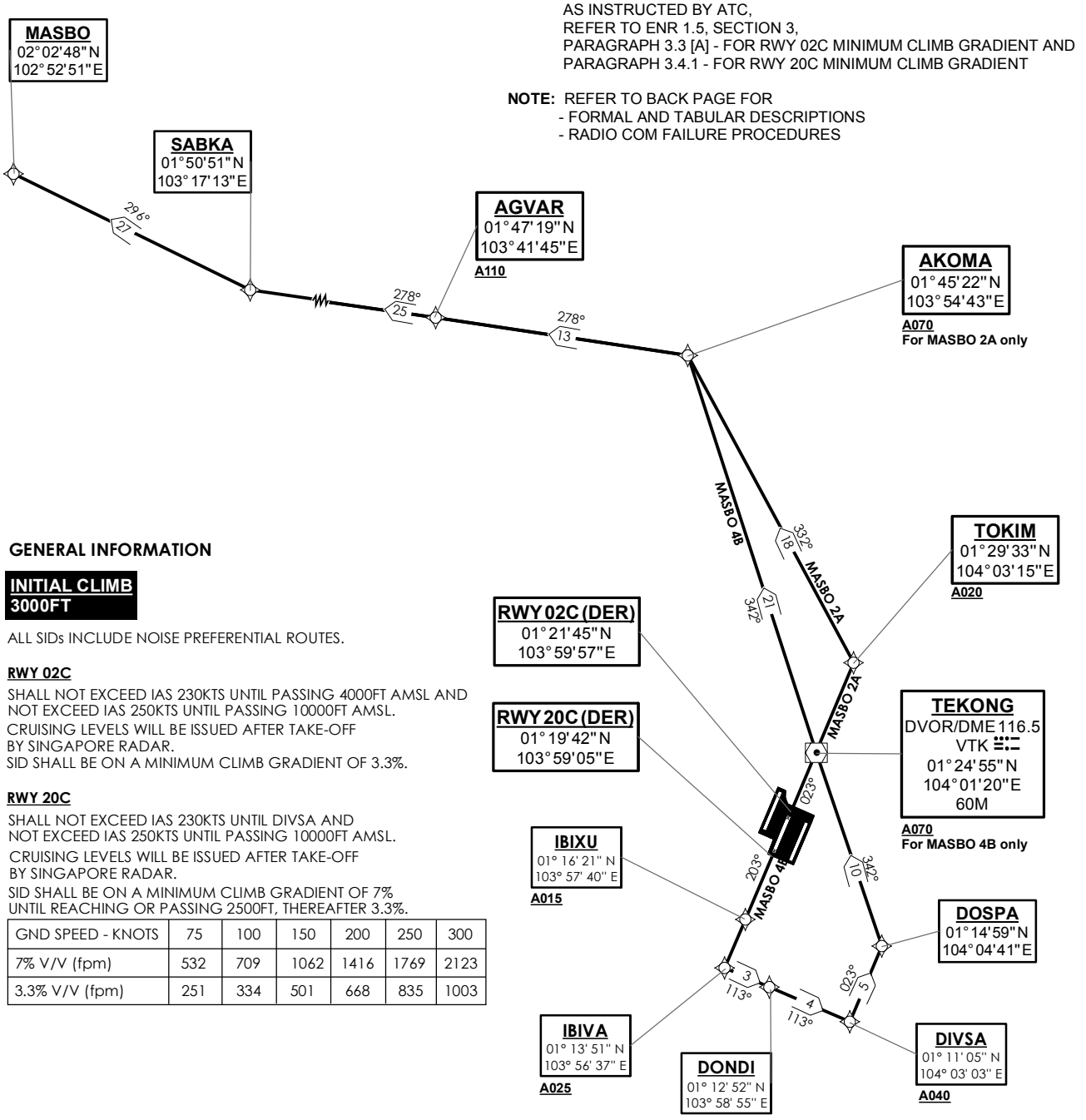
NOTE: CLOSE-IN OBSTACLES (AIRCRAFT UP TO 80FT) EXIST ON TAXIWAYS WEST OF RUNWAY 02C

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 AND PARAGRAPH 3.4.1 - FOR RWY 20C 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

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 3.3%.

RWY 20C

SHALL NOT EXCEED IAS 230KTS UNTIL DIVSA 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	1062	1416	1769	2123
3.3% V/V (fpm)	251	334	501	668	835	1003

NOT TO SCALE

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.

MASBO 2A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOKIM on course 023° at or above 2000ft, turn left. To AKOMA at or above 7000ft, turn left. To AGVAR at or above 11000ft. To SABKA, turn right. To MASBO.	TOKIM [M023; A020+; L] -	CF	N
	AKOMA [A070+; L] -	TF	N
	AGVAR [A110+] -	TF	N
	SABKA [R] -	TF	N
	MASBO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOKIM	-	023(023.4)	-0.4	L	A020+	-	RNAV1
TF	AKOMA	-	332(332.4)	-0.4	L	A070+	-	RNAV1
TF	AGVAR	-	278(278.4)	-0.4	-	A110+	-	RNAV1
TF	SABKA	-	278(278.4)	-0.4	R	-	-	RNAV1
TF	MASBO	-	296(296.4)	-0.4	-	-	-	RNAV1

MASBO 4B (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. To IBIVA at or above 2500ft, turn left. To DONDI. To DIVSA at or above 4000ft, speed 230kts, turn left. To DOSPA, turn left. To VTK at or above 7000ft. To AKOMA, turn left. To AGVAR at or above 11000ft. To SABKA, turn right. To MASBO.	IBIXU [M203; A015+] -	CF	N
	IBIVA [A025+; L] -	TF	N
	DONDI -	TF	N
	DIVSA [A040+; K230; L] -	TF	N
	DOSPA [L] -	TF	N
	VTK [A070+] -	TF	N
	AKOMA [L] -	TF	N
	AGVAR [A110+] -	TF	N
	SABKA [R] -	TF	N
	MASBO	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DONDI	-	113(113.4)	-0.4	-	-	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	L	A040+	K230	RNAV1
TF	DOSPA	-	023(023.4)	-0.4	L	-	-	RNAV1
TF	VTK	-	342(342.4)	-0.4	-	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	-0.4	L	-	-	RNAV1
TF	AGVAR	-	278(278.4)	-0.4	-	A110+	-	RNAV1
TF	SABKA	-	278(278.4)	-0.4	R	-	-	RNAV1
TF	MASBO	-	296(296.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02C -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20C -** 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
APP 120.3
124.05
ACC 133.8

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02L/20R
MERSING DEPARTURES
VMR 5E (R02L)
VMR 8F (R20R)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

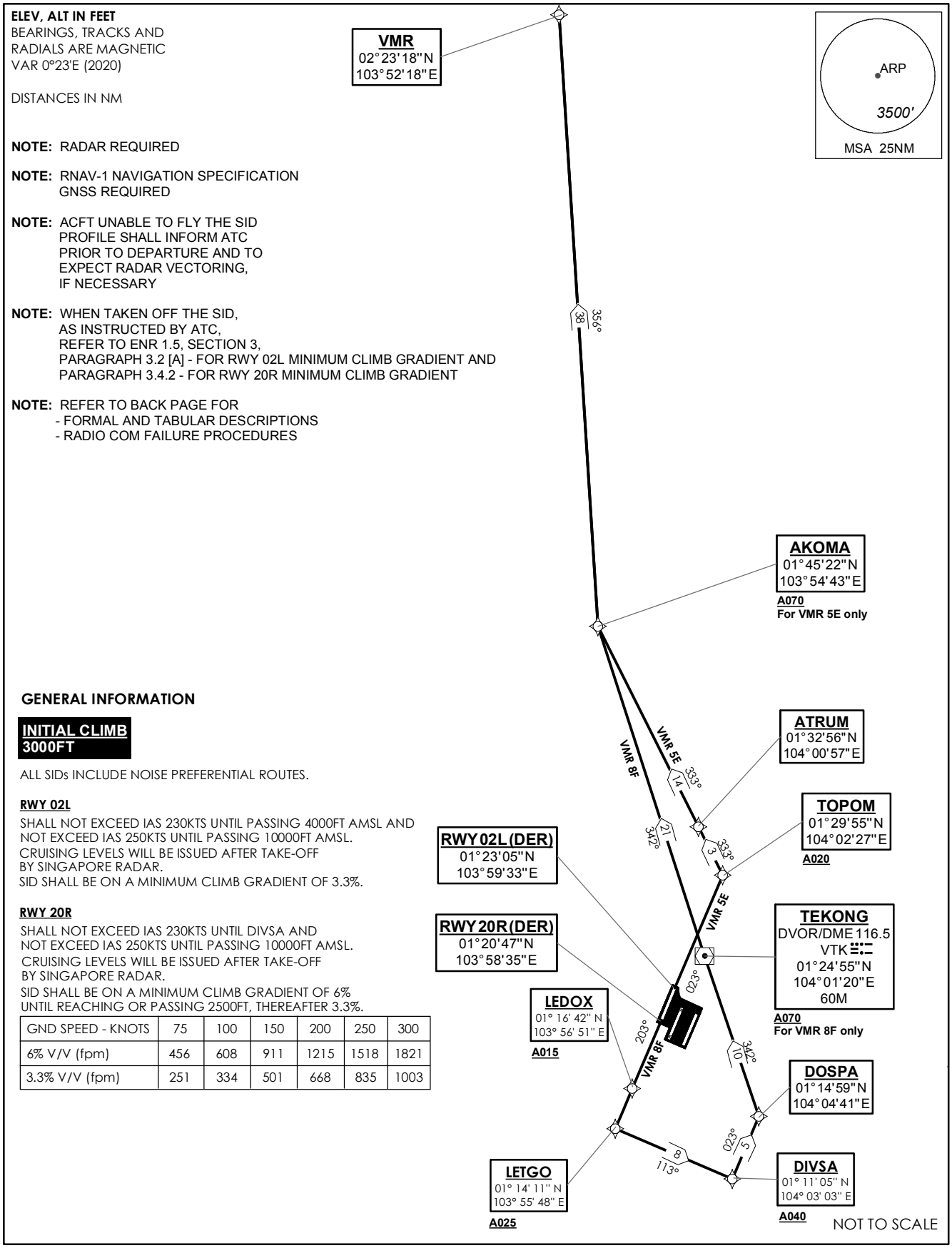
NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND TO EXPECT RADAR VECTORING, IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A] - FOR RWY 02L MINIMUM CLIMB GRADIENT AND PARAGRAPH 3.4.2 - FOR RWY 20R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



NOT TO SCALE

GENERAL INFORMATION

INITIAL CLIMB 3000FT

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02L

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 3.3%.

RWY 20R

SHALL NOT EXCEED IAS 230KTS UNTIL DIVSA 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 : Runway 02C/20C closed - ref AIP SUP 102/20.

VMR 5E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOPOM on course 023° at or above 2000ft, turn left. To ATRUM. To AKOMA at or above 7000ft, turn right. To VMR.	TOPOM [M023; A020+; L] - ATRUM - AKOMA [A070+; R] - VMR	CF TF TF TF	N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOPOM	-	023(023.4)	-0.4	L	A020+	-	RNAV1
TF	ATRUM	-	333(333.4)	-0.4	-	-	-	RNAV1
TF	AKOMA	-	333(333.4)	-0.4	R	A070+	-	RNAV1
TF	VMR	-	356(356.4)	-0.4	-	-	-	RNAV1

VMR 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. To LETGO at or above 2500ft, turn left. To DIVSA at or above 4000ft, speed 230kts, turn left. To DOSPA, turn left. To VTK at or above 7000ft. To AKOMA, turn right. To VMR.	LEDOX [M203; A015+] - LETGO [A025+; L] - DIVSA [A040+; K230; L] - DOSPA [L] - VTK [A070+] - AKOMA [R] - VMR	CF TF TF TF TF TF TF	N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	L	A040+	K230	RNAV1
TF	DOSPA	-	023(023.4)	-0.4	L	-	-	RNAV1
TF	VTK	-	342(342.4)	-0.4	-	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	-0.4	R	-	-	RNAV1
TF	VMR	-	356(356.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02L -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20R -** 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/20C
MERSING DEPARTURES
VMR 5A (R02C)
VMR 8B (R20C)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

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 AND
PARAGRAPH 3.4.1 - FOR RWY 20C 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.

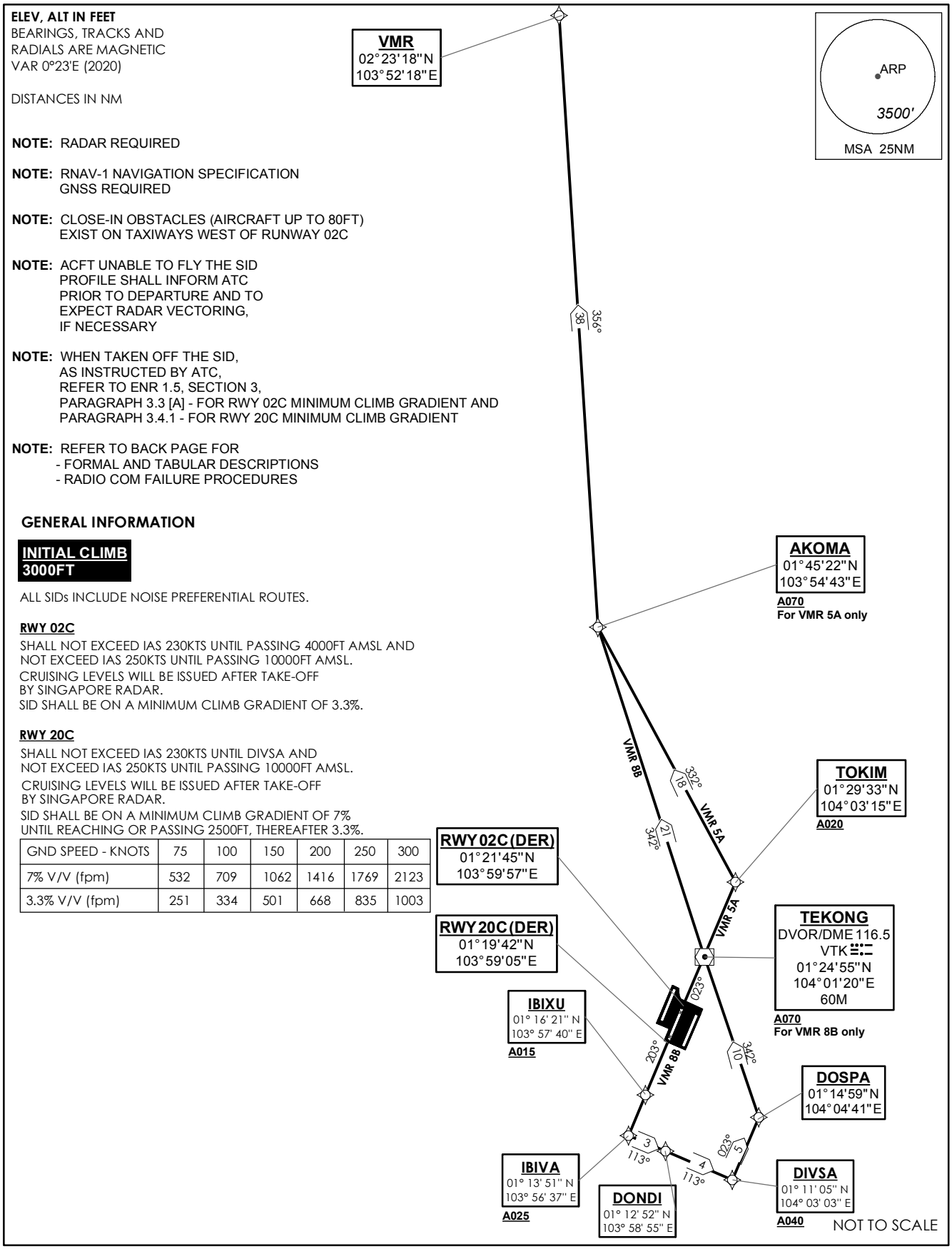
RWY 02C

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 3.3%.

RWY 20C

SHALL NOT EXCEED IAS 230KTS UNTIL DIVSA 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	1062	1416	1769	2123
3.3% V/V (fpm)	251	334	501	668	835	1003



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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.

VMR 5A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOKIM on course 023° at or above 2000ft, turn left. To AKOMA at or above 7000ft, turn right. To VMR.	TOKIM [M023; A020+; L] - AKOMA [A070+; R] - VMR	CF TF TF	N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOKIM	-	023(023.4)	-0.4	L	A020+	-	RNAV1
TF	AKOMA	-	332(332.4)	-0.4	R	A070+	-	RNAV1
TF	VMR	-	356(356.4)	-0.4	-	-	-	RNAV1

VMR 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. To IBIVA at or above 2500ft, turn left. To DONDI. To DIVSA at or above 4000ft, speed 230kts, turn left. To DOSPA, turn left. To VTK at or above 7000ft. To AKOMA, turn right. To VMR.	IBIXU [M203; A015+] - IBIVA [A025+; L] - DONDI - DIVSA [A040+; K230; L] - DOSPA [L] - VTK [A070+] - AKOMA [R] - VMR	CF TF TF TF TF TF TF TF	N N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DONDI	-	113(113.4)	-0.4	-	-	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	L	A040+	K230	RNAV1
TF	DOSPA	-	023(023.4)	-0.4	L	-	-	RNAV1
TF	VTK	-	342(342.4)	-0.4	-	A070+	-	RNAV1
TF	AKOMA	-	342(342.4)	-0.4	R	-	-	RNAV1
TF	VMR	-	356(356.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02C -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20C -** 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

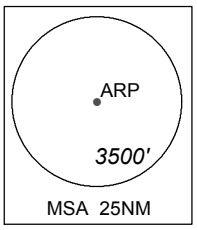
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C/20C
VENIX DEPARTURES
VENIX 1A (R02C)
VENIX 3B (R20C)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



NOTE: RADAR REQUIRED

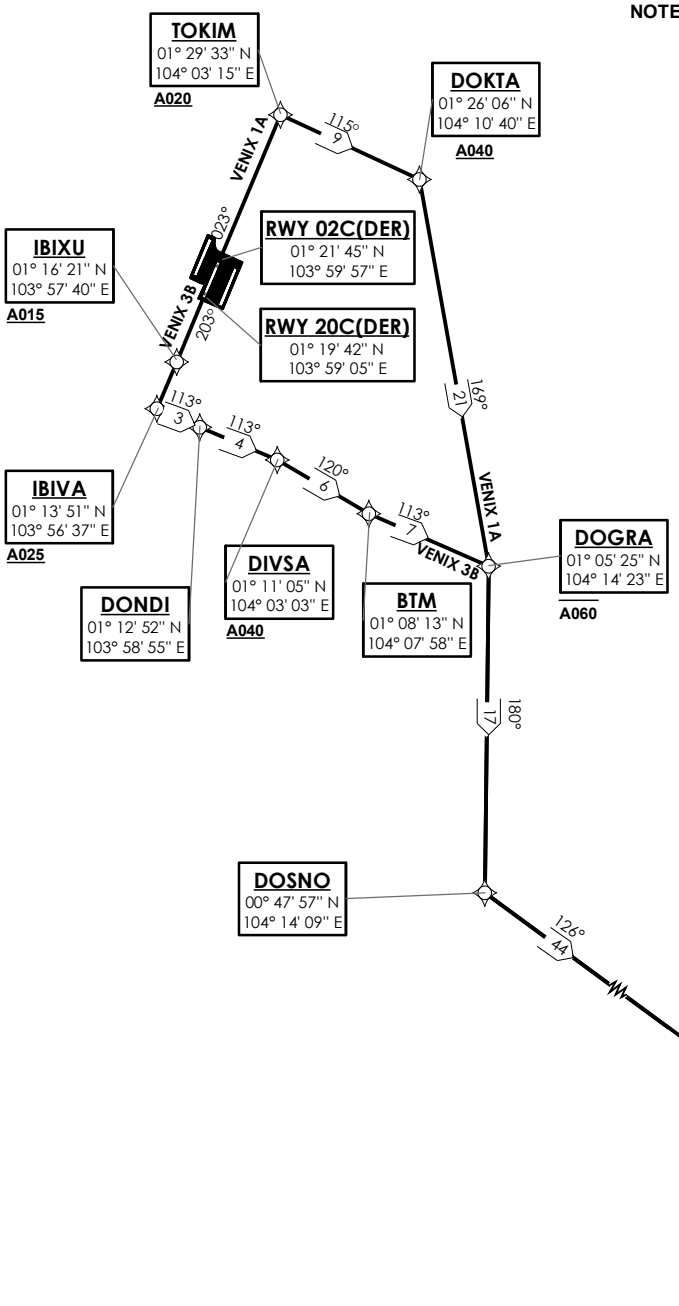
NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

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 AND
PARAGRAPH 3.4.1 - FOR RWY 20C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



NOT TO SCALE

GENERAL INFORMATION

INITIAL CLIMB 3000FT

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C

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 3.3%.

RWY 20C

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	1062	1416	1769	2123
3.3% V/V (fpm)	251	334	501	668	835	1003

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.

VENIX 1A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOKIM on course 023° at or above 2000ft,, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To VENIX. To SURGA.	TOKIM [M023; A020+; R] -	CF	N
	DOKTA [A040+; R] -	TF	N
	DOGRA [A060-; R] -	TF	N
	DOSNO [L] -	TF	N
	VENPA [L] -	TF	N
	VENIX -	TF	N
	SURGA	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOKIM	-	023(023.4)	-0.4	R	A020+	-	RNAV1
TF	DOKTA	-	115(115.4)	-0.4	R	A040+	-	RNAV1
TF	DOGRA	-	169(169.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	VENPA	-	126(126.4)	-0.4	L	-	-	RNAV1
TF	VENIX	-	120(120.4)	-0.4	-	-	-	RNAV1
TF	SURGA	-	120(120.4)	-0.4	-	-	-	RNAV1

VENIX 3B (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. To IBIVA at or above 2500ft, turn left. To DONDI. To DIVSA at or above 4000ft, turn right. To BTM, turn left. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To VENIX. To SURGA.	IBIXU [M203; A015+] -	CF	N
	IBIVA [A025+; L] -	TF	N
	DONDI -	TF	N
	DIVSA [A040+; R] -	TF	N
	BTM [L] -	TF	N
	DOGRA [A060-; R] -	TF	N
	DOSNO [L] -	TF	N
	VENPA [L] -	TF	N
	VENIX -	TF	N
	SURGA	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DONDI	-	113(113.4)	-0.4	-	-	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	R	A040+	-	RNAV1
TF	BTM	-	120(120.4)	-0.4	L	-	-	RNAV1
TF	DOGRA	-	113(113.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	VENPA	-	126(126.4)	-0.4	L	-	-	RNAV1
TF	VENIX	-	120(120.4)	-0.4	-	-	-	RNAV1
TF	SURGA	-	120(120.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02C -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20C -** 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
APP	120.3
	124.05
ACC	134.4

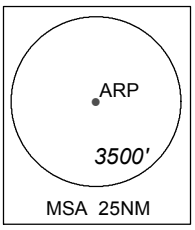
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02L/20R
VENIX DEPARTURES
VENIX 1E (R02L)
VENIX 3F (R20R)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



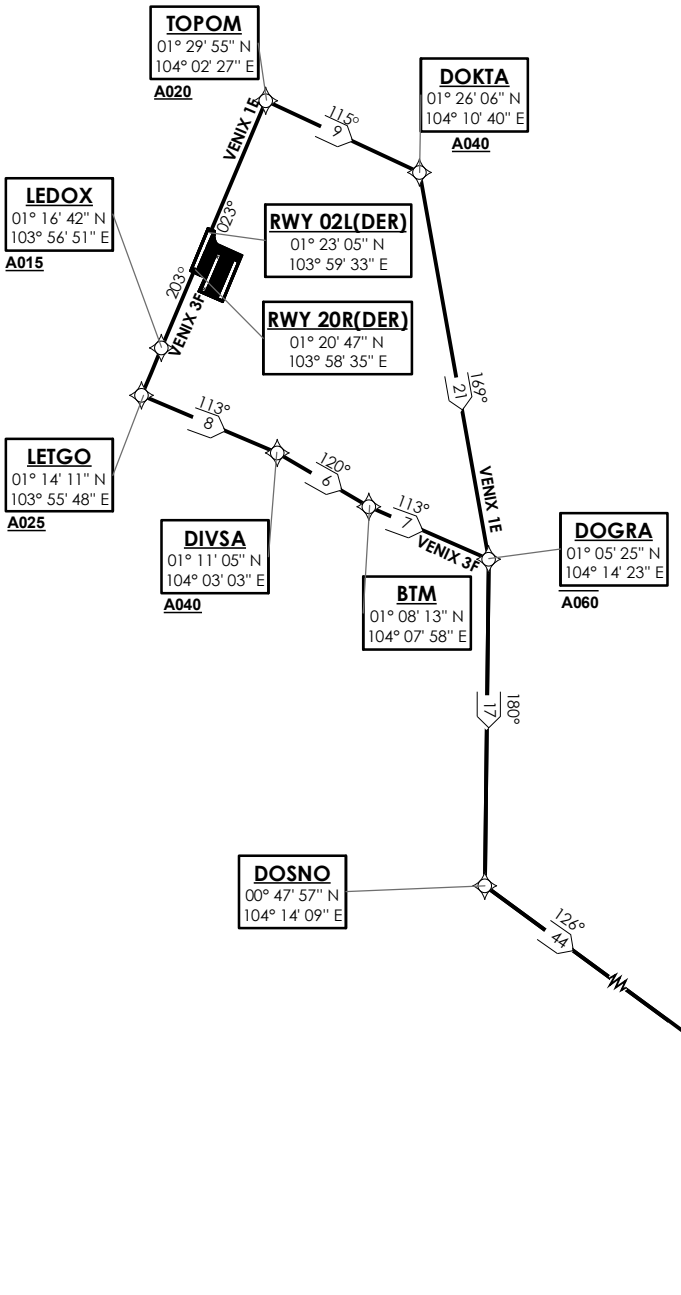
NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND TO EXPECT RADAR VECTORING, IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A] - FOR RWY 02L MINIMUM CLIMB GRADIENT AND PARAGRAPH 3.4.2 - FOR RWY 20R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



NOT TO SCALE

GENERAL INFORMATION

INITIAL CLIMB 3000FT

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02L

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 3.3%

RWY 20R

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 : Runway 02C/20C closed - ref AIP SUP 102/20.

VENIX 1E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOPOM on course 023° at or above 2000ft, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To VENIX. To SURGA.	TOPOM [M023; A020+; R] -	CF	N
	DOKTA [A040+; R] -	TF	N
	DOGRA [A060-; R] -	TF	N
	DOSNO [L] -	TF	N
	VENPA [L] -	TF	N
	VENIX -	TF	N
	SURGA	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOPOM	-	023(023.4)	-0.4	R	A020+	-	RNAV1
TF	DOKTA	-	115(115.4)	-0.4	R	A040+	-	RNAV1
TF	DOGRA	-	169(169.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	VENPA	-	126(126.4)	-0.4	L	-	-	RNAV1
TF	VENIX	-	120(120.4)	-0.4	-	-	-	RNAV1
TF	SURGA	-	120(120.4)	-0.4	-	-	-	RNAV1

VENIX 3F (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. To LETGO at or above 2500ft, turn left. To DIVSA at or above 4000ft, turn right. To BTM, turn left. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To VENIX. To SURGA.	LEDOX [M203; A015+] -	CF	N
	LETGO [A025+; L] -	TF	N
	DIVSA [A040+; R] -	TF	N
	BTM [L] -	TF	N
	DOGRA [A060-; R] -	TF	N
	DOSNO [L] -	TF	N
	VENPA [L] -	TF	N
	VENIX -	TF	N
	SURGA	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	R	A040+	-	RNAV1
TF	BTM	-	120(120.4)	-0.4	L	-	-	RNAV1
TF	DOGRA	-	113(113.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	VENPA	-	126(126.4)	-0.4	L	-	-	RNAV1
TF	VENIX	-	120(120.4)	-0.4	-	-	-	RNAV1
TF	SURGA	-	120(120.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02L -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20R -** 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

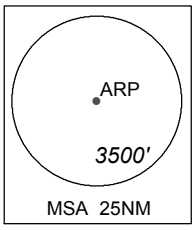
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C/20C
KADAR DEPARTURES
KADAR 1A (R02C)
KADAR 3B (R20C)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



NOTE: RADAR REQUIRED

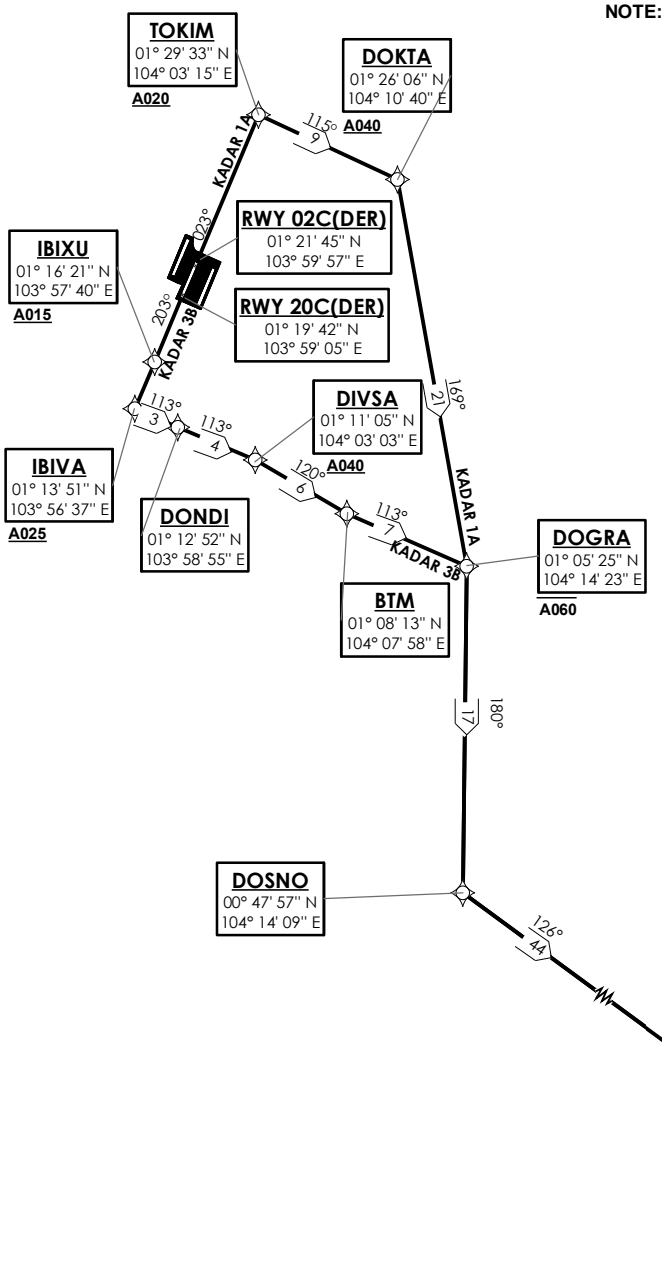
NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

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 AND
PARAGRAPH 3.4.1 - FOR RWY 20C MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



NOT TO SCALE

GENERAL INFORMATION

INITIAL CLIMB 3000FT

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C

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 3.3%.

RWY 20C

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	1062	1416	1769	2123
3.3% V/V (fpm)	251	334	501	668	835	1003

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.

KADAR 1A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOKIM on course 023° at or above 2000ft, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To ATKAX, turn right. To KADAR.	TOKIM [M023; A020+; R] -	CF	N
	DOKTA [A040+; R] -	TF	N
	DOGRA [A060-; R] -	TF	N
	DOSNO [L] -	TF	N
	VENPA [L] -	TF	N
	ATKAX [R] -	TF	N
	KADAR	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOKIM	-	023(023.4)	-0.4	R	A020+	-	RNAV1
TF	DOKTA	-	115(115.4)	-0.4	R	A040+	-	RNAV1
TF	DOGRA	-	169(169.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	VENPA	-	126(126.4)	-0.4	L	-	-	RNAV1
TF	ATKAX	-	097(097.4)	-0.4	R	-	-	RNAV1
TF	KADAR	-	105(105.4)	-0.4	-	-	-	RNAV1

KADAR 3B (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. To IBIVA at or above 2500ft, turn left. To DONDI. To DIVSA at or above 4000ft, turn right. To BTM, turn left. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To ATKAX, turn right. To KADAR.	IBIXU [M203; A015+] -	CF	N
	IBIVA [A025+; L] -	TF	N
	DONDI -	TF	N
	DIVSA [A040+; R] -	TF	N
	BTM [L] -	TF	N
	DOGRA [A060-; R] -	TF	N
	DOSNO [L] -	TF	N
	VENPA [L] -	TF	N
	ATKAX [R] -	TF	N
	KADAR	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	IBIXU	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	IBIVA	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DONDI	-	113(113.4)	-0.4	-	-	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	R	A040+	-	RNAV1
TF	BTM	-	120(120.4)	-0.4	L	-	-	RNAV1
TF	DOGRA	-	113(113.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	VENPA	-	126(126.4)	-0.4	L	-	-	RNAV1
TF	ATKAX	-	097(097.4)	-0.4	R	-	-	RNAV1
TF	KADAR	-	105(105.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02C -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20C -** 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
APP	120.3
	124.05
ACC	134.4

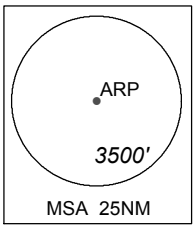
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02L/20R
KADAR DEPARTURES
KADAR 1E (R02L)
KADAR 3F (R20R)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM



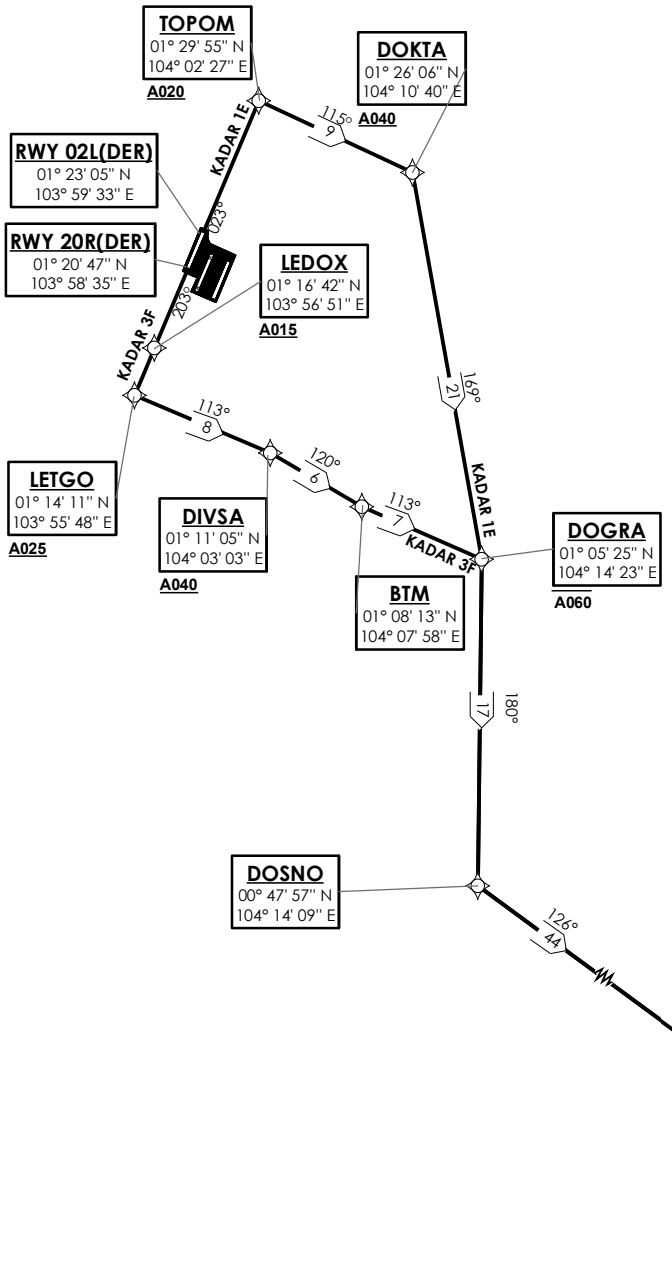
NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND TO EXPECT RADAR VECTORING, IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.2 [A] - FOR RWY 02L MINIMUM CLIMB GRADIENT AND PARAGRAPH 3.4.2 - FOR RWY 20R MINIMUM CLIMB GRADIENT

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



NOT TO SCALE

GENERAL INFORMATION

INITIAL CLIMB 3000FT

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02L

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 3.3%.

RWY 20R

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 : Runway 02C/20C closed - ref AIP SUP 102/20.

KADAR 1E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
To TOPOM on course 023° at or above 2000ft, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To ATKAX, turn right. To KADAR.	TOPOM [M023; A020+; R] -	CF	N
	DOKTA [A040+; R] -	TF	N
	DOGRA [A060-; R] -	TF	N
	DOSNO [L] -	TF	N
	VENPA [L] -	TF	N
	ATKAX [R] -	TF	N
	KADAR	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	TOPOM	-	023(023.4)	-0.4	R	A020+	-	RNAV1
TF	DOKTA	-	115(115.4)	-0.4	R	A040+	-	RNAV1
TF	DOGRA	-	169(169.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	VENPA	-	126(126.4)	-0.4	L	-	-	RNAV1
TF	ATKAX	-	097(097.4)	-0.4	R	-	-	RNAV1
TF	KADAR	-	105(105.4)	-0.4	-	-	-	RNAV1

KADAR 3F (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. To LETGO at or above 2500ft, turn left. To DIVSA at or above 4000ft, turn right. To BTM, turn left. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To ATKAX, turn right. To KADAR.	LEDOX [M203; A015+] -	CF	N
	LETGO [A025+; L] -	TF	N
	DIVSA [A040+; R] -	TF	N
	BTM [L] -	TF	N
	DOGRA [A060-; R] -	TF	N
	DOSNO [L] -	TF	N
	VENPA [L] -	TF	N
	ATKAX [R] -	TF	N
	KADAR	TF	N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
CF	LEDOX	-	203(203.4)	-0.4	-	A015+	-	RNAV1
TF	LETGO	-	203(203.4)	-0.4	L	A025+	-	RNAV1
TF	DIVSA	-	113(113.4)	-0.4	R	A040+	-	RNAV1
TF	BTM	-	120(120.4)	-0.4	L	-	-	RNAV1
TF	DOGRA	-	113(113.4)	-0.4	R	A060-	-	RNAV1
TF	DOSNO	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	VENPA	-	126(126.4)	-0.4	L	-	-	RNAV1
TF	ATKAX	-	097(097.4)	-0.4	R	-	-	RNAV1
TF	KADAR	-	105(105.4)	-0.4	-	-	-	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:** **RWY 02L -** PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE. **RWY 20R -** 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

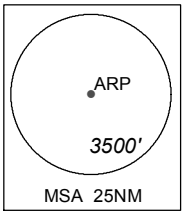
D-ATIS AP ID-WSSS
128.6

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



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

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.

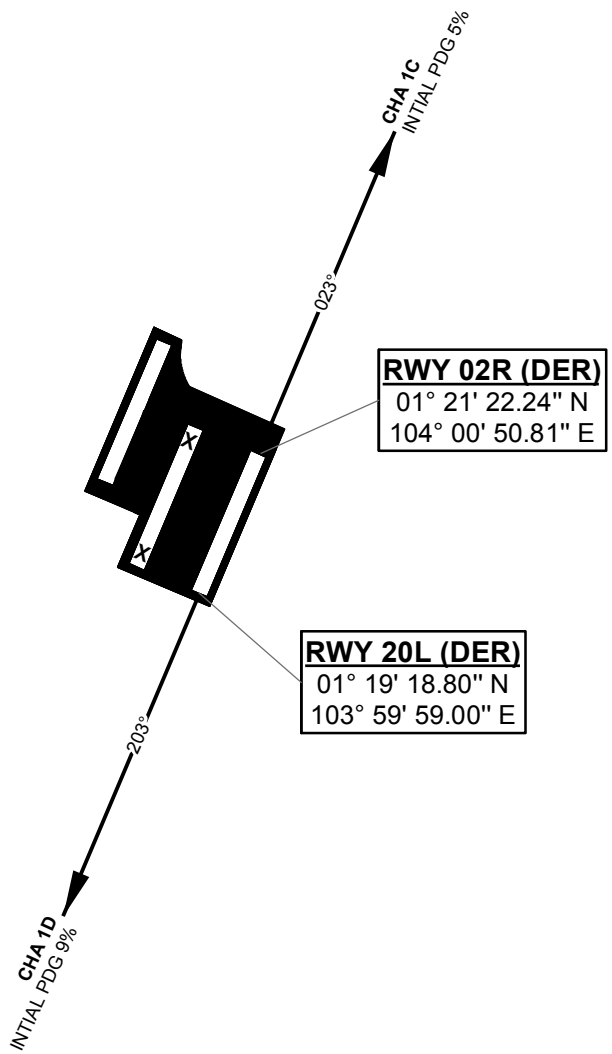
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

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 : New Procedure.
Runway 02C/20C closed - ref AIP SUP 102/20.

CHA 1C SID (RADAR) RWY 02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator
Climb runway heading 023°, Gradient 5% to 2500ft, thence 3.3%. Expect radar vectors to planned ATS route or depicted waypoints (See 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 runway heading 203°, Gradient 9% to 2500ft, thence 3.3%. Expect radar vectors to planned ATS route or depicted waypoints (See 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 fly direct between subsequent waypoints to join the respective planned ATS Route
A457	AKOMA DCT SABKA DCT MASBO
B470	DOSNO DCT ANITO
G580 / M646 / L625	HOSBA DCT TOMAN
L504	DOSNO DCT VENPA DCT ATKAX DCT BAVUS
M635	DOSNO DCT VENPA DCT VENIX DCT SURGA
B469 / M751 / M771 / L642 / M753	AKOMA DCT VMR
M774	DOSNO DCT VENPA DCT ATKAX DCT KADAR
L762 / R469	ADMIM DCT ASUNA
Y339	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	124.05 119.3
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

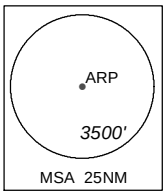
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

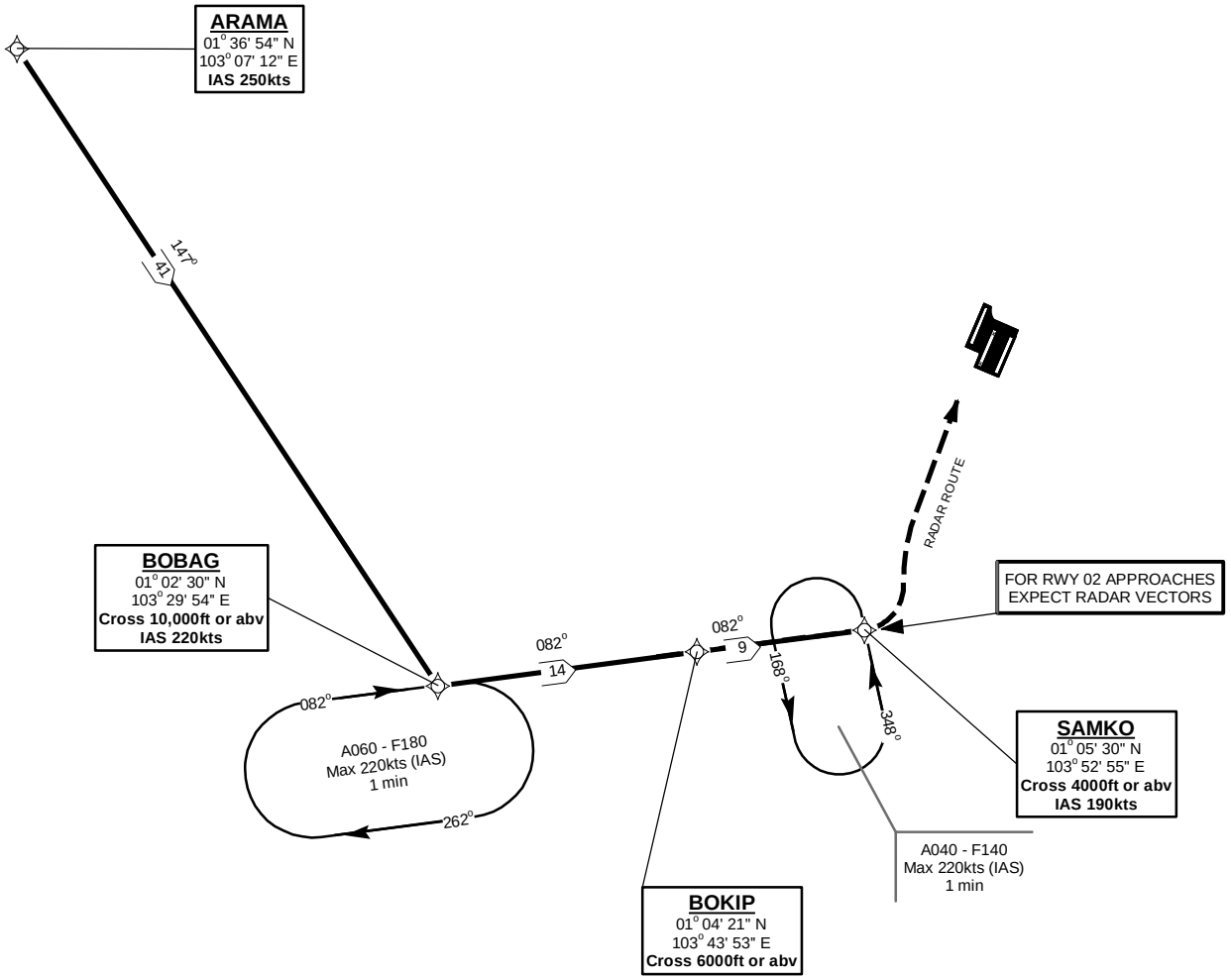
DISTANCES IN NM

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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

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. To BOBAG at or above 10000ft, speed 220kts, turn left. To BOKIP at or above 6000ft. To SAMKO at or above 4000ft, speed 190kts.	ARAMA [K250] - BOBAG [A100+; K220; L] - BOKIP [A060+] - SAMKO [A040+; K190]	IF TF TF TF	N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	ARAMA	-	-	-	-	-	K250	RNAV1
TF	BOBAG	-	147(147.4)	-0.4	L	A100+	K220	RNAV1
TF	BOKIP	-	082(082.4)	-0.4	-	A060+	-	RNAV1
TF	SAMKO	-	082(082.4)	-0.4	-	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	124.05 119.3
TWR	118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

SINGAPORE/Singapore Changi
RWY 02L/C/R
ASUNA ONE ALPHA ARRIVAL
ASUNA 1A

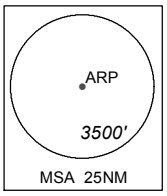
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

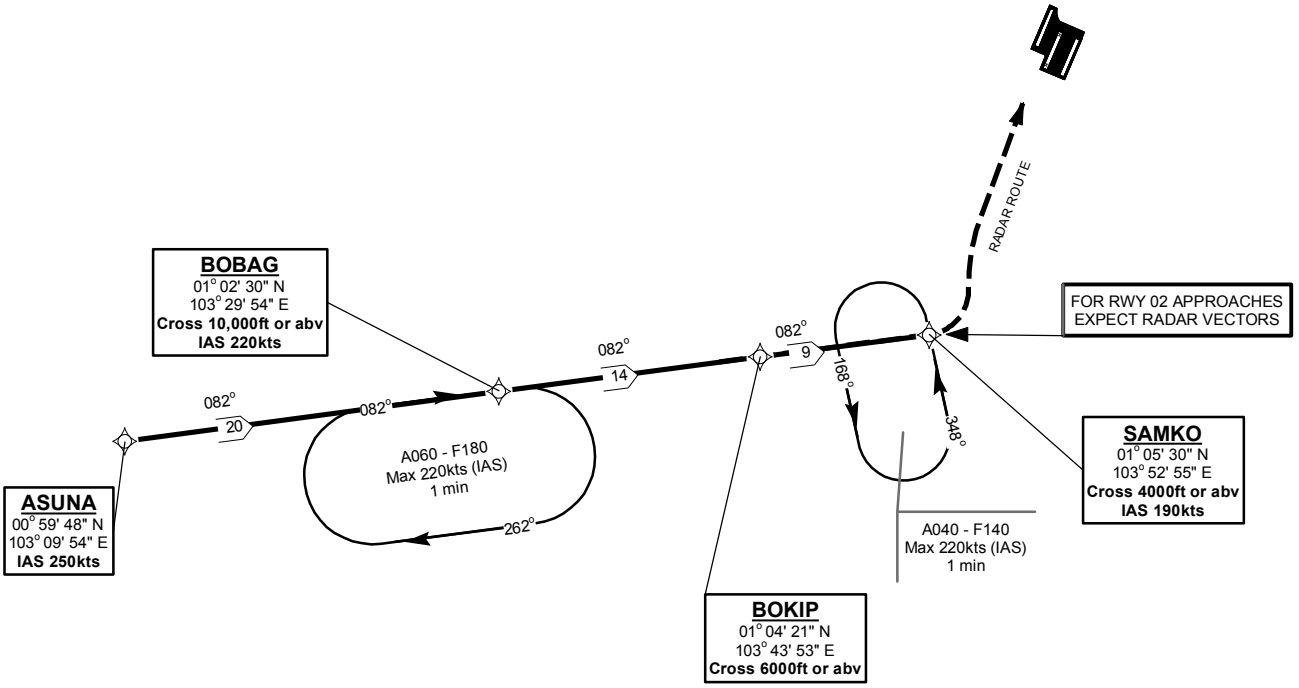
DISTANCES IN NM

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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

ASUNA 1A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From ASUNA, speed 250kts. To BOBAG at or above 10000ft, speed 220kts. To BOKIP at or above 6000ft. To SAMKO at or above 4000ft, speed 190kts.	ASUNA [K250] - BOBAG [A100+; K220] - BOKIP [A060+] - SAMKO [A040+; K190]	IF TF TF TF	N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	ASUNA	-	-	-	-	-	K250	RNAV1
TF	BOBAG	-	082(082.4)	-0.4	-	A100+	K220	RNAV1
TF	BOKIP	-	082(082.4)	-0.4	-	A060+	-	RNAV1
TF	SAMKO	-	082(082.4)	-0.4	-	A040+	K190	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**When cleared via ASUNA 1A by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on ASUNA 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 124.05
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
ARAMA ONE BRAVO ARRIVAL
ARAMA 1B

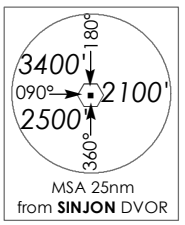
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

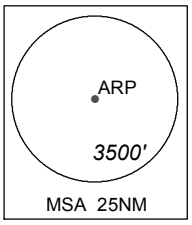
NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

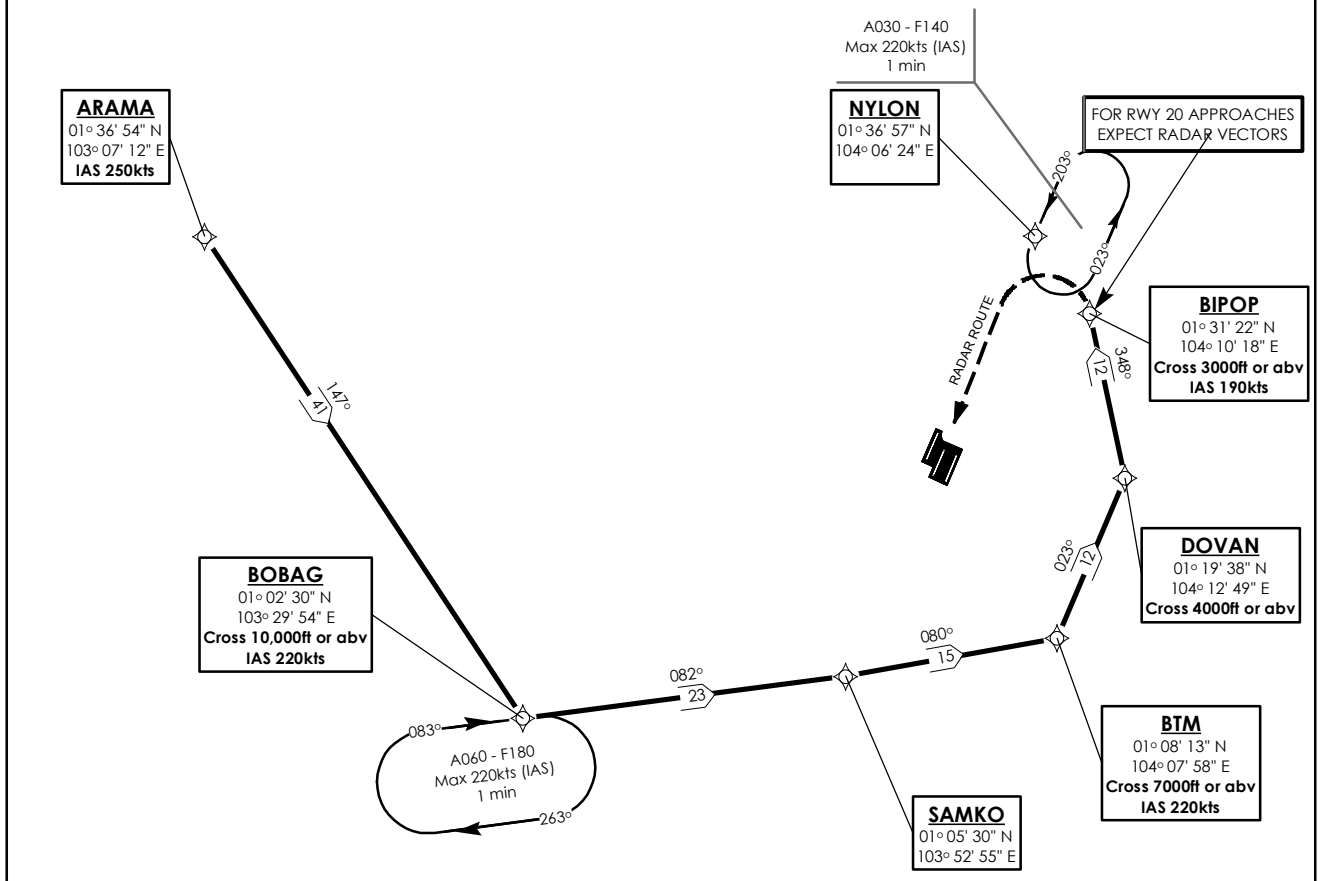
NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



MSA 25nm
from **SINJON** DVOR



MSA 25NM



NOT TO SCALE

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

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. To BOBAG at or above 10000ft, speed 220kts, turn left. To SAMKO, turn left. To BTM at or above 7000ft, speed 220kts, turn left. To DOVAN at or above 4000ft, turn left. To BIPOP at or above 3000ft, speed 190kts.	ARAMA [K250] - BOBAG [A100+; K220; L] - SAMKO [L] - BTM [A070+; K220; L] - DOVAN [A040+; L] - BIPOP [A030+; K190]	IF TF TF TF TF TF	N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	ARAMA	-	-	-	-	-	K250	RNAV1
TF	BOBAG	-	147(147.4)	-0.4	L	A100+	K220	RNAV1
TF	SAMKO	-	082(082.4)	-0.4	L	-	-	RNAV1
TF	BTM	-	080(080.4)	-0.4	L	A070+	K220	RNAV1
TF	DOVAN	-	023(023.4)	-0.4	L	A040+	-	RNAV1
TF	BIPOP	-	348(348.4)	-0.4	-	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 124.05
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
ASUNA ONE BRAVO ARRIVAL
ASUNA 1B

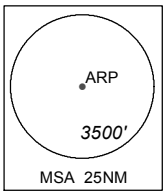
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

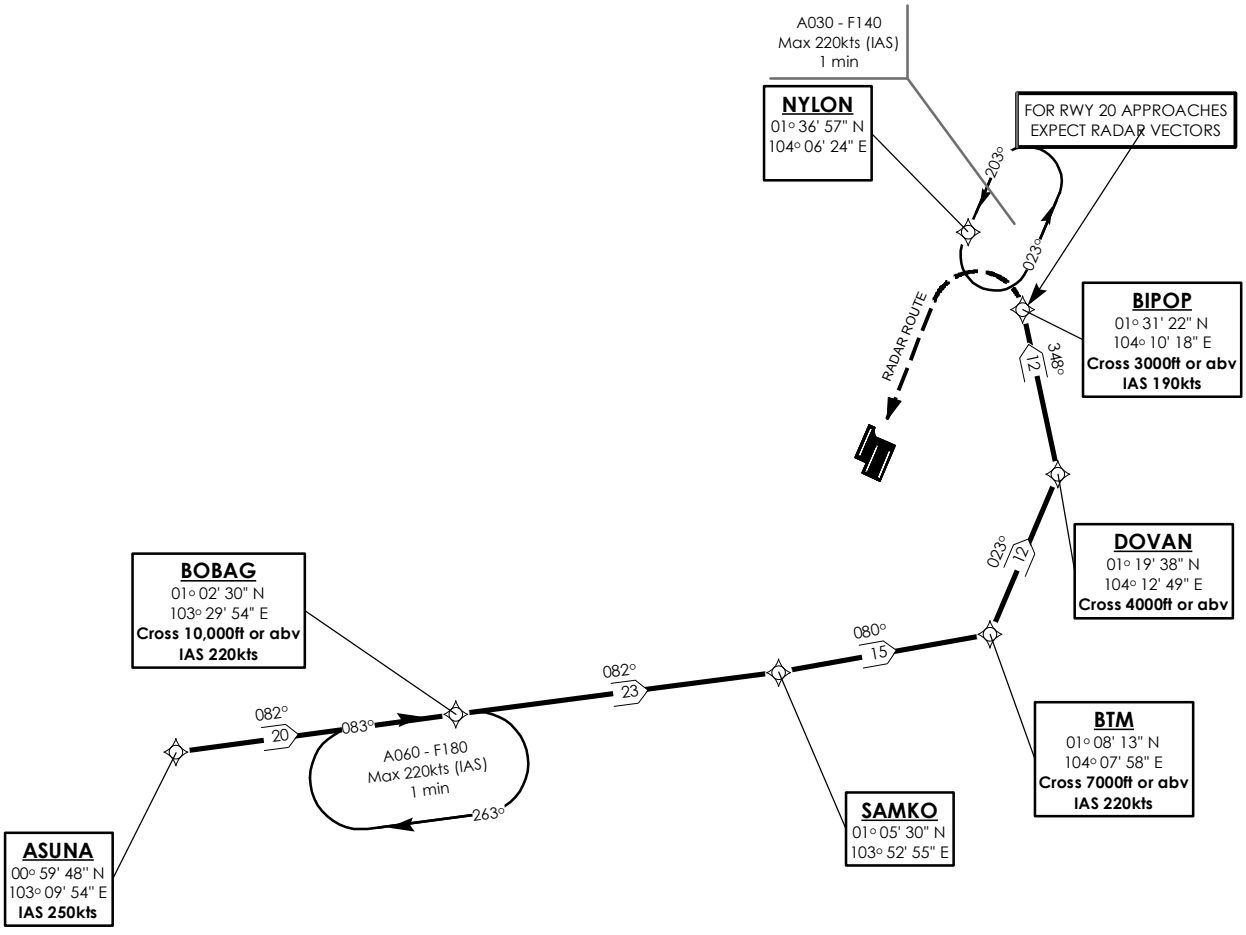
DISTANCES IN NM

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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

ASUNA 1B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From ASUNA, speed 250kts. To BOBAG at or above 10000ft, speed 220kts. To SAMKO, turn left. To BTM at or above 7000ft, speed 220kts, turn left. To DOVAN at or above 4000ft, turn left. To BIPOP at or above 3000ft, speed 190kts.	ASUNA [K250] - BOBAG [A100+; K220] - SAMKO [L] - BTM [A070+; K220; L] - DOVAN [A040+; L] - BIPOP [A030+; K190]	IF TF TF TF TF TF	N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	ASUNA	-	-	-	-	-	K250	RNAV1
TF	BOBAG	-	082(082.4)	-0.4	-	A100+	K220	RNAV1
TF	SAMKO	-	082(082.4)	-0.4	L	-	-	RNAV1
TF	BTM	-	080(080.4)	-0.4	L	A070+	K220	RNAV1
TF	DOVAN	-	023(023.4)	-0.4	L	A040+	-	RNAV1
TF	BIPOP	-	348(348.4)	-0.4	-	A030+	K190	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**When cleared via ASUNA 1B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on ASUNA 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
KARTO ONE ALPHA ARRIVAL
KARTO 1A

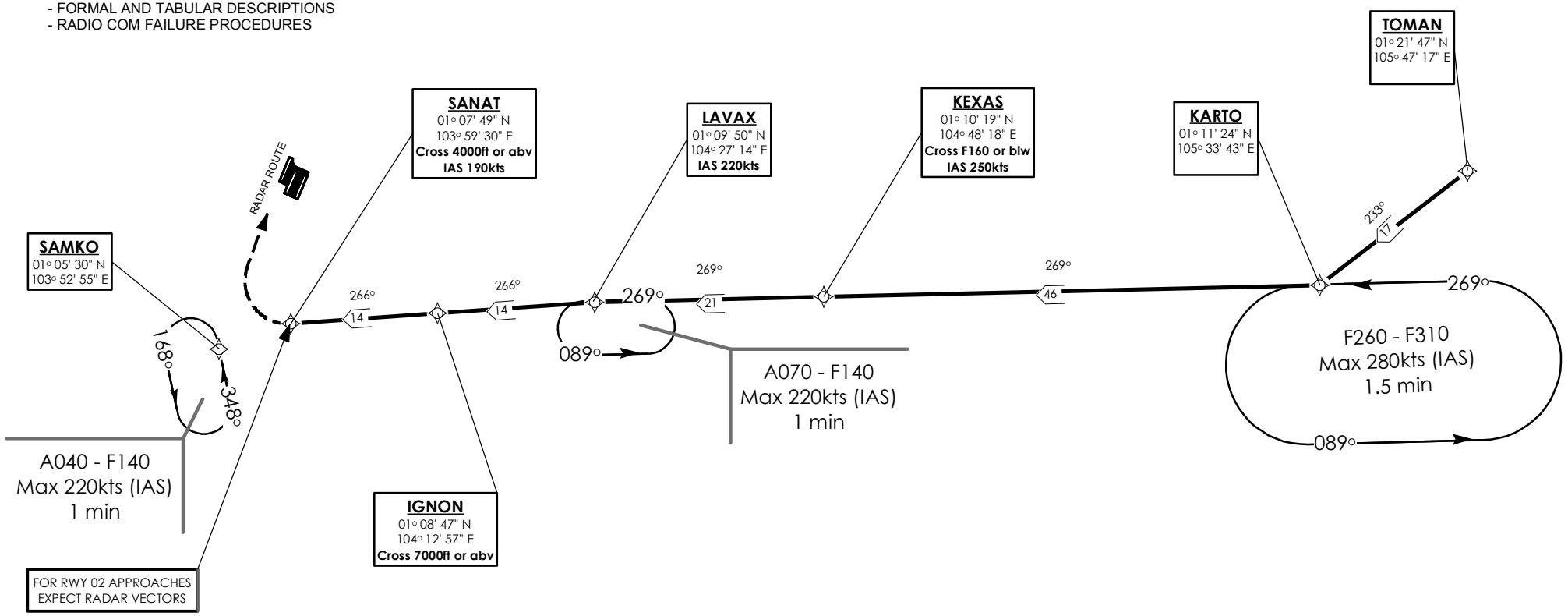
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

KARTO 1A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From TOMAN. To KARTO, turn right. To KEXAS at or below FL160, speed 250kts. To LAVAX, speed 220kts,turn left.To IGNON at or above 7000ft. To SANAT at or above 4000ft, speed 190kts.	TOMAN - KARTO [R] - KEXAS [FL160-; K250] - LAVAX [K220; L] - IGNON [A070+] - SANAT [A040+; K190]	IF TF TF TF TF TF	N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	TOMAN	-	-	-	-	-	-	RNAV1
TF	KARTO	-	233(233.4)	-0.4	R	-	-	RNAV1
TF	KEXAS	-	269(269.4)	-0.4	-	FL160-	K250	RNAV1
TF	LAVAX	-	269(269.4)	-0.4	L	-	K220	RNAV1
TF	IGNON	-	266(266.4)	-0.4	-	A070+	-	RNAV1
TF	SANAT	-	266(266.4)	-0.4	-	A040+	K190	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**When cleared via KARTO 1A by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on KARTO 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 134.4
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
OBDOS ONE ALPHA ARRIVAL
OBDOS 1A

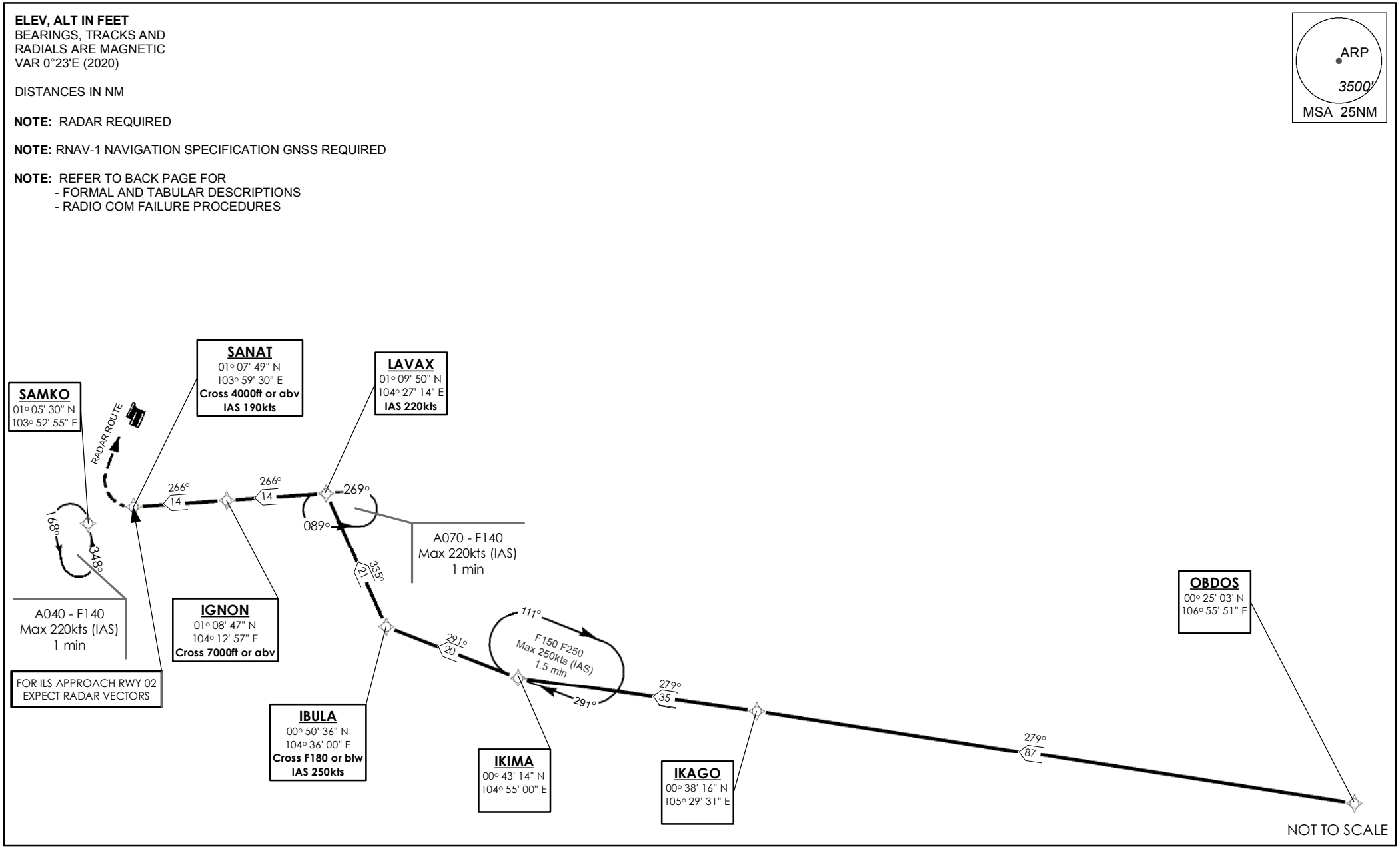
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

OBDOS 1A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From OBDOS. To IKAGO. To IKIMA, turn right. To IBULA at or below FL180, speed 250kts, turn right. To LAVAX, speed 220kts, turn left. To IGNON at or above 7000ft. To SANAT at or above 4000ft, speed 190kts.	OBDOS - IKAGO - IKIMA [R] - IBULA [FL180-; K250; R] - LAVAX [K220; L] - IGNON [A070+] - SANAT [A040+; K190]	IF TF TF TF TF TF TF	N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	OBDOS	-	-	-	-	-	-	RNAV1
TF	IKAGO	-	279(279.4)	-0.4	-	-	-	RNAV1
TF	IKIMA	-	279(279.4)	-0.4	R	-	-	RNAV1
TF	IBULA	-	291(291.4)	-0.4	R	FL180-	K250	RNAV1
TF	LAVAX	-	335(335.4)	-0.4	L	-	K220	RNAV1
TF	IGNON	-	266(266.4)	-0.4	-	A070+	-	RNAV1
TF	SANAT	-	266(266.4)	-0.4	-	A040+	K190	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**When cleared via OBDOS 1A by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on OBDOS 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
KARTO ONE BRAVO ARRIVAL
KARTO 1B

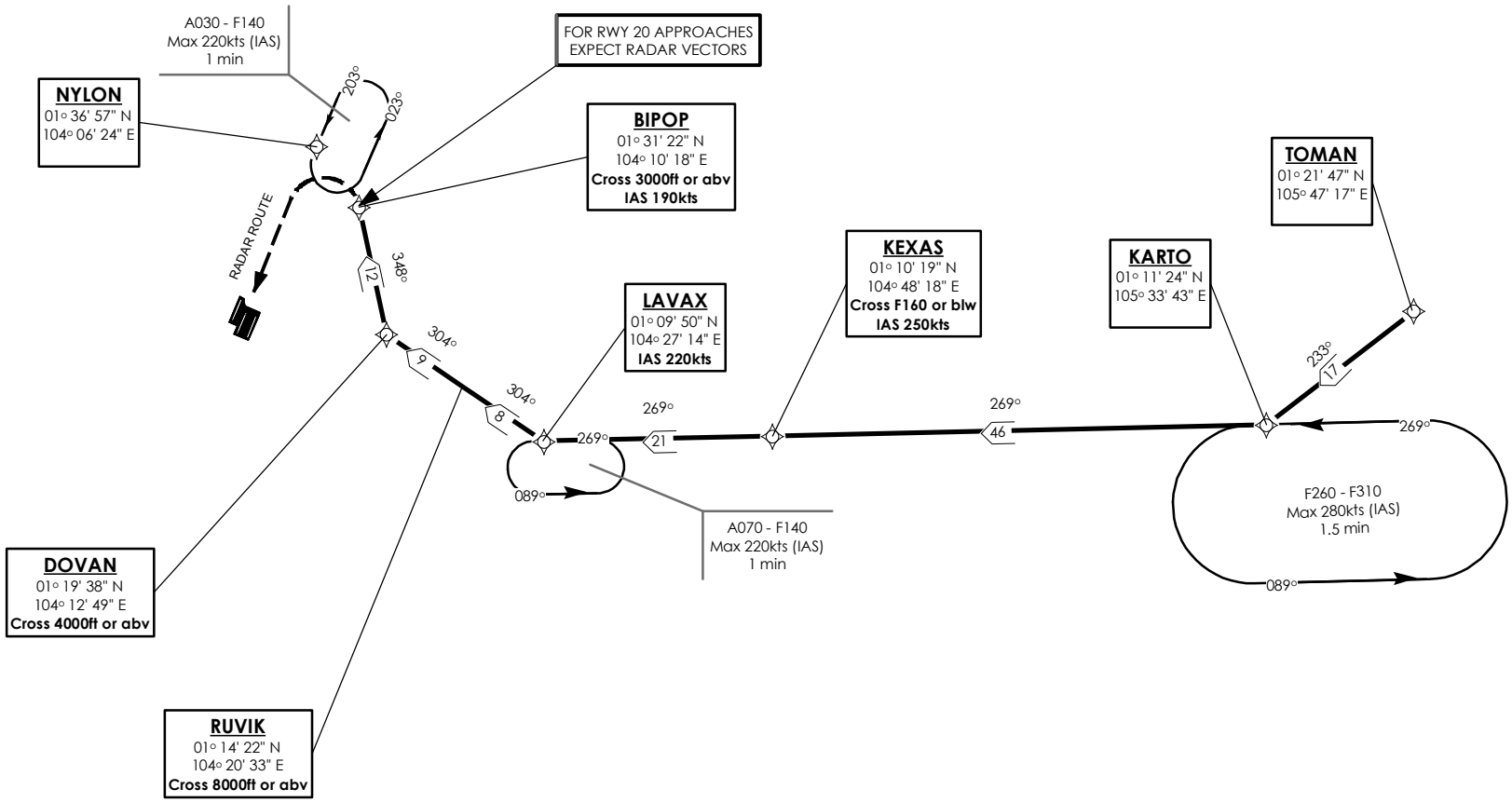
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

KARTO 1B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From TOMAN. To KARTO, turn right. To KEXAS at or below FL160, speed 250kts. To LAVAX, speed 220kts, turn right. To RUVIK at or above 8000ft. To DOVAN at or above 4000ft, turn right. To BIPOP at or above 3000ft, speed 190kts.	TOMAN - KARTO [R] - KEXAS [FL160-; K250] - LAVAX [K220; R] - RUVIK [A080+] - DOVAN [A040+; R] - BIPOP [A030+; K190]	IF TF TF TF TF TF TF	N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	TOMAN	-	-	-	-	-	-	RNAV1
TF	KARTO	-	233(233.4)	-0.4	R	-	-	RNAV1
TF	KEXAS	-	269(269.4)	-0.4	-	FL160-	K250	RNAV1
TF	LAVAX	-	269(269.4)	-0.4	R	-	K220	RNAV1
TF	RUVIK	-	304(304.4)	-0.4	-	A080+	-	RNAV1
TF	DOVAN	-	304(304.4)	-0.4	R	A040+	-	RNAV1
TF	BIPOP	-	348(348.4)	-0.4	-	A030+	K190	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**When cleared via KARTO 1B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on KARTO 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 134.4
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
OBDOS ONE BRAVO ARRIVAL
OBDOS 1B

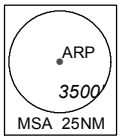
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

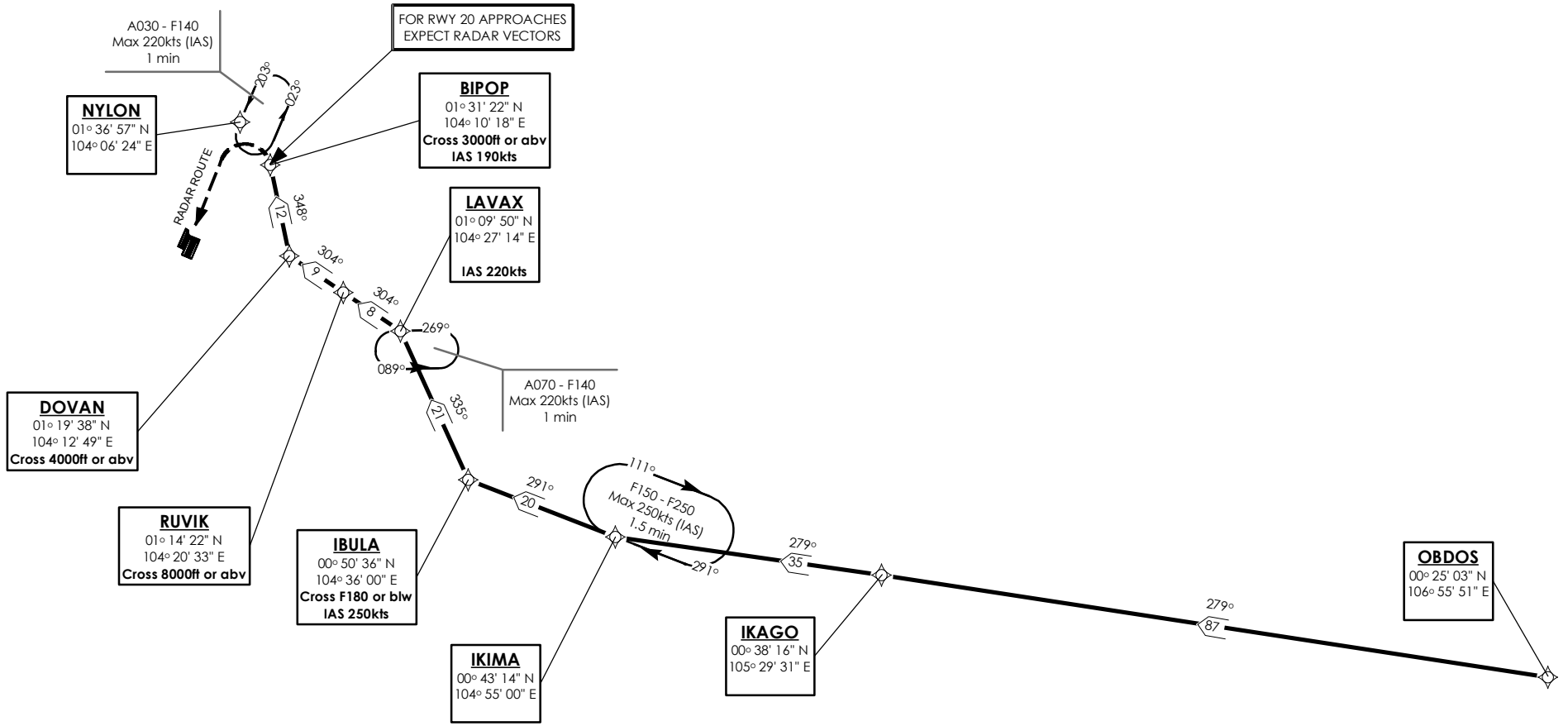
DISTANCES IN NM

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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

OBDOS 1B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From OBDOS. To IKAGO. To IKIMA, turn right. To IBULA at or below FL180, speed 250kts, turn right. To LAVAX, speed 220kts, turn left. To RUVIK at or above 8000ft. To DOVAN at or above 4000ft, turn right. To BIPOP at or above 3000ft, speed 190kts.	OBDOS - IKAGO - IKIMA [R] - IBULA [FL180-; K250; R] - LAVAX [K220; L] - RUVIK [A080+] - DOVAN [A040+; R] - BIPOP [A030+; K190]	IF TF TF TF TF TF TF TF	N N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	OBDOS	-	-	-	-	-	-	RNAV1
TF	IKAGO	-	279(279.4)	-0.4	-	-	-	RNAV1
TF	IKIMA	-	279(279.4)	-0.4	R	-	-	RNAV1
TF	IBULA	-	291(291.4)	-0.4	R	FL180-	K250	RNAV1
TF	LAVAX	-	335(335.4)	-0.4	L	-	K220	RNAV1
TF	RUVIK	-	304(304.4)	-0.4	-	A080+	-	RNAV1
TF	DOVAN	-	304(304.4)	-0.4	R	A040+	-	RNAV1
TF	BIPOP	-	348(348.4)	-0.4	-	A030+	K190	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**When cleared via OBDOS 1B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on OBDOS 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 124.05
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
LELIB THREE BRAVO ARRIVAL
LELIB 3B

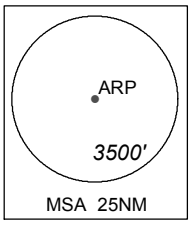
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

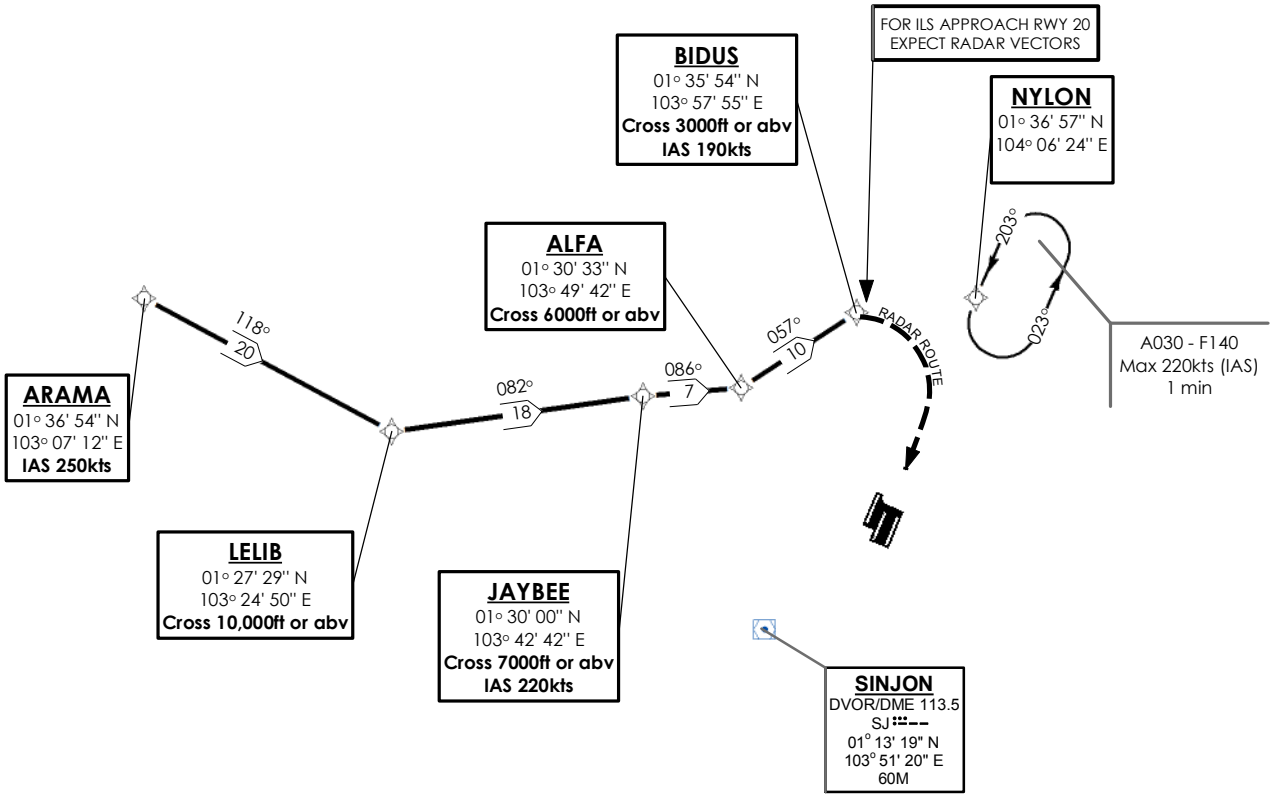
DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES





ARAMA 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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

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. To LELIB at or above 10000ft, turn left. To JAYBEE at or above 7000ft, speed 220kts, turn right. To ALFA at or above 6000ft, turn left. To BIDUS at or above 3000ft, speed 190kts.	ARAMA [K250] - LELIB [A100+; L] - JAYBEE [A070+; K220; R] - ALFA [A060+; L] - BIDUS [A030+; K190]	IF TF TF TF TF	N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	ARAMA	-	-	-	-	-	K250	RNAV1
TF	LELIB	-	118(118.4)	-0.4	L	A100+	-	RNAV1
TF	JAYBEE	-	082(082.4)	-0.4	R	A070+	K220	RNAV1
TF	ALFA	-	086(086.4)	-0.4	L	A060+	-	RNAV1
TF	BIDUS	-	057(057.4)	-0.4	-	A030+	K190	RNAV1

RADIO COMMUNICATIONS FAILURE PROCED

AIP Singapore

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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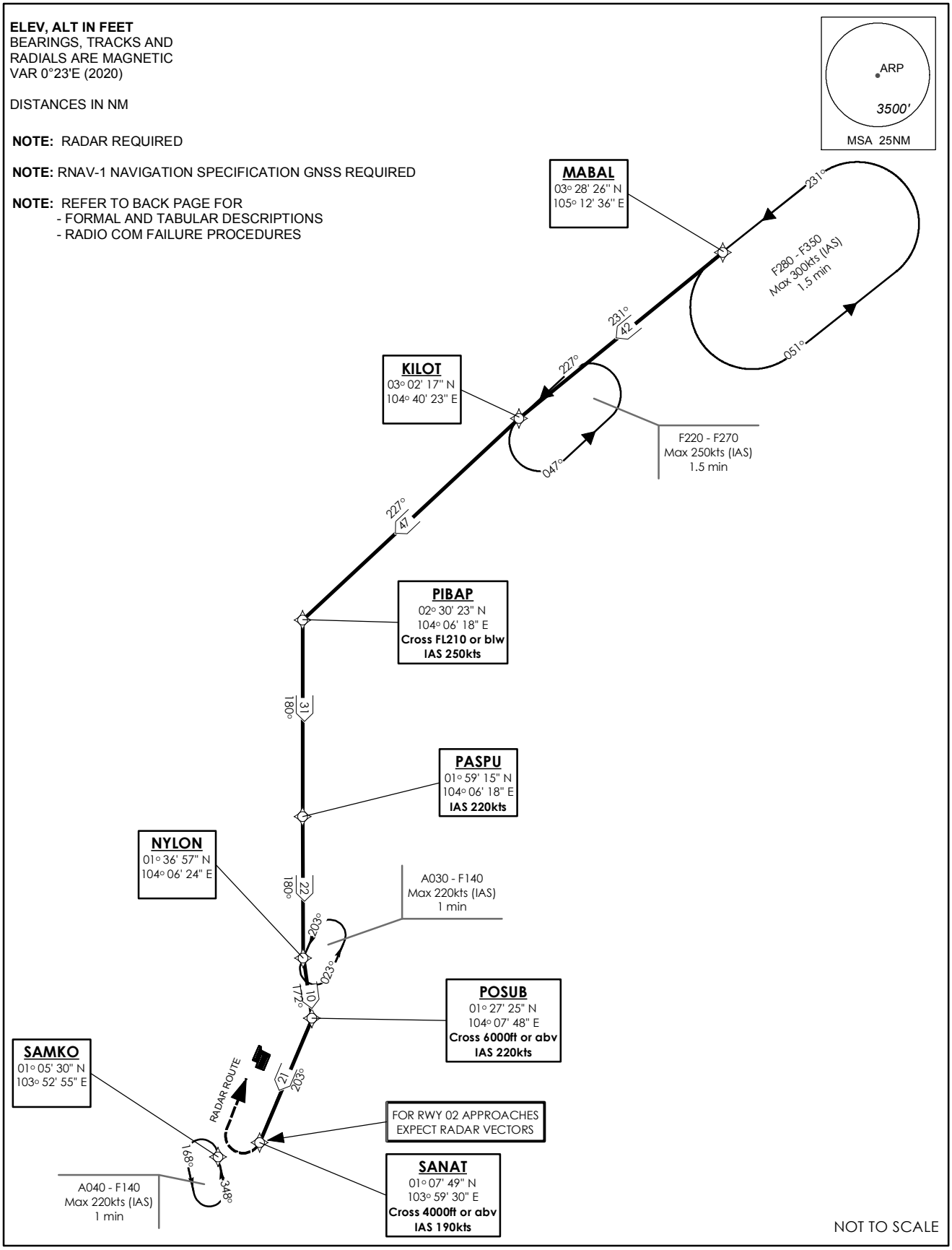
STANDARD ARRIVAL CHART RNAV (GNSS) - INSTRUMENT (STAR)

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



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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

MABAL 2A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From MABAL. To KILOT, turn left. To PIBAP at or below FL210, speed 250kts, turn left. To PASPU, speed 220kts. To NYLON, turn left. To POSUB at or above 6000ft, speed 220kts, turn right. To SANAT at or above 4000ft, speed 190kts.	MABAL - KILOT [L] - PIBAP [FL210-; K250; L] - PASPU [K220] - NYLON [L] - POSUB [A060+; K220; R] - SANAT [A040+; K190]	IF TF TF TF TF TF TF	N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	MABAL	-	-	-	-	-	-	RNAV1
TF	KILOT	-	231(231.4)	-0.4	L	-	-	RNAV1
TF	PIBAP	-	227(227.4)	-0.4	L	FL210-	K250	RNAV1
TF	PASPU	-	180(180.4)	-0.4	-	-	K220	RNAV1
TF	NYLON	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	POSUB	-	172(172.4)	-0.4	R	A060+	K220	RNAV1
TF	SANAT	-	203(203.4)	-0.4	-	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

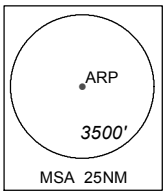
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

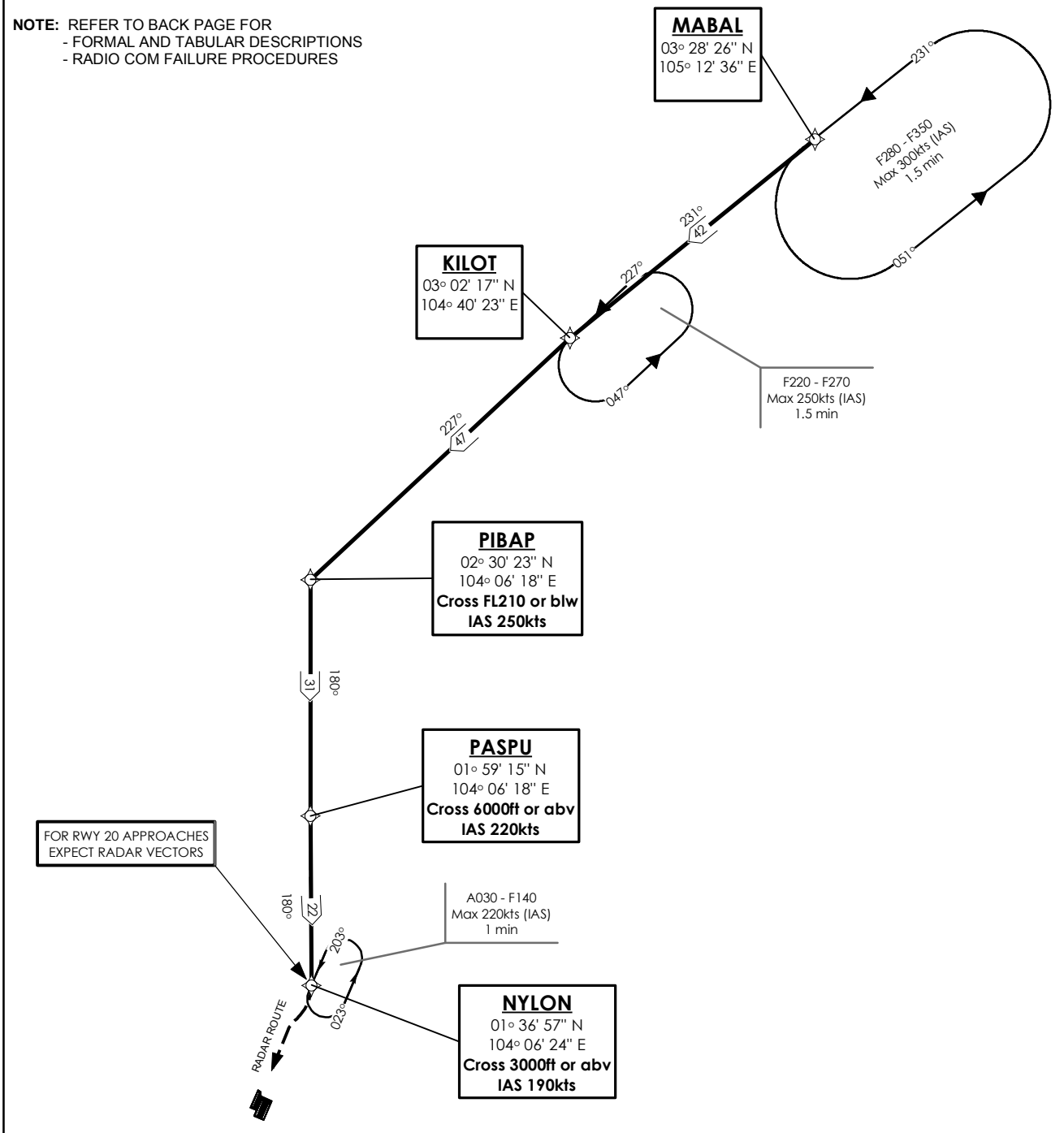
DISTANCES IN NM

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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

MABAL 2B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From MABAL. To KILOT, turn left. To PIBAP at or below FL210, speed 250kts, turn left. To PASPU, at or above 6000ft, speed 220kts. To NYLON at or above 3000ft, speed 190kts.	MABAL - KILOT [L] - PIBAP [FL210-; K250; L] - PASPU [A060+; K220] - NYLON [A030+; K190]	IF TF TF TF TF	N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	MABAL	-	-	-	-	-	-	RNAV1
TF	KILOT	-	231(231.4)	-0.4	L	-	-	RNAV1
TF	PIBAP	-	227(227.4)	-0.4	L	FL210-	K250	RNAV1
TF	PASPU	-	180(180.4)	-0.4	-	A060+	K220	RNAV1
TF	NYLON	-	180(180.4)	-0.4	-	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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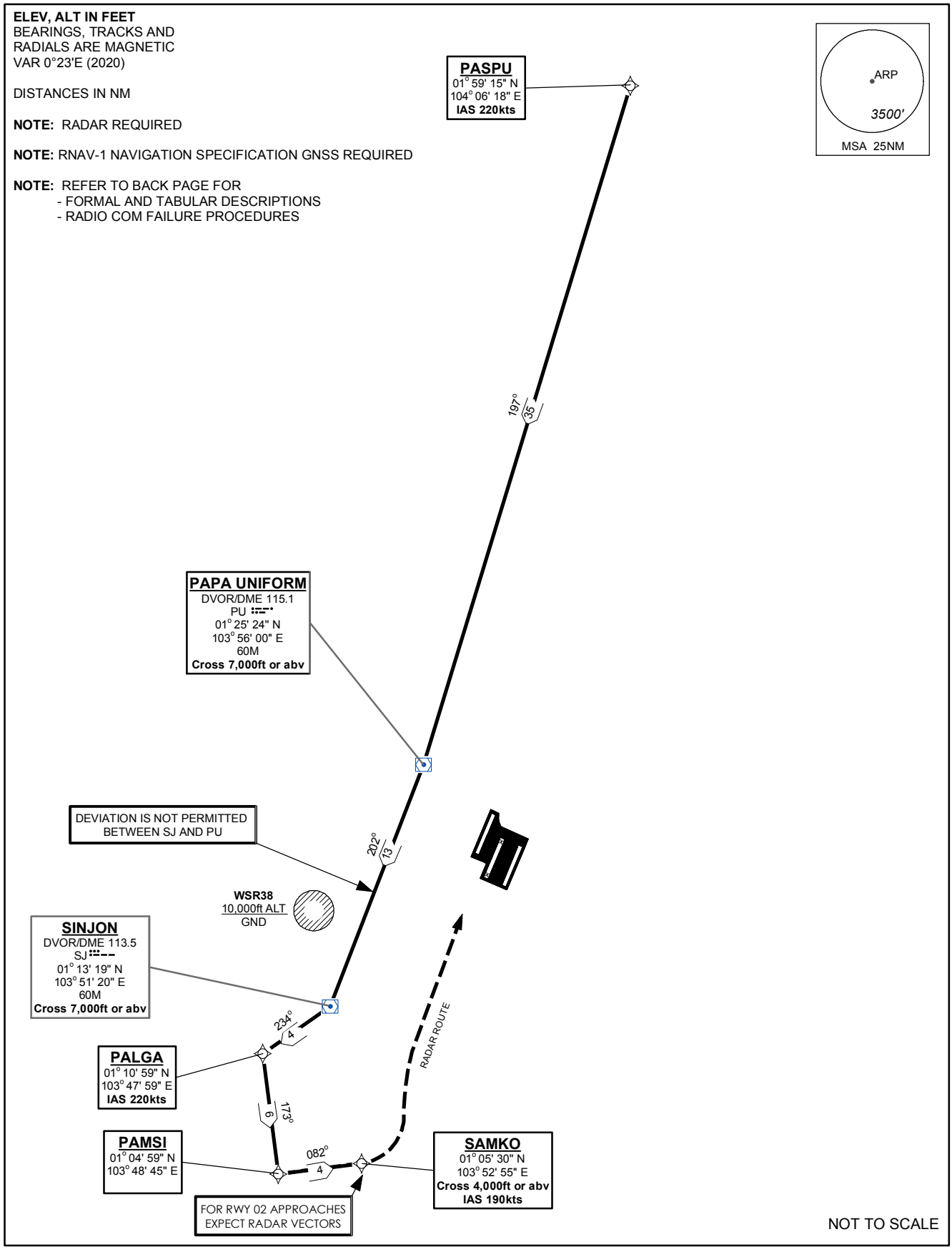
STANDARD ARRIVAL CHART RNAV (GNSS) - INSTRUMENT (STAR)

ACC 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



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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

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. To PU at or above 7000ft, turn right. To SJ at or above 7000ft, turn right. To PALGA, speed 220kts, turn left. To PAMSI, turn left. To SAMKO at or above 4000ft, speed 190kts.	PASPU [K220] - PU [A070+; R] - SJ [A070+; R] - PALGA [K220; L] - PAMSI [L] - SAMKO [A040+; K190]	IF TF TF TF TF TF	N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	PASPU	-	-	-	-	-	K220	RNAV1
TF	PU	-	197(197.4)	-0.4	R	A070+	-	RNAV1
TF	SJ	-	202(202.4)	-0.4	R	A070+	-	RNAV1
TF	PALGA	-	234(234.4)	-0.4	L	-	K220	RNAV1
TF	PAMSI	-	173(173.4)	-0.4	L	-	-	RNAV1
TF	SAMKO	-	082(082.4)	-0.4	-	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 133.25 / 134.4
APP 124.05
119.3
TWR 118.6

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

SINGAPORE/Singapore Changi
RWY 20R/C/L

LEBAR TWO BRAVO ARRIVAL
LEBAR 2B

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

ARP
3500'
MSA 25NM

BIDUS
01° 35' 54" N
103° 57' 55" E
Cross 3,000ft or abv
IAS 190kts

BETBA
01° 33' 02" N
103° 53' 31" E

FOR RWY 20 APPROACHES
EXPECT RADAR VECTORS

PAPA UNIFORM
DVOR/DME 115.1
PU
01° 25' 24" N
103° 56' 00" E
60M
Cross 7,000ft or abv
IAS 220kts

057°
5
342°
8
RADAR ROUTE

DEVIATION IS NOT PERMITTED
BETWEEN SJ AND PU

SINJON
DVOR/DME 113.5
SJ
01° 13' 19" N
103° 51' 20" E
60M
Cross 7,000ft or abv

WSR38
10,000ft ALT
GND

022°
13

BOBAG
01° 02' 30" N
103° 29' 54" E
Cross 10,000ft or abv
IAS 220kts

063°
24
BOBAG TRANSITION

REMES TRANSITION
348°
30

REMES
00° 43' 42" N
103° 57' 35" E
IAS 220kts

NOT TO SCALE

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

LEBAR 2B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description (BOBAG Transition)	Abbreviated Description	Path Terminator	Fly-Over required
From BOBAG at or above 10000ft, speed 220kts. To SJ at or above 7000ft, turn left. To PU at or above 7000ft, speed 220kts, turn left. To BETBA, turn right. To BIDUS at or above 3000ft, speed 190kts.	BOBAG [A100+; K220] - SJ [A070+; L] - PU [A070+; K220; L] - BETBA [R] - BIDUS [A030+; K190]	IF TF TF TF TF	N N N N N
Formal Description (REMES Transition)	**Abbreviated Description**	**Path Terminator**	**Fly-Over required**
From REMES, speed 220kts. To SJ at or above 7000ft, turn right. To PU at or above 7000ft, speed 220kts, turn left. To BETBA, turn right. To BIDUS at or above 3000ft, speed 190kts.	REMES [K220] - SJ [A070+; R] - PU [A070+; K220; L] - BETBA [R] - BIDUS [A030+; K190]	IF TF TF TF TF	N N N N N

Tabular Descriptions (BOBAG Transition)

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	BOBAG	-	-	-	-	A100+	K220	RNAV1
TF	SJ	-	063(063.4)	-0.4	L	A070+	-	RNAV1
TF	PU	-	022(022.4)	-0.4	L	A070+	K220	RNAV1
TF	BETBA	-	342(342.4)	-0.4	R	-	-	RNAV1
TF	BIDUS	-	057(057.4)	-0.4	-	A030+	K190	RNAV1

Tabular Descriptions (REMES Transition)

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	REMES	-	-	-	-	-	K220	RNAV1
TF	SJ	-	348(348.4)	-0.4	R	A070+	-	RNAV1
TF	PU	-	022(022.4)	-0.4	L	A070+	K220	RNAV1
TF	BETBA	-	342(342.4)	-0.4	R	-	-	RNAV1
TF	BIDUS	-	057(057.4)	-0.4	-	A030+	K190	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**When cleared via LEBAR 2B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on LEBAR 2B to BIDUS, then direct to NYLON **(b)** From NYLON commence descent and carry out appropriate landing procedure for RWY 20R as close as possible to EAT or ETA **(c)** If unable to effect a landing, refer to Singapore 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 124.05
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
REPOV ONE ALPHA ARRIVAL
REPOV 1A

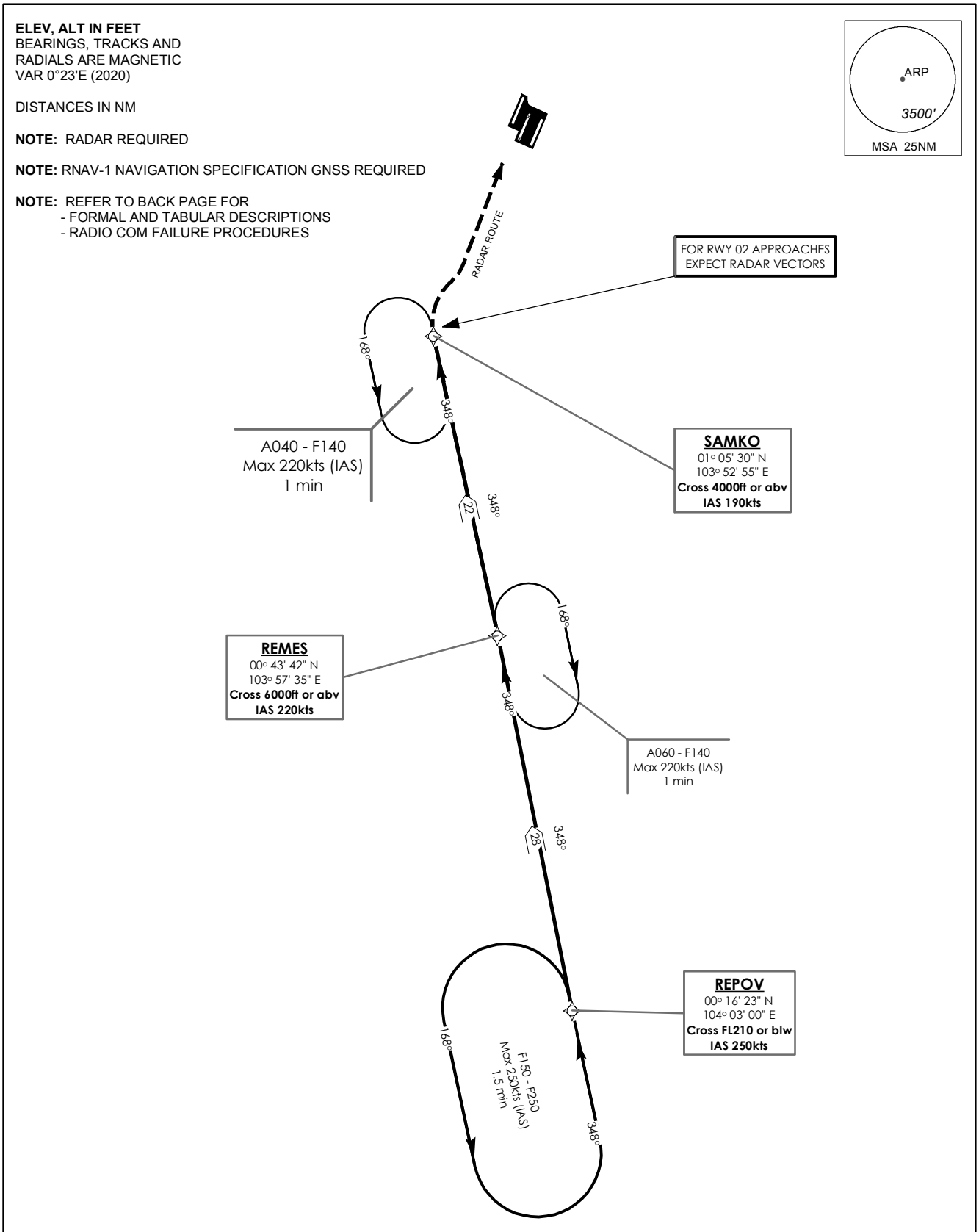
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

REPOV 1A (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. To REMES at or above 6000ft, speed 220kts. To SAMKO at or above 4000ft, speed 190kts.	REPOV [FL210-; K250] - REMES [A060+; K220] - SAMKO [A040+; K190]	IF TF TF	N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	REPOV	-	-	-	-	FL210-	K250	RNAV1
TF	REMES	-	348(348.4)	-0.4	-	A060+	K220	RNAV1
TF	SAMKO	-	348(348.4)	-0.4	-	A040+	K190	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**When cleared via REPOV 1A by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on REPOV 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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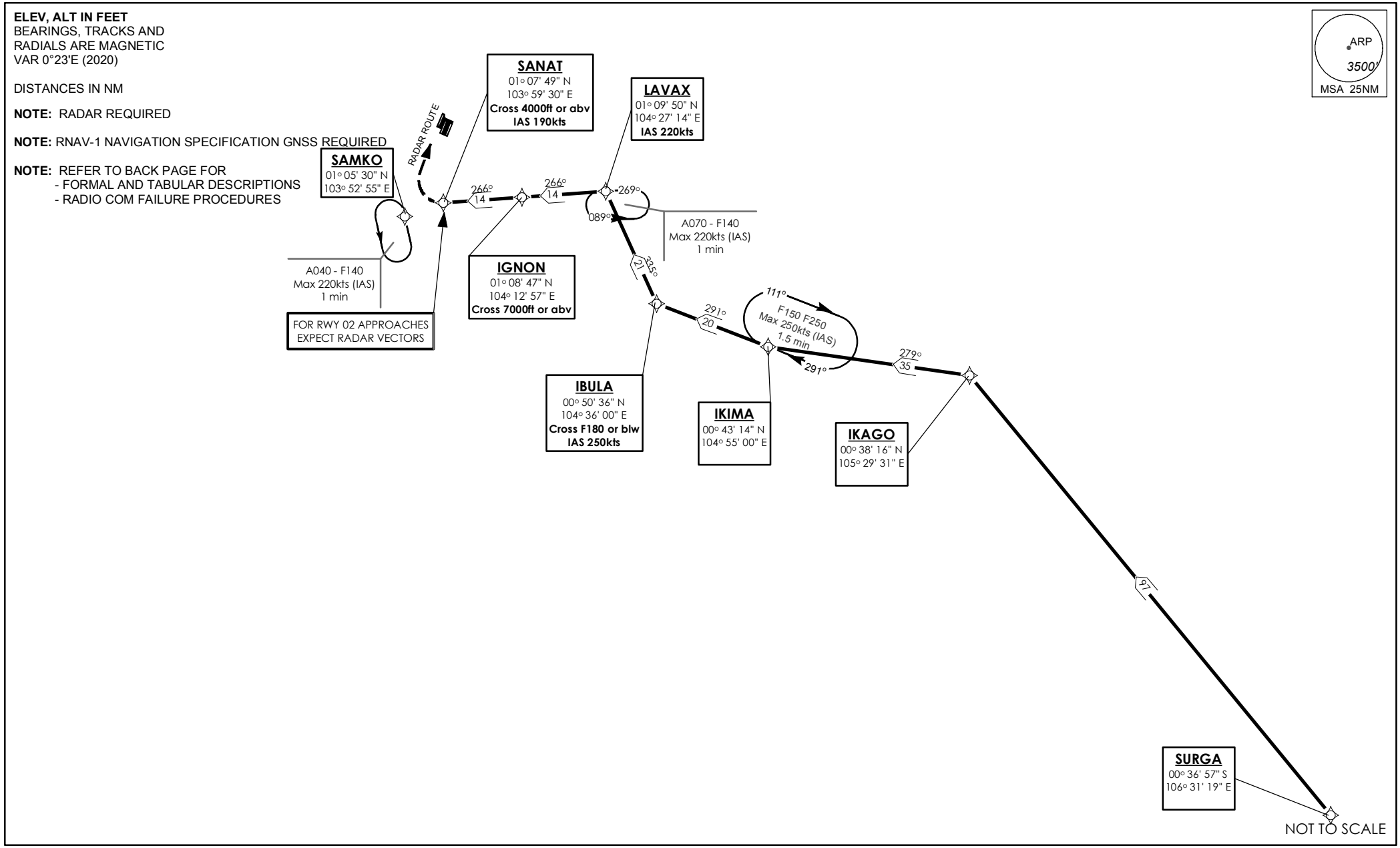
STANDARD ARRIVAL CHART
RNAV (GNSS) - INSTRUMENT (STAR)

ACC 134.4
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
SURGA ONE ALPHA ARRIVAL
SURGA 1A



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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

SURGA 1A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From SURGA. To IKAGO, turn left. To IKIMA, turn right. To IBULA at or below FL180, speed 250kts, turn right. To LAVAX, speed 220kts, turn left. To IGNON at or above 7000ft. To SANAT at or above 4000ft, speed 190kts.	SURGA - IKAGO [L] - IKIMA [R] - IBULA [FL180-; K250; R] - LAVAX [K220; L] - IGNON [A070+] - SANAT [A040+; K190]	IF TF TF TF TF TF TF	N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	SURGA	-	-	-	-	-	-	RNAV1
TF	IKAGO	-	320(320.4)	-0.4	L	-	-	RNAV1
TF	IKIMA	-	279(279.4)	-0.4	R	-	-	RNAV1
TF	IBULA	-	291(291.4)	-0.4	R	FL180-	K250	RNAV1
TF	LAVAX	-	335(335.4)	-0.4	L	-	K220	RNAV1
TF	IGNON	-	266(266.4)	-0.4	-	A070+	-	RNAV1
TF	SANAT	-	266(266.4)	-0.4	-	A040+	K190	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**When cleared via SURGA 1A by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on SURGA 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 134.4
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
REPOV ONE BRAVO ARRIVAL
REPOV 1B

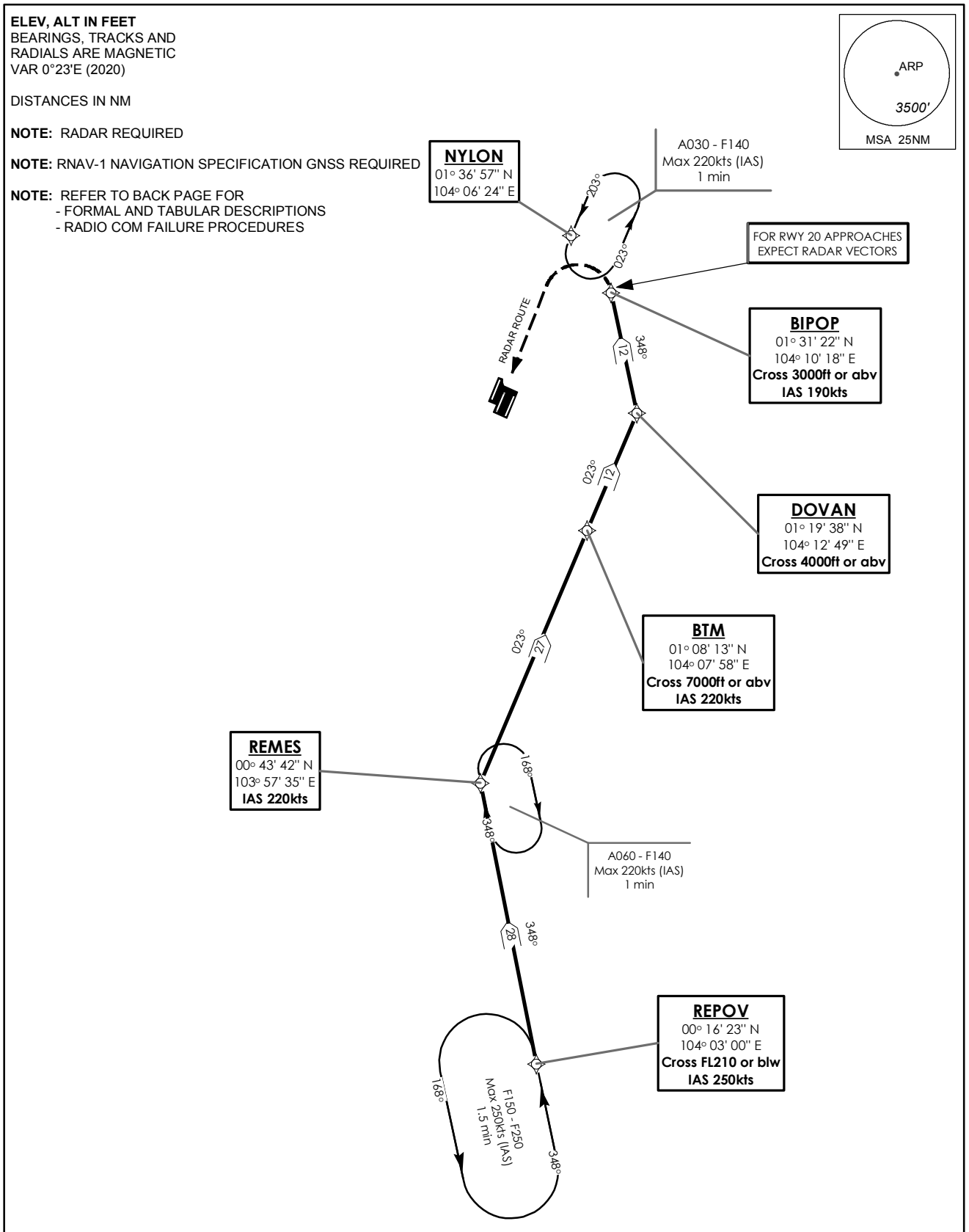
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

REPOV 1B (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. To REMES, speed 220kts, turn right. To BTM at or above 7000ft, speed 220kts. To DOVAN at or above 4000ft, turn left. To BIPOP at or above 3000ft, speed 190kts.	REPOV [FL210-; K250] - REMES [K220; R] - BTM [A070+; K220] - DOVAN [A040+; L] - BIPOP [A030+; K190]	IF TF TF TF TF	N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	REPOV	-	-	-	-	FL210-	K250	RNAV1
TF	REMES	-	348(348.4)	-0.4	R	-	K220	RNAV1
TF	BTM	-	023(023.4)	-0.4	-	A070+	K220	RNAV1
TF	DOVAN	-	023(023.4)	-0.4	L	A040+	-	RNAV1
TF	BIPOP	-	348(348.4)	-0.4	-	A030+	K190	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**When cleared via REPOV 1B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on REPOV 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 134.4
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
SURGA ONE BRAVO ARRIVAL
SURGA 1B

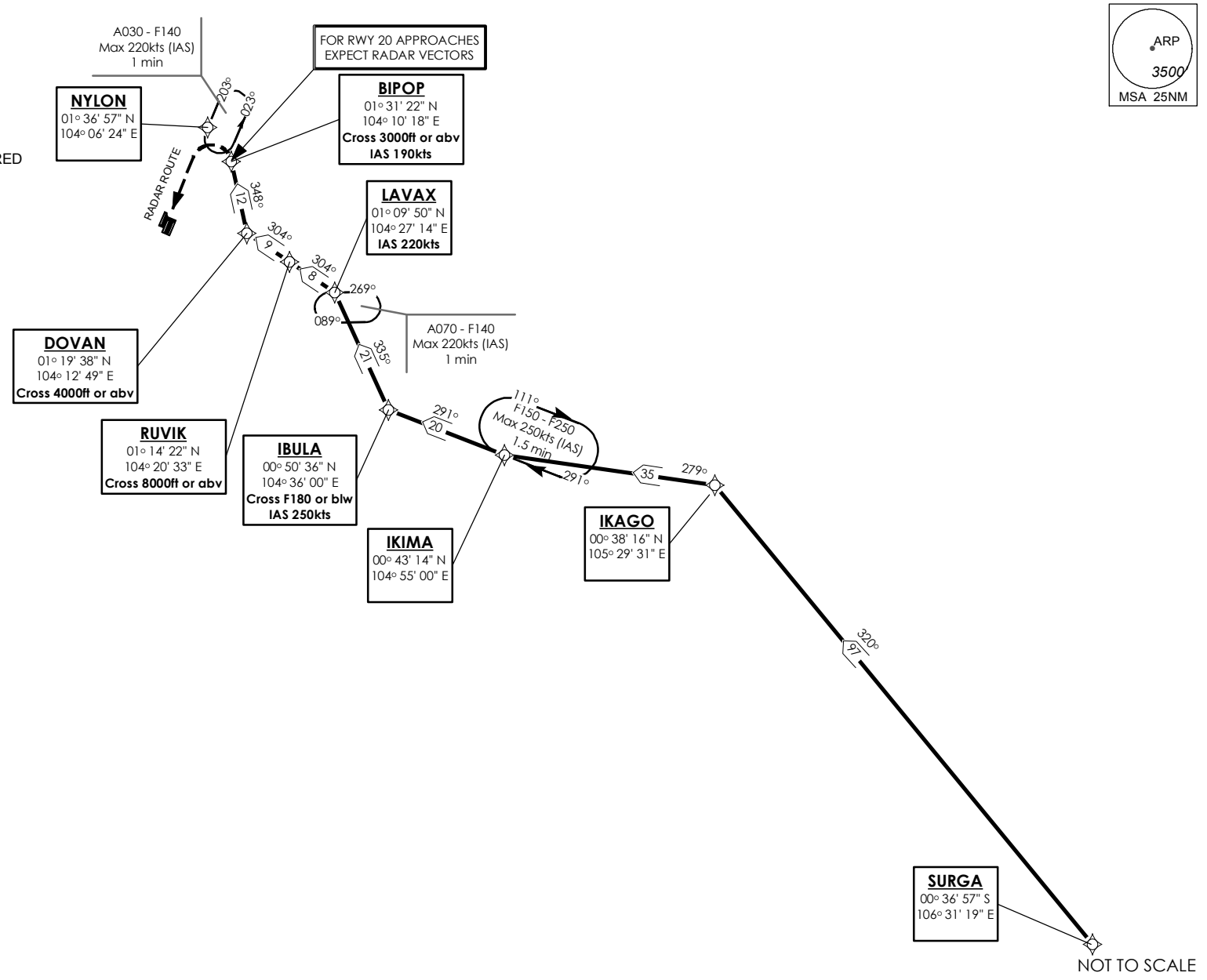
ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

SURGA 1B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From SURGA. To IKAGO, turn left. To IKIMA, turn right. To IBULA at or below FL180, speed 250kts, turn right. To LAVAX, speed 220kts, turn left. To RUVIK at or above 8000ft. To DOVAN at or above 4000ft, turn right. To BIPOP at or above 3000ft, speed 190kts.	SURGA - IKAGO [L] - IKIMA [R] - IBULA [FL180-; K250; R] - LAVAX [K220; L] - RUVIK [A080+] - DOVAN [A040+; R] - BIPOP [A030+; K190]	IF TF TF TF TF TF TF TF	N N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	SURGA	-	-	-	-	-	-	RNAV1
TF	IKAGO	-	320(320.4)	-0.4	L	-	-	RNAV1
TF	IKIMA	-	279(279.4)	-0.4	R	-	-	RNAV1
TF	IBULA	-	291(291.4)	-0.4	R	FL180-	K250	RNAV1
TF	LAVAX	-	335(335.4)	-0.4	L	-	K220	RNAV1
TF	RUVIK	-	304(304.4)	-0.4	-	A080+	-	RNAV1
TF	DOVAN	-	304(304.4)	-0.4	R	A040+	-	RNAV1
TF	BIPOP	-	348(348.4)	-0.4	-	A030+	K190	RNAV1

RADIO COMMUNICATIONS FAILURE PROCEDURE

1	**SET TRANSPONDER TO MODE A/C CODE 7600**
2	**When cleared via SURGA 1B by Singapore ATC** **(a)** Maintain last assigned flight level or altitude and proceed on SURGA 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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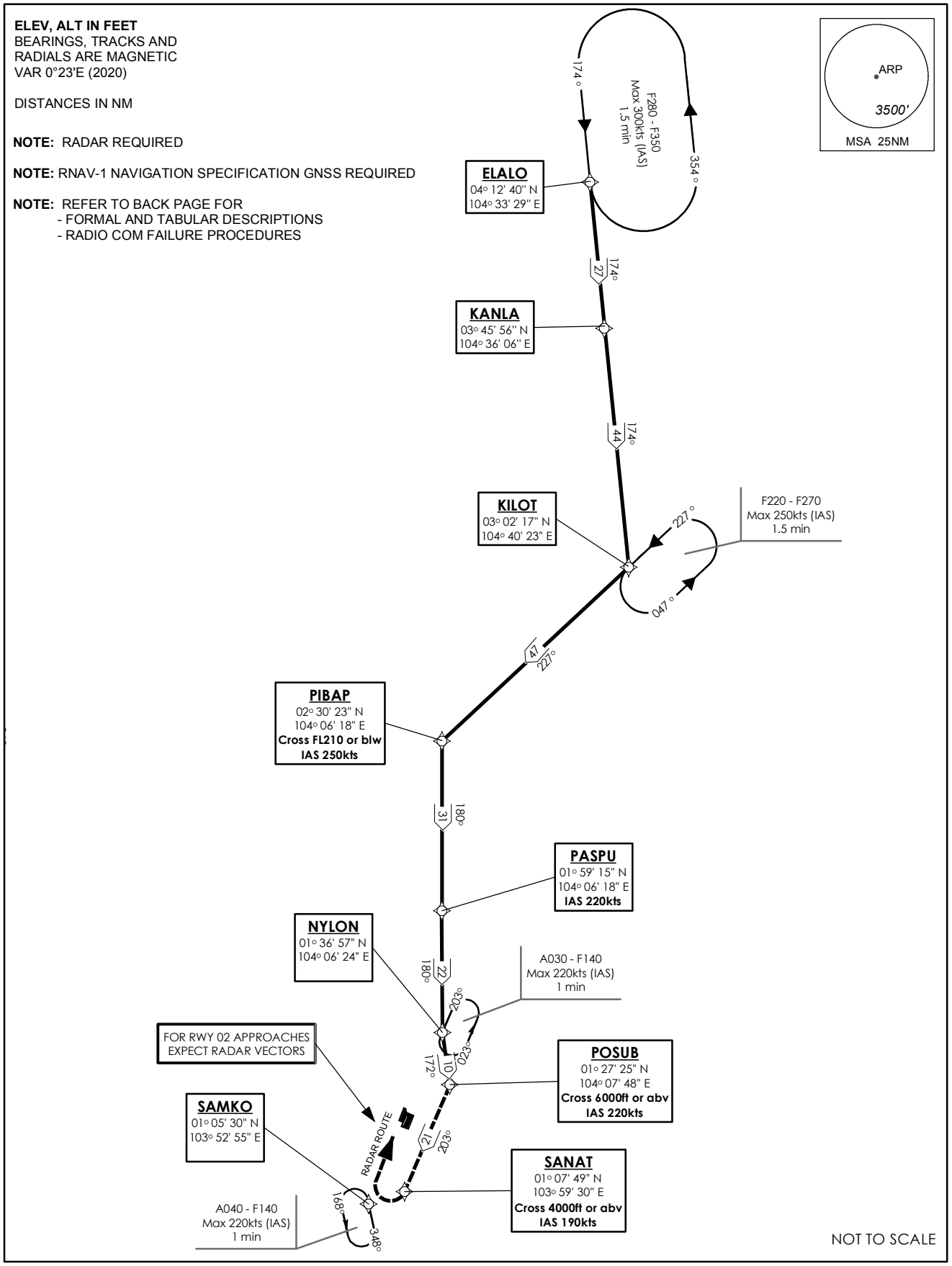
STANDARD ARRIVAL CHART RNAV (GNSS) - INSTRUMENT (STAR)

ACC 133.8
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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

ELALO 1A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From ELALO. To KANLA. To KILOT, turn right. To PIBAP at or below FL210, speed 250kts, turn left. To PASPU, speed 220kts. To NYLON, turn left. To POSUB at or above 6000ft, speed 220kts, turn right. To SANAT at or above 4000ft, speed 190kts.	ELALO - KANLA - KILOT [R] - PIBAP [FL210-; K250; L] - PASPU [K220] - NYLON [L] - POSUB [A060+; K220; R] - SANAT [A040+; K190]	IF TF TF TF TF TF TF TF	N N N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	ELALO	-	-	-	-	-	-	RNAV1
TF	KANLA	-	174(174.4)	-0.4	-	-	-	RNAV1
TF	KILOT	-	174(174.4)	-0.4	R	-	-	RNAV1
TF	PIBAP	-	227(227.4)	-0.4	L	FL210-	K250	RNAV1
TF	PASPU	-	180(180.4)	-0.4	-	-	K220	RNAV1
TF	NYLON	-	180(180.4)	-0.4	L	-	-	RNAV1
TF	POSUB	-	172(172.4)	-0.4	R	A060+	K220	RNAV1
TF	SANAT	-	203(203.4)	-0.4	-	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

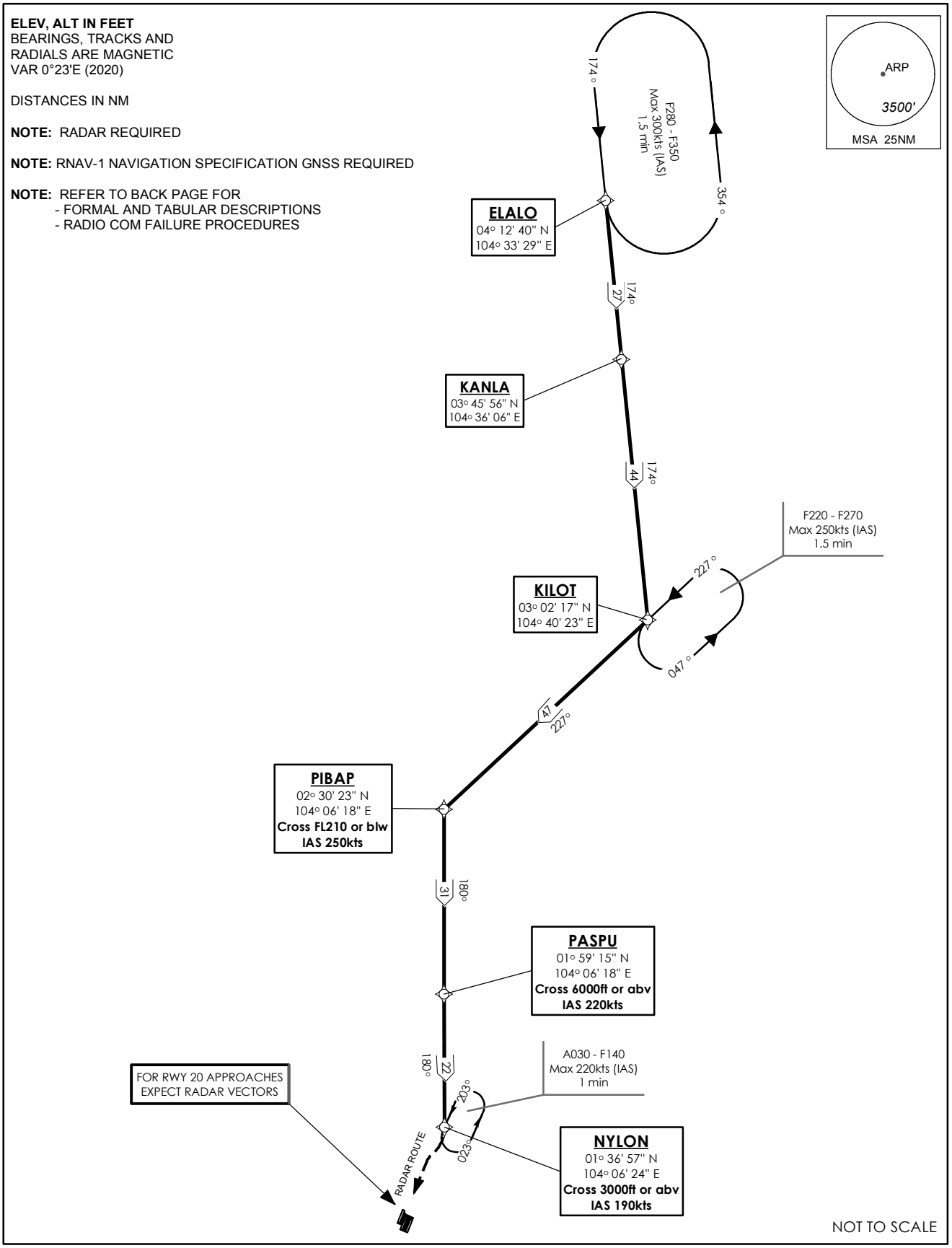
ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

ELALO 1B (STAR) RNAV GNSS RWY 20R/20C/20L - DESCRIPTIONS

Formal & Abbreviated Descriptions

Formal Description	Abbreviated Description	Path Terminator	Fly-Over required
From ELALO. To KANLA. To KILOT, turn right. To PIBAP at or below FL210, speed 250kts turn left. To PASPU, at or above 6000ft, speed 220kts. To NYLON at or above 3000ft, speed 190kts.	ELALO - KANLA - KILOT [R] - PIBAP [FL210-; K250; L] - PASPU [A060+; K220] - NYLON [A030+; K190]	IF TF TF TF TF TF	N N N N N N

Tabular Descriptions

Path Term	Waypoint Name	Fly-Over	Course °M(°T)	Magnetic Variation	Turn Direction	Altitude	Speed Limit	Navigation Spec
IF	ELALO	-	-	-	-	-	-	RNAV1
TF	KANLA	-	174(174.4)	-0.4	-	-	-	RNAV1
TF	KILOT		174(174.4)	-0.4	R	-	-	RNAV1
TF	PIBAP	-	227(227.4)	-0.4	L	FL210-	K250	RNAV1
TF	PASPU	-	180(180.4)	-0.4	-	A060+	K220	RNAV1
TF	NYLON	-	180(180.4)	-0.4	-	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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INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO THR RWY 02L - ELEV 22ft

MSA 25 NM from TEKONG DVOR
3400' 090° 1900' 2100' 180° 3600'

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

103° 50'E — 104° 00' — 104° 10'

01° 30' — 01° 20' — 01° 10' N

BEARINGS ARE MAGNETIC
ALTITUDES, ELEVATIONS AND HEIGHTS ARE IN FEET

VAR 0°23'E (2020)

PAPA UNIFORM DVOR/DME 115.1
PU
01° 25' 24"N
103° 56' 00" E
60m

PU R-356

335°

TEKONG DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

MISSED APCH
MNM ALT 4 000
AKOMA
PU R-356/ 20 DME
01°45' 22"N
103°54' 43"E
176°
356°
PU R-356

RADAR REQUIRED

PIC 2000ft SFC

KUALA LUMPUR FIR
SINGAPORE FIR

Pengerang Integrated Complex (PIC). Aircraft may overfly area at 2000ft and above.

Sembawang
Seletar
Paya Lebar

WSR6 200ft ALT GND
WSD35 900ft ALT GND
WSP3 750ft ALT GND
WSR16 200ft ALT GND
WSR38 10 000ft ALT GND
WSR9 200ft ALT GND
WSP24 800ft ALT GND/WATER
WSD34 500ft ALT GND

LLZ 110.9 ICW

POSSIBLE VESSEL

CAUTION :
Rwy 02C/20C closed due development works.

SIMULTANEOUS APPROACHES AUTHORIZED WITH RWY 02R OR 02C

ALL ARRIVALS INTO WSSS WILL BE ISSUED INSTRUCTIONS BY ATC TO MAINTAIN 180KT TILL 8NM FROM TOUCHDOWN AND THEREAFTER 150KT TILL 4NM FROM TOUCHDOWN

(MAPT) ABVON 0.7 DME ICW
01°20' 28.18"N
103°58' 27.03"E

(FAF) ADNIK 4.6 DME ICW
01° 16' 51.19"N
103° 56' 55.43"E

AKIPO 7.8 DME ICW
01°13' 56.27"N
103°55' 41.59"E
2 500

SINJON DVOR/DME 113.5
SJ
01°13' 19.28"N
103° 51' 20.08" E
60m

023°
10 NM

ANUMA 11.1 DME ICW
01°10' 53.11"N
103°54' 24.35"E
3 500

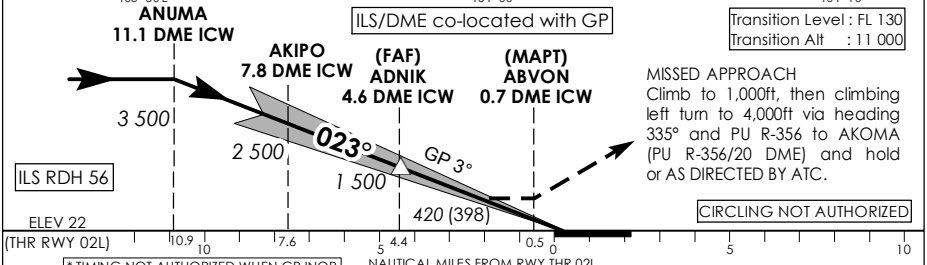
APIPA 16 DME ICW
01°06' 18.43"N
103°52' 28.35"E
3 500

SJ R-168
023°
168°
348°

SAMKO
16.6 DME ICW
SJ R-168/8 DME
MNM ALT
4 000

NOTE:
MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

SCALE 1 : 400,000
0 1 2 3 4 5 6 7 8 km
1 0 1 2 3 4 5 NM



ILS/DME co-located with GP

Transition Level : FL 130
Transition Alt : 11 000

MISSED APPROACH
Climb to 1,000ft, then climbing left turn to 4,000ft via heading 335° and PU R-356/20 DME) and hold or AS DIRECTED BY ATC.

CIRCLING NOT AUTHORIZED

* 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 : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

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INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO THR RWY 02C - ELEV 14ft

MSA 25 NM from TEKONG DVOR
3400' 080° 1900' 180° 2100' 360° 090°

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

103° 50'E 104° 00' 104° 10'

BEARINGS ARE MAGNETIC
ALTITUDES, ELEVATIONS AND HEIGHTS ARE IN FEET
VAR 0°23'E (2020)

10 NM

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

VTK R-023

MISSED APCH
NYLON
VTK R-023/ 13 DME
01°36' 57"N
104°06' 24"E
203°
023°
MNM ALT 3 000

WSD34 500ft ALT GND

POSSIBLE VESSEL

LLZ 108.3 ICE

PIC 2000ft SFC

CAUTION :
Rwy 02C/20C closed due development works

KUALA LUMPUR FIR
SINGAPORE FIR

Pengerang Integrated Complex (PIC). Aircraft may overfly area at 2000ft and above.

NOTE:
MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

Sembawang
Seletar
Paya Lebar

WSR6 200ft ALT GND
WSD35 900ft ALT GND
WSP3 750ft ALT GND
WSR16 200ft ALT GND
WSR38 10 000ft ALT GND
WSR9 200ft ALT GND
WSP24 800ft ALT GND/WATER

(MAPT)
LAGUS
0.7 DME ICE
01°19' 15.29"N
103°58' 54.00"E

POSSIBLE VESSEL

(Stepdown Fix)
LUXOL
2.0 DME ICE
01°18' 02.73"N
103°58' 23.38"E

(FAF)
LASIN
4.6 DME ICE
01° 15' 38.25"N
103° 57' 22.39"E

LELON
7.8 DME ICE
01°12' 43.51"N
103°56' 08.62"E
2 500

ALL ARRIVALS INTO WSSS WILL BE ISSUED INSTRUCTIONS BY ATC TO MAINTAIN 180KT TILL 8NM FROM TOUCHDOWN AND THEREAFTER 150KT TILL 4NM FROM TOUCHDOWN

SINJON
DVOR/DME 113.5
SJ
01° 13' 19.28"N
103° 51' 20.08" E
60m

023°

SAMKO
15.6 DME ICE
SJ R-168/8 DME
MNM ALT 4 000

LIDVA
16 DME ICE
01°05' 05.67"N
103°52' 55.38"E
4 500

168°
348°

SIMULTANEOUS APPROACHES AUTHORIZED WITH RWY 02R OR 02L

LEPNA
14.2 DME ICE
01°06' 48.29"N
103°53' 38.82"E
4 500

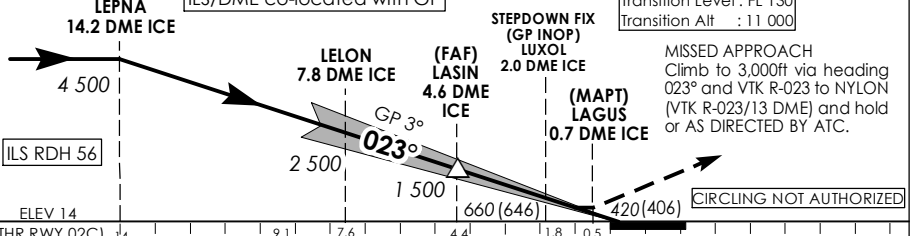
RADAR REQUIRED

SCALE 1 : 400,000
1 0 1 2 3 4 5 6 7 8 9 km
1 0 1 2 3 4 5 NM

01° 20'
01° 10' N

ILS/DME co-located with GP

Transition Level : FL 130
Transition Alt : 11 000



MISSED APPROACH
Climb to 3,000ft via heading 023° and VTK R-023 to NYLON (VTK R-023/13 DME) and hold or AS DIRECTED BY ATC.

* TIMING NOT AUTHORIZED WHEN GP INOP

OCA (OCH)						
Category of Aircraft		A	B	C	D	D_L
Straight-in	CAT I ILS	170 (156)	180 (166)	196 (182)	209 (195)	212 (198)
	GP INOP (with stepdown fix)	420 (406)				
	GP INOP (without stepdown fix)	660 (646)				

Distance	4 DME			3 DME	
Altitude (Height)	1290 (1276)			970 (956)	
Speed	knots	70	120	150	185
FAF - MAPT 3.9nm	min : s*	3 : 21	1 : 57	1 : 34	1 : 16
Rate of descent/GS	ft/min	370	635	795	980

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

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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
3400' 080° 1900' 2100' 180° 3.6°

D-ATIS	AP ID WSSS
APP	128.025 124.05
TWR	119.3 118.6 118.25

SINGAPORE/ SINGAPORE CHANGI
ICH ILS/DME RWY 20R

103° 50'E 104° 00' 104° 10'

ALL ARRIVALS INTO WSSS WILL BE ISSUED INSTRUCTIONS BY ATC TO MAINTAIN 180KT TILL 8NM FROM TOUCHDOWN AND THEREAFTER 150KT TILL 4NM FROM TOUCHDOWN

RWY 20R ILS DME NOT AVAILABLE BEYOND 15 DEG WEST OF RWY 20R CENTRELINE BELOW 2500FT

SIMULTANEOUS APPROACHES AUTHORIZED WITH RWY 20L OR 20C

BEARINGS ARE MAGNETIC
ALTITUDES, ELEVATIONS AND HEIGHTS ARE IN FEET

VAR 0°23'E (2020)

10 NM

IGULA
11.1 DME ICH
01°32' 32.27"N
104°03' 32.66"E
3 500

IDVAS
7.8 DME ICH
01°29' 34.66"N
104°02' 17.75"E
2 500

(FAF)
IDURO
4.6 DME ICH
01° 26' 39.84"N
104° 01' 03.94"E

(MAPT)
IDUNA
0.8 DME ICH
01°23' 05.80"N
103°59' 33.58"E

203°

IPNAK
16 DME ICH
01°37' 11.93"N
104°05' 30.83"E
3 500

203° 023° 203°

NYLON
(16.2 DME ICH/ VTK R-023/ 13 DME)
MNM ALT 3 000

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

RADAR REQUIRED

Pengerang Integrated Complex (PIC). Aircraft may overfly area at 2000ft and above.

PIC
2000ft
SFC

KUALA LUMPUR FIR
SINGAPORE FIR

Sembawang
Seletar
Paya Lebar

WSR6 200ft ALT GND
WSD35 900ft ALT GND
WSP3 750ft ALT GND
WSR16 200ft ALT GND
WSR38 10 000ft ALT GND
WSR9 200ft ALT GND
WSP24 800ft ALT GND/WATER
WSD34 500ft ALT GND

POSSIBLE VESSEL

CAUTION :
Rwy 02C/20C closed due development works.

LLZ 108.9
ICH

NOTE:
MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

MISSED APCH
SJ R-168
SJ R-146
MNM ALT 5 000
SAMKO
SJ R-168/8 DME
01°05': 30"N
103°52' 55"E
348° 168°

SINJON
DVOR/DME 113.5
SJ
01°13' 19.28"N
103° 51' 20.08" E
60m

SCALE 1 : 400,000
1 0 1 2 3 4 5 6 7 8 9 km
1 0 1 2 3 4 5 NM

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

(MAPT) IDUNA 0.8 DME ICH
(FAF) IDURO 4.6 DME ICH
IDVAS 7.8 DME ICH
IGULA 11.1 DME ICH 3 500

203°
GP 3°
2 500
1 500
420(407)

ILS/DME co-located with GP

ELEV 13
(DTHR RWY 20R)

10 5 0 DISPLACED THR 0.6 4.4 5 7.6 9.1 10 10.9
NAUTICAL MILES FROM RWY DTHR 20R

* 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 : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

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INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 20C - ELEV 15ft

MSA 25 NM
from TEKONG DVOR

D-ATIS	AP ID WSSS
APP	128.025 124.05
TWR	119.3 118.6 118.25

SINGAPORE/ SINGAPORE CHANGI
ICC ILS/DME RWY 20C

ALL ARRIVALS INTO WSSS WILL BE ISSUED INSTRUCTIONS BY ATC TO MAINTAIN 180KT TILL 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' 39.87"N
104°05' 24.21"E
4 500

EGORA
16 DME ICC
01°36' 21.37"N
104°06' 07.23"E
4 500

NYLON
16.7 DME ICC
VTK R-023/
13 DME
MNM ALT
3 000

ELBEB
7.8 DME ICC
01°28' 44.66"N
104°02' 54.38"E

(FAF)
ELMIN
4.6 DME ICC
01° 25' 49.68"N
104° 01' 40.51"E
2 500

203°

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

KUALA LUMPUR FIR
SINGAPORE FIR

Sembawang
Selatar
Paya Lebar

WSR6 200ft ALT GND
WSD35 900ft ALT GND
WSP3 750ft ALT GND
WSR16 200ft ALT GND
WSR38 10 000ft ALT GND
WSR9 200ft ALT GND
WSP24 800ft ALT GND/WATER
WSD34 500ft ALT GND

POSSIBLE VESSEL

(MAPT)
ESBIT
0.7 DME ICC
01°22' 12.07"N
104°00' 08.64"E

CAUTION :
Rwy 02C/20C closed due development works.

LLZ 109.7
ICC

130°

ESLUX
6.7 DME VTK
01° 18' 44.31"N
103° 58' 40.44"E

NOTE:
MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

EXOMO
VTK R-158/
22 DME
01° 04' 25.49"N
104° 09' 33.17"E

VTK R-158°
158°
338°

MISSED APCH
MNM ALT
4 000

SINJON
DVOR/DME 113.5
SJ
01° 13' 19.28"N
103° 51' 20.08" E
60m

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

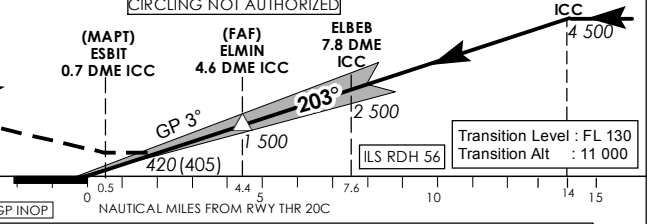
This procedure requires a missed approach climb gradient of 2.8% (171 ft/NM) until passing 2,000ft.
For aircraft which can only achieve a 2.5% (152 ft/NM) climb gradient, the CAT I OCA (OCH) is 315ft (300ft).

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

ELEV 15
(THR RWY 20C)

CIRCLING NOT AUTHORIZED



* TIMING NOT AUTHORIZED WHEN GP INOP

Category of Aircraft		OCA (OCH) 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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

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INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO AD ELEV

MSA 25 NM from TEKONG DVOR
3400' 1900' 2100' 090° 180° 360°

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'

ALL ARRIVALS INTO WSSS WILL BE ISSUED INSTRUCTIONS BY ATC TO MAINTAIN 180KT TILL 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)

01° 30'

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' 19.46"N
104° 02' 18.41"E

Pengerang Integrated Complex (PIC). Aircraft may overfly area at 2000ft and above.

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

Sembawang
Seletar
Paya Lebar
KUALA LUMPUR FIR
SINGAPORE FIR

WSR6 200ft ALT GND
WSD35 900ft ALT GND
WSP3 750ft ALT GND
WSR16 200ft ALT GND
WSR38 10 000ft ALT GND
WSR9 200ft ALT GND
WSP24 800ft ALT GND/WATER
WSD34 500ft ALT GND

POSSIBLE VESSEL

MAPT
3 DME VTK

PIC
2000ft
SFC

01° 20' N

ESLUX
6.7 DME VTK
01° 18' 44.31"N
103° 58' 40.44"E
POSSIBLE VESSEL

130°

CAUTION :
Rwy 02C/20C closed due development works.

NOTE:
MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

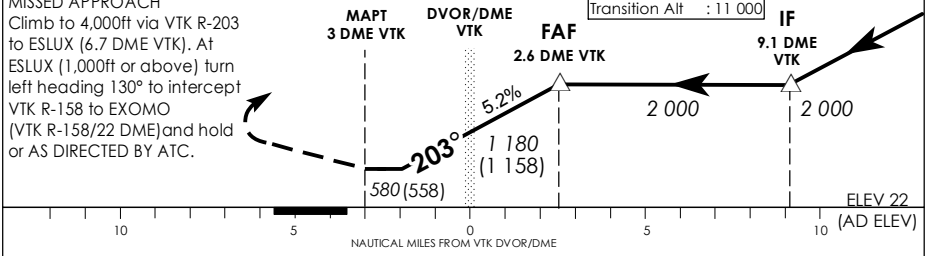
EXOMO
VTK R-158/ 22 DME
01° 04' 25.49"N
104° 09' 33.17"E
VTK R-158°
158°
338°
MISSED APCH
MNM ALT 4 000

SINJON
DVOR/DME 113.5
SJ
01° 13' 19.28"N
103° 51' 20.08" E
60m

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 : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

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INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO THR RWY 02L - ELEV 22ft

MSA 3500 — 25 NM — ARP

D-ATIS	AP ID WSSS
	128.025
APP	124.05
	119.3
TWR	118.6
	118.25

SINGAPORE/ SINGAPORE CHANGI
RNP RWY 02L

103° 50'E — 104° 00' — 104° 10'

01° 30' — 01° 20' — 01° 10' N

BEARINGS ARE MAGNETIC
ALTITUDES, ELEVATIONS AND HEIGHTS ARE IN FEET

VAR 0°23'E (2020)

TO AKOMA

342° 20.2 NM

ENSUN
01° 26' 02.56"N
104° 00' 48.10"E

023° 5.5 NM

MISSED APCH — MNM ALT 4 000
2081 — 176° — 356°
AKOMA
01°45' 22.00"N
103°54' 43.00"E

Sembawang — Seletar — Paya Lebar

WSR6 200ft ALT GND
WSD35 900ft ALT GND
WSP3 750ft ALT GND
WSR16 200ft ALT GND
WSR38 10 000ft ALT GND
WSR9 200ft ALT GND
WSP24 800ft ALT GND/WATER
WSD34 500ft ALT GND

CAUTION :
Rwy 02C/20C closed due development works.

PIC 2000ft / SFC

KUALA LUMPUR FIR
SINGAPORE FIR

Pengerang Integrated Complex (PIC). Aircraft may overfly area at 2000ft and above.

RWY02L
01° 20' 56.26"N
103° 58' 38.83"E

NOTE:
MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

(FAF) EMTAP
01° 16' 55.88"N
103° 56' 57.47"E

023° 4.3 NM

ALL ARRIVALS INTO WSSS WILL BE ISSUED INSTRUCTIONS BY ATC TO MAINTAIN 180KT TILL 8NM FROM TOUCHDOWN AND THEREAFTER 150KT TILL 4NM FROM TOUCHDOWN

MNM ALT 4 000

(IAF) SAMKO
Max IAS 220 kts
01° 05' 29.51"N
103° 52' 54.86"E

016° 6.1 NM — 348° — 168°

(IF) ERVOT
01° 11' 20.09"N
103° 54' 35.85"E

023° 6.1 NM — 10 NM

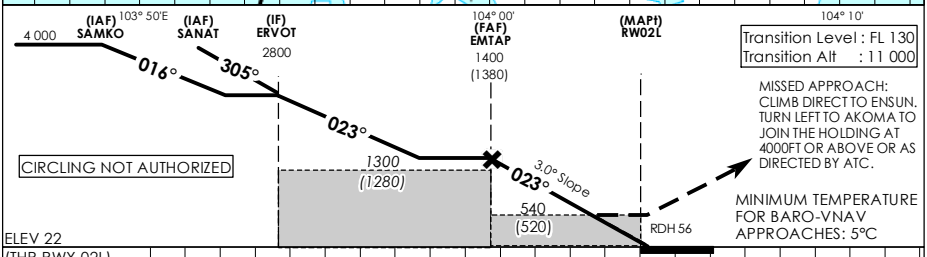
(IAF) SANAT
Max IAS 220 kts
01° 07' 48.79"N
103° 59' 29.76"E

305° 6.0 NM

016° 6.1 NM

FROM SAMKO

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 DIRECT TO ENSUN. TURN LEFT TO AKOMA TO JOIN THE HOLDING AT 4000FT OR ABOVE OR AS DIRECTED BY ATC.

MINIMUM TEMPERATURE FOR BARO-VNAV APPROACHES: 5°C

		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 : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

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’ 29.51” N	103° 52’ 54.86” E
SANAT (IAF)	01° 07’ 48.79” N	103° 59’ 29.76” E
ERVOT (IF)	01° 11’ 20.09” N	103° 54’ 35.85” E
EMTAP (FAF)	01° 16’ 55.88” N	103° 56’ 57.47” E
RW02L	01° 20’ 56.26” N	103° 58’ 38.83” E
ENSUN	01° 26’ 02.56” N	104° 00’ 48.10” E
AKOMA	01° 45’ 22.00” N	103° 54’ 43.00” E

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INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO THR RWY 02C - ELEV 14ft

MSA 3500 — ARP — 25 NM

D-ATIS	AP ID WSSS
	128.025
APP	124.05
	119.3
TWR	118.6
	118.25

SINGAPORE/ SINGAPORE CHANGI
RNP RWY 02C

ALL ARRIVALS INTO WSSS WILL BE ISSUED INSTRUCTIONS BY ATC TO MAINTAIN 180KT TILL 8NM FROM TOUCHDOWN AND THEREAFTER 150KT TILL 4NM FROM TOUCHDOWN

TO NYLON

MISSED APCH — MNM ALT 3000
NYLON
01°36' 57.00"N
104°06' 24.00"E

Sembawang
Seletar
Paya Lebar

WSR6 200ft ALT GND
WSD35 900ft ALT GND
WSP3 750ft ALT GND
WSR16 200ft ALT GND
WSR38 10 000ft ALT GND
WSR9 200ft ALT GND
WSP24 800ft ALT GND/WATER
WSD34 500ft ALT GND

PIC 2000ft SFC

KUALA LUMPUR FIR
SINGAPORE FIR

Pengerang Integrated Complex (PIC). Aircraft may overfly area at 2000ft and above.

CAUTION : Rwy 02C/20C closed due development works.

(SDF) KAKSA
01° 17' 02.58"N
103° 57' 57.92"E

RWY02C
01° 19' 43.51"N
103° 59' 05.86"E

(FAF) KASPO
01° 15' 07.15"N
103° 57' 09.20"E

(IF) KIMER
01° 11' 05.74"N
103° 55' 27.30"E

SAMKO
Max IAS 220 kts
01° 05' 29.51"N
103° 52' 54.86"E

MNM ALT 4 000

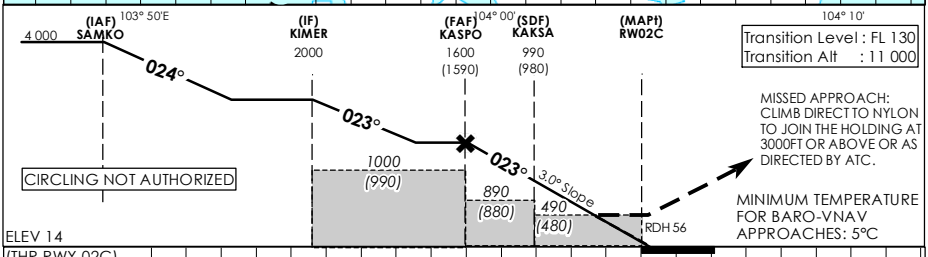
023° 18.6 NM
023° 2.9 NM
023° 2.1 NM
023° 4.4 NM
024° 6.1 NM FROM SAMKO
024° 3.48
168°
10 NM

NOTE: MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

VAR 0°23'E (2020)

BEARINGS ARE MAGNETIC
ALTITUDES, ELEVATIONS AND HEIGHTS ARE IN FEET

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 DIRECT TO NYLON TO JOIN THE HOLDING AT 3000FT OR ABOVE OR AS DIRECTED BY ATC.

MINIMUM TEMPERATURE FOR BARO-VNAV APPROACHES: 5°C

		OCA (OCH)			
Category of Aircraft		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 : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

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’ 29.51” N	103° 52’ 54.86” E
KIMER (IF)	01° 11’ 05.74” N	103° 55’ 27.30” E
KASPO (FAF)	01° 15’ 07.15” N	103° 57’ 09.20” E
KAKSA (SDF)	01° 17’ 02.58” N	103° 57’ 57.92” E
RW02C	01° 19’ 43.51” N	103° 59’ 05.86” E
NYLON	01° 36’ 57.00” N	104° 06’ 24.00” E

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INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO
DTHR RWY 20R - ELEV 13ft

MSA
3500
ARP
25 NM

D-ATIS	AP ID WSSS
	128.025
APP	124.05
	119.3
TWR	118.6
	118.25

SINGAPORE/ SINGAPORE CHANGI

RNP RWY 20R

103° 50'E 104° 10'

ALL ARRIVALS INTO WSSS WILL BE ISSUED INSTRUCTIONS BY ATC TO MAINTAIN 180KT TILL 8NM FROM TOUCHDOWN AND THEREAFTER 150KT TILL 4NM FROM TOUCHDOWN

VAR 0°23'E (2020)

BEARINGS ARE MAGNETIC
ALTITUDES, ELEVATIONS
AND HEIGHTS ARE IN FEET

FROM NYLON

(IAF) BIDUS
Max IAS 220 kts
01° 35' 54.05"N
103° 57' 54.86"E

127° 6.7 NM

211° 6.0 NM

(IAF) BIPOP
Max IAS 220 kts
01° 31' 21.83"N
104° 10' 18.03"E

273° 7.1 NM

(IF) ELBEX
01° 31' 48.96"N
104° 03' 14.18"E

203° 3.8 NM

10 NM

(FAF) ELGAP
01° 28' 20.28"N
104° 01' 46.15"E

(IAF) NYLON
Max IAS 220 kts
01° 36' 57.00"N
104° 06' 24.00"E

203° 023° 211°

MNM ALT 3000

RWY20R (DTHR)
01° 22' 33.95"N
103° 59' 20.06"E

203° 6.2 NM

01° 30'

01° 20' N

Sembawang

Seletar

Paya Lebar

WSR6 200ft ALT GND

WSD35 900ft ALT GND

WSP3 750ft ALT GND

WSR16 200ft ALT GND

WSR38 10 000ft ALT GND

WSR9 200ft ALT GND

WSP24 800ft ALT GND/WATER

WSD34 500ft ALT GND

420 342 407 229 381 296 272 589 854 321 291 383 369 661 382 941 713 281 168 266 312 217 240 611 627 602

CAUTION :
Rwy 02C/20C closed due development works.

PIC 2000ft SFC

KUALA LUMPUR FIR

SINGAPORE FIR

Pengerang Integrated Complex (PIC). Aircraft may overfly area at 2000ft and above.

NOTE:
MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

203° 14.1 NM

MISSED APCH

ENLES
01°09'31.51"N
103°53' 49.83"E

4.1 NM 192°

SAMKO
01°05'29.51"N
103°52' 54.86"E

168° 348°

MNM ALT 3200

660

TO ENLES

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'

Transition Level : FL 130
Transition Alt : 11 000

MISSED APPROACH:
CLIMB DIRECT TO ENLES.
TURN LEFT TO SAMKO TO JOIN THE HOLDING AT 3200FT OR ABOVE OR AS DIRECTED BY ATC.

MINIMUM TEMPERATURE FOR BARO-VNAV APPROACHES: 5°C

(MAPt) RW20R	(FAF) ELGAP	(IF) ELBEX	(IAF) BIDUS	(IAF) BIPOP	(IAF) NYLON
	2 000 (1990)	2000	3400	3000	3000

127° 273° 211° 203°

3° Slope 203°

690 (680)

RDH 56

CIRCLING NOT AUTHORIZED

ELEV 13 (DTHR RWY 20R)

5 0 DISPLACED THR 5 10

NAUTICAL MILES FROM DTHR 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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

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’ 54.05” N	103° 57’ 54.86” E
NYLON (IAF)	01° 36’ 57.00” N	104° 06’ 24.00” E
BIPOP (IAF)	01° 31’ 21.83” N	104° 10’ 18.03” E
ELBEX (IF)	01° 31’ 48.96” N	104° 03’ 14.18” E
ELGAP (FAF)	01° 28’ 20.28” N	104° 01’ 46.15” E
RW20R	01° 22’ 33.95” N	103° 59’ 20.06” E
ENLES	01° 09’ 31.51” N	103° 53’ 49.83” E
SAMKO	01° 05’ 29.51” N	103° 52’ 54.86” E

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INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 20C - ELEV 15ft

MSA
3500
ARP
25 NM

D-ATIS	AP ID WSSS
	128.025
APP	124.05
	119.3
TWR	118.6
	118.25

SINGAPORE/ SINGAPORE CHANGI

RNP RWY 20C

ALL ARRIVALS INTO WSSS WILL BE ISSUED INSTRUCTIONS BY ATC TO MAINTAIN 180KT TILL 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)

103° 50'E — 104° 10'

FROM NYLON

6.2 NM 203°

(IF)
VABRI
01° 31' 14.96"N
104° 03' 57.78"E

(IAF)
NYLON
Max IAS 220 kts
01° 36' 57.00"N
104° 06' 24.00"E
614
203°
023°
203°
MNM ALT
3000

10 NM

(FAF)
VILEV
01° 27' 29.10"N
104° 02' 22.42"E

4.1 NM 203°

RWY20C
01° 21' 43.37"N
103° 59' 56.46"E

6.2 NM 203°

Pengerang Integrated Complex (PIC). Aircraft may overfly area at 2000ft and above.

PIC
2000ft
SFC

NOTE:
MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

KUALA LUMPUR FIR
SINGAPORE FIR

01° 30'N — 01° 20'N

Sembawang
Seletar
Paya Lebar

WSR6 200ft ALT GND
WSD35 200ft ALT GND
WSP3 750ft ALT GND
WSR16 200ft ALT GND
WSR38 10 000ft ALT GND
WSR9 200ft ALT GND
WSP24 800ft ALT GND/WATER
WSD34 500ft ALT GND

ESLUX
01° 18' 44.31"N
103° 58' 40.44"E

CAUTION :
Rwy 02C/20C closed due development works.

TO EXOMO
142°

SCALE 1 : 400,000
1 0 1 2 3 4 5 6 7 8 9 km
0 1 2 3 4 5 NM

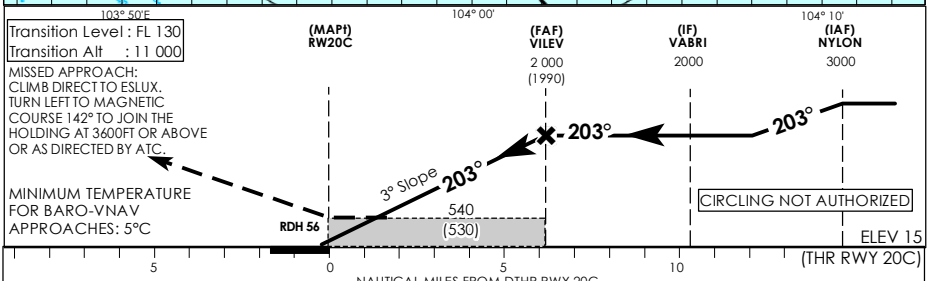
MISSED APCH
EXOMO
01°04'25.49"N
104°09' 33.17"E
158°
338°
621
MNM ALT
3600

103° 50'E — 104° 00' — 104° 10'

Transition Level : FL 130
Transition Alt : 11 000

MISSED APPROACH:
CLIMB DIRECT TO ESLUX.
TURN LEFT TO MAGNETIC COURSE 142° TO JOIN THE HOLDING AT 3600FT OR ABOVE OR AS DIRECTED BY ATC.

MINIMUM TEMPERATURE FOR BARO-VNAV APPROACHES: 5°C



OCA (OCH)					
Category of Aircraft		A	B	C	D
LNAV/VNAV	2.5%	**490 (480)**			
LNAV	2.5%	**540 (530)**			

Fix		NYLON	VABRI	VILEV	RW20C	ESLUX	EXOMO
Altitude (Height)		**3000 (2985)**	**2000 (1985)**	**2000 (1985)**	**540 (525)**	**540 (525)**	**3600 (3585)**
Speed	knots	80	100	120	140	160	180
FAF - MAPt 6.2 nm	min : s	**4 : 39**	**3 : 44**	**3: 06**	**2 : 40**	**2 : 20**	**2 : 04**
Rate of descent/GS	ft/min	**425**	**531**	**637**	**743**	**849**	**955**

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

SINGAPORE CHANGI RNP-APCH RWY 20C – Approach from NYLON

Path Terminator	Waypoint	Fly-Over	Course °M (°T)	Magnetic Variation	Distance (NM)	Turn Direction	Altitude (FT)	Speed Limit (KT)	VPA/ TCH(FT)	Navigation Specification
IF	NYLON	-	-	-0.4	-	-	A030+	220	-	RNP APCH
TF	VABRI	-	203 (203.4)	-0.4	6.2	-	A020+	-	-	RNP APCH
TF	VILEV	-	203 (203.4)	-0.4	4.1	-	A020+	-	-	RNP APCH
TF	RW20C	Y	203 (203.4)	-0.4	6.2	-	-	-	-3.0° / 50	RNP APCH
DF	ESLUX	Y	-	-0.4	-	L	-	-	-	RNP APCH
TF	EXOMO	-	142(142.4)	-0.4	-	-	A036+	-	-	RNP APCH

Waypoint Coordinates

Name	Latitude	Longitude
NYLON (IAF)	01° 36’ 57.00” N	104° 06’ 24.00” E
VABRI (IF)	01° 31’ 14.96” N	104° 03’ 57.78” E
VILEV (FAF)	01° 27’ 29.10” N	104° 02’ 22.42” E
RW20C	01° 21’ 43.37” N	103° 59’ 56.46” E
ESLUX	01° 18’ 44.31” N	103° 58’ 40.44” E
EXOMO	01° 04’ 25.49” N	104° 09’ 33.17” E

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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
APP	128.025
	124.05
TWR	124.6
	131.4

SINGAPORE/ SINGAPORE CHANGI

RNP RWY 02R

104° 10'

ALL ARRIVALS INTO WSSS WILL BE ISSUED INSTRUCTIONS BY ATC TO MAINTAIN 180KT TILL 8NM FROM TOUCHDOWN AND THEREAFTER 150KT TILL 4NM FROM TOUCHDOWN

TEKONG DVOR/DME 116.5
VTK
01° 24' 55"N
104° 01' 20" E
60m

BEARINGS ARE MAGNETIC
ALTITUDES, ELEVATIONS AND HEIGHTS ARE IN FEET

VAR 0° 29'E (2020)

IGODO
AT OR ABOVE 2 000ft
01°24' 03.18"N
104°05' 14.4"E

Pengerang Integrated Complex (PIC). Aircraft may overfly area at 2000ft and above.

PIC 2000ft SFC

WSD34 500ft AMSL GND

POSSIBLE VESSEL

Seletar
Paya Lebar

KUALA LUMPUR FIR
SINGAPORE FIR

WSR16 200ft ALT GND
WSR38 10 000ft ALT GND

CAUTION : Rwy 02C/20C closed due development works.

3 NM 023°
2 NM 023°
10 NM

(MAPT) RW02R
01°19' 20.59"N
103°59' 59.44"E

(FAF) MOPSI
01°16' 34.76"N
103°58' 49.43"E
1 030

(IF) LUVUL
01°14' 44.21"N
103°58' 02.76"E
1700

NOTE: MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

MNM ALT 7 000
079°
259°
HOSBA
01°19' 48"N
104°24' 18"E
MISSED APCH

SCALE 1 : 300,000
1 0 1 2 3 4 5 6 7 8 9 km
1 0 1 2 3 4 5 NM

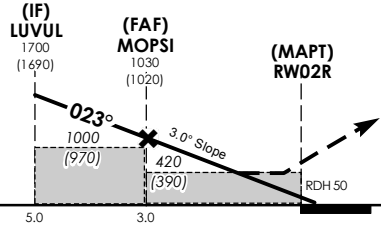
EXPECT RADAR VECTORS TO LUVUL

RADAR REQUIRED

104° 00'

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 CAT I OCA (OCH) is 820ft (800ft) and aircraft shall climb straight to 1200ft before commencing right turn climbing to 7000ft to HOSBA.

Transition Level : FL 130
Transition Alt : 11 000



MINIMUM TEMPERATURE FOR BARO-VNAV APPROACHES: 5°C

ELEV 16
(THR RWY 02R)

MISSED APPROACH
Climb direct to IGODO at 2 000ft or above. Thereafter, turn right climbing to 7 000ft to HOSBA. Hold at HOSBA or AS DIRECTED BY ATC.
No turn before MAPt.

CIRCLING NOT AUTHORIZED

		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 : Missed Approach instructions revised.

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	-	1030+	150	-	RNP APCH
TF	RW02R	Y	023 (023.4)	-0.4	3	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’ 44.21” N	103° 58’ 02.76” E
MOPSI (FAF)	01° 16’ 34.76” N	103° 58’ 49.43” E
RW02R	01° 19’ 20.59” N	103° 59’ 59.44” E
IGODO	01° 24’ 03.18” N	104° 05’ 14.40” E
HOSBA	01° 19’ 48.00” N	104° 24’ 18.00” E

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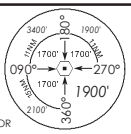
INSTRUMENT APPROACH CHART

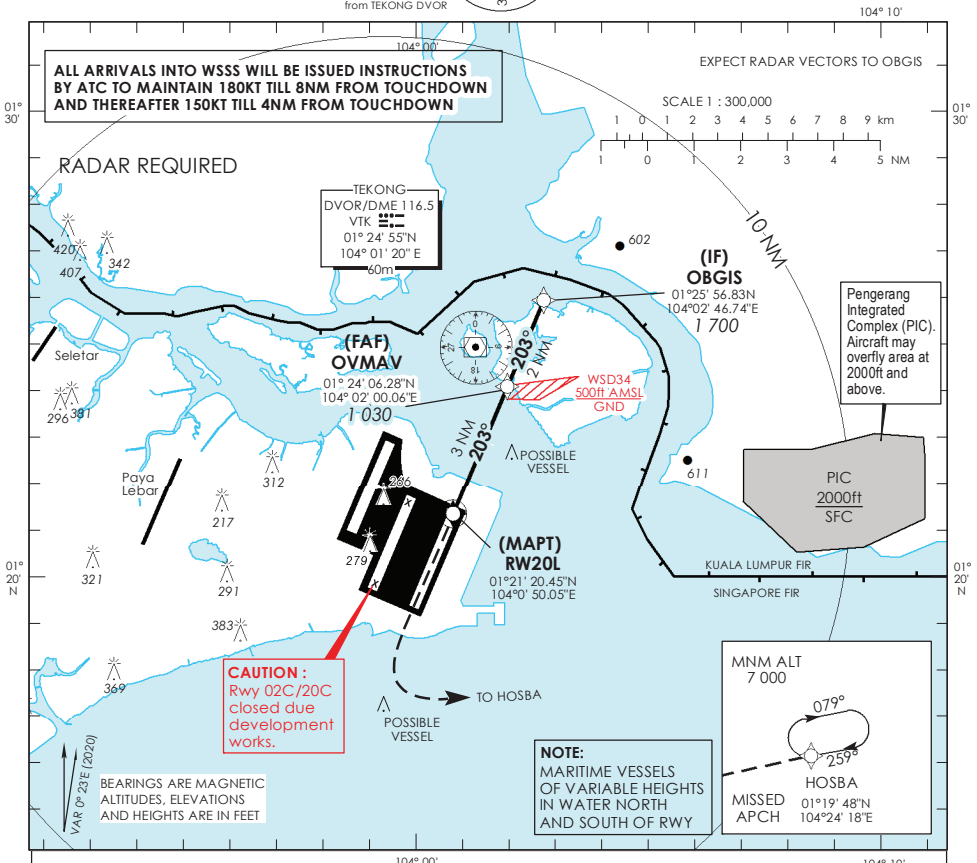
AERODROME ELEV 22ft
HEIGHT RELATED TO THR RWY 20L - ELEV 16ft
MSA 25 NM from TEKONG DVOR



D-ATIS	AP ID WSSS
	128.6
APP	124.05
	124.6
TWR	131.4

SINGAPORE/
SINGAPORE CHANGI

RNP RWY 20L

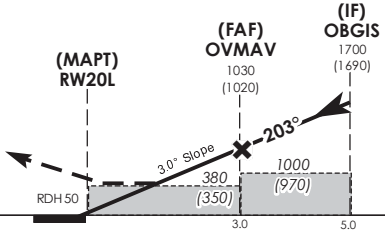


This procedure requires a missed approach climb gradient of 5% (304 ft/NM) until passing 3,000ft.
For aircraft which can only achieve a 2.5% (152 ft/NM) climb gradient, the CAT I OCA (OCH) is 1080ft (1050ft).

Transition Level	: FL 130
Transition Alt	: 11 000

MISSED APPROACH
Climb straight to 1 500ft, turn left climbing to 7 000ft 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 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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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	-	1030+	150	-	RNP APCH
TF	RW20L	Y	203 (203.4)	-0.4	3	-	-	-	-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’ 56.83” N	104° 02’ 46.74” E
OVMAV (FAF)	01° 24’ 06.28” N	104° 02’ 00.06” E
RW20L	01° 21’ 20.45” N	104° 00’ 50.05” E
HOSBA	01° 19’ 48.00” N	104° 24’ 18.00” E

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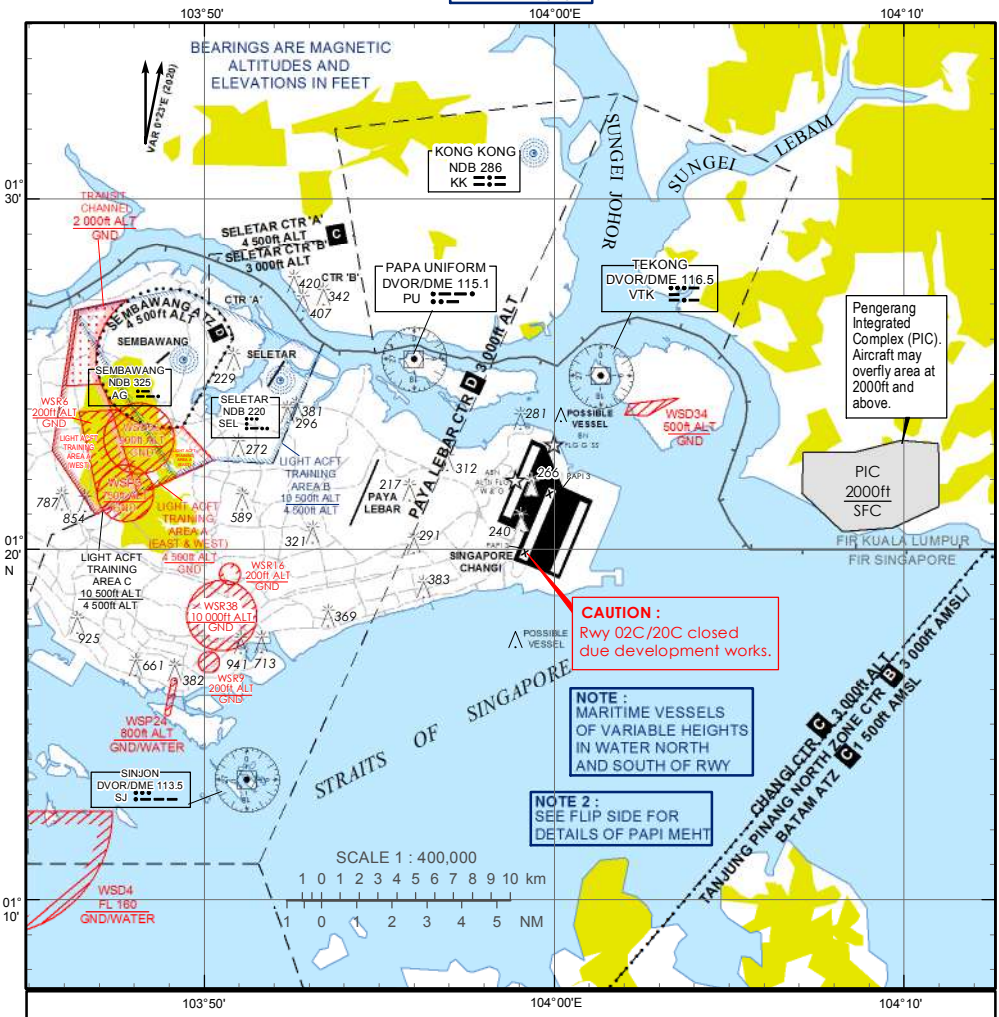
VISUAL APPROACH CHART - ICAO

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 : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

PAPI 3° (MEHT)*						
Pilot's eye height over the threshold when the following PAPI lights come in view.	**RUNWAY**					
	02L	20R	02C	20C	20L	02R
2 White lights and 2 Red lights	20.0m	20.0m	19.8m	19.8m	19.7m	19.7m
3 White lights and 1 Red light	24.0m	22.6m	23.7m	23.7m	23.6m	23.6m
4 White lights	26.4m	25.0m	26.2m	26.2m	26.0m	26.0m

*MEHT : Minimum Eye Height Over the Threshold.

Note : Aircraft with eye-to-wheel height greater than 8 metres are advised to fly with 2 white lights and 2 red lights visible so as to achieve sufficient wheel clearance.

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) / 33.7°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)

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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
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)91130816 (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

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WSSL AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

1	*Apron surface and strength*	Surface: Bituminous concrete (aircraft stand C7) Strength: PCN44/F/C/X/T Surface: Concrete (all other aircraft stands) Strength: PCN41/R/C/W/T
2	*Taxiway width, surface and strength*	Width: 23 M (75.5ft), 18 M (59.1ft)TWY EC4, EC5 AND EC6 8 M (26.2ft) TWY WS1 and WS2 Surface: Bituminous concrete Strength: PCN44/F/C/X/T
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 (DHC7) and Falcon 7X (FA7X) 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 C1 shall taxi out towards the north only.
		h.	Aircraft departing stand C6 shall taxi out towards the south only.
		i.	Aircraft departing stands C2, C3, C4 and C5 are allowed to taxi out towards the south or the north.
		j.	Aircraft parking stand C7 is unable to accommodate aircraft with wingspan larger than 28.35m.
		k.	No Refuelling is permitted for aircraft parked at aircraft stand C7.
		l.	Aircraft types up to B757-200 (no winglets) can taxi into aircraft stands D50, D51, D52, D53, D54, D55 and D56.
		m.	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 (DHC 7), Embraer 190STD (E190), Embraer ERJ 135 (E135), Falcon 7X (FA7X), Fokker 50, 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.
		n.	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.
		o.	Only aircraft type ATR72 (AT75 & AT76) and aircrafts with wingspan less than 27.2m can be parked at aircraft stands C60, C61 and C62.

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SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS		
Aircraft Stands	**Pushback / Tow Forward Procedures**	**Phraseology Used By SELETAR GROUND**
C1, C2, C3, C4, C5, C6	**PUSHBACK** The aircraft (on idle thrust) shall be pushed back onto TWY WA to face North (or South) until its nose wheel is at the intersection of the aircraft stand lead-in line and the centreline of TWY WA. The aircraft may breakaway from there. **TOW FORWARD** The aircraft (on idle thrust) shall be towed forward onto the centreline of TWY WP to face North (or South) until its nose wheel is at the intersection of the aircraft tow-out line and TWY WP centreline. The aircraft may breakaway from there.	Pushback approved, to face North (or South) Tow forward approved, to face North (or South)
C7	**PUSHBACK** The aircraft (on idle thrust) shall be pushed back onto TWY WA to face North (or South) until its nose wheel is at the intersection of the aircraft stand lead-in line and the centreline of TWY WA. The aircraft may breakaway from there.	Pushback approved, to face North (or South)
C50, C51, C52	**PUSHBACK** The aircraft (on idle thrust) shall be pushed back onto TWY ES to face North (or South) until its nose wheel is at the intersection of the aircraft stand lead-in line (or pushback line) and the centreline of TWY ES. The aircraft may breakaway from there.	Pushback approved, to face North (or South)
C60, C61	**Pushback to face North** The aircraft (on idle thrust) shall be pushed back onto TWY EC to face North until its nose wheel is abeam the centreline of aircraft stand C62. The aircraft may break away from there. **Pushback to face East** The aircraft (on idle thrust) shall be pushed back onto TWY EC2 to face East until its nose wheel is at the “EOP C60/C61” position. The aircraft may break away from there.	Pushback approved, to face North. Pushback approved, to face East.
C62	**Pushback to face North** The aircraft (on idle thrust) shall be pushed back onto TWY EC to face North until its nose wheel is at the “EOP C62” position. The aircraft may break away from there. **Pushback to face South** The aircraft (on idle thrust) shall be pushed back onto TWY EC to face South until its nose wheel is abeam the centreline of aircraft stand C61. The aircraft may break away from there.	Pushback approved, to face North. Pushback approved, to face South.

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Aircraft Stands	Pushback / Tow Forward Procedures	Phraseology Used By SELETAR GROUND
D1, D2 (for B757-200 and C130)	**PUSHBACK AND TOW FORWARD TO TWY WP** The tow-crew shall request from Seletar Ground (vehicular) on 122.9MHz for departure pushback approval. Upon receiving the approval, the aircraft shall be pushed back onto TWY WA to face South until its nose wheel is at the intersection of the aircraft stand lead-in line and TWY WA centreline. The aircraft shall then be towed forward to TWY WP until the tow tug towing the aircraft is at the intermediate holding position short of TWY W1 (see chart AD 2.WSSL-9) or TWY W3 (see chart AD 2.WSSL-10). Once the tow tug is disengaged, the aircraft will request start up approval from Seletar Ground (aircraft) on 121.6MHz. The aircraft shall breakaway from there.	1) Tow approved to intermediate holding position on TWY WP short of TWY W1 to face North; or 2) Tow approved to intermediate holding position on TWY WP short of TWY W3 to face South
	FOR LANDED B757-200/C130 AIRCRAFT EXITING VIA TWY W1 After landing, B757-200/C130 aircraft exiting TWY W1 shall stop when its nose is at the information marking “B757/C130 HOLD FOR TOW” on TWY W1. The aircraft shall be on tow starting from this point onwards until they park inside the aircraft stands.	Not applicable
	FOR LANDED B757-200/C130 AIRCRAFT EXITING VIA TWY W2 After landing, B757-200/C130 aircraft exiting TWY W2 shall stop when its nose is at the information marking “B757/C130 HOLD FOR TOW” on TWY W2. The aircraft shall be on tow starting from this point onwards until they park inside the aircraft stands.	Not applicable
	FOR LANDED B757-200/C130 AIRCRAFT EXITING VIA TWY W3 After landing, B757-200/C130 aircraft exiting TWY W3 shall stop when its nose is at the information marking “B757/C130 HOLD FOR TOW” on TWY W3. The aircraft shall be on tow starting from this point onwards until they park inside the aircraft stands.	Not applicable
D50	**Pushback to face North** The aircraft (on idle thrust) shall be pushed back onto TWY EN to face North until its nose wheel is at the intersection of the aircraft stand pushback line and TWY EN centreline. The aircraft shall then be towed forward until its nose wheel is abeam the centreline of aircraft stand D51. The aircraft may break away from there. **Pushback to face South** The aircraft (on idle thrust) shall be pushed back onto TWY EN to face South until its nose wheel is at the intersection of the aircraft stand pushback line and TWY EN centreline. The aircraft may break away from there. **Tow Forward** The aircraft (on idle thrust) shall be towed forward onto TWY EP to face North (or South) until its nose wheel is at the intersection of the aircraft lead-out line and TWY EP centreline. The aircraft may break away from there.	Pushback approved, to face North. Pushback approved, to face South. Tow forward approved, to face North (or South)
D51, D52, D53, D54, D55	**Pushback** The aircraft (on idle thrust) shall be pushed back onto TWY EN to face North (or South) until its nose wheel is at the intersection of the aircraft stand pushback line and TWY EN centreline. The aircraft may break away from there. **Tow Forward** The aircraft (on idle thrust) shall be towed forward onto TWY EP to face North (or South) until its nose wheel is at the intersection of the aircraft lead-out line and TWY EP centreline. The aircraft may break away from there.	Pushback approved, to face North (or South). Tow forward approved, to face North (or South)

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Aircraft Stands	Pushback / Tow Forward Procedures	Phraseology Used By SELETAR GROUND
D56	**Pushback to face North**	
	The aircraft (on idle thrust) shall be pushed back onto TWY EN to face North until its nose wheel is at the intersection of the aircraft stand pushback line and TWY EN centreline. The aircraft may break away from there.	Pushback approved, to face North.
	Pushback to face South	
	The aircraft (on idle thrust) shall be pushed back onto TWY EN to face South until its nose wheel is at the intersection of the aircraft stand pushback line and TWY EN centreline. The aircraft shall then be towed forward until its nose wheel is abeam the centreline of aircraft stand D55. The aircraft may break away from there.	Pushback approved, to face South.
	Tow Forward	
	The aircraft (on idle thrust) shall be towed forward onto TWY EP to face North (or South) until its nose wheel is at the intersection of the aircraft lead-out line and TWY EP centreline. The aircraft may break away from there.	Tow forward approved, to face North (or South)

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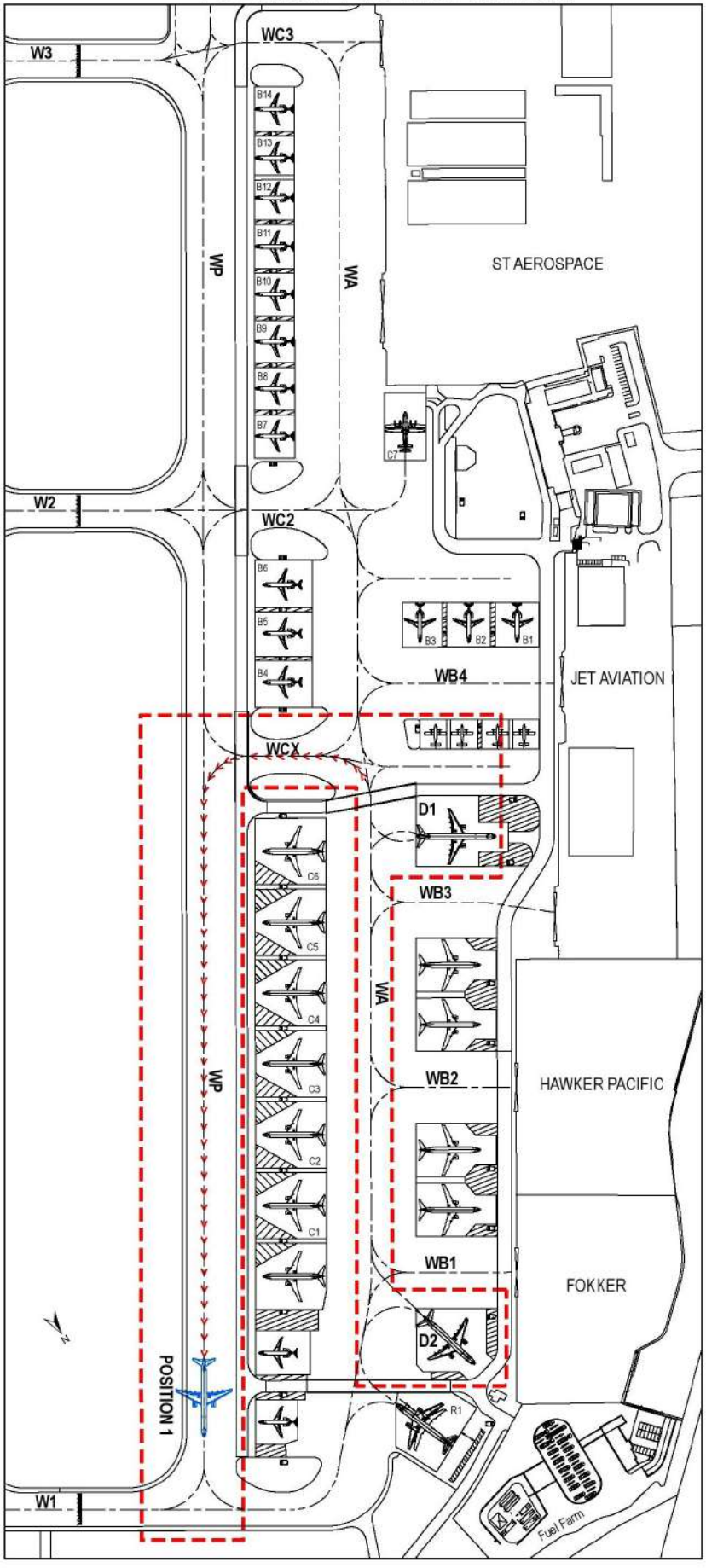
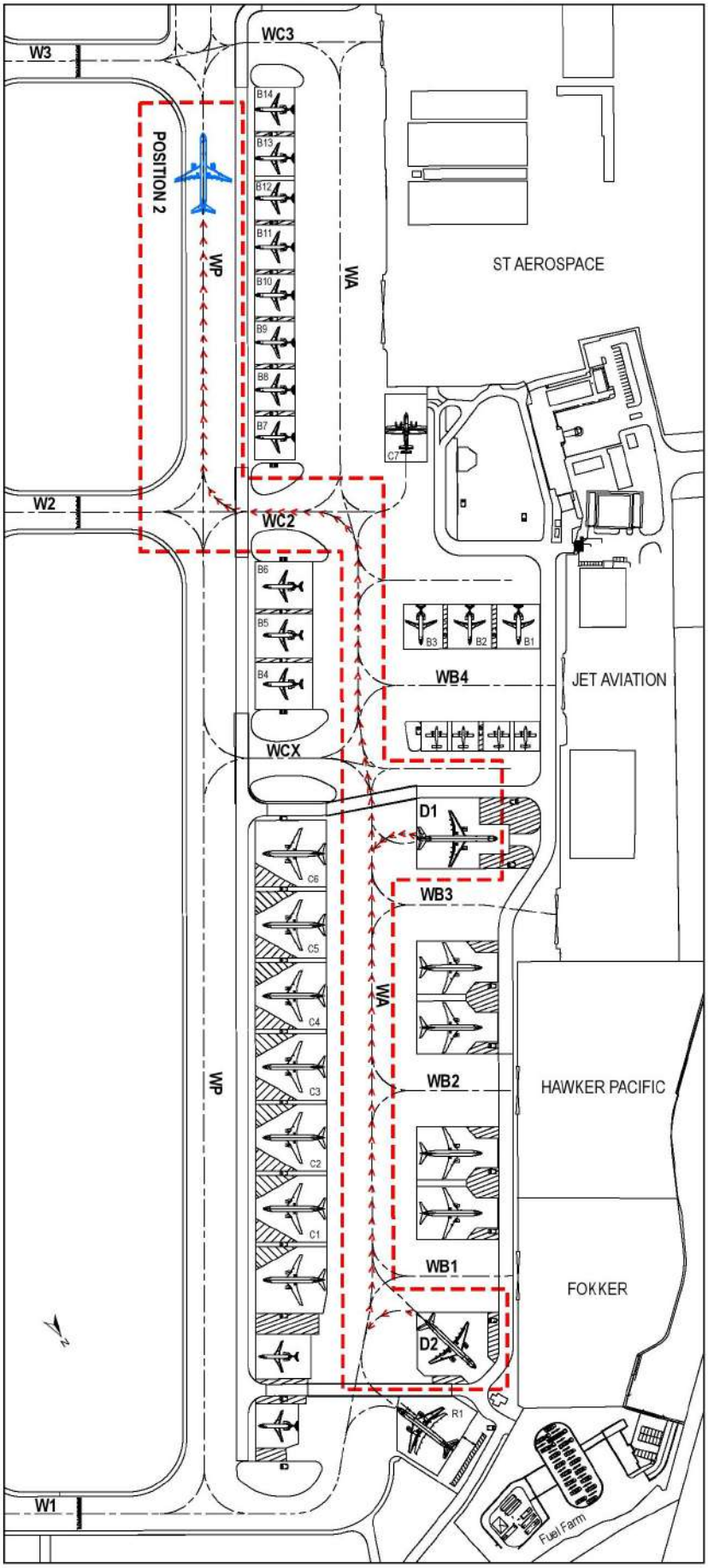
PROCEDURES FOR PUSHBACK OF AIRCRAFT FROM AIRCRAFT STANDS D1/D2 AND TOW FORWARD TO TWY WP POSITION 1 TO FACE NORTH



PROCEDURES FOR PUSHBACK OF AIRCRAFT FROM AIRCRAFT STANDS D1/D2 AND TOW FORWARD TO TWY WP POSITION 2 TO FACE SOUTH



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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
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 (Met Doppler Weather Radar) Maintenance Period: Second WED of every month between 0200-0900. In case of bad weather, THU following the second WED between 0200-0900.
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 (PCN) and Surface of RWY and SWY	THR coordinates and RWY end coordinates (THR GEOID Undulation)	THR Elevation and highest elevation of TDZ of precision APCH RWY
1	2	3	4	5	6
03	033.33°	1836 x 46	44/F/C/X/T Grooved Bituminous Concrete	012430.846N 1035143.791E (9.78M)	14 M 13 M
21	213.33°	1836 x 46	44/F/C/X/T Grooved Bituminous Concrete	012520.791N 1035216.425E (9.78M)	5M 10 M

Slope of RWY – SWY Transverse / Longitudinal	SWY Dimensions (m)	CWY Dimensions (m)	STRIP Dimensions (m)	Dimensions of RESA (m)	Locations and description of ARST system
7	8	9	10	11	12
RWY 03 1.23 / 0.49% SWY: Not Applicable	Not Applicable	60 X 150	1956 X 150	RWY 03-240 X 92	Not Applicable
RWY 21 1.23 / 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 0500-0515, 1030-1045, 1600-1615 and 2300-2315 daily for 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, omni-directional and brilliancy controlled.	Red	NIL
21	APCH LGT: 1 row of inset APCH LGT of 4 LGT and 4 rows of barettes of 4 LGT each. White inset uni-directional APCH LGT and white omni-directional CGL on top of white, elevated uni-directional APCH LGT. Simple TDZ LGT: 2 pairs white, inset, uni-directional LGT.	Green with THR IDENT LGT	PAPI 3.5° (both sides of RWY) 2 white 2 red LGT (17.720m) 3 white 1 red LGT (19.286m) 4 white LGT (20.871m). ACFT with eye-to-wheel HGT greater than 6.3m are ADZ to fly with 2 white 2 red LGT visible so as to achieve sufficient wheel CLR.	NIL	NIL	White with yellow on last 600m of either end. Elevated, omni-directional and brilliancy controlled.	Red	NIL
	RWY 21 THR and RWY END LGT symmetrically disposed in 2 groups with a gap between the groups. RWY 21 THR and RWY END LGT reinstated to inset fitting.							

WSSL AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

1	*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.

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WSSL AD 2.16 HELICOPTER LANDING AREA

1	**Coordinates of THR of FATO Geoid undulation**	**H03 H21 012437.963N 1035152.072E 012446.046N 1035157.344E**
2	**FATO elevation M/FT**	H03- 10.45m/34.3ft; H21 - 9.36m/30.7ft
3	**FATO area dimensions, surface, strength, marking**	Rectangle 297m x 21.5m, compacted turf, helicopter landing area designations, outline by concrete kerbs painted white.
4	**True BRG of FATO**	033.33/213.33° Direction of TKOF zones: 034°GEO / 214°GEO
5	**Declared distance available**	**TODAH RTODAH LDAH H03 297m 297m 297m H21 297m 297m 297m**
6	**Approach and FATO lighting**	Nil
7	**Remarks**	Slope of helicopter landing area (transverse/longitudinal) H03 - 1.19%/0.44% ; H21 - 0.96%/0.44%

WSSL AD 2.17 ATS AIRSPACE

1	*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 012527N 1034856E) 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 FT (3,350m)
6	*Remarks*	NIL

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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
ACC	Singapore Radar	P123.7 MHz S127.3 MHz	H24	for ATS Routes B469, G219, G334, R208, L625, L629, L635, L642, L644, M751, M753, M758, M761, M763, M771, N875, N884, N891, N892 and Y514.
		133.8 MHz	0000-1430	
		P134.7 MHz S134.15 MHz	H24	for ATS Routes G334, L625, L644, M758, M761, M771, N875, N884 and N892.
		P133.25 MHz S135.8 MHz		for ATS Routes A457, A464, A576, B466, L762, M630, R325 and R469.
		P134.2 MHz S133.35 MHz		for ATS Routes G334, G580, L625, L644, M646, M767 and N875.
		P134.4 MHz S128.1 MHz		for ATS Routes B338, B469, B470, G579, L504, L644, M635, M774, N502, N875, P501 and in area in the immediate vicinity of Singapore.
	Singapore Control	P134.35 MHz S133.6 MHz	H24	AUTOMATIC DEPENDENT SURVEILLANCE BROADCAST (ADS-B) OUT EXCLUSIVE AIRSPACE WITHIN PARTS OF THE SINGAPORE FIR - 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), 045223N 1041442E (ENREP), 045000N 1034400E, thence north along the Singapore FIR boundary to 070000N 1080000E at or above FL290.
	Singapore Radio	6556 kHz 11297 kHz	H24	SEA 1. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
		5655 kHz 8942 kHz 11396 kHz		SEA 2. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
		6556 kHz		SEA 3. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
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	121.625 MHz	0000-1500	TAR - Intermediate approach to Seletar Airport.
ATIS	Seletar Airport Information	128.425 MHz	H24	Combined ARR and DEP report (broadcasting with hourly updated MET INFO) Data Link Service available. AP IDENT WSSL Messages comply with ARINC 623 Standards. Updating of data: H+00 to H+10 and H+30 to H+40

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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
JAYBEE NDB	JB	400 KHz (80w)	H24	012959.77N 1034241.82E	BRG 298° DIST 19.6km from ARP Seletar. Coverage 50NM. Unusable 285°-060° beyond 20NM. Bearing fluctuations greater than +/- 10° may be observed in sector 138° to 148°. EM: A0/A2
KONG KONG NDB	KK	286 KHz (70w)	H24	013117.76N 1035923.69E	BRG 049° DIST 17.7km from ARP Seletar. Coverage 50NM. Unusable 270°-010° beyond 30NM. Bearing fluctuations greater than +/- 10° may be observed in sector 048° to 052°. EM: A0/A2
SELETAR NDB	SEL	220 KHz	H24	012448.50N 1035210.16E	BRG 152° DIST 0.44km from ARP Seletar. Coverage 50NM. EM: A0/A2

WSSL AD 2.20 LOCAL TRAFFIC REGULATIONS

1 LOCAL FLYING RESTRICTIONS:

1.1 Fixed-wing aircraft operations including circuit flying and training operations are restricted to the west of Seletar runway. Helicopter operations are confined to the west of Seletar runway between sunset and sunrise, subject to the restrictions in paragraph 1.3 below.

1.2 Circuit Heights:

Light aircraft 800ft (west of Seletar runway only);

Other aircraft 1,000ft - 1,500ft (west of Seletar runway only);

Helicopter-only area east of runway up to 600ft AGL

1.3 Circuit Flying and Training Operations are not permitted between 1400-2300 daily.

1.4 Pilots are required to keep clear of PAYA LEBAR CTR and SEMBAWANG ATZ.

2 TEST/TRAINING FLIGHTS

2.1 Flight notification shall be given prior to departure. Flight notification by means of RTF should be avoided.

2.2 For circuits and landings or flights to Light Aircraft Training Areas A, B and C, locally based operators shall submit details of their flight by electronic mail using the Seletar Test / Training Form which can be retrieved from webpage:

https://aim-sg.caas.gov.sg

2.3 For test/currency maintenance flight in the fixed-wing circuit, the operator shall contact Seletar Tower Manager, giving at least 2 days' advance notice from the date of flight. The Tower Manager will then liaise with the host slot-time operator during which the test/currency maintenance flight is to be conducted. The advance notice will enable the host slot-time operator to adjust its training programme to accommodate the flight.

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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;
g. Area of flight (Light Aircraft Training Areas A, B or C)

2.5 For flights other than those classified in para 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, the pilot-in-command shall vacate the runway as soon as possible via TWY W1, W2 or W3, or in accordance with instructions from Aerodrome Control.

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

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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 JAYBEE (JB) shall operate at/above 5,000ft.

1.3 When overflying residential areas around Seletar Airport, aircraft are to adhere to the minimum altitudes specified within the Noise Abatement Areas.

1.4 Noise Abatement Area 1 is bounded by the following points, and aircraft are to maintain a minimum altitude of 1,500ft when overflying the area.

Lateral Limits of Noise Abatement Area 1	
POINT	**COORDINATES**
A	012551.0N 1035044.3E
B	012549.9N 1035059.2E
C	012522.3N 1035102.3E
D	012458.3N 1035044.4E
E	012443.4N 1035005.3E
A	012551.0N 1035044.3E

1.5 Noise Abatement Area 2 is bounded by the following points, and aircraft are to maintain a minimum altitude of 1,500ft when overflying the area.

Lateral Limits of Noise Abatement Area 2	
Point	**Coordinates**
F	012335.6N 1035006.0E
G	012324.6N 1035023.1E
H	012316.4N 1035029.7E
N	012250.1N 1034959.9E
O	012315.1N 1034937.1E
P	012322.4N 1034942.2E
Q	012317.5N 1034957.3E
F	012335.6N 1035006.0E

1.6 Noise Abatement Area 3 is bounded by the following points, and aircraft are to maintain a minimum altitude of 700ft when overflying the area.

Lateral Limits of Noise Abatement Area 3	
Point	**Coordinates**
H	012316.4N 1035029.7E
I	012252.7N 1035038.2E
J	012237.4N 1035040.4E
K	012236.0N 1035051.0E
L	012231.1N 1035051.8E
M	012232.2N 1035016.2E
N	012250.1N 1034959.9E
H	012316.4N 1035029.7E

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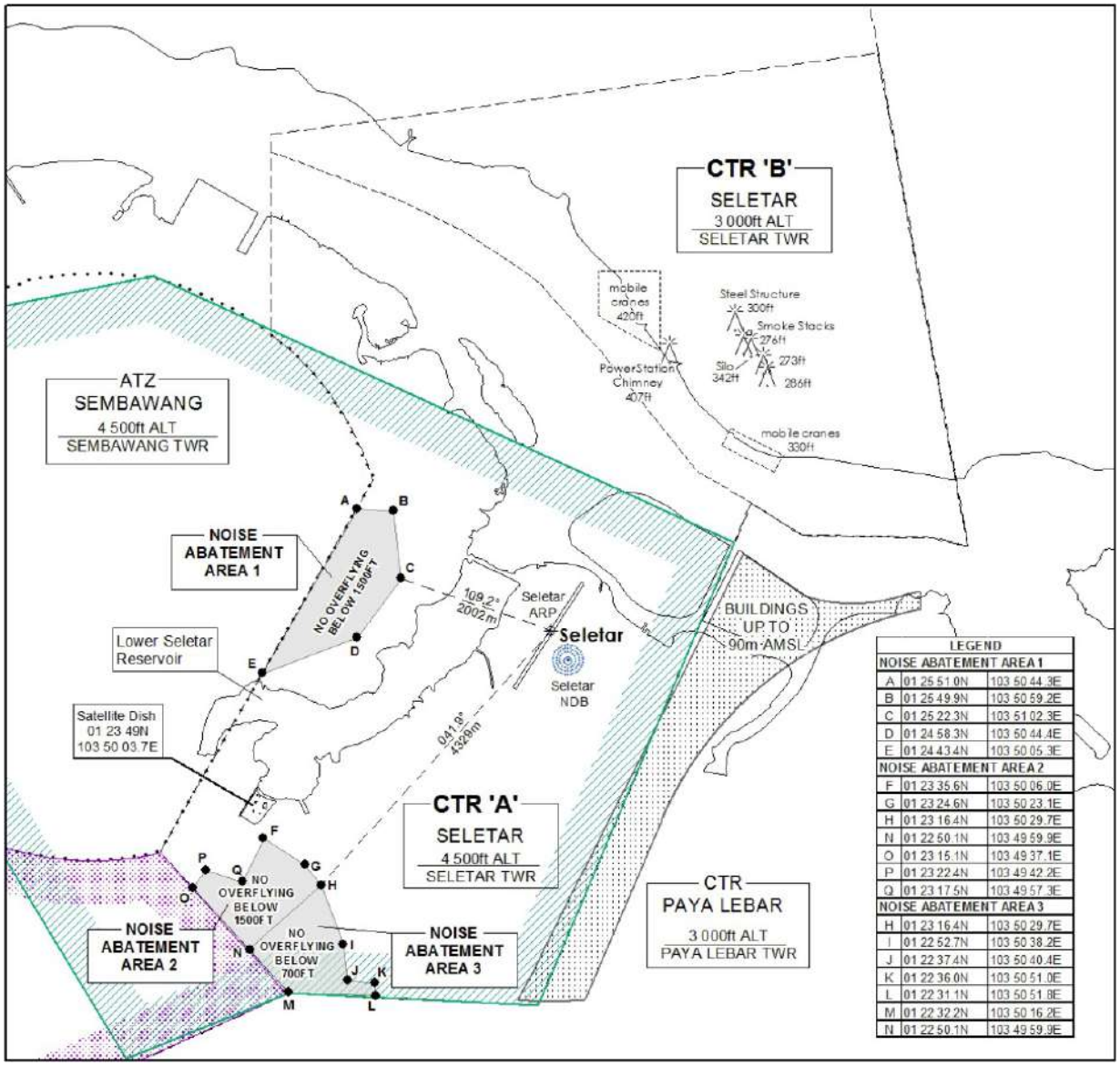
1.7 The map below shows the locations of Noise Abatement Areas 1, 2 and 3 within Seletar Control Zone.



1.8 Aircraft which are unable to adhere to the minimum altitudes specified over the noise abatement areas are not allowed to operate at Seletar Airport.

1.9 No engine run up shall be permitted between 1400-2300.

WSSL AD 2.22 FLIGHT PROCEDURES

1 PROCEDURES FOR ARRIVALS INTO SELETAR AERODROME

1.1 Introduction

1.1.1 Aircraft on VFR flight plan, routing via Tebrau City Mall (013259N1034748E) to Seletar shall follow the joining procedures as described in paragraph 1.2 and illustrated in charts AD-2-WSSL-VAC-1, AD-2-WSSL-VAC-2 and AD-2-WSSL-VFR-1.

1.1.2 Aircraft returning from Light Aircraft Training Areas shall follow the joining procedures as described in paragraph 1.3 and illustrated in charts AD-2-WSSL-VAC-1 and AD-2-WSSL-VAC-2.

1.1.3 Aircraft on IFR flight plan, routing via JB, KK 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 JB and KK, 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.

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1.1.4 When within 5km of the aerodrome reference point, aircraft are to fly at a manoeuvring speed of not more than 170kt unless otherwise authorised by ATC. All aircraft are required to keep well clear of Sembawang ATZ, Paya Lebar CTR and any Prohibited/Restricted/Danger Areas (e.g. WSR38 and WSD4) within the vicinity.

1.1.5 Circuit traffic already downwind shall have priority. Arriving aircraft shall position and sequence itself accordingly, unless directed otherwise by ATC.

1.1.6 Pilots shall not fly east of the runway. This is due to tall buildings up to 90m (296ft) AMSL to the east of Seletar CTR (the location is depicted in charts AD-2-WSSL-VAC-1 to AD-2-WSSL-VAC-4.

1.2 Joining Procedures for VFR flights from Tebrau City Mall (013259N1034748E)

1.2.1 Aircraft on VFR flight plan joining Seletar CTR from East of JB Town are to descend to altitude cleared by ATC. From Tebrau City Mall (013259N1034748E) descend in VMC to altitude cleared by ATC and proceed to POINT 'X' (located 012830N 1034954E or radial 297/7DME from PU DVOR/DME) keeping clear of WMP228 and then direct to overhead the airfield.

1.2.2 When overhead the airfield, the joining aircraft shall make a turn overflying the runway and after passing abeam the Control Tower, commence descent as cleared to cross the upwind end of the runway at 1,500ft. Passing over the end of the runway, descend to circuit altitude as cleared by ATC. Pilots shall ensure to keep clear of Sembawang ATZ and Paya Lebar CTR and not to fly east of the runway. This is to keep clear of tall buildings up to 90m AMSL to the east of Seletar CTR. The area where the tall buildings are located is indicated in the Seletar Visual Approach Charts AD-2-WSSL-VAC-1 to AD-2-WSSL-VAC-4. Procedures are illustrated in the following charts:

i. AD-2-WSSL-VAC-1 : Visual Approach Chart - RWY 03
ii. AD-2-WSSL-VAC-2 : Visual Approach Chart - RWY 21

1.2.3 Traffic permitting and in good visibility, joining aircraft may be cleared to join directly for right base when landing on RWY 21 or turn downwind for RWY 03 from north-end of the runway (THR RWY 21).

1.3 Joining Procedures from Light Aircraft Training Areas

1.3.1 Unless otherwise authorised by ATC, aircraft are to join overhead the airfield at 2,000ft keeping clear of Sembawang ATZ and Paya Lebar CTR.

1.3.2 When overhead the airfield, the joining aircraft shall make a turn to the eastern side of the runway and after passing abeam the Control Tower, commence descent as cleared to cross the upwind end of the runway at 1,500ft. Passing over the end of the runway, descend to circuit altitude as cleared by ATC. Pilots shall ensure to keep clear of Sembawang ATZ and Paya Lebar CTR and not to fly east of the runway. This is to keep clear of tall buildings up to 90m AMSL to the east of Seletar CTR. The area where the tall buildings are located is indicated in the Seletar Approach Charts AD-2-WSSL-VAC-1 to AD-2-WSSL-VAC-4. Procedures are illustrated in the following charts:

i. AD-2-WSSL-VAC-1: Visual Approach Chart - RWY 03
ii. AD-2-WSSL-VAC-2: Visual Approach Chart - RWY 21

1.3.3 Traffic permitting and in good visibility, joining aircraft may be cleared to join directly for right base when landing on RWY 21 or turn downwind for RWY 03 from north-end of the runway (THR RWY 21).

1.4 Joining Procedures for IFR flights from JB, KK or SJ - RWY 03

1.4.1 From KK
Cross KK at or above 3,000ft. On passing KK descend in VMC to 2,000ft or altitude cleared by ATC and join downwind RWY 03.

i. Straight-in-Approach
Join downwind RWY 03 at 2,000ft (keeping clear of Sembawang ATZ). When downwind descend from 2,000ft for visual approach RWY 03, or as cleared by ATC. Pilots should have the runway in sight.

ii. Circling Approach
Join downwind RWY 03 at 2,000ft (keeping clear of Sembawang ATZ). At end of downwind turn left and overfly the runway. When passing over north end of the runway (THR RWY 21), descend from 2,000ft to 1,500ft and turn left for downwind RWY 03. At downwind descend for a visual approach RWY 03 or as cleared by ATC. Pilots should have the runway in sight.

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1.4.2 From JB
Cross JB at or above 6,000ft enroute to Point ALFA. On passing Point ALFA, descend in VMC to 2,000ft or altitude cleared by ATC. (Point ALFA is located at 013033N 1034942E or Radial 296/7 DME VTK)

i. Straight-in-Approach
On passing Point ALFA, turn right for downwind RWY 03 (keeping clear of Sembawang ATZ). At downwind descend from 2,000ft for a visual approach RWY 03, or as cleared by ATC. Pilots should have the runway in sight.

ii. Circling Approach
On passing Point ALFA, turn right for downwind RWY 03 (keeping clear of Sembawang ATZ). At end of downwind, turn left and overfly the runway. Passing over north end of the runway (THR RWY 21), descend from 2,000ft to 1,500ft and turn left for downwind RWY 03. At downwind descend for a visual approach RWY 03 or as cleared by ATC. Pilots should have the runway in sight.

1.4.3 From SJ
Cross SJ at 4,000ft or as cleared by ATC. On passing SJ, descend to 3,000ft for PONJO. On passing PONJO, descend in VMC to 2,000ft or altitude cleared by ATC. (PONJO is located at 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.

1.4.4 Procedures are illustrated in the following charts:

- AD-2-WSSL-VAC-3 : Visual Approach Chart - RWY 03
- AD-2-WSSL-IFR-1 : Seletar Aerodrome Joining Procedures (IFR flights) from JB, KK and SJ - RWY 03

1.5 Joining Procedures for IFR flights from JB, KK or SJ - RWY 21

1.5.1 From KK
Cross KK at or above 3,000ft. On passing KK descend in VMC to 2,000ft or altitude cleared by ATC.

i. Straight-in-Approach
Join direct for a straight-in visual approach Rwy 21 descending from 2,000ft, or as cleared by ATC. Pilots should have the runway in sight.

ii. Circling Approach
Overfly the runway at 2,000ft, or as cleared by ATC. Passing over the south-end of the runway (THR RWY 03), descend from 2,000ft to 1,500ft and turn right for downwind RWY 21 (keeping clear of Light Aircraft Training Area A and Sembawang ATZ). At downwind descend for a visual approach RWY 21 or as cleared by ATC. Pilots should have the runway in sight.

1.5.2 From JB
Cross JB at or above 6,000ft enroute to Point ALFA. On passing Point ALFA, descend in VMC to 2,000ft or altitude cleared by ATC. (Point ALFA is located at 013033N 1034942E or Radial 296 VTK)

i. Straight-in-Approach
On passing Point ALFA, join direct for a straight-in visual approach RWY 21 descending from 2,000ft, or as cleared by ATC (keeping clear of Sembawang ATZ).

ii. Circling Approach
On passing Point ALFA, overfly the runway at 2,000ft. When passing over the south end of the runway (THR RWY 03), descend from 2,000ft to 1,500ft and turn right for downwind RWY 21 (keeping clear of Light Aircraft Training Area A and Sembawang ATZ). At downwind descend for a visual approach RWY 21 or as cleared by ATC. Pilots should have the runway in sight.

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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 JB, KK and SJ - RWY 21

1.6 Holding Procedure

1.6.1 A low level holding procedure is established at SJ DVOR/DME. Suitably equipped aircraft bound for Seletar which may wish to hold for weather improvement may use this procedure (ENR 3.6-3 refers)

1.7 Approaches to Seletar Aerodrome

1.7.1 A deep-water shipping channel approximately 1525m from the northern threshold cuts across the extended centreline of Seletar RWY 21.

1.7.2 Information on the mast heights of tall vessels is relayed to ATC by Maritime and Port Authority of Singapore. ATC shall inform pilots of landing and departing aircraft of such information if the reported mast height of the vessel is above 30m.

1.7.3 At night ATC shall not permit landing on RWY 21 when vessels of mast height above 30m are reported.

1.7.4 Aircraft making approaches into Seletar are required to keep clear of Sembawang ATZ and any Prohibited/Restricted/Danger Areas (e.g. WSR38 and WSD4) within the vicinity.

1.7.5 Aircraft are restricted from overflying built-up residential areas around Seletar Airport (charts AD-2-WSSL-VAC-1 to AD-2-WSSL-VAC-4 refer) at an altitude of below 1,500ft. Aircraft types which are unable to safely manoeuvre clear of the built-up residential areas are not allowed to operate at Seletar Airport.

2 DEPARTURES FROM SELETAR AERODROME

2.1 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.

2.2 The pilot-in-command or the operator of IFR flight operating out of Seletar is required to file via KK or RECHI - PONJO - SJ under item 15 of the flight plan. All departure clearances subject to ATC coordination.

2.3 Aircraft departing Seletar are required to adhere to the speed restrictions (charts AD-2-WSSL-VDC-1 and AD-2-WSSL-VDC-2 refer).

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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.

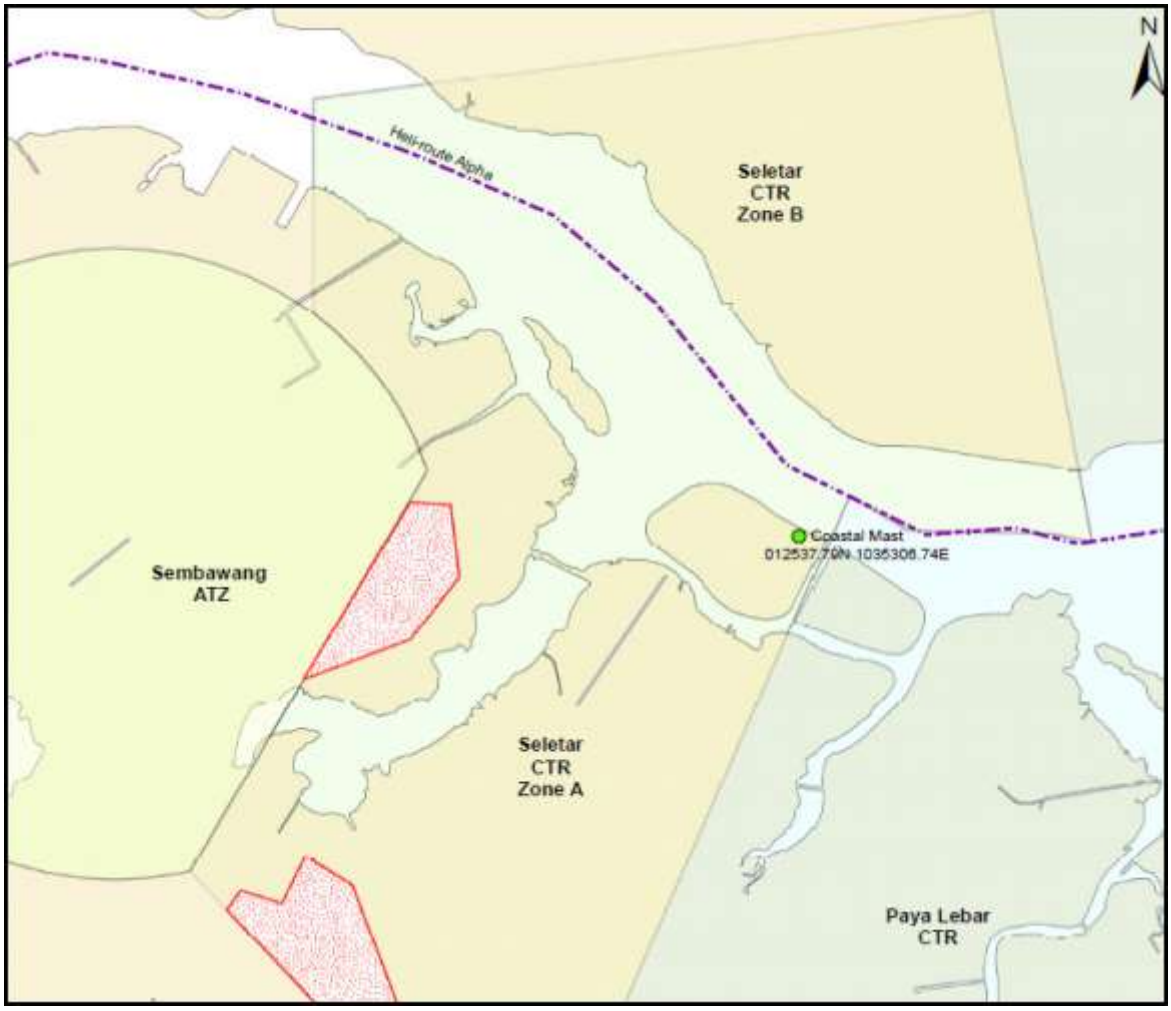
2 HELICOPTER CROSSING SELETAR NORTHERN EXTENDED CENTRELINE

2.1 Due to flying activities in Seletar Control Zone, all helicopters flying on Heli-route Alpha and intending to cross the northern extended centreline of Seletar Aerodrome shall obtain a positive clearance from Seletar Tower on 118.45MHz prior to crossing (see chart below).

2.2 For eastbound crossing, all helicopters are to hold over the western tip of Seletar Island until a clearance has been issued by Seletar Tower.

2.3 For westbound crossing, all helicopters are to hold on Heli-route Alpha abeam the coastal mast until a clearance has been issued by Seletar Tower.

2.4 The holding altitude is 200 feet or otherwise instructed by ATC.



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WSSL AD 2.24 CHARTS RELATED TO SELETAR AIRPORT

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AERODROME CHART - ICAO

01° 25' 01.04"N
103° 52' 03.52"E

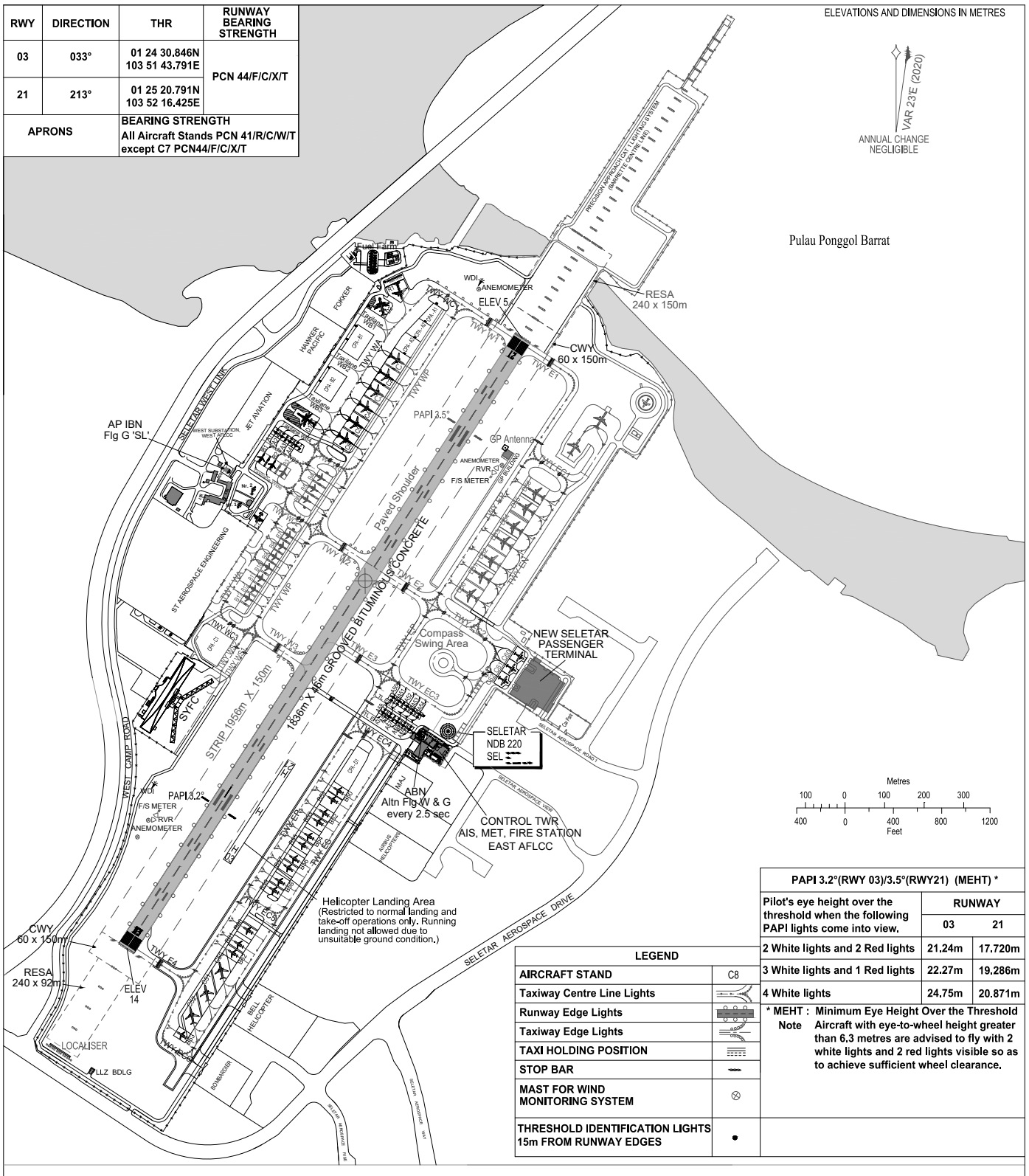
ELEV 14m

TWR	118.45
	121.6

SINGAPORE/SELETAR

RWY	DIRECTION	THR	RUNWAY BEARING STRENGTH
03	033°	01 24 30.846N 103 51 43.791E	PCN 44/F/C/X/T
21	213°	01 25 20.791N 103 52 16.425E	
APRONS		BEARING STRENGTH All Aircraft Stands PCN 41/R/C/W/T except C7 PCN44/F/C/X/T	

ELEVATIONS AND DIMENSIONS IN METRES



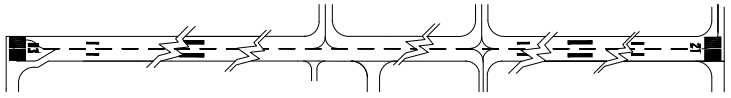
LEGEND	
AIRCRAFT STAND	C8
Taxiway Centre Line Lights	
Runway Edge Lights	
Taxiway Edge Lights	
TAXI HOLDING POSITION	
STOP BAR	
MAST FOR WIND MONITORING SYSTEM	⊗
THRESHOLD IDENTIFICATION LIGHTS 15m FROM RUNWAY EDGES	•

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

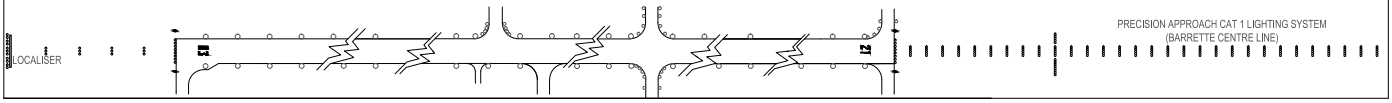
* MEHT : Minimum Eye Height Over the Threshold

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



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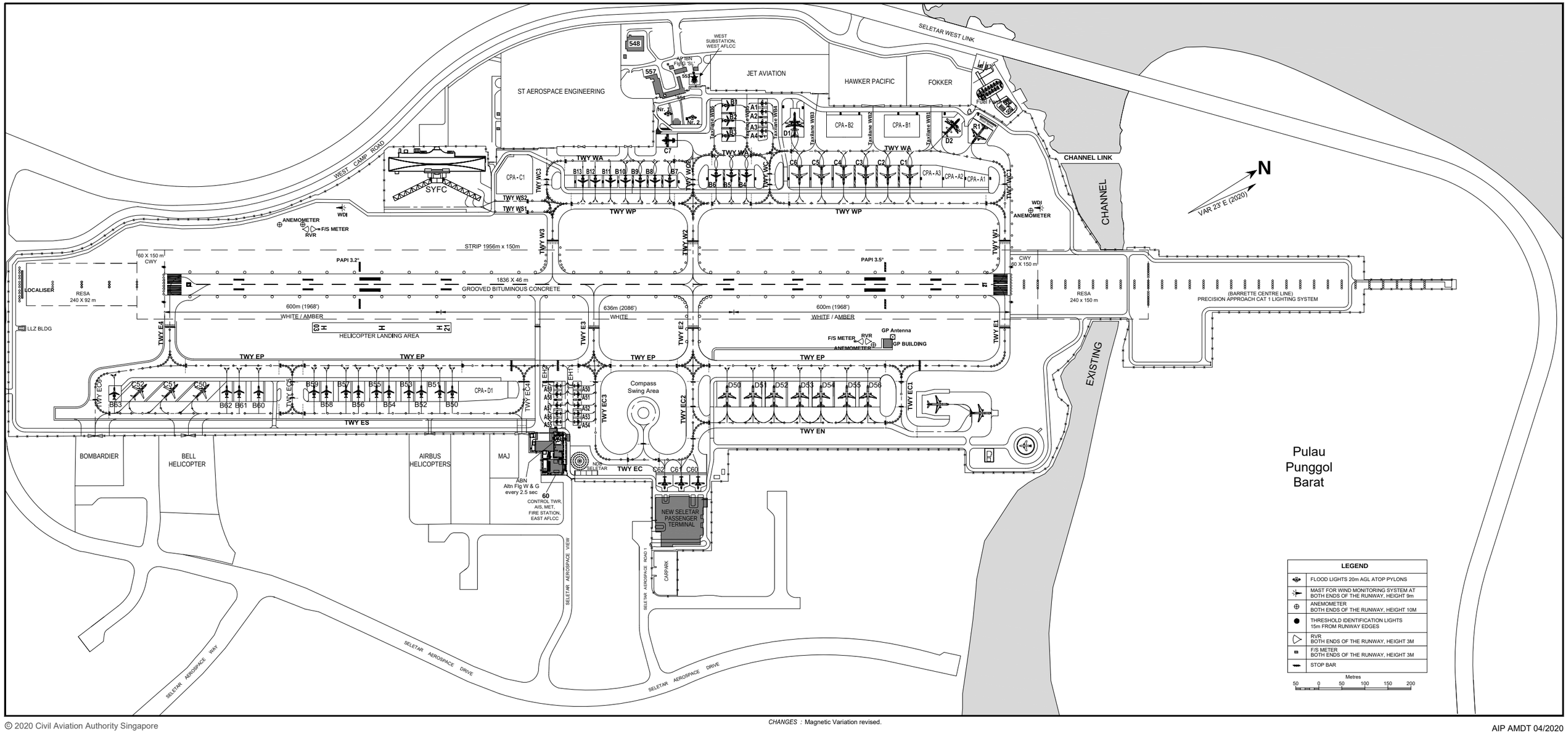
INS COORDINATES FOR AIRCRAFT STANDS

STAND NR	NORTH LATITUDE	EAST LONGITUDE	ELEVATION
A1	01 25 13.102	103 51 56.167	6.181m (20.280ft)
A2	01 25 12.779	103 51 56.653	6.338m (20.795ft)
A3	01 25 12.350	103 51 57.301	6.586m (21.609ft)
A4	01 25 12.029	103 51 57.787	6.761m (22.183ft)
A50	01 24 51.431	103 52 05.765	7.807m (25.615ft)
A51	01 24 51.110	103 52 06.251	7.948m (26.077ft)
A52	01 24 50.681	103 52 06.900	8.105m (26.593ft)
A53	01 24 50.358	103 52 07.387	8.211m (26.940ft)
A54	01 24 50.036	103 52 07.874	8.337m (27.354ft)
A55	01 24 48.591	103 52 06.930	8.750m (28.709ft)
A56	01 24 48.913	103 52 06.443	8.587m (28.174ft)
A57	01 24 49.236	103 52 05.957	8.402m (27.567ft)
A58	01 24 49.665	103 52 05.309	8.179m (26.835ft)
A59	01 24 49.987	103 52 04.822	8.014m (26.294ft)
B1	01 25 11.401	103 51 55.231	6.301m (20.674ft)
B2	01 25 10.817	103 51 56.116	6.639m (21.783ft)
B3	01 25 10.221	103 51 57.014	6.967m (22.859ft)
B4	01 25 09.180	103 52 00.361	7.703m (25.274ft)
B5	01 25 08.258	103 51 59.758	7.933m (26.028ft)
B6	01 25 07.348	103 51 59.163	8.163m (26.783ft)
B7	01 25 04.505	103 51 57.519	8.442m (27.698ft)
B8	01 25 03.635	103 51 56.951	8.406m (27.580ft)
B9	01 25 02.765	103 51 56.382	8.396m (27.547ft)
B10	01 25 01.893	103 51 55.814	8.383m (27.505ft)
B11	01 25 01.006	103 51 55.237	8.330m (27.331ft)
B12	01 25 00.109	103 51 54.650	8.449m (27.721ft)
B13	01 24 59.374	103 51 54.170	8.571m (28.121ft)
B50	01 24 43.887	103 52 00.875	8.753m (28.719ft)
B51	01 24 43.153	103 52 00.394	8.847m (29.027ft)
B52	01 24 42.063	103 51 59.681	8.988m (29.490ft)
B53	01 24 41.328	103 51 59.202	9.183m (30.129ft)
B54	01 24 40.154	103 51 58.435	9.358m (30.704ft)
B55	01 24 39.420	103 51 57.954	9.434m (30.953ft)
B56	01 24 38.347	103 51 57.253	9.592m (31.471ft)
B57	01 24 37.614	103 51 56.774	9.679m (31.757ft)
B58	01 24 36.462	103 51 56.021	9.806m (32.172ft)
B59	01 24 35.728	103 51 55.541	9.930m (32.580ft)
B60	01 24 32.416	103 51 53.376	10.094m (33.117ft)
B61	01 24 31.265	103 51 52.624	10.177m (33.389ft)
B62	01 24 30.529	103 51 52.144	10.246m (33.617ft)
B63	01 24 23.858	103 51 47.937	10.639m (34.907ft)
C1	01 25 18.803	103 52 06.627	5.105m (16.750ft)
C2	01 25 17.498	103 52 05.773	5.423m (17.793ft)
C3	01 25 16.192	103 52 04.921	5.759m (18.895ft)
C4	01 25 14.887	103 52 04.067	6.256m (20.526ft)
C5	01 25 13.581	103 52 03.214	6.824m (22.390ft)
C6	01 25 12.275	103 52 02.360	7.304m (23.964ft)
C7	01 25 05.738	103 51 54.466	7.192m (23.596ft)
C50	01 24 29.476	103 51 51.396	10.381m (34.060ft)
C51	01 24 27.626	103 51 50.188	10.589m (34.743ft)
C52	01 24 25.781	103 51 48.979	10.770m (35.335ft)
C60	01 24 54.470	103 52 16.296	6.280m (20.604ft)
C61	01 24 53.483	103 52 15.651	6.301m (20.673ft)
C62	01 24 52.496	103 52 15.006	6.312m (20.709ft)
D1	01 25 14.663	103 51 58.151	6.408m (21.025ft)
D2	01 25 24.033	103 52 04.804	3.471m (11.388ft)
D50	01 25 00.056	103 52 11.563	6.680m (21.916ft)
D51	01 25 01.585	103 52 12.561	6.440m (21.129ft)
D52	01 25 02.828	103 52 13.373	6.280m (20.604ft)
D53	01 25 04.357	103 52 14.372	6.040m (19.816ft)
D54	01 25 05.600	103 52 15.184	5.820m (19.094ft)
D55	01 25 07.129	103 52 16.184	5.550m (18.209ft)
D56	01 25 08.372	103 52 16.997	5.320m (17.454ft)

SELETAR AERODROME

LAYOUT OF SIGNIFICANT AERODROME BUILDINGS AND APRON FACILITIES



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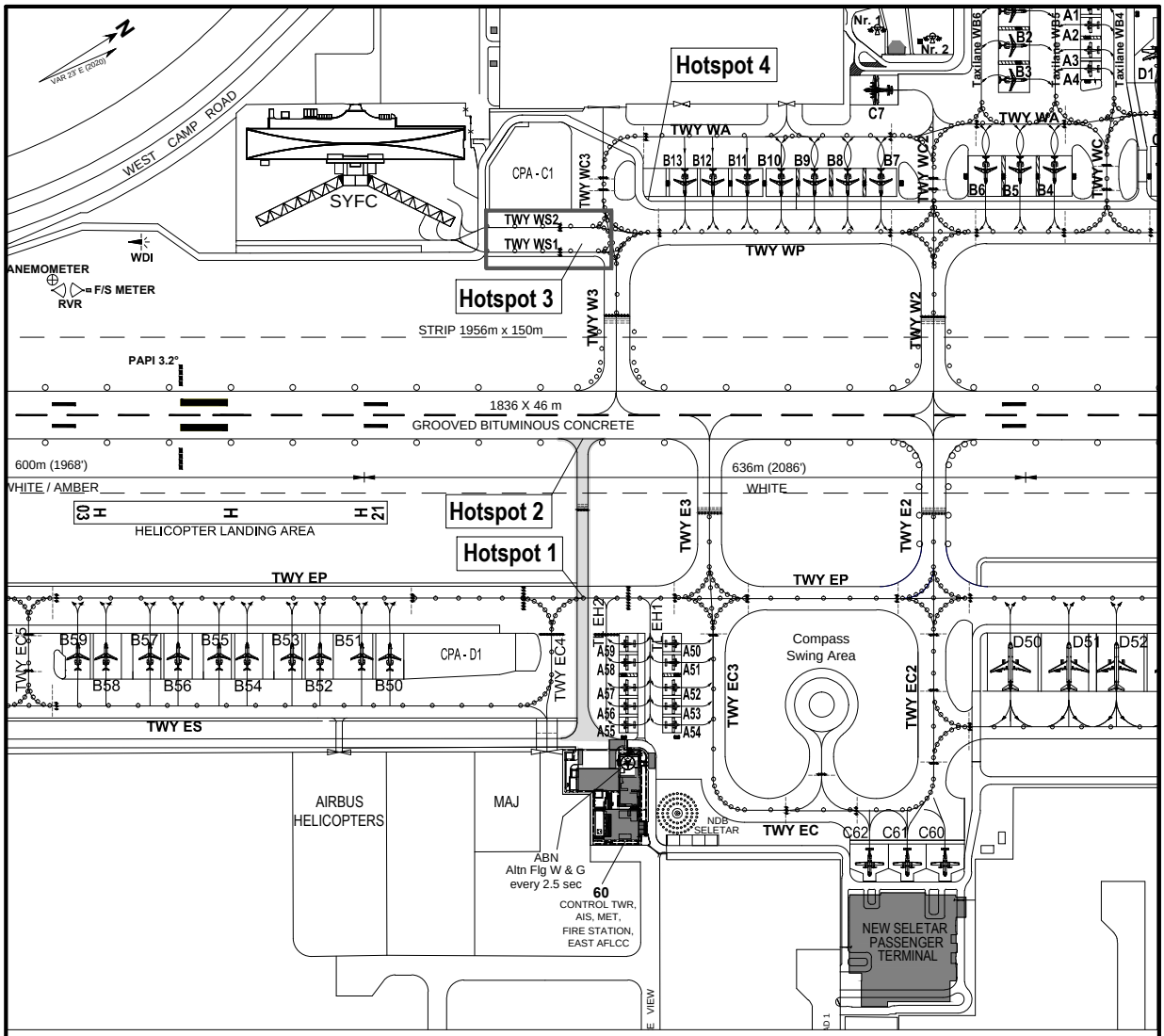
AERODROME HOTSPOTS



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.

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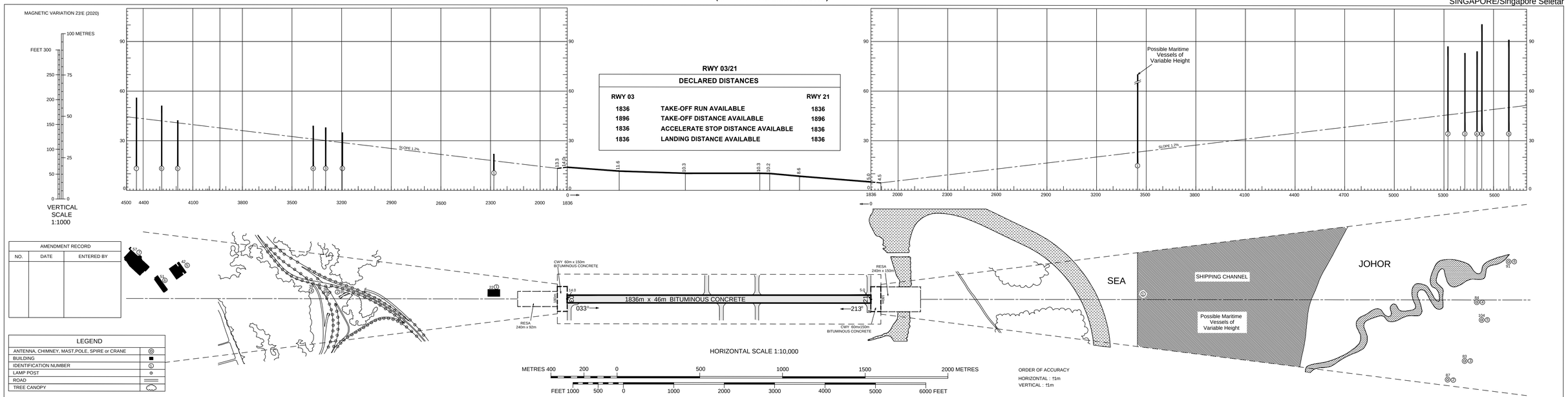
DIMENSIONS AND ELEVATIONS IN METRES

AERODROME OBSTACLE CHART - ICAO
TYPE A (OPERATING LIMITATIONS)

SINGAPORE/Singapore Seletar



AMENDMENT RECORD		
NO.	DATE	ENTERED BY

LEGEND	
ANTENNA, CHIMNEY, MAST,POLE, SPIRE or CRANE	◎
BUILDING	■
IDENTIFICATION NUMBER	①
LAMP POST	⊕
ROAD	═══
TREE CANOPY	☁

ORDER OF ACCURACY
HORIZONTAL : ±1m
VERTICAL : ±1m

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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

INNER HORIZONTAL SURFACE 56m

CONICAL SURFACE Slope 1:20

APPROACH SURFACE SLOPE 1:40

TAKE-OFF CLIMB SURFACE SLOPE 1:50

APPROACH SURFACE SLOPE 1:50

TRANSITIONAL SURFACE SLOPE 1:7

Mobile Cranes 128

Possible Maritime Vessels of Variable Height

Mobile Cranes 100.5

P. SELETAR

P. PUNGGOL BARAT

P. PUNGGOL TIMOR

RESA 240m

CWY 60m

21

033°

213°

22

Lower Seletar Reservoir

Buildings up to 90m

Punggol

Sungai

Serangoon

MRT LINE

LRT LINE

Lower Pierce Reservoir

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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GRID : Grid lines and co-ordinates shown are based on WGS-84 datum.

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VISUAL APPROACH CHART - ICAO

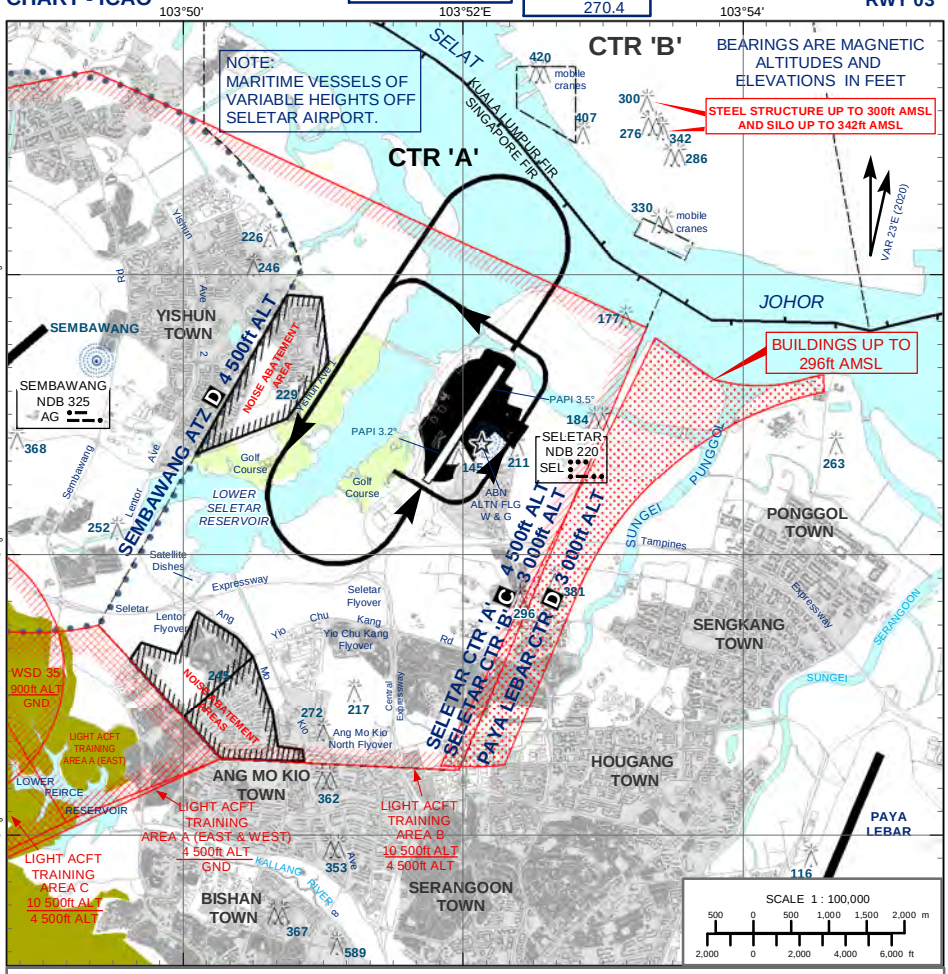
AD ELEV 46 ft

ATIS AP ID-WSSL 128.425

APP 124.05 121.625
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 CTR and Paya Lebar CTR.

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CHANGES : ATIS and APP frequencies revised.
Magnetic Variation revised.

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VISUAL APPROACH CHART - ICAO

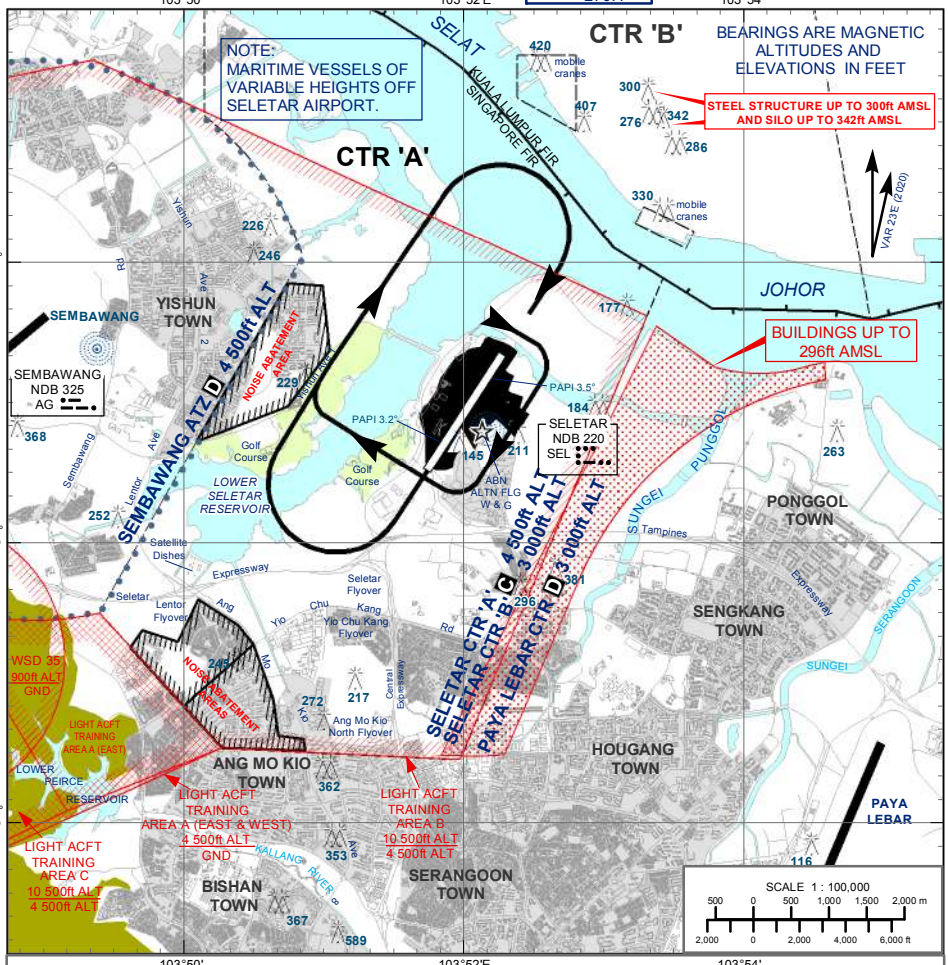
AD ELEV 46 ft

ATIS AP ID-WSSL 128.425

APP 124.05 121.625
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 CTR and Paya Lebar CTR.

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VISUAL APPROACH CHART - ICAO

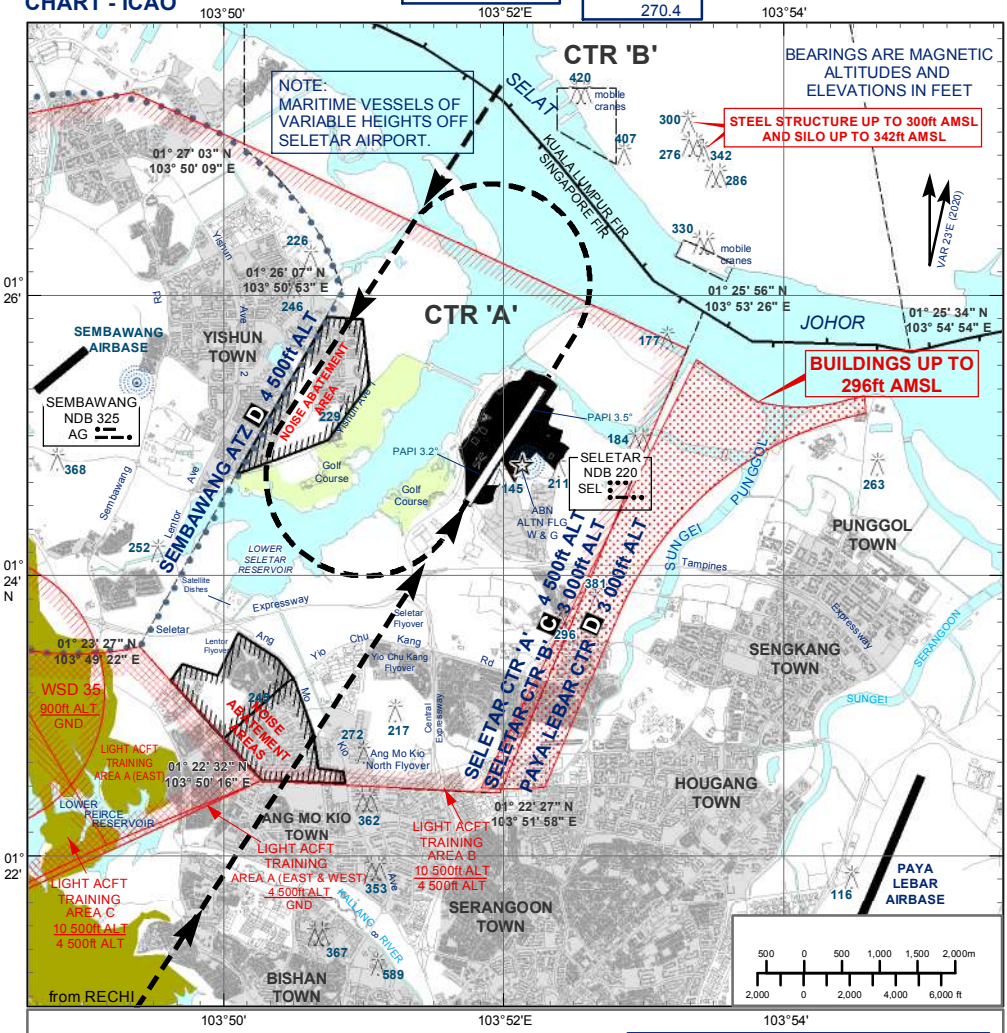
AD ELEV 46 ft

ATIS AP ID-WSSL 128.425

APP 124.05 121.625
TWR 118.45 270.4

SINGAPORE/SELETAR

RWY 03



ADVISORY JOINING PROCEDURES - RWY 03

Straight-in Approach

1) From JB or KK, join downwind at 2 000ft 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.
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.
3) Joining aircraft shall give way to circuit traffic already on downwind.

Circling Approach

1) From JB or KK, join downwind at 2 000ft at a speed of not more than 160kt. 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 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 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.

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.

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.

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CHANGES : ATIS and APP frequencies revised. Magnetic Variation revised.

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VISUAL APPROACH CHART - ICAO

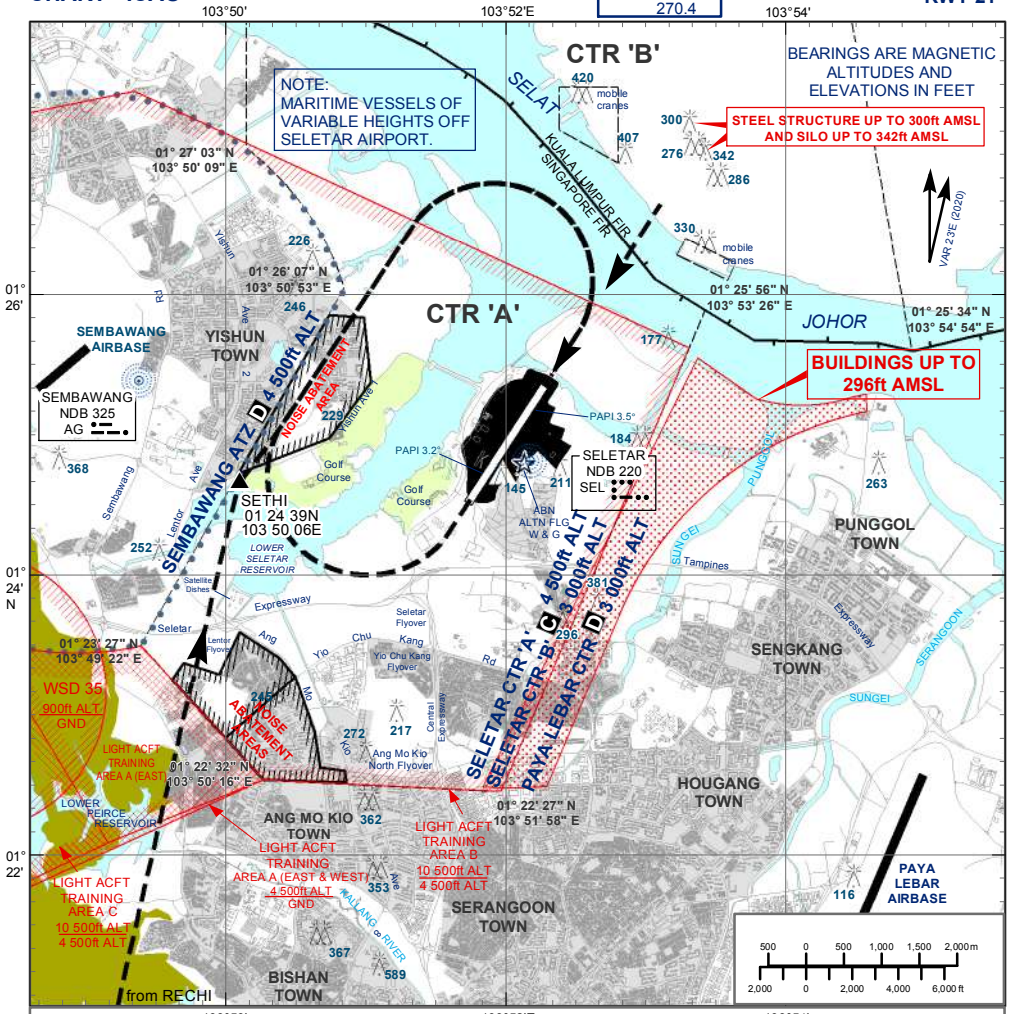
AD ELEV 46 ft

ATIS AP ID-WSSL 128.425

APP 124.05 121.625
TWR 118.45 270.4

SINGAPORE/SELETAR

RWY 21



ADVISORY JOINING PROCEDURES - RWY 21

Straight-in Approach

1) From JB or KK, 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 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.
3) Joining aircraft shall give way to circuit traffic already on downwind.

Circling Approach

1) From JB or KK, 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 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 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 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 : ATIS and APP frequencies revised.
Magnetic Variation revised.

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VISUAL DEPARTURE CHART

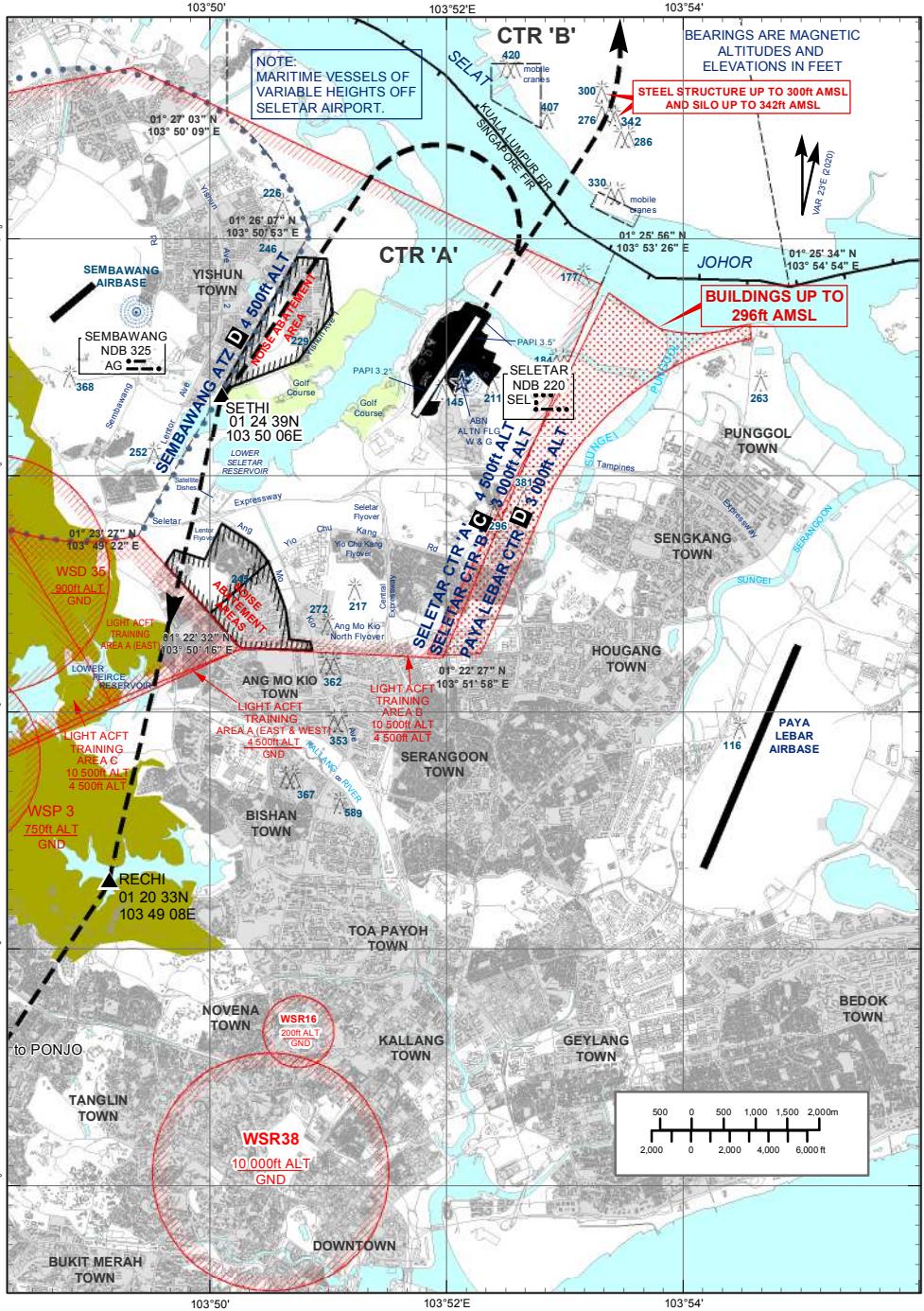
AD ELEV 46 ft

ATIS AP ID-WSSL 128.425

APP 124.05
TWR 118.45
270.4

SINGAPORE/SELETAR

RWY 03



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CHANGES : ATIS and APP frequencies revised.
Magnetic Variation revised.

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 KK 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 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) 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.

VISUAL DEPARTURE CHART

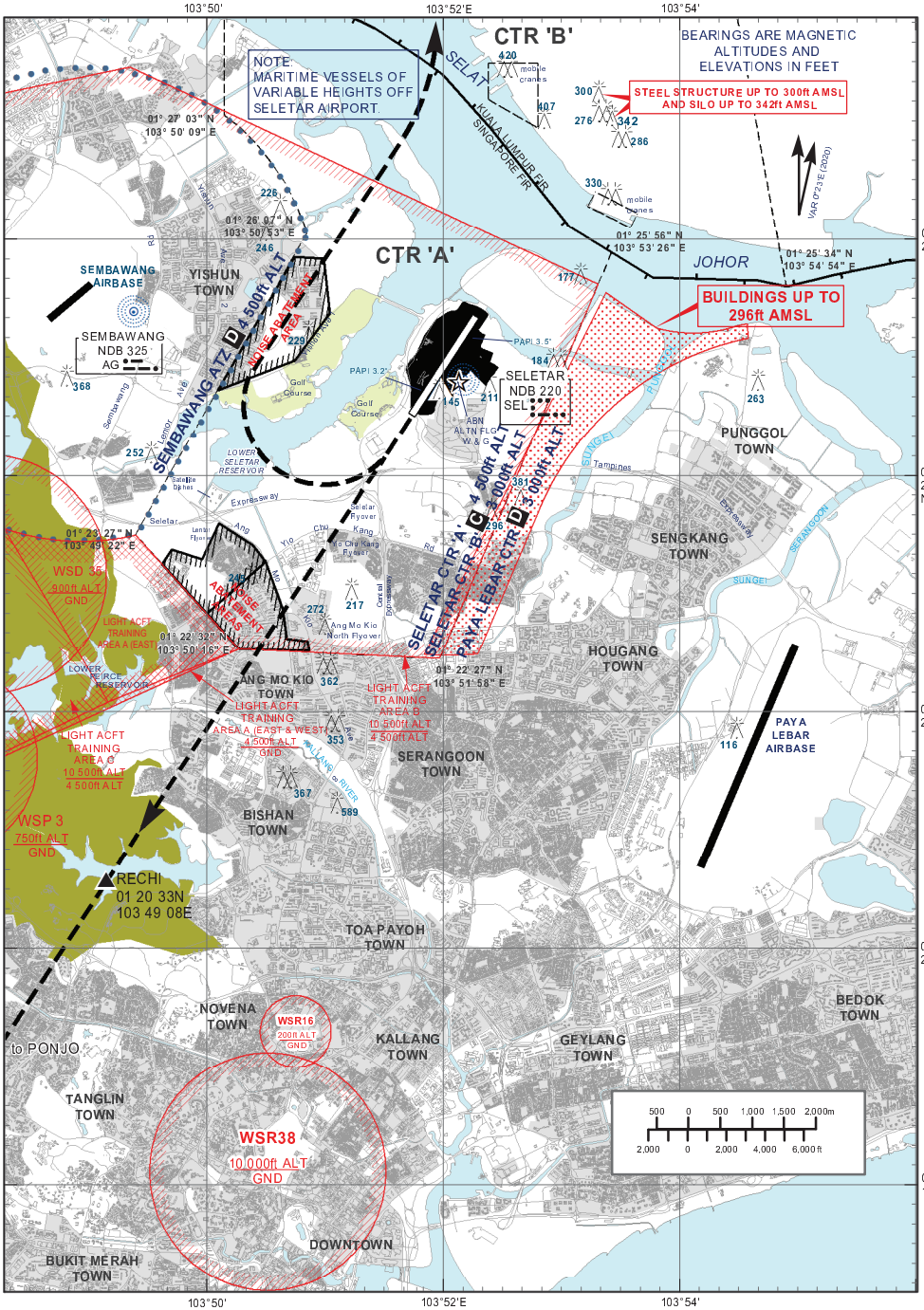
AD ELEV 46 ft

ATIS AP ID-WSSL 128.425

APP 124.05
TWR 118.45
270.4

SINGAPORE/SELETAR

RWY 21



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CHANGES : Caution note added on flip side.

ADVISORY DEPARTURE PROCEDURES FOR RUNWAY 21

On departure, pilots can expect climb to an initial altitude cleared by ATC. Pilots of fixed-wing aircraft navigating to KK 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 KK 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 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) 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 KK, Pilots shall maintain a speed of not more than 185kts until established on the downwind leg to mitigate risk of encroaching into Sembawang ATZ.

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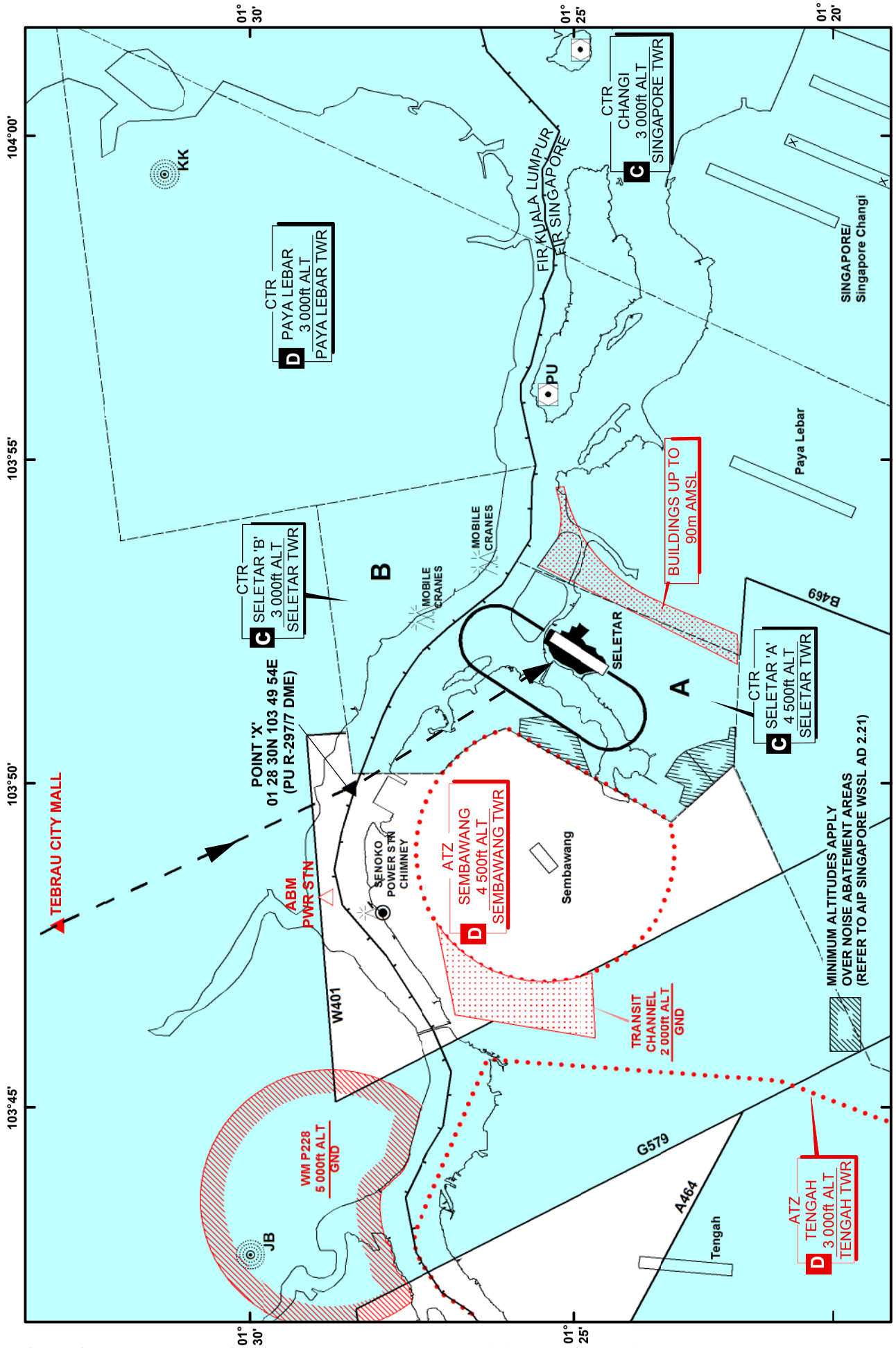
SELETAR AERODROME
JOINING PROCEDURE (VFR FLIGHTS) FROM JOHOR BAHRU



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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

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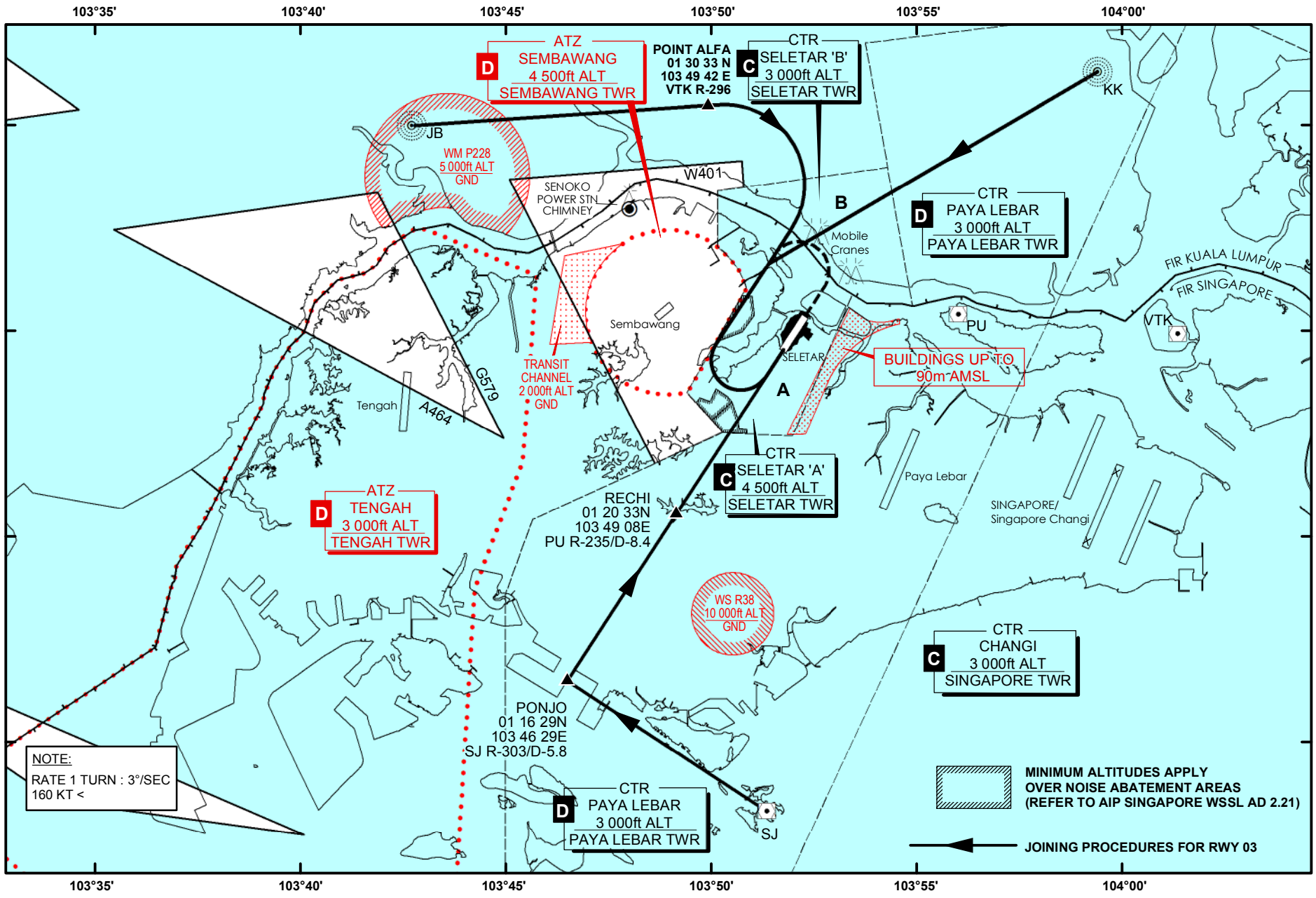
SELETAR AERODROME JOINING PROCEDURE (IFR FLIGHTS) FROM JB, KK AND SJ - RUNWAY 03



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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

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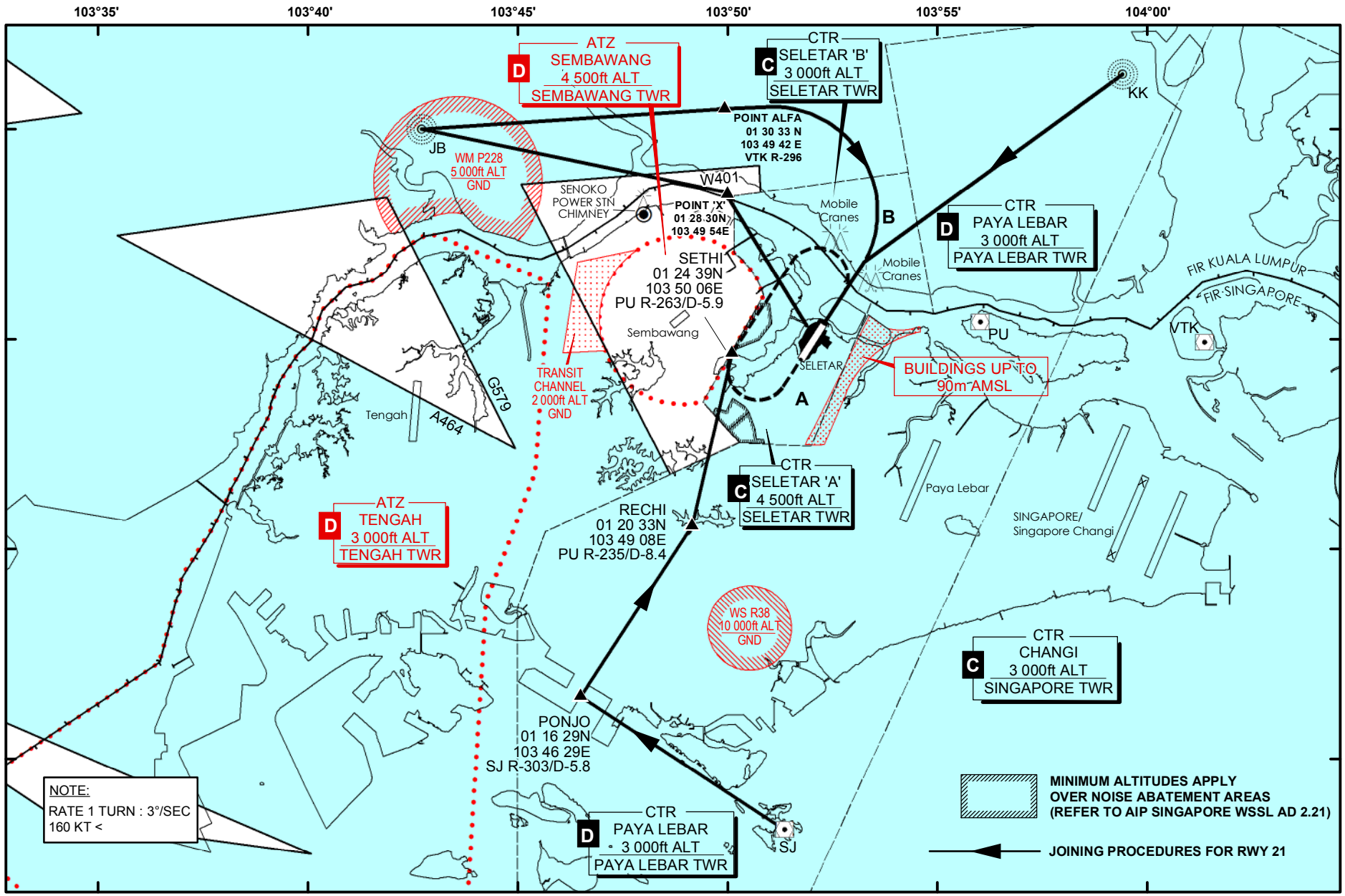
SELETAR AERODROME JOINING PROCEDURE (IFR FLIGHTS) FROM JB, KK AND SJ - RUNWAY 21



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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

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WSAP — PAYA LEBAR

Note: The following sections in this chapter are intentionally left blank:
AD 2.16, AD 2.21.

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*	012120.6N 1035410.0E(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 SINGAPORE 534395 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.

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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
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 DATA

1	*Apron surface and strength*	Strength: LCN80 - F (Apron A) Strength: LCN100 - PCN71/R/B/W/U (Apron B) Strength: LCN100 - PCN72/F/B/W/U (Apron C) Strength: LCN80 - F (Jet Apron/Jet Apron Extension)
2	*Taxiway width, surface and strength*	Strength: PCN72/F/B/W/U
3	*Remarks*	TWY between TWY W1 and TWY W2 closed to all code C and above aircraft. Pilots to exercise caution.

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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		
	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		

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SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS	
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	LLS 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.

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, 46.2ft 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, marked and LGTD.	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.

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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 (PCN) 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	023° GEO 023° MAG	3780 x 61	72/F/B/W/U Bituminous concrete	012041.08N 1035410.36E	12.9 M (43ft)
20	203° GEO 203° MAG	3780 x 61	72/F/B/W/U Bituminous concrete	012234.41N 1035458.53E	19.7 M (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	012120.6N 1035410.0E; Flashing Red 'PL" ; Operating hours HN and IMC

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 3000 FT 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*	11000 FT (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	121.625 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
ACC	SINGAPORE RADAR	P123.7 MHz S127.3 MHz	H24	for ATS routes B469, G219, G334, R208, L625, L629, L635, L642, L644 , M751, M753, M758, M761, M763, M771, N875, N884, N891, N892 and Y514.
		133.8 MHz	0000-1430	
		P134.7 MHz S134.15 MHz	H24	for ATS Routes G334, L625, L644, M758, M761, M771, N875, N884 and N892.
		P133.25 MHz S135.8 MHz		for ATS Routes A457, A464, A576, B466, L762, M630, R325 and R469.
		P134.2 MHz S133.35 MHz		for ATS Routes G334, G580, L625, L644, M646, M767 and N875.
		P134.4 MHz S128.1 MHz		for ATS Routes B338, B469, B470, G579, L504, L644, M635, M774, N502, N875, P501 and in area in the immediate vicinity of Singapore.
	SINGAPORE CONTROL	P134.35 MHz S133.6 MHz	H24	AUTOMATIC DEPENDENT SURVEILLANCE BROADCAST (ADS-B) OUT EXCLUSIVE AIRSPACE WITHIN PARTS OF THE SINGAPORE FIR - 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), 045223N 1041442E (ENREP), 045000N 1034400E, thence north along the Singapore FIR boundary to 070000N 1080000E at or above FL290.
	SINGAPORE RADIO	6556 kHz 11297 kHz	H24	SEA 1. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
		5655 kHz 8942 kHz 11396 kHz		SEA 2. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
		6556 kHz		SEA 3. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.

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WSAP AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of Aid and MAG Variation	IDENT	FREQ	OPR Hour	Position of transmitting Antenna Coordinates	DME transmitting Antenna Elevation / Remarks
TACAN	PLA	CH110X	H24	012224.00N 1035451.00E	030° MAG 2.375km from ARP. Maint Period: BTN 0001-0900 Second SAT of EV month For homing purposes only.
PAPA UNIFORM DVOR/DME	PU	115.1 MHz CH98X	H24	012523.99N 1035559.74E	020° MAG 9km from THR RWY 02 Antenna Hgt: 190ft AMSL. Coverage 200NM. Maint Period: BTN 0200-0600 Third WED of EV month
SINJON DVOR/DME	SJ	113.5 MHz CH82X	H24	011319.28N 1035120.08E	201° MAG 14.5km from THR RWY 02 (Paya Lebar). Antenna HGT: 194ft AMSL Coverage 200NM Maint Period: BTN 0200-0600 Third THU of EV month
ILS LLZ RWY 02	IPN	109.3MHz	H24	012246.41N 1035503.64E	LOC 401m from THR RWY 20 along centreline of RWY. Course width 3 DEG. Maint Period: BTN 0001-0900 First SUN of EV month
ILS GP RWY 02	-	332.00MHz	H24	012050.42N 1035410.11E	GP angle 3 DEG.
ILS DME RWY 02	IPN	CH30X	H24	012050.42N 1035410.11E	DME co-located with GP
ILS LLZ RWY 20	IPS	111.5MHz	H24	012027.24N 1035404.48E	LOC 462m from THR RWY 02 along centreline of RWY. Course width 3 deg. Maint Period: BTN 0001-0900 Second SUN of EV month
ILS GP RWY 20	-	332.90MHz	H24	012227.29N 1035451.29E	GP angle 3 deg.
ILS DME RWY 20	IPS	CH52X	H24	012227.29N 1035451.29E	DME co-located with GP

WSAP AD 2.20 LOCAL TRAFFIC REGULATIONS - DESIGNATION OF PAYA LEBAR AIRPORT AS AN ALTERNATE AD FOR SINGAPORE CHANGI AIRPORT

1 INTRODUCTION

1.1 Paya Lebar Airport is designated as an alternate aerodrome to Singapore Changi Airport.

1.2 As Paya Lebar Airport is a joint civil/military aerodrome, its use as a planned alternate aerodrome for Singapore Changi Airport is subjected to certain restrictions and limitations. It also has limited ground, baggage and passenger handling facilities for civilian aircraft operations, such as passenger boarding bridges.

2 MANNING OF PAYA LEBAR AIRPORT

2.1 The airport is open from 2300-1100 on SUN-MON to THU-FRI. It is closed on Saturdays, Sundays and Public Holidays. Outside the stipulated operating hours and during airport closure, Paya Lebar Airport will be opened at 30 minutes' notice to accept diversion flights into the aerodrome.

2.2 Airline operators are requested to inform the Airport Manager and the Duty Tower Controller or SATCC Watch Manager at Singapore Changi Airport as soon as it is known that their service will require the use of Paya Lebar Airport. Revised ETAs and/or ETDs are to be notified as soon as known.

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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/test flights scheduled to depart and arrive back to the airport, such departures may be held off when the aerodrome visibility falls below 6km, or when the aerodrome prevailing cloud base is lower than 1,000ft.

3 OPERATIONAL SERVICES

3.1 Air-ground-air communications maintained by Paya Lebar Airport for aerodrome/approach control service are listed in page WSAP AD 2-7.

4 PASSENGER CLEARANCE

4.1 All Customs, Health and Immigration clearances will be carried out at Singapore Changi Airport.

4.2 The diverting aircraft Airline's Coordinator and its ground handling agency staff shall be present to provide assistance when an aircraft is required to land at Paya Lebar Airport.

5 SECURITY

5.1 All airline personnel, including ground handlers and support staff who have to proceed to Paya Lebar Airport must wear their Singapore Changi Airport passes at a prominent position for entry to the aircraft parking area. All personnel not in possession of the laminated Singapore Changi Airport pass will be denied entry into Paya Lebar Airport by the RSAF Security Guard. Entry into the airport by both the airline personnel and service equipment is via the main gate. The Airline Engineering Coordinator shall be responsible for the proper positioning of the ground servicing equipment and vehicles in the Apron Area where arriving aircraft are to be parked.

5.2 The security of civil aircraft parked in the Apron is the responsibility of the aircraft owner and any security service obtained shall first be cleared with the Paya Lebar Airport flight security.

6 AIRCRAFT STAND ALLOCATION

6.1 Nine aircraft parking positions in Apron C and on taxiway fillets are available for civil aircraft. A separation of 40 feet between wing-tips should be maintained.

6.2 Aircraft parking positions will be issued by the Paya Lebar Tower and the Airline Engineering Coordinator shall provide the marshalling services. Close coordination between the Airline Engineering Coordinator and the Tower Controller is essential in regard to aircraft parking and positioning of servicing equipment in and around the parking apron.

7 AIRCRAFT REFUELLING

7.1 ST Airport Services Pte Ltd (STARS) is the assigned aircraft fuelling agency. However, prior arrangement must be made between the airline and STARS for such services. The refuelling rate available is 350 imperial gallons per minute (IGPM).

8 GROUND OPERATIONS

8.1 Singapore Airport Terminal Services (SATS) and DNATA Singapore Pte Ltd (DNATA) will provide all ground services at one hour's prior notice except engineering services which will be provided by Singapore Airlines.

9 FULL EMERGENCY/CRASH PROCEDURE

9.1 In the event of a Full Emergency being declared on a civil aircraft diverted to Paya Lebar AP, Full Emergency/Crash Procedures applicable to Singapore Changi AP will equally apply to Paya Lebar AP.

9.2 Alerting of all outside organisations such as the Singapore Civil Defence Force, Police, MINDEF and ambulance services shall be carried out by the Singapore Changi AP Tower Controller.

10 METEOROLOGICAL AND AERONAUTICAL INFORMATION SERVICE

10.1 Meteorological service is available 24 hours at the 6th floor of the building where Paya Lebar Air Traffic Control Tower is located.

10.2 Aeronautical Information Service is available at Singapore Changi Airport.

11 ATC SERVICE OUTSIDE STIPULATED OPERATING HOURS

11.1 Radar service will not be available at Paya Lebar Airport outside its stipulated operating hours.

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WSAP AD 2.22 FLIGHT AND GROUND PROCEDURES

1 DEPARTURE AND ARRIVAL PROCEDURES

1.1 The designated runway for departures is RWY 02 and for arrivals is RWY 20.

1.2 The airport will hold off all departures and arrivals when the aerodrome visibility falls below 3km, or when the aerodrome prevailing cloud base is lower than 500ft. This is a safety consideration to avoid aircraft from carrying out a missed approach and overflying the populace under an adverse weather condition.

2 STANDARD INSTRUMENT DEPARTURES

November 1 Departure - Climb to maintain 3,000ft on RWY heading for PU DVOR/DME. At PU DVOR/ DME, turn left heading 010. Contact Seletar APP on 126.025 MHz or as instructed by ATC.

November 2 Departure - Climb to maintain 3,000ft on RWY heading for PU DVOR/DME. At PU DVOR/ DME, maintain heading 020. Contact Seletar APP on 126.025 MHz or as instructed by ATC.

November 3 Departure - Climb to maintain 3,000ft on RWY heading for PU DVOR/DME. At PU DVOR/ DME, turn left heading 360. Contact Seletar APP on 126.025 MHz or as instructed by ATC.

3 STANDARD ARRIVALS

When Paya Lebar is VMC - Expect radar vector to RWY 20 for visual straight-in approach.

When Paya Lebar is IMC - Expect radar vector to RWY 20 for ILS or PU DVOR/DME approach.

WSAP AD 2.23 ADDITIONAL INFORMATION

1 OUTDOOR LIGHT AND WATER SHOW

1.1 An outdoor light and water show will take place between 1200-1215, 1300-1315, 1400-1415 Friday to Saturday and 1200-1215, 1300-1315 Sunday to Thursday at 011704N 1035130E (within Paya Lebar Control Zone). GND - UNL.

WSAP AD 2.24 CHARTS RELATED TO PAYA LEBAR AIRPORT

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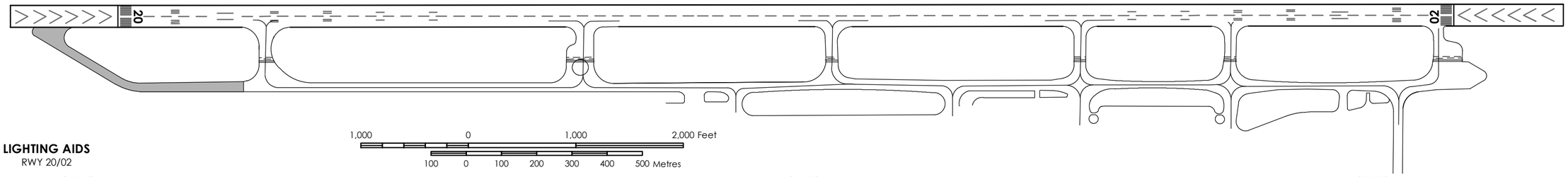
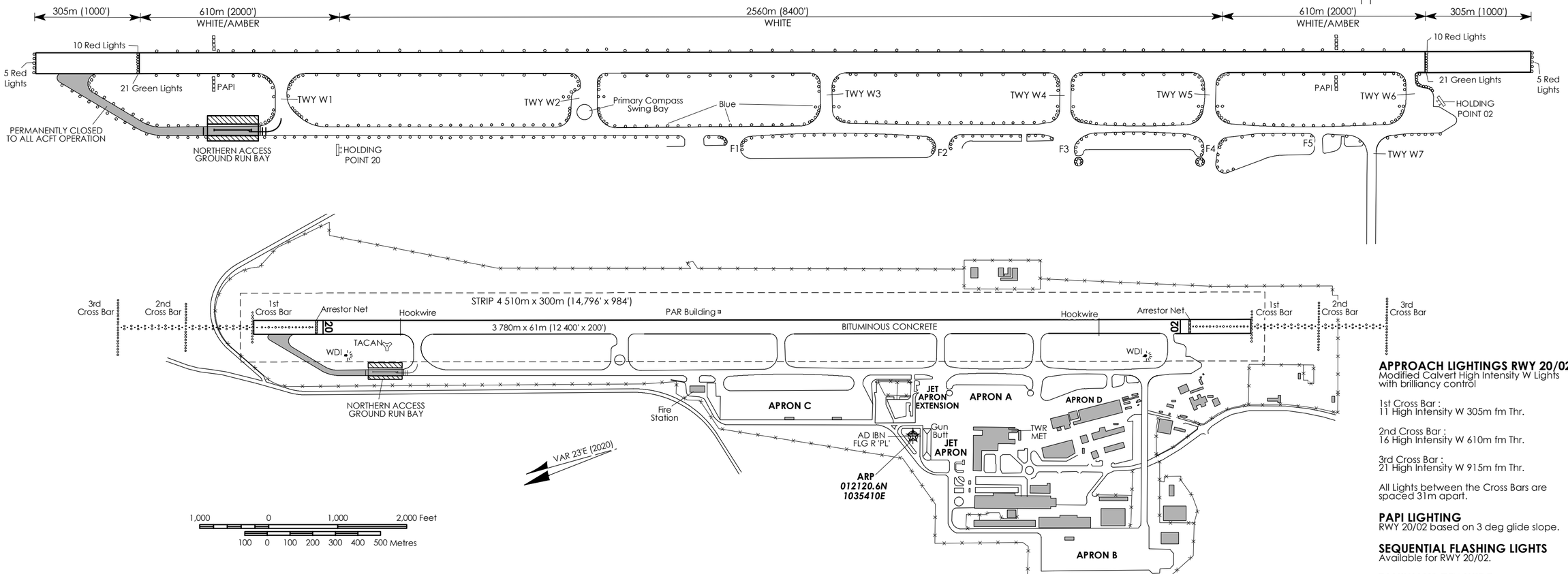
AERODROME CHART - PAYA LEBAR AIRPORT

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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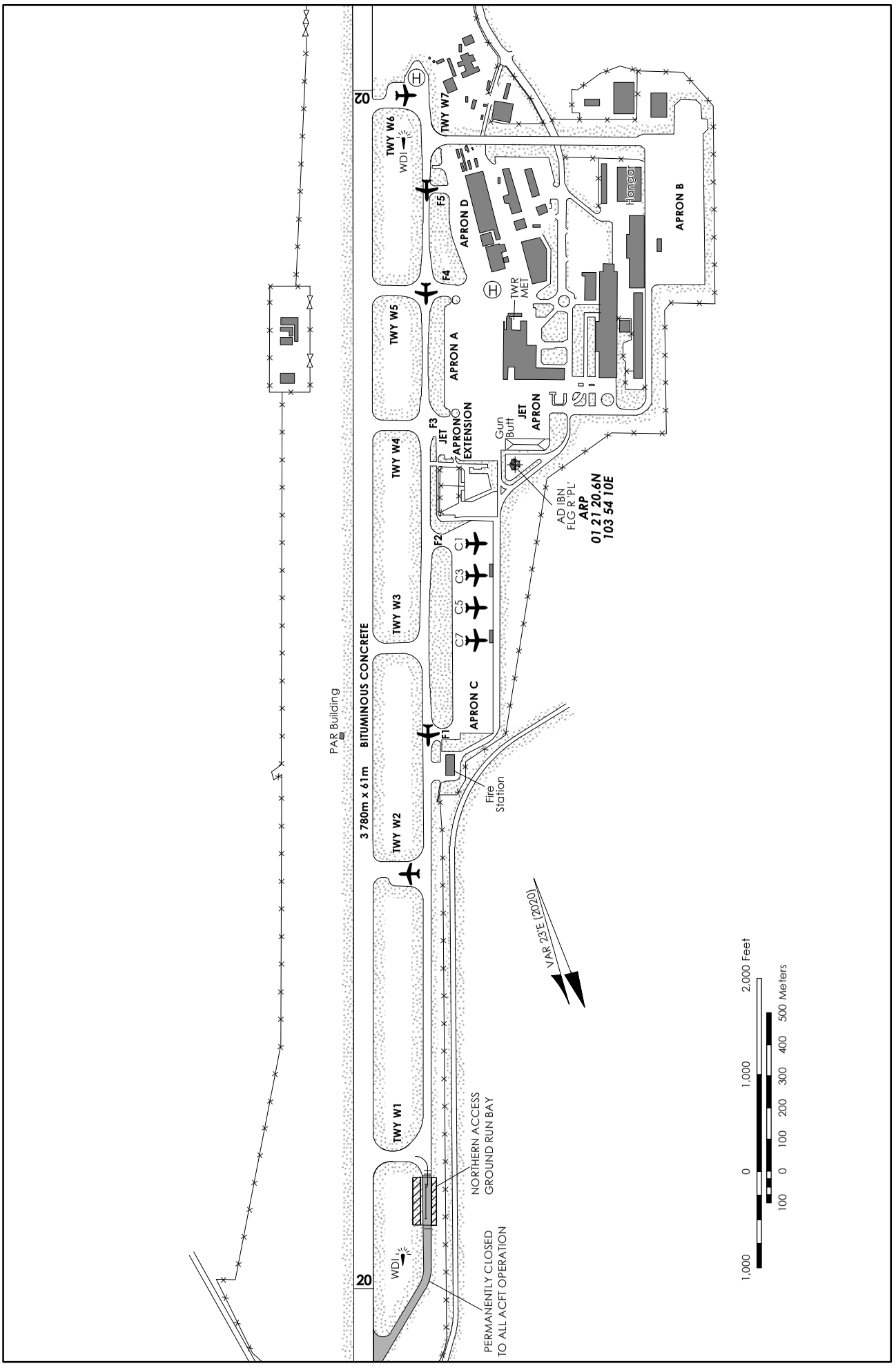
LOCATION OF AIRCRAFT STANDS FOR CIVIL AIRCRAFT AT PAYA LEBAR AIRPORT



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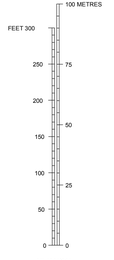
AERODROME OBSTACLE CHART - ICAO

TYPE A (OPERATING LIMITATIONS)

DIMENSIONS AND ELEVATIONS IN METRES

SINGAPORE/Paya Lebar Airport

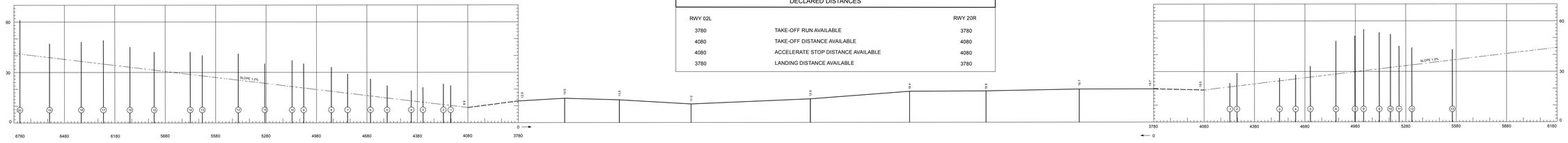
MAGNETIC VARIATION 23'E (2020)

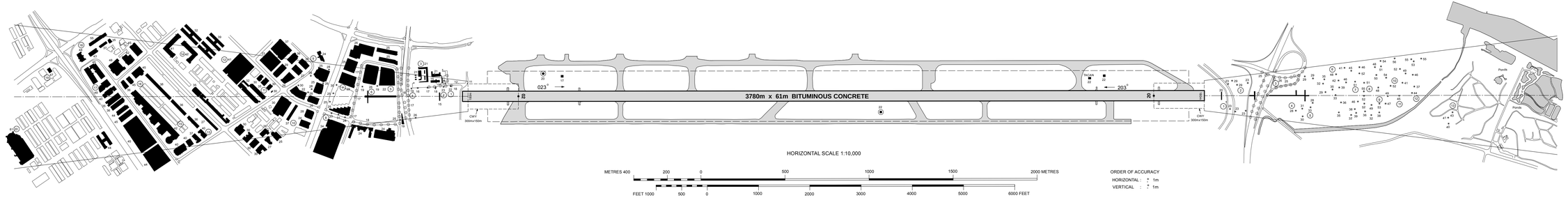


VERTICAL
SCALE
1:1000

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

METRES 400 200 0 500 1000 1500 2000 METRES

FEET 1000 500 0 1000 2000 3000 4000 5000 6000 FEET

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 : Magnetic Variation revised.

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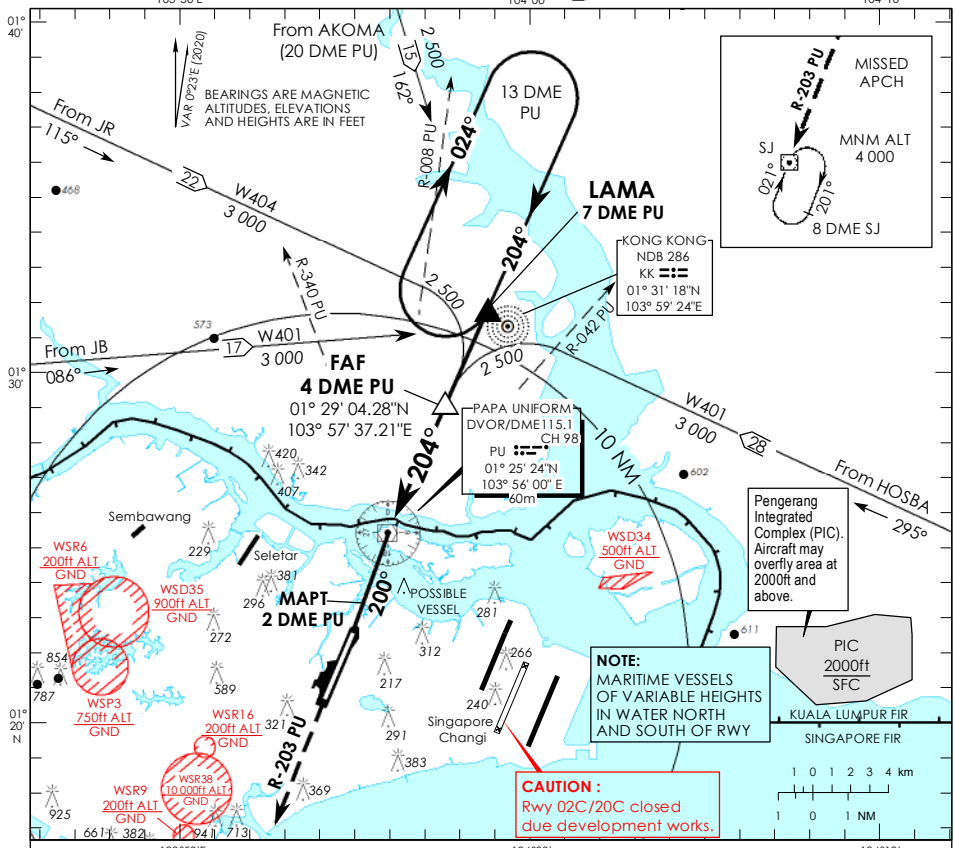
INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 65ft
HEIGHT RELATED TO AD ELEV - 65ft

MSA 25 NM from PAPA UNIFORM DVOR
3400' 2900' 2100'

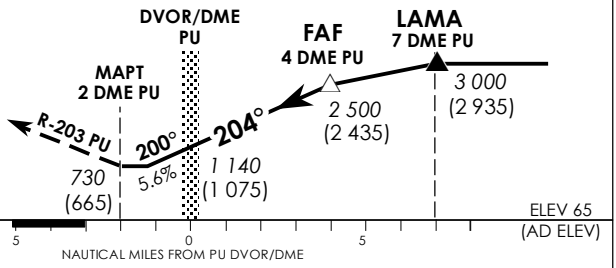
APP	124.05
	119.9
	121.625
TWR	118.05

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 : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

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INSTRUMENT APPROACH CHART - ICAO

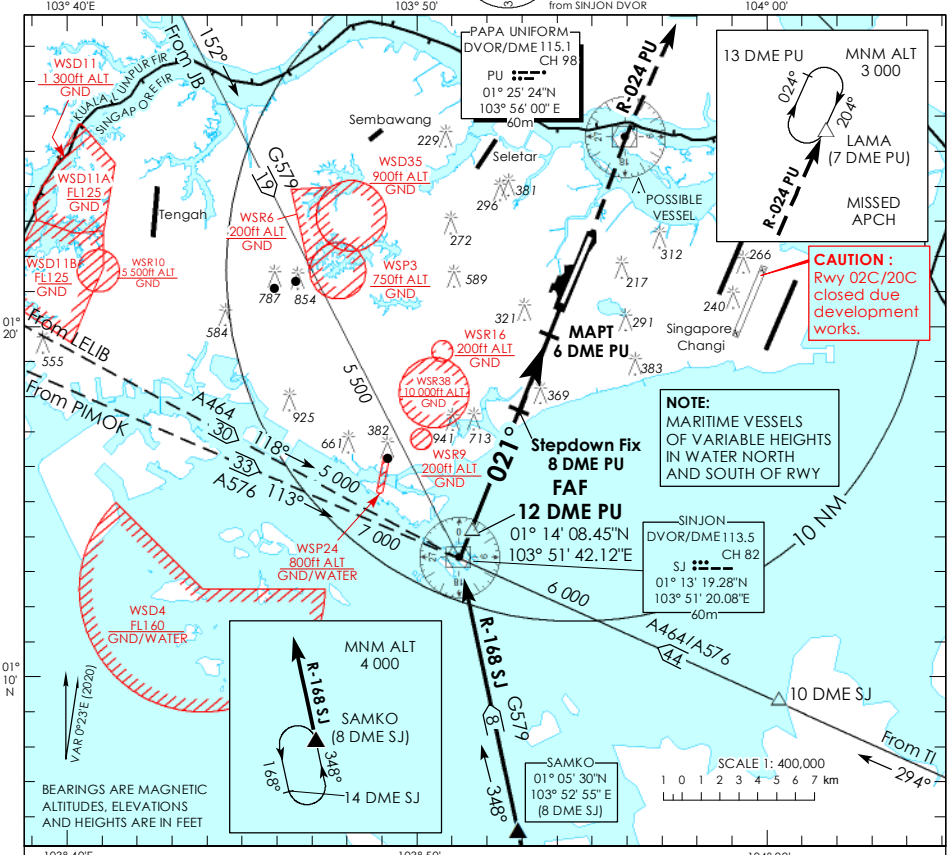
AERODROME ELEV 65ft
HEIGHT RELATED TO
THR RWY 02 - ELEV 43ft

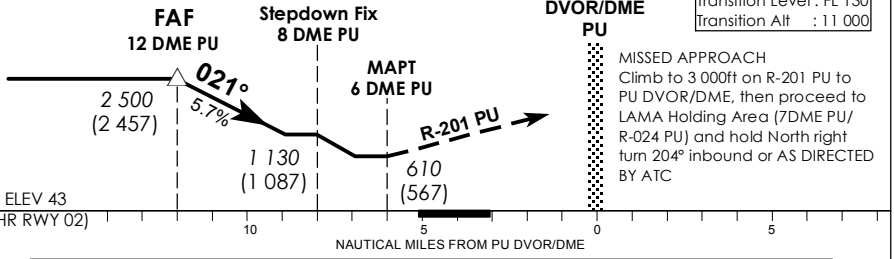
MSA 25 NM from SINJON DVOR
3400' 090° 2100' 2500' 360° 80°

APP 124.05 119.9 121.625
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 : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

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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	121.625	
Paya Lebar TWR	118.05	263.1
Ground Control	130.8	296.0

RADAR REQUIRED

SINGAPORE/ PAYA LEBAR
IPS ILS/DME RWY 20

VAR 0°23'E (2020)

BEARINGS ARE MAGNETIC
ALTITUDES, ELEVATIONS AND HEIGHTS ARE IN FEET

10 NM

PAPA UNIFORM DVOR/DME 115.1 CH 98
PU
01° 25' 24"N
103° 56' 00" E
60m

203°

RADAR VECTORS
FAP
4.6 DME IPS
01° 26' 38.40"N
103° 56' 42.00"E

Pengerang Integrated Complex (PIC). Aircraft may overfly area at 2000ft and above.

PIC 2000ft SFC

CAUTION : Rwy 02C/20C closed due development works.

KUALA LUMPUR FIR

SINGAPORE FIR

Sembawang
Seletar
POSSIBLE VESSEL
Singapore Changi

WSD34 500ft ALT GND
WSD35 900ft ALT GND
WSR6 200ft ALT GND
WSP3 750ft ALT GND
WSR16 200ft ALT GND
WSR38 10 000ft ALT GND
WSR9 200ft ALT GND
WSP24 800ft ALT GND/WATER
WSD4 FL 160 GND/WATER

R-203 PU

LLZ 111.5 IPS

MISSED APCH
MNM ALT 2 500
SJ
021°
201°
8 DME SJ

NOTE:
MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

SINJON DVOR/DME 113.5 CH 82
SJ
01° 13' 19.28"N
103° 51' 20.08" E
60m

SCALE 1 : 400,000
1 0 1 2 3 4 5 6 7 8 9 km
1 0 1 2 3 4 5 NM

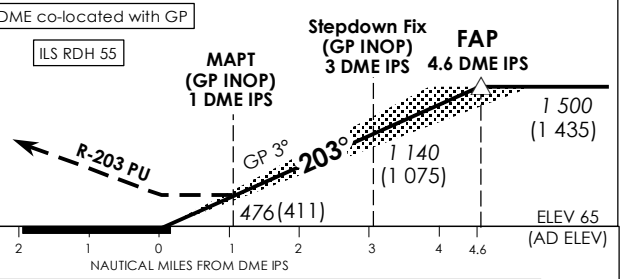
103°50'E 104°00' 104°10'
01° 30' 01° 20' N

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 : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

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INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 65ft
HEIGHT RELATED TO
THR RWY 02 - ELEV 43ft

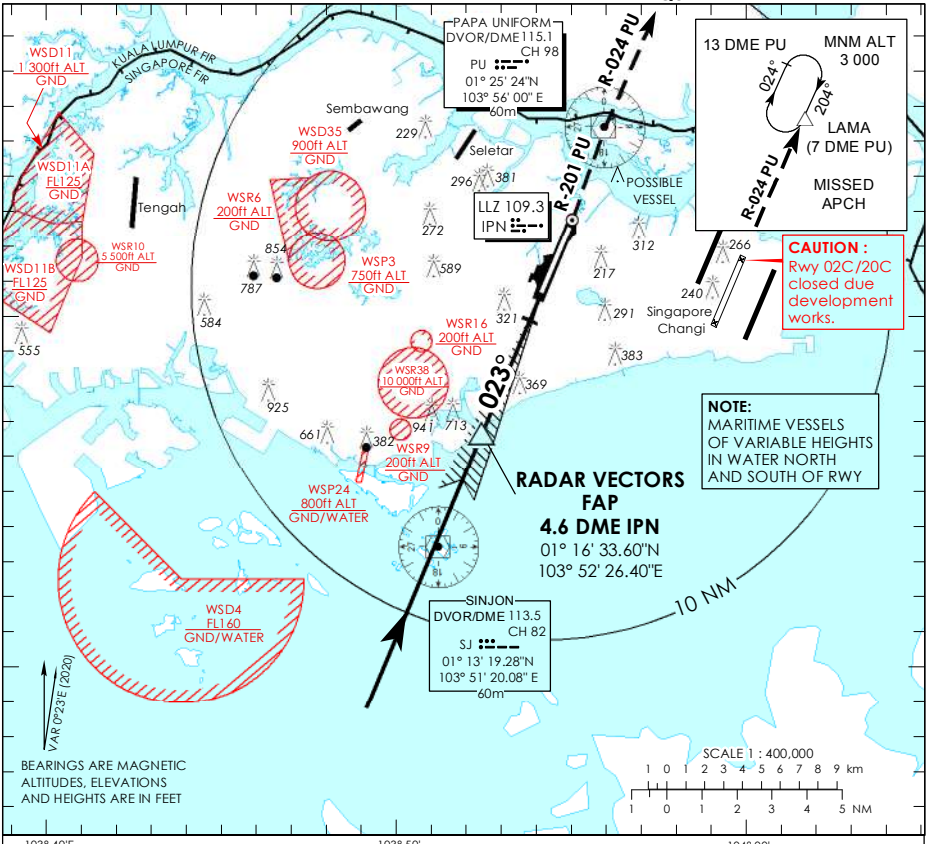
MSA 25 NM
from PAPA UNIFORM DVOR

ATIS Paya Lebar	148.9
Singapore APP	124.05
Paya Lebar APP	119.9 298.0
Seletar APP	121.625
Paya Lebar TWR	118.05 263.1
Ground Control	130.8 296.0

SINGAPORE/ PAYA LEBAR

IPN ILS/DME RWY 02

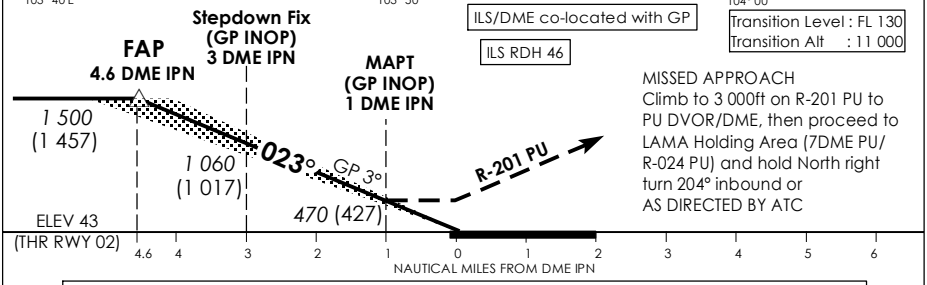
RADAR REQUIRED



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 : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

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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	121.625	
Paya Lebar TWR	118.05	263.1
Ground Control	130.8	296.0

SINGAPORE/ PAYA LEBAR

RNP RWY 02

MSA 25 NM from PAYA LEBAR ARP

RADAR REQUIRED

BEARINGS ARE MAGNETIC
ALTITUDES, ELEVATIONS AND HEIGHTS ARE IN FEET

VAR 0°23'E (2020)

(MATF) ALDAM
01°27'49.57"N
103°57'12.64"E

022° 10 NM 4.3 NM
023° 7.7 NM
023° 4.5 NM
023° 5.0 NM

MISSED APCH
MNM ALT 3 000
024°
204°
022°
LAMA
01°31'50.00"N
103°58'50.00"E

Sembawang
Seletar
WSD35 900ft ALT GND
WSR6 200ft ALT GND
WSP3 750ft ALT GND
WSR16 200ft ALT GND
WSR38 10 000ft ALT GND
WSR9 200ft ALT GND
WSP24 800ft ALT GND/WATER
WSD4 FL 160 GND/WATER
WSD34 500ft ALT GND
POSSIBLE VESSEL
Singapore Changi
PIC 2000ft SFC
KUALA LUMPUR FIR
SINGAPORE FIR

Pengerang Integrated Complex (PIC). Aircraft may overfly area at 2000ft and above.

(MAPt) RWY02
01°20'41.08"N
103°54'10.36"E

CAUTION : Rwy 02R/20L closed due development works.

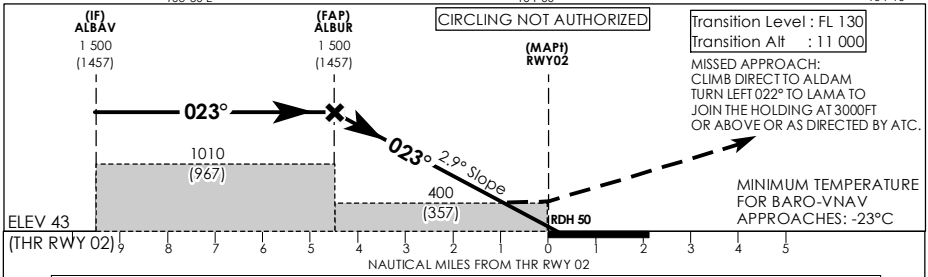
(FAP) ALBUR
01°16'28.90"N
103°52'23.08"E

RADAR VECTORS (IF) ALBAV
01°11'52.85"N
103°50'25.65"E

NOTE:
MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

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' N 01° 20' N 01° 10' N



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 : Runway 02C/20C closed - ref AIP SUP 102/20. Runway 02R/20L open for civil flights.

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INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 65ft
HEIGHT RELATED TO THR RWY 20 - 65ft

MSA 25 NM from PAYA LEBAR ARP

ATIS Paya Lebar	148.9	
Singapore APP	124.05	
Paya Lebar APP	119.9	298.0
Seletar APP	121.625	
Paya Lebar TWR	118.05	263.1
Ground Control	130.8	296.0

SINGAPORE/ PAYA LEBAR

RNP RWY 20

RADAR REQUIRED

103°50'E 104°00' 104°10'

01° 30' N

01° 20' N

VAR 0°23'E (2020)

BEARINGS ARE MAGNETIC
ALTITUDES, ELEVATIONS AND HEIGHTS ARE IN FEET

RADAR VECTORS (IF) ROBGU
01°31'18.70"N
103°58'41.60"E

10 NM

(MAPt) RWY20
01°22'34.41"N
103°54'58.53"E

203° 5.0 NM

(FAP) REDEN
01°26'42.64"N
103°56'44.17"E

203° 4.5 NM

203° 6.3 NM

200° 3.6 NM

Sembawang
Seletar
POSSIBLE VESSEL
Singapore Changi

WSD35 900ft ALT GND
WSR6 200ft ALT GND
WSP3 750ft ALT GND
WSR16 200ft ALT GND
WSR38 10 000ft ALT GND
WSR9 200ft ALT GND
WSP24 800ft ALT GND/WATER
WSD4 FL 160 GND/WATER
WSD34 500ft ALT GND

Pengerang Integrated Complex (PIC). Aircraft may overfly area at 2000ft and above.

PIC 2000ft SFC

CAUTION : Rwy 02C/20C closed due development works.

KUALA LUMPUR FIR
SINGAPORE FIR

NOTE:
MARITIME VESSELS OF VARIABLE HEIGHTS IN WATER NORTH AND SOUTH OF RWY

(MATF) RUGVI
01°16'45.71"N
103°52'30.23"E

MISSED APCH
200°
MNM ALT 4 500
168°
348°
SJ
01°13' 19.28"N
103°51'20.08"E

SINJON
DVOR/DME 113.5 CH 82
SJ
01° 13' 19.28"N
103° 51' 20.08" E
60m

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 DIRECT TO RUGVI.
TURN LEFT 200° TO SJ TO
JOIN THE HOLDING AT 4500FT
OR ABOVE OR AS DIRECTED BY ATC.

MINIMUM TEMPERATURE FOR BARO-VNAV APPROACHES: -23°C

(MAPt) RWY20
(FAP) REDEN 1 500 (1435)
(IF) ROBGU 1 500 (1435)
203°
2.9° Slope
RDH 50
420 (355)
1010 (945)
CIRCLING NOT AUTHORIZED
ELEV 65 (THR RWY 20)

5 4 3 2 1 0 1 2 3 4 5 6 7 8 9 10
NAUTICAL MILES FROM THR RWY 20

OCA (OCH)					
Category of Aircraft		A	B	C	D
LNAV/VNAV	2.5%	**420 (355)**			
LNAV	2.5%	**420 (355)**			

Fix		ROBGU	REDEN	RWY20	RUGVI	SINJON
Altitude (Height)		**1500 (1435)**	**1500 (1435)**	**420 (355)**	**1030 (965)**	**1580 (1515)**
Speed	knots	80	100	120	140	160	180
FAP - MAPt 4.5 nm	min : s	**3 : 23**	**2 : 42**	**2 : 15**	**1 : 56**	**1 : 41**	**1 : 30**
Rate of descent/GS	ft/min	**410**	**513**	**615**	**718**	**821**	**923**

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CHANGES : Runway 02C/20C closed - ref AIP SUP 102/20.
Runway 02R/20L open for civil flights.

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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*	15.24M (50ft) / 31.5°C
4	*MAG VAR*	0°23' E(2020)
5	*AD Administration, address, telephone, telefax, telex, AFS*	RSAF TENGAH AIRBASE CHOA CHU KANG ROAD SINGAPORE 669638 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*	-

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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*	-
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 strength*	-
2	*Taxiway width, surface and strength*	Strength : LCN80 (Taxiway E) Surface : Asphalt
3	*Remarks*	Nil

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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 centre line. 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 (PCN) 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	PCN 100 F/A/W/T	-	50 FT
36	004.5	2743 x 46	PCN 100 F/A/W/T	-	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	2743	3115	2743	2743	Nil
36	2743	3030	2743	2743	Nil

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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 3.0° 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 3.0° 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	012400N 1034254E, 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
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 <u>During Aerodrome operating hours:</u> Contact Tengah APP on 130.0 MHz, 263.4 MHz or 122.0 MHz <u>Outside Aerodrome operating hours:</u> Contact SATCC (RSAF element) on 123.4MHz or 288.2MHz

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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
ACC	SINGAPORE RADAR	P123.7 MHz S127.3 MHz	H24	for ATS Routes B469, G219, G334, R208, L625, L629, L635, L642, L644, M751, M753, M758, M761, M763, M771, N875, N884, N891, N892 and Y514.
		133.8 MHz	0000-1430	
		P134.7 MHz S134.15 MHz	H24	for ATS Routes G334, L625, L644, M758, M761, M771, N875, N884 and N892.
		P133.25 MHz S135.8 MHz		for ATS Routes A457, A464, A576, B466, L762, M630, R325 and R469.
		P134.2 MHz S133.35 MHz		for ATS Routes G334, G580, L625, L644, M646, M767 and N875.
		P134.4 MHz S128.1 MHz		for ATS Routes B338, B469, B470, G579, L504, L644, M635, M774, N502, N875, P501 and in area in the immediate vicinity of Singapore.
	SINGAPORE CONTROL	P134.35 MHz S133.6 MHz	H24	AUTOMATIC DEPENDENT SURVEILLANCE BROADCAST (ADS-B) OUT EXCLUSIVE AIRSPACE WITHIN PARTS OF THE SINGAPORE FIR - 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), 045223N 1041442E (ENREP), 045000N 1034400E, thence north along the Singapore FIR boundary to 070000N 1080000E at or above FL290.

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Service designation	*Call sign*	*Frequency P - Primary S - Secondary*	*Hours of operation*	*Remarks*
ACC	SINGAPORE RADIO	6556 kHz 11297 kHz	H24	SEA 1. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
		5655 kHz 8942 kHz 11396 kHz		SEA 2. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
		6556 kHz		SEA 3. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
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	011319.28N 1035120.08E	201° MAG 14.5km from THR RWY 02 (Paya Lebar) Antenna HGT: 194ft AMSL. Coverage 200NM Maint Period: 0200-0600 third THU of EV month
ILS LLZ RWY 36	ITN	108.1 MHz	H24	012408.43N 1034234.34E	Located 260m from THR RWY 18 along centreline of RWY. Course width 3°
ILS GP RWY 36	-	334.7 MHz	H24	012240.84N 1034231.01E	GP antenna 3°
ILS DME RWY 36	ITN	CH18X	H24	012241.02N 1034226.67E	DME co-located with GP

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WSAT AD 2.20 LOCAL TRAFFIC REGULATIONS - USE OF RSAF TENGAH AIR BASE AS AN EMERGENCY DIVERSION AERODROME FOR SINGAPORE CHANGI AIRPORT

1 INTRODUCTION

1.1 RSAF Tengah Air Base is nominated as the emergency diversionary aerodrome for Singapore Changi Airport. The arrangement outlined below is applicable for the handling of any civil aircraft movement that is diverted to RSAF Tengah Air Base.

1.2 It is emphasised that RSAF Tengah Air Base **is not an ICAO designated alternate aerodrome for Singapore Changi Airport** and therefore should not be flight planned as such. Its use by civil aircraft is permitted for emergency purposes only when Singapore Changi Airport runway is obstructed.

2 MANNING OF TENGAH AIR BASE

2.1 Tengah Air Base is open from 2300-1100 SUN/MON to THU/FRI. It is closed on SAT, SUN and public holidays. Outside the above stipulated operating hours, Tengah Air Base can be opened on 2 hours' prior notice. This arrangement, if necessary, will be undertaken by the Duty Tower Controller or SATCC Watch Manager of Singapore Changi Airport who will inform RSAF Headquarters via Tengah Ops.

2.2 Airline operators are requested to inform the Airport Manager and the Duty Tower Controller or SATCC Watch Manager at Singapore Changi Airport as soon as it is known that their service will require the use of Tengah Air Base. Revised ETAs/ETDs are to be notified as soon as known.

3 OPERATIONAL SERVICES

3.1 The layout of Tengah Airbase with the aircraft parking apron which is available for the use of civil aircraft (except B747 aircraft types) in the event of an emergency diversion from Singapore Changi Airport, is indicated in page WSAT AD 2-11. It is to be noted that only a limited number of civil aircraft can be accommodated at any one time.

3.2 Air-ground-air communication maintained by RSAF Tengah Tower/APP for AD Control Services is VHF 122.0MHz.

4 PASSENGER CLEARANCE

4.1 Once the aircraft has shutdown, only the Captain of the aircraft will be allowed out of the aircraft. All other passengers will remain in the aircraft due to space constraints and to avoid possible immigration problems.

4.2 Arrangements will be made to transport all the passengers back to Singapore Changi Airport for immigration processing.

4.3 The Airport Manager or his representative will be present at the Passenger Terminal to provide assistance when aircraft are required to land at Tengah Air Base.

4.4 No refreshment facilities are available.

5 SECURITY

5.1 All Airline personnel who are required to proceed to Tengah Air Base must wear their Singapore Changi Airport Passes at a prominent position and they will be escorted to the respective areas. All personnel not in possession of the laminated pass except Customs and Government Officers in uniform will be denied entry into Tengah Air Base by the RSAF Security Guard. Entry into the Air Base by both the airline personnel and service equipment is via the main gate. The Airline Engineering Coordinator shall be responsible for the proper positioning of the ground servicing equipment and vehicles in the Apron Area where arriving aircraft are to be parked.

5.2 No equipment, vehicles, stores, cargo or mail shall be left overnight at Tengah Air Base.

5.3 The security of civil aircraft parked in the Apron is the responsibility of the aircraft owner and any security service obtained shall first be cleared with the Tengah Air Base Security Authorities.

6 AIRCRAFT STAND ALLOCATION

6.1 Aircraft parking positions will be issued by the RSAF Tower Controller. A "follow-me" vehicle will be waiting at the accesses to guide the aircraft to the allocated parking stands.

7 COMMUNICATIONS

7.1 No VHF RTF surface movement frequency is available at Tengah Tower. Communication with the Tower will be by telephone, the nearest of which is in the Fire Station Building in front of the aircraft parking apron.

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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

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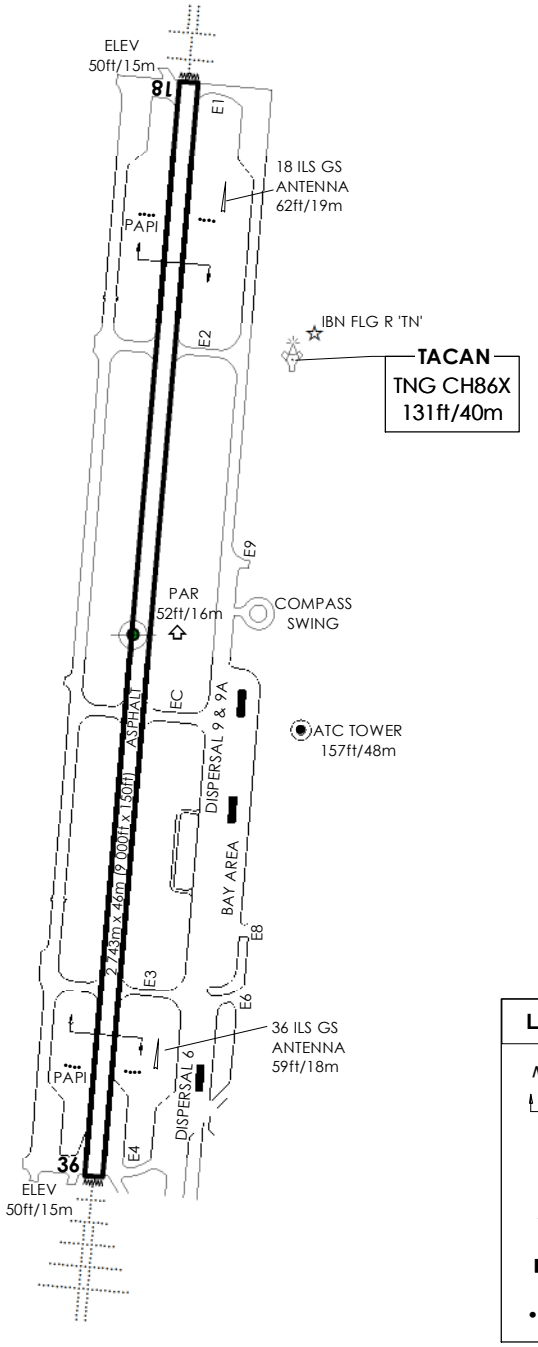
AERODROME CHART - TENGAH

01°23'15.40"N 103°42'29.80"E

RSAF TENGAH

ELEV 50ft/15.24m
ELEVATIONS AND HEIGHTS IN FEET/METRES

VAR 0°23'E (2020)
ANNUAL CHANGE NEGLIGIBLE



LEGEND

- Barrier
- Hookwire
- ILS Glideslope Antenna
- Precision Approach Radar
- Dispersal
- PAPI

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 : Red "T" Lighting removed.

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WSAG — SEMBAWANG

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.

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*	012536N 1034858E
2	*Elevation/Reference temperature*	25.82M (86ft) / 31.5° C
3	*MAG VAR*	0°23' E (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*	2300-1100 SUN/MON to THU/FRI, 2300-0500 FRI/SAT. Prior permission required on SUN and Public holidays.
2	*MET Briefing Office*	H24
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 APRON, 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

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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

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°	914 x 30	LCN 26 Bitum	Nil	86 FT
23	226°	914 x 30	LCN 26 Bitum	Nil	54 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	975	975	914	Nil
23	914	975	975	914	Nil

WSAG AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

1	*IBN*	012500N 1034854E, 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 (012527N 1034856E) 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.

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WSAG AD 2.18 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	129.7 MHz 239.0 MHz		Nil
GND	SEMBAWANG GROUND	277.1 MHz 118.8 MHz		Nil
Flight Information Service	SINGAPORE RADAR	119.1 MHz	H24	Nil
ACC	SINGAPORE RADAR	P123.7 MHz S127.3 MHz	H24	for ATS Routes B469, G219, G334, R208, L625, L629, L635, L642, L644, M751, M753, M758, M761, M763, M771, N875, N884, N891, N892 and Y514.
		133.8 MHz	0000 - 1430	
		P134.7 MHz S134.15 MHz	H24	for ATS Routes G334, L625, L644, M758, M761, M771, N875, N884 and N892.
		P133.25 MHz S135.8 MHz		for ATS Routes A457, A464, A576, B466, L762, M630, R325 and R469.
		P134.2 MHz S133.35 MHz		for ATS Routes G334, G580, L625, L644, M646, M767 and N875.
		P134.4 MHz S128.1 MHz		For ATS Routes B338, B469, B470, G579, L504, L644, M635, M774, N502, N875, P501 and in area in the immediate vicinity of Singapore.
	SINGAPORE CONTROL	P134.35 MHz S133.6 MHz	H24	AUTOMATIC DEPENDENT SURVEILLANCE BROADCAST (ADS-B) OUT EXCLUSIVE AIRSPACE WITHIN PARTS OF THE SINGAPORE FIR - 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), 045223N 1041442E (ENREP), 045000N 1034400E, thence north along the Singapore FIR boundary to 070000N 1080000E at or above FL290.
	SINGAPORE RADIO	6556 kHz 11297 kHz	H24	SEA 1. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
		5655 kHz 8942 kHz 11396 kHz		SEA 2. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
		6556 kHz		SEA 3. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
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.

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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	012524.00N 1034924.00E	198° MAG 0.54km from ARP Coverage 30NM. MAINT Period: Monthly - EV 2nd FRI 0200-0400. For training approaches in VMC only.

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WMKJ — JOHOR BAHRU

Note: The following sections in this chapter are intentionally left blank:
AD 2.2, AD 2.3, AD 2.4, AD 2.5, AD 2.6, AD 2.7, AD 2.8, AD 2.9, AD 2.10, AD 2.11, AD 2.12, AD 2.13, AD 2.14, AD 2.15, AD 2.16, AD 2.18, AD 2.19, AD 2.20, AD 2.21, AD 2.22, AD 2.23, AD 2.24.

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*	11,000ft (3,350m)
6	*Remarks*	Nil

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WIDD — BATAM/HANG NADIM (INDONESIA)

Note: The following sections in this chapter are intentionally left blank:
AD 2.2, AD 2.3, AD 2.4, AD 2.5, AD 2.6, AD 2.7, AD 2.8, AD 2.9, AD 2.10, AD 2.11, AD 2.12, AD 2.13, AD 2.14, AD 2.15, AD 2.16, AD 2.19, AD 2.20, AD 2.21, AD 2.22, AD 2.23.

WIDD AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WIDD — BATAM/HANG NADIM (INDONESIA)

WIDD AD 2.17 ATS AIRSPACE

1	*Designation and lateral limits*	**BATAM ATZ** 010018N 1035530E 005315N 1040335E 011305N 1042029E 012000N 1041224E
2	*Vertical limits*	SFC to 1,500ft MSL
3	*Airspace Classification*	C
4	*ATS unit call sign* *Language(s)*	HANG NADIM TOWER English
5	*Transition altitude*	11000 FT (3,350m)
6	*Remarks*	Controlling Authorities: 1. Hang Nadim Aerodrome Control Tower - Responsible for providing Aerodrome Control Service to aircraft operating within the Batam ATZ except those aircraft which have been released to Singapore Approach. Pilots shall request for start-up clearance from Hang Nadim Tower to avoid unnecessary delay on the ground. Prior permission required outside operating hours. 2. Singapore Approach - Responsible for flights through Batam ATZ outside the operating hours of Hang Nadim Tower and when Batam Airport has closed down. Traffic Circuit: : RWY 04 - right hand circuit pattern; RWY 22 - normal (left) hand circuit pattern Maximum Circuit: ALT - 3,000ft Batam Holding Areas: see charts ENR 3.6-7 and ENR 3.6-9. Missed Approach Procedures: **RWY 04:** to climb straight ahead to 1,000ft, then turn right and climb to 3,000ft to join the BTM DVOR/DME Holding Area and await further instructions from Hang Nadim Tower. **RWY 22:** to climb straight ahead to 2,500ft, then turn left to join the BTM DVOR/DME Holding Area and await further instructions from Hang Nadim Tower.

WIDD AD 2.18 ATS COMMUNICATION FACILITIES

Service designation	*Call sign*	*Frequency*	*Hours of operation*	*Remarks*
1	2	3	4	5
APP	SINGAPORE APPROACH	120.3 MHz	H24	Nil

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Service designation	*Call sign*	*Frequency*	*Hours of operation*	*Remarks*
1	2	3	4	5
TWR	HANG NADIM TOWER	118.7 MHz 118.3 MHz *	H24	* Secondary frequency. Operating Authority: Directorate-General of Civil Aviation, Indonesia.

WIDD AD 2.24 CHARTS RELATED TO AN AERODROME

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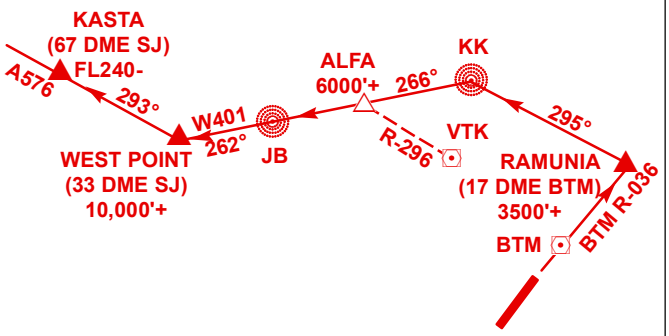
BATAM AIRPORT - RUNWAY 04 AND 22
STANDARD INSTRUMENT DEPARTURE (SID)

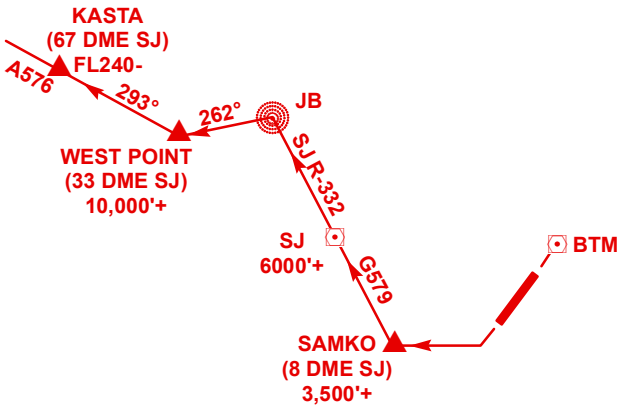
RUNWAY 04



WEST POINT 2C DEP (ALFA 576 WESTBOUND) (TO MEDAN)

After departure, join Airway W401 at RAMUNIA (BTE R-036/ 17 DME) at or above 3 500ft and track 295° to KONG KONG NDB. At KONG KONG NDB track 266° to JAYBEE NDB and then track 262° to WEST POINT (33 DME SJ). Cross Point ALFA (TEKONG R-296) at or above 6 000ft and WEST POINT at or above 10 000ft. Turn right at WEST POINT and track 293° to KASTA (67 DME SJ). Cross KASTA at or below FL 240.

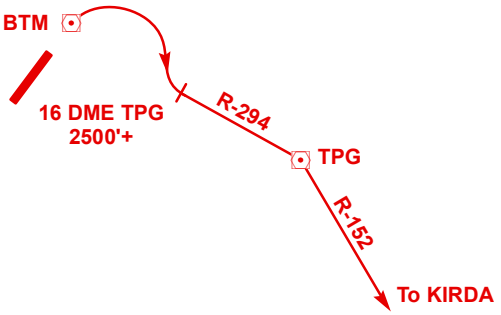
RUNWAY 22



WEST POINT 2D DEP (ALFA 576 WESTBOUND) (TO MEDAN)

After departure, join Airway G579 at SAMKO (8 DME SJ) at or above 3 500ft. Cross SINJON DVOR/DME at or above 6 000ft. Continue on SINJON R-332 to JAYBEE NDB. At JAYBEE NDB track 262° to join Airway A576 at WEST POIINT (33 DME SJ). Cross WEST POINT at or above 10 000ft. Turn right at WEST POINT and track 293° to KASTA (67 DME SJ). Cross KASTA at or below FL 240.

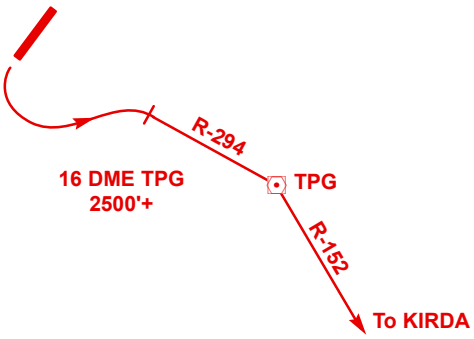
RUNWAY 04



KIRDA 1C DEP (EASTBOUND) (TO PANGKAL PINANG/JAKARTA)

After departure, turn right to intercept TPG R-294. Then track for TPG VOR/DME to cross TANJUNG PINANG 16 DME at or above 2 500ft. At TPG VOR/DME turn right and proceed on TPG R-152 to KIRDA.

RUNWAY 22



KIRDA 1C DEP (EASTBOUND) (TO PANGKAL PINANG/JAKARTA)

After departure, turn left to intercept TPG R-294. Then track for TPG VOR/DME to cross TANJUNG PINANG 16 DME at or above 2 500ft. At TPG VOR/DME turn right and proceed on TPG R-152 to KIRDA.

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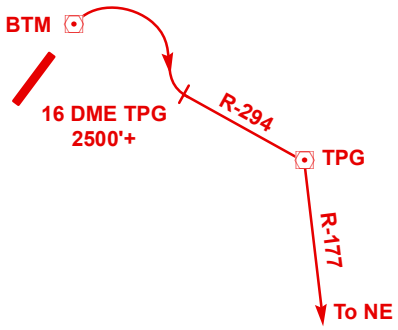
BATAM AIRPORT - RUNWAY 04 AND 22
STANDARD INSTRUMENT DEPARTURE (SID)

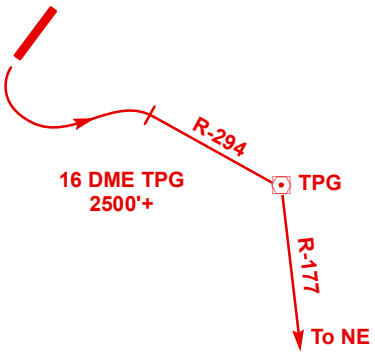
RUNWAY 04



SINGKEP 1C DEP (WHISHKEY 24 EASTBOUND)
(TO SINGKEP/PALEMBANG)

After departure, turn right to intercept TPG R-294. Then track for TPG VOR/DME to cross TANJUNG PINANG 16 DME at or above 2 500ft. At TPG VOR/DME turn right and proceed on TPG R-177 to NE NDB (SINGKEP).

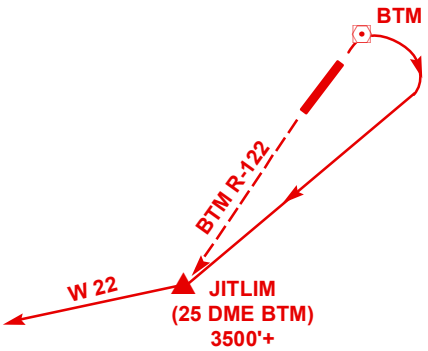
RUNWAY 22



SINGKEP 1D DEP (WHISHKEY 24 EASTBOUND)
(TO SINGKEP/PALEMBANG)

After departure, turn left to intercept TPG R-294. Then track for TPG VOR/DME to cross TANJUNG PINANG 16 DME at or above 2 500ft. At TPG VOR/DME turn right and proceed on TPG R-177 to NE NDB (SINGKEP).

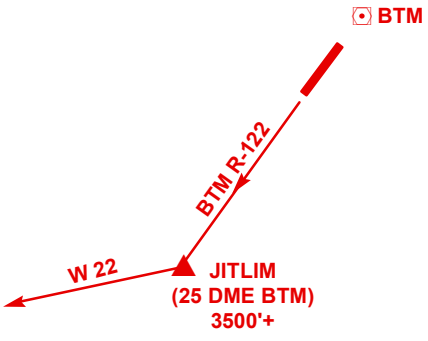
RUNWAY 04



JITLIM 2C DEP (WHISKEY 22 WESTBOUND)
(TO PEKANBARU)

After departure, turn right to join Airway W22 at JITLIM (BTM R-221/25 DME) at or above 3 500ft. Proceed on Airway W22 to PIDON.

RUNWAY 22



JITLIM 2D DEP (WHISKEY 22 WESTBOUND)
(TO PEKANBARU)

After departure, fly straight ahead to join Airway W22 at JITLIM (BTM R-221/25 DME) at or above 3 500ft. Proceed on Airway W22 to PIDON.

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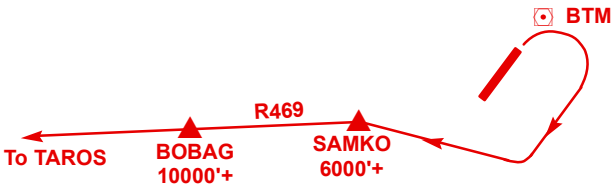
BATAM AIRPORT - RUNWAY 04 AND 22
STANDARD INSTRUMENT DEPARTURE (SID)

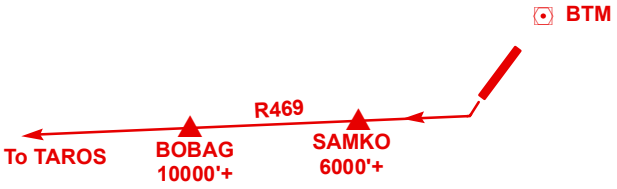
RUNWAY 04



BOBAG 1C DEP (ROMEO 469 WESTBOUND)
(TO PEKANBARU)

After departure, turn right to join Airway R469 at SAMKO. Cross SAMKO at or above 6 000ft. Proceed on Airway R469 to TAROS. Cross BOBAG at or above 10 000ft.

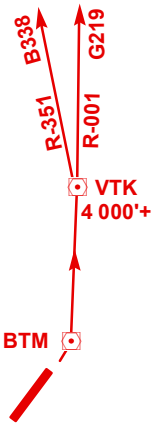
RUNWAY 22



BOBAG 1D DEP (ROMEO 469 WESTBOUND)
(TO PEKANBARU)

After departure, turn right to join Airway R469 at SAMKO. Cross SAMKO at or above 6 000ft. Proceed on Airway R469 to TAROS. Cross BOBAG at or above 10 000ft.

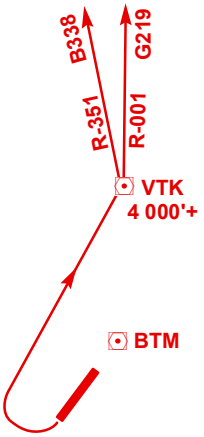
RUNWAY 04



TEKONG 1C DEP
(BRAVO 338/GOLF 219 NORTHBOUND)

After departure, proceed to BTM VOR/DME. At BTM VOR/DME turn left for TEKONG DVOR/DME to cross TEKONG DVOR/DME at or above 4 000ft. Then proceed on Airway B338/G219.

RUNWAY 22



TEKONG 1D DEP
(BRAVO 338/GOLF 219 NORTHBOUND)

After departure, turn right for TEKONG DVOR/DME to cross TEKONG DVOR/DME at or above 4 000ft. Then proceed on Airway B338/G219.

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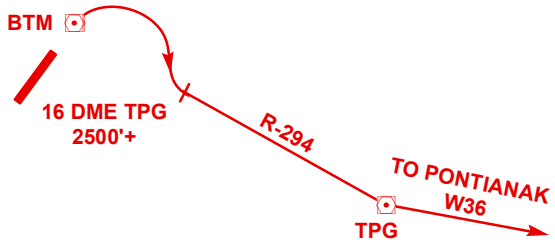
BATAM AIRPORT - RUNWAY 04 AND 22
STANDARD INSTRUMENT DEPARTURE (SID)

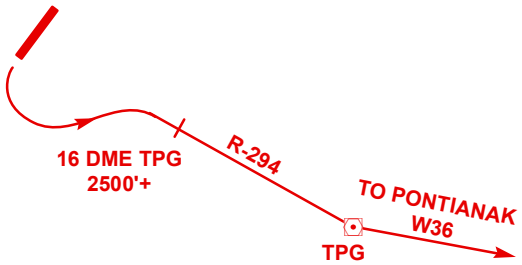
RUNWAY 04



TANGO INDIA 1C DEP (WHISKEY 36 EASTBOUND)
(TO TANJUNG PINANG/PONTIANAK)

After departure, turn right to intercept TPG R-294. Then track for TPG VOR/DME to cross TANJUNG PINANG 16 DME at or above 2 500ft. At TPG VOR/DME proceed on Airway W36 to GOBIK.

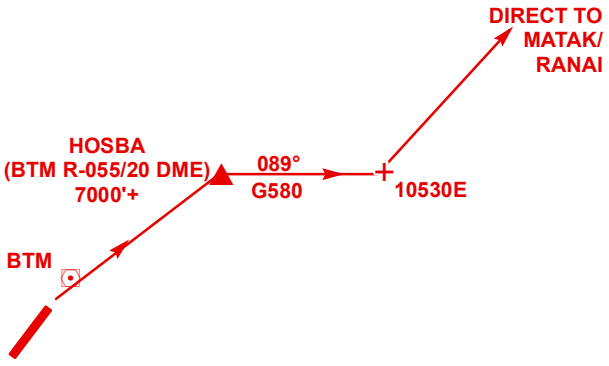
RUNWAY 22



TANGO INDIA 1D DEP (WHISKEY 36 EASTBOUND)
(TO TANJUNG PINANG/PONTIANAK)

After departure, turn left to intercept TPG R-294. Then track for TPG VOR/DME to cross TANJUNG PINANG 16 DME at or above 2 500ft. At TPG VOR/DME proceed on Airway W36 to GOBIK.

RUNWAY 04



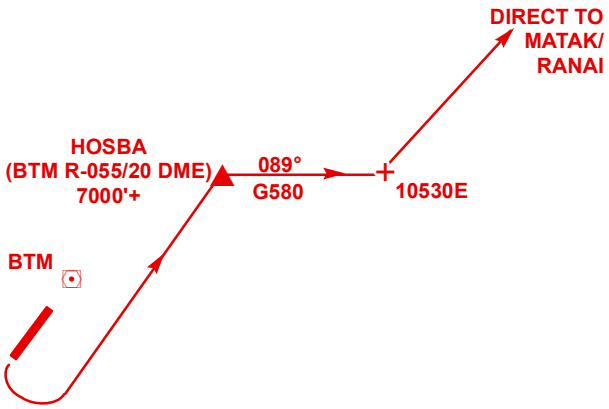
HOSBA 1C DEP (GOLF 580 EASTBOUND)
(TO MATAK/RANAI)

After departure, set course for HOSBA (BTM R-055/20 DME) to join Airway G580. Cross HOSBA at or above 7 000ft. Proceed on G580 to 10530E, then leave Airway direct for MATAK/RANAI.

NOTE :

Expect direct routing from HOSBA to MATAK/RANAI when South China Sea Danger Areas are not active.

RUNWAY 22



HOSBA 1D DEP (GOLF 580 EASTBOUND)
(TO MATAK/RANAI)

After departure, turn left for HOSBA (BTM R-055/20 DME) to join Airway G580. Cross HOSBA at or above 7 000ft. Proceed on G580 to 10530E, then leave Airway direct for MATAK/RANAI.

NOTE :

Expect direct routing from HOSBA to MATAK/RANAI when South China Sea Danger Areas are not active.

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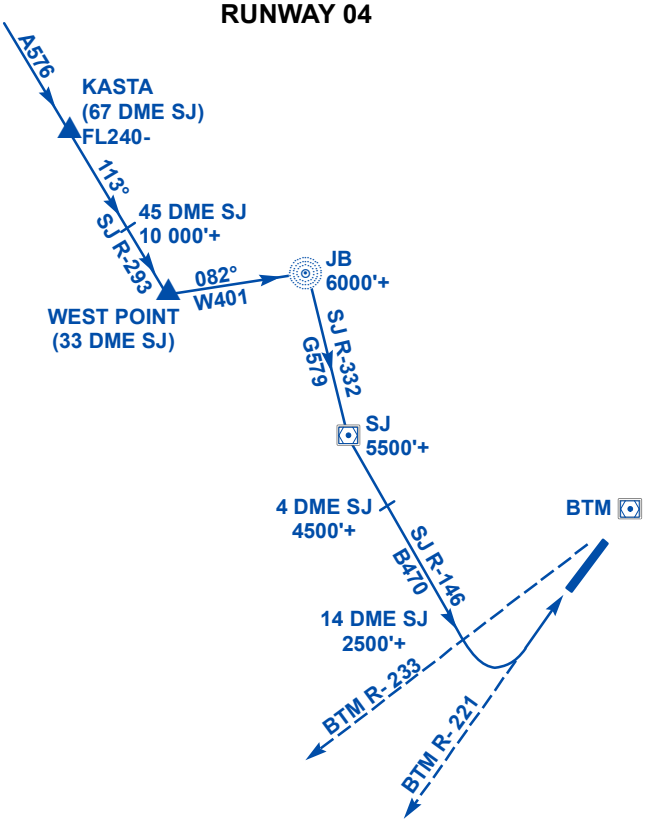
BATAM AIRPORT - RUNWAY 04 AND 22
STANDARD INSTRUMENT ARRIVAL (STAR)

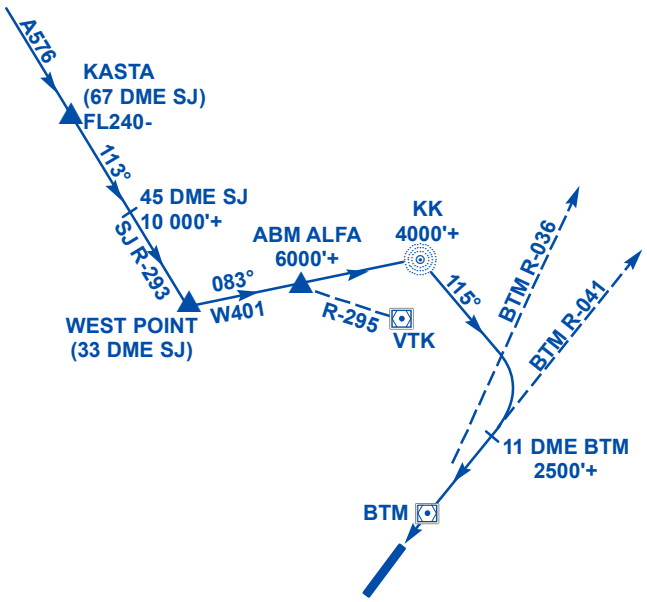
RUNWAY 04



WEST POINT 2C ARR (ALFA 576N EASTBOUND)
(FROM MEDAN)

Cross KASTA (67 DME SJ) at or below FL 240. Track 113° (SINJON R-293) to WEST POINT (33 DME SJ). Cross SINJON 45 DME at or above 10 000ft. At WEST POINT turn left track 082° to JAYBEE NDB. Cross JAYBEE at or above 6 000ft and turn right onto SINJON R-332 to cross SINJON DVOR/DME at or above 5 500ft. Then proceed on SINJON R-146 to cross SINJON 4 DME at or above 4 500ft descending thereafter to 2 500ft. At SINJON 14 DME (BTM R-233) turn left to intercept BTM R-221 and commence approach.

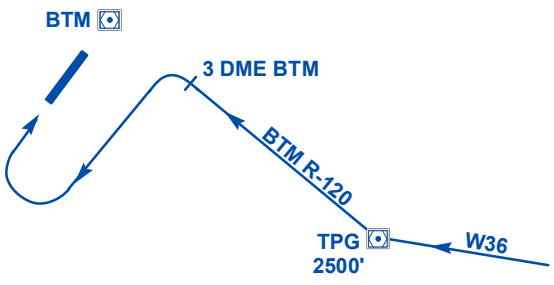
RUNWAY 22



WEST POINT 2D ARR (ALFA 576N EASTBOUND)
(FROM MEDAN)

Cross KASTA (67 DME SJ) at or below FL 240. Track 113° (SINJON R-293) to WEST POINT (33 DME SJ). Cross SINJON 45 DME at or above 10 000ft. At WEST POINT turn left track 083° to cross ABM Point ALFA (TEKONG R-295) at or above 6 000ft and KONG KONG NDB at or above 4 000ft. At KONG KONG NDB track 115° and on intercepting BTM R-036 turn right to intercept BTM R-041. Cross BATAM 11 DME at or above 2 500ft. Then commence approach.

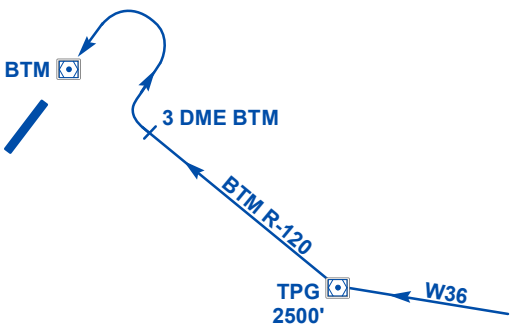
RUNWAY 04



TANGO INDIA 1C ARR (WHISKEY 36 WESTBOUND)
(FROM PONTIANAK/TANJUNG PINANG)

Cross Tanjung Pinang TMA boundary (60 DME TPG) at or below 9 500ft. Cross the control zone boundary (30 DME TPG) at or below 5 500ft and cross TPG VOR/DME at 2 500ft. After TPG VOR/DME proceed on BTM R-120 to BATAM 3 DME and turn left for downwind Runway 04.

RUNWAY 22



TANGO INDIA 1D ARR (WHISKEY 36 WESTBOUND)
(FROM PONTIANAK/TANJUNG PINANG)

Cross Tanjung Pinang TMA boundary (60 DME TPG) at or below 9 500ft. Cross the control zone boundary (30 DME TPG) at or below 5 500ft and cross TPG VOR/DME at 2 500ft. After TPG VOR/DME proceed on BTM R-120 to BATAM 3 DME and turn right for downwind Runway 22.

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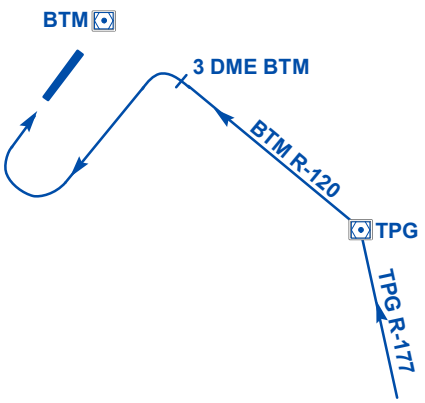
BATAM AIRPORT - RUNWAY 04 AND 22
STANDARD INSTRUMENT ARRIVAL (STAR)

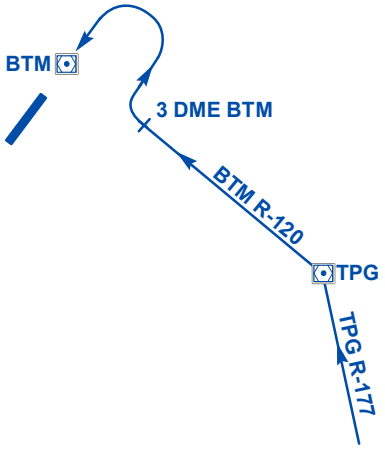
RUNWAY 04



SINGKEP 1C ARR
(BRAVO 469/WHISKEY 24 WESTBOUND)
(FROM PALEMBANG/SINGKEP)

Proceed on TPG R-177, descending to 2 500ft. Cross Tanjung Pinang control zone boundary (26 DME TPG) at or below 5 500ft and cross TPG VOR/DME at 2 500ft. After TPG VOR/DME proceed on BTM R-120 to BATAM 3 DME and turn left downwind Runway 04.

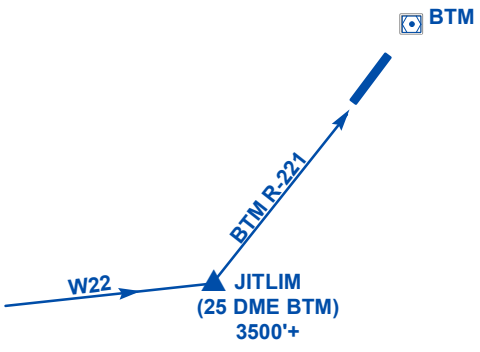
RUNWAY 22



SINGKEP 1D ARR
(BRAVO 469/WHISKEY 24 WESTBOUND)
(FROM PALEMBANG/SINGKEP)

Proceed on TPG R-177, descending to 2 500ft. Cross Tanjung Pinang control zone boundary (26 DME TPG) at or below 5 500ft and cross TPG VOR/DME at 2 500ft. After TPG VOR/DME proceed on BTM R-120 to BATAM 3 DME and turn right downwind Runway 22.

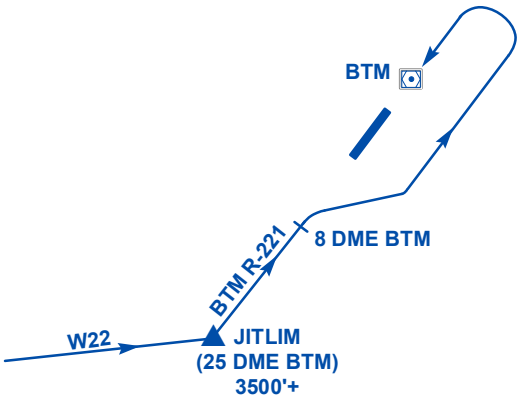
RUNWAY 04



JITLIM 1C ARR (WHISKEY 22 EASTBOUND)
(FROM PEKANBARU)

Cross JITLIM (BTM R-221/25DME) at or above 3 500ft. Proceed on BTM R-221 and commence approach.

RUNWAY 22



JITLIM 1D ARR (WHISKEY 22 EASTBOUND)
(FROM PEKANBARU)

Cross JITLIM (BTM R-221/25DME) at or above 3 500ft. Proceed on BTM R-221 and at BATAM 8 DME turn right to join downwind Runway 22.

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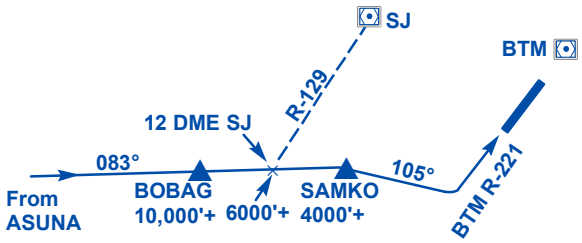
BATAM AIRPORT - RUNWAY 04 AND 22
STANDARD INSTRUMENT ARRIVAL (STAR)

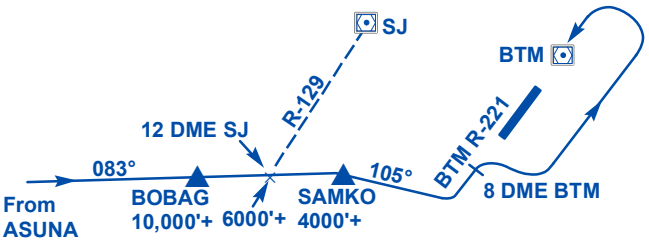
RUNWAY 04



BOBAG 1C ARR (ROMEO 469 EASTBOUND) (FROM PEKANBARU)

At ASUNA (SINJON R-252/44 DME), turn right and track 083° to SAMKO (SINJON R-168/8 DME). Cross BOBAG (SINJON R-243/24 DME) at or above 10 000ft. Cross SINJON R-219/ 12 DME at or above 6 000ft and thereafter descend to 4 000ft. At SAMKO turn right track 105° to intercept BTM R-221. Commence approach.

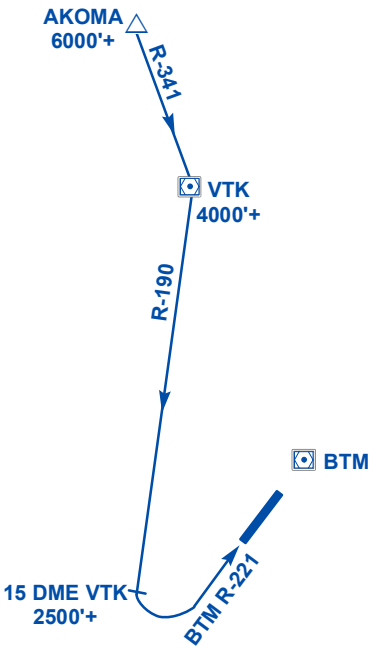
RUNWAY 22



BOBAG 1D ARR (ROMEO 469 EASTBOUND) (FROM PEKANBARU)

At ASUNA (SINJON R-252/44 DME), turn right and track 083° to SAMKO (SINJON R-168/8 DME). Cross BOBAG (SINJON R-243/24 DME) at or above 10 000ft. Cross SINJON R-219/ 12 DME at or above 6 000ft and thereafter descend to 4 000ft. At SAMKO turn right track 105° to intercept BTM R-221. At BATAM 8 DME turn right to join downwind for Runway 22.

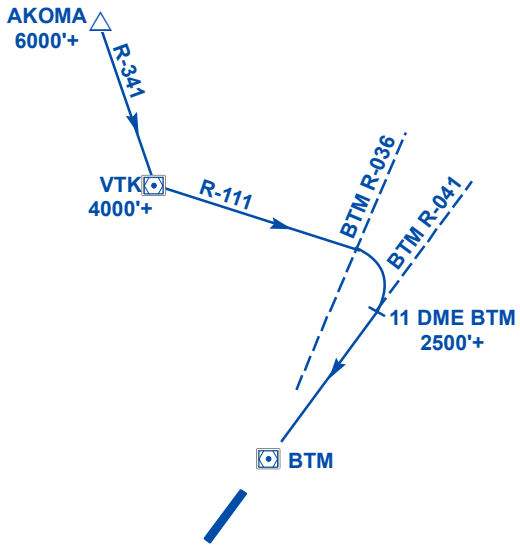
RUNWAY 04



TEKONG 1C ARR (BRAVO 469)

Cross AKOMA (TEKONG R-341/21 DME) at or above 6 000ft and proceed on TEKONG R-341 to cross TEKONG DVOR/DME at or above 4 000ft. Turn right to intercept TEKONG R-190 and cross TEKONG 15 DME at or above 2 500ft. Then turn left to intercept BTM R-221 and commence approach for Runway 04.

RUNWAY 22



TEKONG 1D ARR (BRAVO 469)

Cross AKOMA (TEKONG R-341/21 DME) at or above 6 000ft and proceed on TEKONG R-341 to cross TEKONG DVOR/DME at or above 4 000ft. Turn left to intercept TEKONG R-111. On intercepting BTM R-036, turn right to intercept BTM R-041. Cross BATAM 11 DME at or above 2 500ft. Then commence approach for Runway 22.

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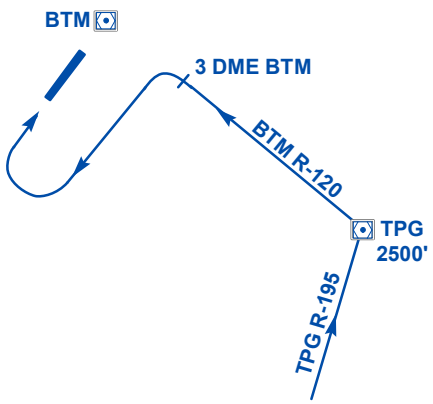
BATAM AIRPORT - RUNWAY 04 AND 22
STANDARD INSTRUMENT ARRIVAL (STAR)

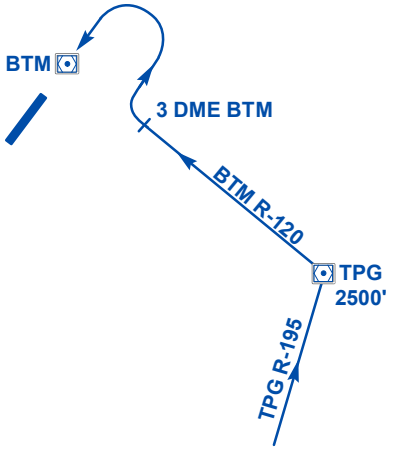
RUNWAY 04



PARDI 1C ARR (GOLF 579 WEST/EASTBOUND)
(FROM JAKARTA)

Proceed on TPG R-195, descending to 2 500ft. Cross Tanjung Pinang control zone boundary (21 DME TPG) at or below 5 500ft and cross TPG VOR/DME at 2 500ft. After TPG VOR/DME proceed on BTM R-120 to cross BATAM 3 DME and turn left for downwind Runway 04.

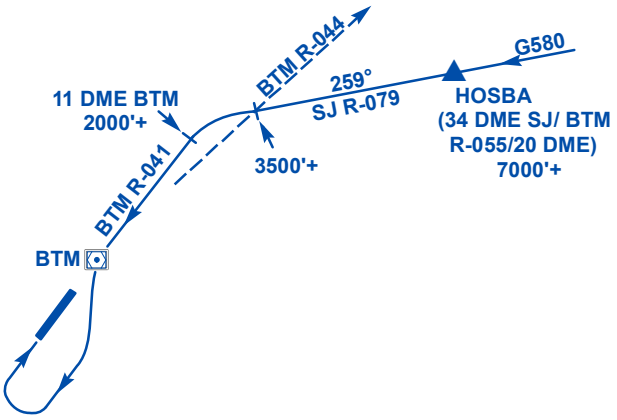
RUNWAY 22



PARDI 1D ARR (GOLF 579 WEST/EASTBOUND)
(FROM JAKARTA)

Proceed on TPG R-195, descending to 2 500ft. Cross Tanjung Pinang control zone boundary (21 DME TPG) at or below 5 500ft and cross TPG VOR/DME at 2 500ft. After TPG VOR/DME proceed on BTM R-120 to cross BATAM 3 DME and turn right for downwind Runway 22.

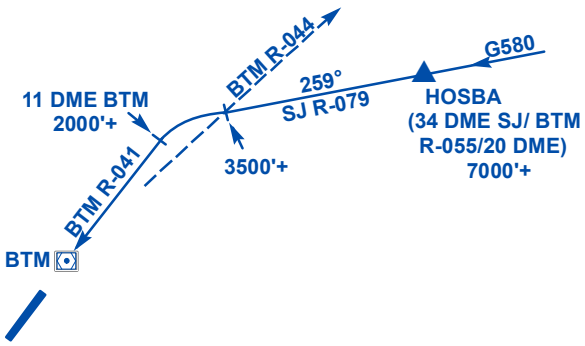
RUNWAY 04



HOSBA 1C ARR (GOLF 580 WESTBOUND)
(FROM MATAK/NATUNA)

Cross HOSBA (SINJON R-079/34 DME) at or above 7 000ft. At HOSBA track 259° (SINJON R-079) descending to cross BTM R-044 at or above 3 500ft. On intercepting BTM R-044 turn left to intercept BTM R-041. Cross BATAM 11 DME at or above 2 000ft. At BTM VOR/DME turn left to join downwind for Runway 04.

RUNWAY 22



HOSBA 1D ARR (GOLF 580 WESTBOUND)
(FROM MATAK/NATUNA)

Cross HOSBA (SINJON R-079/34 DME) at or above 7 000ft. At HOSBA track 259° (SINJON R-079) descending to cross BTM R-044 at or above 3 500ft. On intercepting BTM R-044 turn left to intercept BTM R-041. Cross BATAM 11 DME at or above 2 000ft. Then commence approach on Runway 22.

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WIDN — TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA)

Note: The following sections in this chapter are intentionally left blank:
AD 2.2, AD 2.3, AD 2.4, AD 2.5, AD 2.6, AD 2.7, AD 2.8, AD 2.9, AD 2.10, AD 2.11, AD 2.12, AD 2.13, AD 2.14, AD 2.15, AD 2.16, AD 2.19, AD 2.20, AD 2.21, AD 2.22, AD 2.23.

WIDN AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WIDN — TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA)

WIDN AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	**Tanjung Pinang North Control Zone (CTR):** 012000N 1041224E 011305N 1042029E 010942N 1043500E thence along the circle radius 27nm from BTM VOR/DME clockwise until 004236N 1041654E 005315N 1040335E 010018N 1035530E 012000N 1041224E. **Tanjung Pinang South Control Zone (CTR):** 004236N 1041654E follow the circle radius 27nm from BTM VOR/DME anti-clockwise until 010942N 1043500E 010342N 1050018E thence along the circle radius 30nm from TI NDB clockwise until 002448N 1043700E 004236N 1041654E.
2	*Vertical Limits*	**Tanjung Pinang North Control Zone (CTR)** GND/WATER up to 3,000ft **Tanjung Pinang South Control Zone (CTR)** GND/WATER up to 6,000ft
3	*Airspace Classification*	C
4	*ATS Unit Callsign*	Tanjung Pinang Approach
5	Language(s)	English
6	*Transition Altitude*	11,000ft
7	*Remarks*	NIL

WIDN AD 2.18 ATS COMMUNICATION FACILITIES

Service designation	*Callsign*	*Frequency*	*Hours of operation*	*Remarks*
TWR	RAJA TOWER	118.95 MHz	0000-1100	TWR coordinates: 005524.59N 1043144.53E
APP	TANJUNG PINANG APPROACH	P 130.2 MHz S 119.35 MHz	H24	Radar Service

WIDN AD 2.24 CHARTS RELATED TO AN AERODROME

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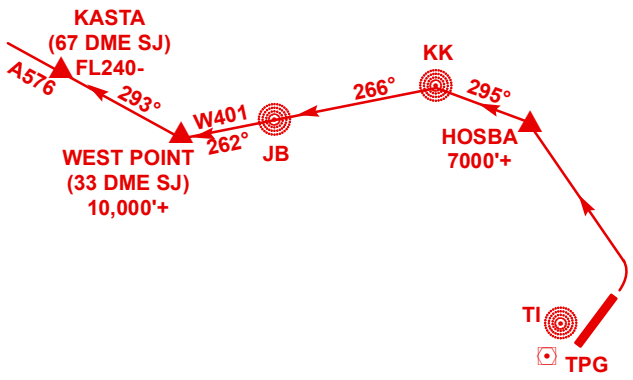
TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) - RUNWAY 04 AND 22
STANDARD INSTRUMENT DEPARTURE (SID)

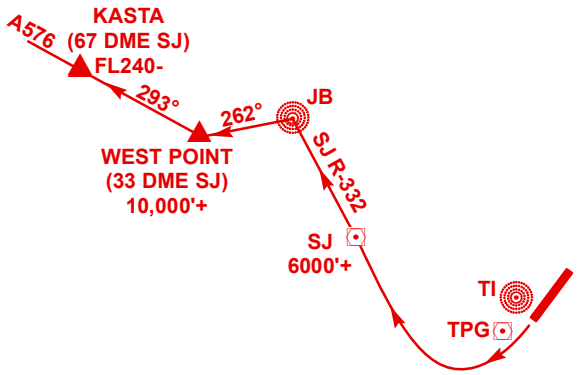
RUNWAY 04



WEST POINT 1A DEP (ALFA 576 WESTBOUND) (TO MEDAN)

After departure, join Airway W401 at HOSBA (TPG R-344/26 DME) at or above 7 000ft. Track 295° to KONG KONG NDB. At KONG KONG NDB track 266° to JAYBEE NDB Then track 262° to WEST POINT (33 DME SJ). Cross WEST POINT at or above 10 000ft. Turn right at WEST POINT and track 293° to KASTA (67 DME SJ). Cross KASTA at or below FL 240.

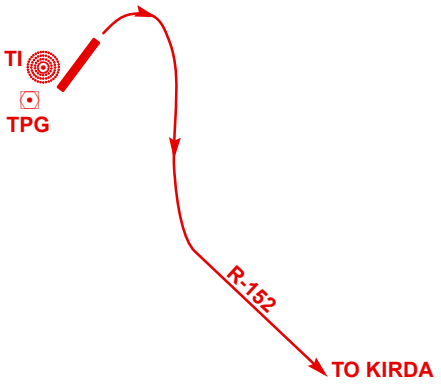
RUNWAY 22



WEST POINT 1B DEP (ALFA 576 WESTBOUND) (TO MEDAN)

After departure, join Airway G579 at SINJON DVOR/DME at or above 6 000ft. Proceed on SINJON R-332 to JAYBEE NDB. At JAYBEE NDB track 262° to join Airway A576 at WEST POIINT (33 DME SJ). Cross WEST POINT at or above 10 000ft. Turn right at WEST POINT and track 293° to KASTA (67 DME SJ). Cross KASTA at or below FL 240.

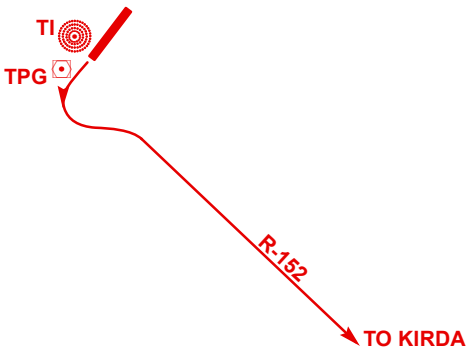
RUNWAY 04



KIRDA 1A DEP (EASTBOUND) (TO PANGKAL PINANG/JAKARTA)

After departure, turn right to intercept TPG R-152 and proceed on TPG R-152 to KIRDA.

RUNWAY 22



KIRDA 1B DEP (EASTBOUND) (TO PANGKAL PINANG/JAKARTA)

After departure, turn left to intercept TPG R-152 and proceed on TPG R-152 to KIRDA.

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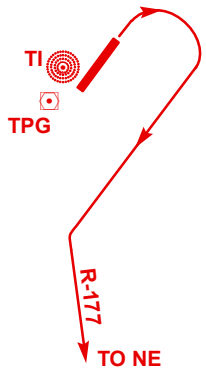
TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) - RUNWAY 04 AND 22
STANDARD INSTRUMENT DEPARTURE (SID)

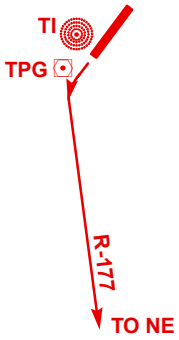
RUNWAY 04



SINGKEP 1A DEP (EASTBOUND)
(TO SINGKEP/PALEMBANG)

After departure, turn right to intercept TPG R-177 and proceed on TPG R-177 to NE NDB (SINGKEP).

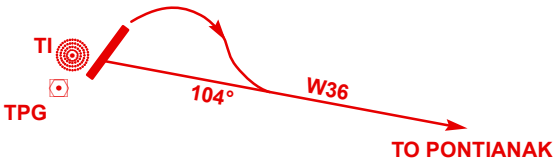
RUNWAY 22



SINGKEP 1B DEP (EASTBOUND)
(TO SINGKEP/PALEMBANG)

After departure, turn left to intercept TPG R-177 and proceed on TPG R-177 to NE NDB (SINGKEP).

RUNWAY 04



TANGO INDIA 1A DEP (WHISKEY 36 EASTBOUND)
(TO PONTIANAK)

After departure, turn right to intercept 104° bearing from TI NDB and proceed on Airway W36 to GOBIK.

RUNWAY 22

TANGO INDIA 1B DEP (WHISKEY 36 EASTBOUND)
(TO PONTIANAK)

After departure, turn left to intercept 104° bearing from TI NDB and proceed on Airway W36 to GOBIK.

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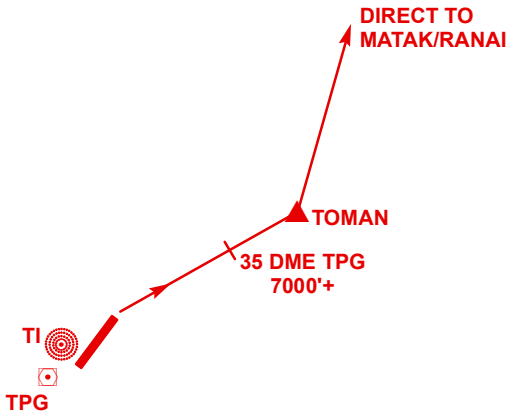
TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) - RUNWAY 04 AND 22
STANDARD INSTRUMENT DEPARTURE (SID)

RUNWAY 04



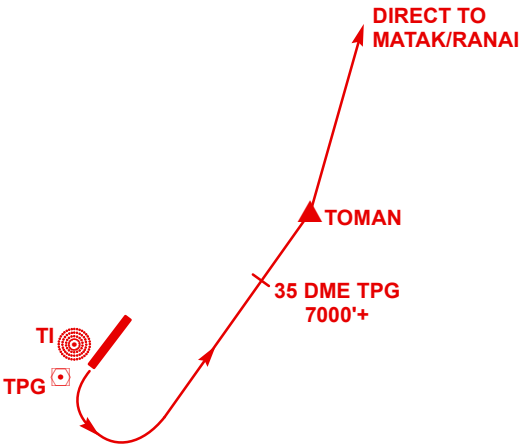
TOMAN 1A DEP (GOLF 580 EASTBOUND)
(TO MATAK/RANAI)

After departure, set course for TOMAN. Cross TANJUNG PINANG 35 DME at or above 7 000ft. At TOMAN, leave airway direct for MATAK/RANAI.

NOTE :

Expect direct routing to MATAK/RANAI when South China Sea Danger Areas are not active.

RUNWAY 22



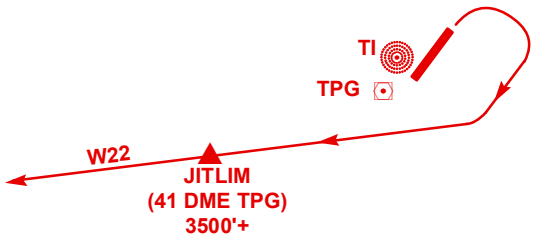
TOMAN 1B DEP (GOLF 580 EASTBOUND)
(TO MATAK/RANAI)

After departure, turn left and set course for TOMAN. Cross TANJUNG PINANG 35 DME at or above 7 000ft. At TOMAN, leave airway direct for MATAK/RANAI.

NOTE :

Expect direct routing to MATAK/RANAI when South China Sea Danger Areas are not active.

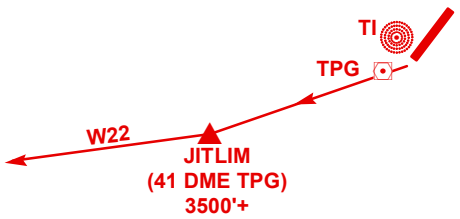
RUNWAY 04



JITLIM 1A DEP (WHISKEY 22 WESTBOUND)
(TO PEKANBARU)

After departure, turn right to join Airway W22 at JITLIM (TPG R-263/41 DME) at or above 3 500ft. Proceed on Airway W22 to PIDON.

RUNWAY 22



JITLIM 1B DEP (WHISKEY 22 WESTBOUND)
(TO PEKANBARU)

After departure, turn right to join Airway W22 at JITLIM (TPG R-263/41 DME) at or above 3 500ft. Proceed on Airway W22 to PIDON.

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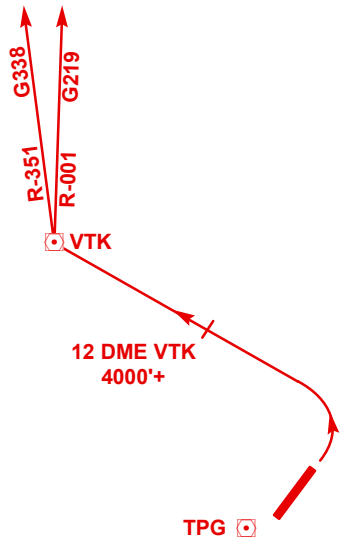
TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) - RUNWAY 04 AND 22
STANDARD INSTRUMENT DEPARTURE (SID)

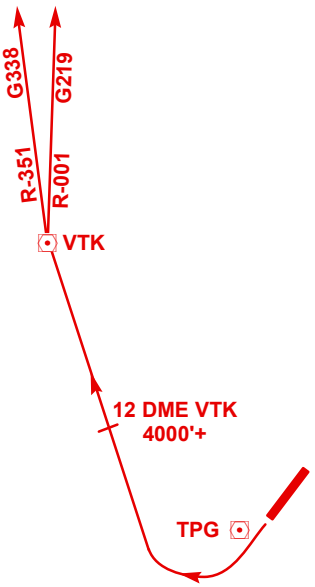
RUNWAY 04



TEKONG 1A DEP
(BRAVO 338/GOLF 219 NORTHBOUND)

After departure, turn left for TEKONG DVOR/DME to cross TEKONG 12 DME at or above 4 000ft. Then proceed on Airway B338/G219.

RUNWAY 22



TEKONG 1B DEP
(BRAVO 338/GOLF 219 NORTHBOUND)

After departure, turn right for TEKONG DVOR/DME to cross TEKONG 12 DME at or above 4 000ft. Then proceed on Airway B338/G219.

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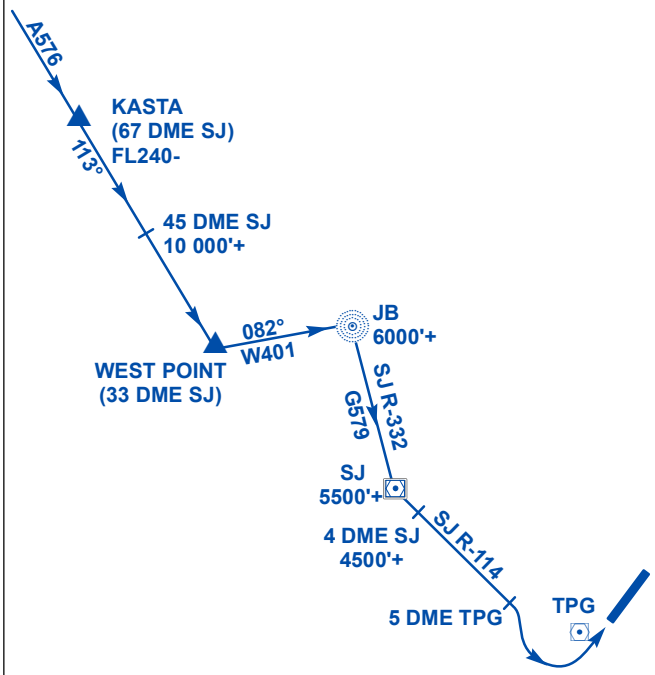
TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) - RUNWAY 04 AND 22
STANDARD INSTRUMENT ARRIVAL (STAR)

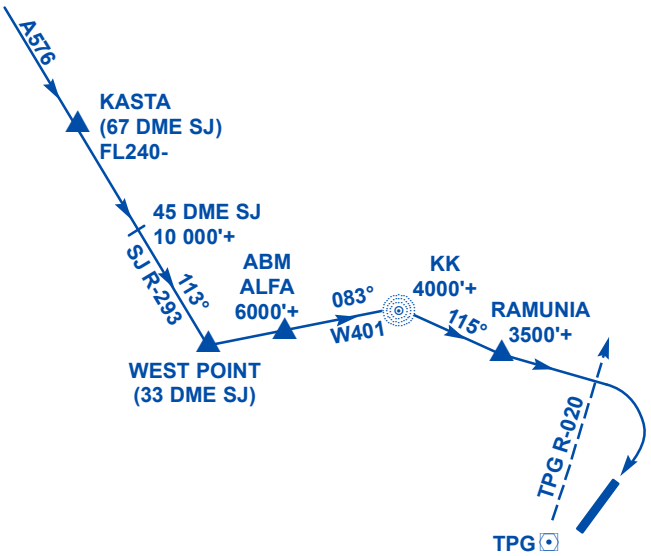
RUNWAY 04



WEST POINT 1A ARR (ALFA 576N EASTBOUND) (FROM MEDAN)

Cross KASTA (67 DME SJ) at or below FL 240. Track 113° (SINJON R-293) to WEST POINT (33 DME SJ). Cross SINJON 45 DME at or above 10 000ft. At WEST POINT turn left track 082° to JAYBEE NDB. Cross JAYBEE at or above 6 000ft and turn right onto SINJON R-332 to cross SINJON DVOR/DME at or above 5 500ft. Then proceed on SINJON R-114 to cross SINJON 4 DME at or above 4 500ft Thereafter descend to 2 500ft and join downwind Runway 04 at TANJUNG PINANG 5 DME.

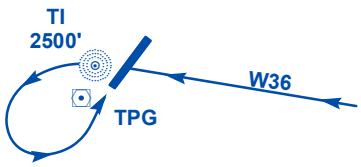
RUNWAY 22



WEST POINT 1B ARR (ALFA 576N EASTBOUND) (FROM MEDAN)

Cross KASTA (67 DME SJ) at or below FL 240. Track 113° (SINJON R-293) to WEST POINT (33 DME SJ). Cross SINJON 45 DME at or above 10 000ft. At WEST POINT turn left track 083° to cross ABM Point ALFA (TEKONG R-295) at or above 6 000ft and KONG KONG NDB at or above 4 000ft. At KONG KONG NDB track 115° to cross RAMUNIA (BTM R-036/17 DME) at or above 3 500ft. Thereafter descend to 2 500ft. On passing TPG R-020, turn right and commence approach.

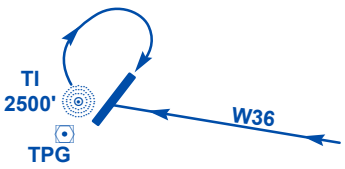
RUNWAY 04



TANGO INDIA 1A ARR (WHISKEY 36 WESTBOUND) (FROM PONTIANAK)

Cross Tanjung Pinang TMA boundary (60 DME TPG) at or below 9 500ft, cross the control zone boundary (30 DME TPG) at or below 5 500ft and cross TI NDB at 2 500ft. At TI NDB, turn left for downwind Runway 04 and commence approach.

RUNWAY 22



TANGO INDIA 1B ARR (WHISKEY 36 WESTBOUND) (FROM PONTIANAK)

Cross Tanjung Pinang TMA boundary (60 DME TPG) at or below 9 500ft, cross the control zone boundary (30 DME TPG) at or below 5 500ft and cross TI NDB at 2 500ft. At TI NDB, turn right for downwind Runway 22 and commence approach.

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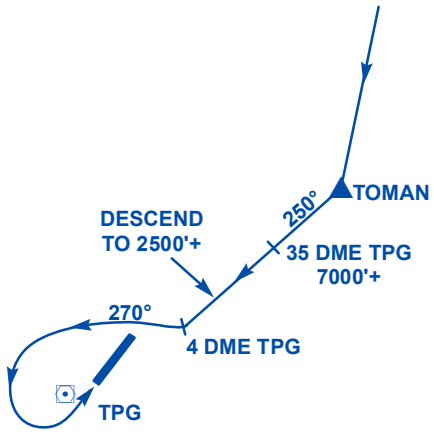
TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) - RUNWAY 04 AND 22
STANDARD INSTRUMENT ARRIVAL (STAR)

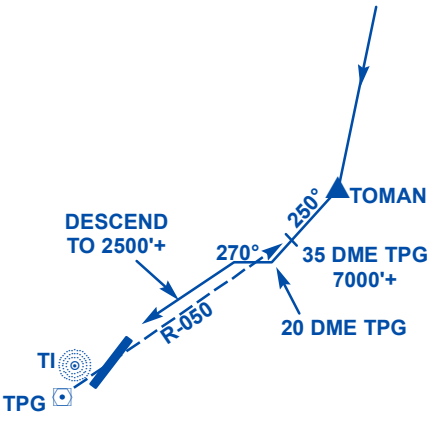
RUNWAY 04



TOMAN 1A ARR (GOLF 580 WESTBOUND)
(FROM MATAK/RANAI)

Proceed from TOMAN to TPG VOR/DME on track 250° to cross TANJUNG PINANG 35 DME at or above 7 000ft. Thereafter descend to 2 500ft. At TANJUNG PINANG 4 DME, turn right and track 270° to join downwind Runway 04 and commence approach.

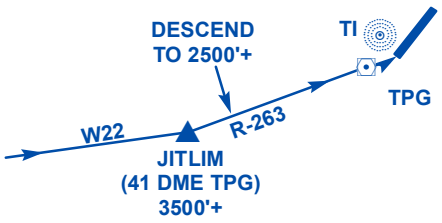
RUNWAY 22



TOMAN 1B ARR (GOLF 580 WESTBOUND)
(FROM MATAK/RANAI)

Proceed from TOMAN to TPG VOR/DME on track 250° to cross TANJUNG PINANG 35 DME at or above 7 000ft. At TANJUNG PINANG 20 DME, turn right and track 270° descending to 2 500ft. On passing TPG R-050, turn left and commence approach.

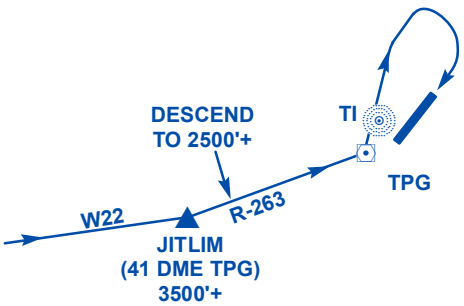
RUNWAY 04



JITLIM 1A ARR (WHISKEY 22 EASTBOUND)
(FROM PEKANBARU)

Cross JITLIM (TPG R-263/41 DME) at or above 3 500ft. Then proceed on TPG R-263 to TPG VOR/DME descending to 2 500ft and commence approach.

RUNWAY 22



JITLIM 1B ARR (WHISKEY 22 EASTBOUND)
(FROM PEKANBARU)

Cross JITLIM (TPG R-263/41 DME) at or above 3 500ft. Then proceed on TPG R-263 to TPG VOR/DME descending to 2 500ft. Cross TPG VOR/DME at 2 500ft. At TPG VOR/DME, turn left to join downwind Runway 22 and commence approach.

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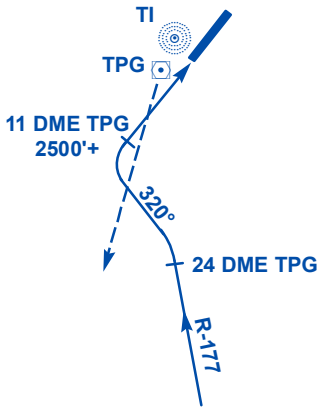
TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) - RUNWAY 04 AND 22
STANDARD INSTRUMENT ARRIVAL (STAR)

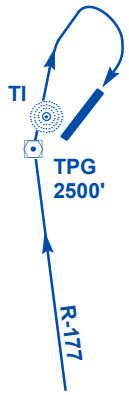
RUNWAY 04



SINGKEP 1A ARR
(BRAVO 469/WHISKEY 24 EASTBOUND)
(FROM PALEMBANG/SINGKEP)

Proceed on TPG R-177 to cross Tanjung Pinang control zone boundary (26 DME TPG) at or below 5 500ft. Then descend to 2 500ft. At TANJUNG PINANG 24 DME, turn left and track 320°. On passing TPG R-205, turn right and commence approach to cross TANJUNG PINANG 11 DME at or above 2 500ft.

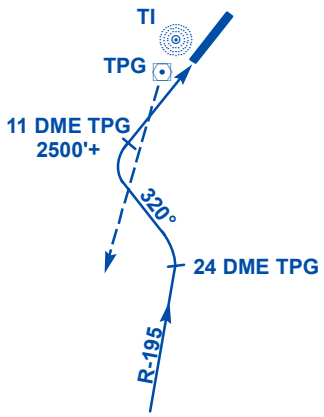
RUNWAY 22



SINGKEP 1B ARR
(BRAVO 469/WHISKEY 24 EASTBOUND)
(FROM PALEMBANG/SINGKEP)

Proceed on TPG R-177 to cross Tanjung Pinang control zone boundary (26 DME TPG) at or below 5 500ft and TPG VOR/DME at 2 500ft. On passing TPG VOR/DME, turn right for downwind Runway 22 and commence approach.

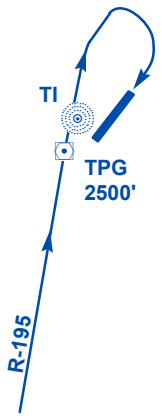
RUNWAY 04



PARDI 1A ARR (GOLF 579 EASTBOUND)
(FROM JAKARTA)

Proceed on TPG R-195 to cross Tanjung Pinang control zone boundary (21 DME TPG) at or below 5 500ft. Then descend to 2 500ft. At TANJUNG PINANG 18 DME, turn left and track 320°. On passing TPG R-205, turn right and commence approach to cross TANJUNG PINANG 11 DME at or above 2 500ft.

RUNWAY 22



PARDI 1A ARR (GOLF 579 EASTBOUND)
(FROM JAKARTA)

Proceed on TPG R-195 to cross Tanjung Pinang control zone boundary (21 DME TPG) at or below 5 500ft and TPG VOR/DME at 2 500ft. On passing TPG VOR/DME, join downind Runway 22 and commence approach.

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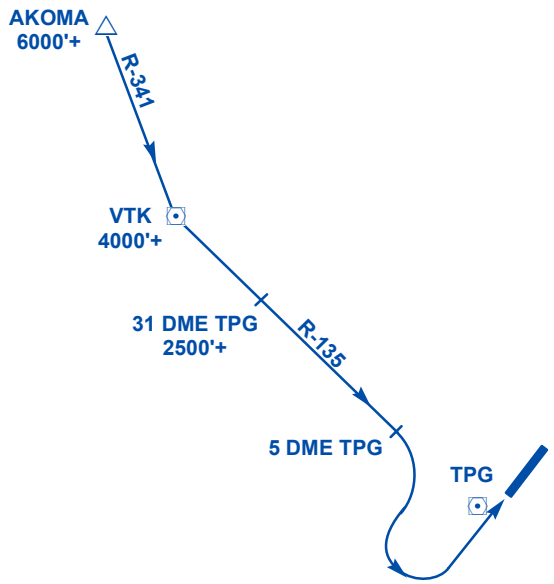
TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) - RUNWAY 04 AND 22 STANDARD INSTRUMENT ARRIVAL (STAR)

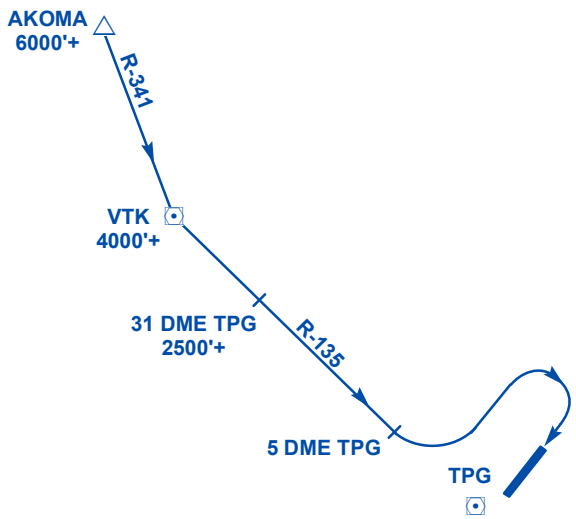
RUNWAY 04



TEKONG 1A ARR (BRAVO 469)

Cross AKOMA (TEKONG R-341/21 DME) at or above 6 000ft and proceed on TEKONG R-341 to cross TEKONG DVOR/DME at or above 4 000ft. At TEKONG DVOR/DME, turn left to intercept TPG R-135. Cross TANJUNG PINANG 31 DME at or above 2 500ft. At TANJUNG PINANG 5 DME, turn right to join downwind Runway 04 and commence approach.

RUNWAY 22



TEKONG 1B ARR (BRAVO 469)

Cross AKOMA (TEKONG R-341/21 DME) at or above 6 000ft and proceed on TEKONG R-341 to cross TEKONG DVOR/DME at or above 4 000ft. At TEKONG DVOR/DME, turn left to intercept TPG R-135. Cross TANJUNG PINANG 31 DME at or above 2 500ft. At TANJUNG PINANG 5 DME, turn left to join downwind Runway 22 and commence approach.

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