

Contact

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

AMDT
03/2022
Effective date
19 MAY 2022
Publication date
19 MAY 2022

wp-AMDT-2022-03

1. Significant information and changes

NIL

2. This amendment incorporates information contained in the listed AIP Supplement and NOTAM which are hereby superseded:

AIP Supplement

055/2022 dated 10/03/2022

NOTAM

A1866/22 dated 07/04/2022

Amended Pages

GEN-0.1-3: : *replace.*
 GEN 0.2-1/2: : *replace.*
 GEN 0.3-1/2: : *replace.*
 GEN 0.3-3/4: : *replace.*
 GEN 0.3-5: : *replace.*
 GEN 0.4-1/2: : *replace.*
 GEN 0.4-3: : *replace.*
 GEN 0.6-1/2: : *replace.*
 GEN 0.6-3: : *replace.*
 GEN 1.2-3/4: : *replace.*
 GEN 1.6-1/2: : *replace.*
 GEN 1.6-3/4: : *replace.*
 GEN 3.1-1/2: : *replace.*
 GEN 3.1-3/4: : *replace.*
 GEN 3.2-1/2: : *replace.*
 GEN 3.2-3/4: : *replace.*
 GEN 3.2-5/6: : *replace.*
 GEN 3.3-1/2: : *replace.*
 GEN 3.4-1/2: : *replace.*
 GEN 3.4-3/4: : *replace.*
 GEN 3.5-1/2: : *replace.*
 GEN 3.5-3/4: : *replace.*
 GEN 3.5-5/6: : *replace.*
 GEN 3.5-7/8: : *replace.*
 GEN 3.5-9: : *replace.*
 GEN 3.6-1/2: : *replace.*
 ENR 1.6-1/2: : *replace.*
 ENR-2.1-15: : *replace.*
 ERC-6-1 En-Route Chart: : *replace.*
 WAC-2860-Singapore-Island: : *replace.*

AD-2-WSSS-ADC-2: : *replace.*

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.

- [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 |
|------------------|-------------------|
| 06/2021 | 02 December 2021 |
| 01/2022 | 27 January 2022 |
| 02/2022 | 24 March 2022 |
| 03/2022 | 19 May 2022 |
| 04/2022 | 14 July 2022 |
| 05/2022 | 08 September 2022 |
| 06/2022 | 03 November 2022 |
| 07/2022 | 29 December 2022 |

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

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

Post:

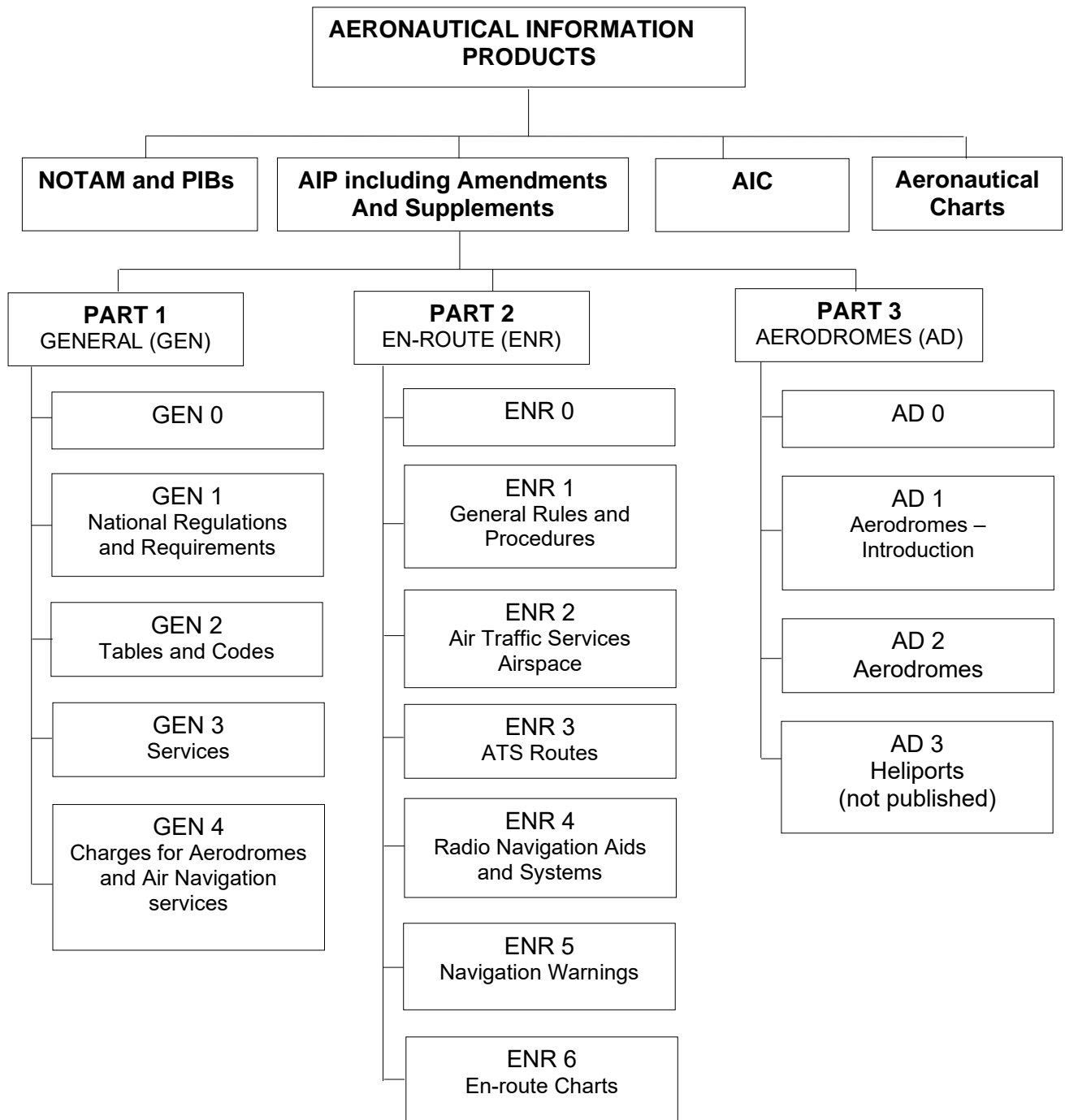
AERONAUTICAL INFORMATION SERVICES
Civil Aviation Authority of Singapore,
Singapore Changi Airport,
P. O. Box 1
Singapore 918141

Tel: (65) 64227036

Fax: (65) 64410221

Email: caas_singaporeais@caas.gov.sg

GEN 0.1 PREFACE



PAGE INTENTIONALLY LEFT BLANK

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 | |

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 | |
| 03/2021 | 17 JUN 2021 | 17 JUN 2021 | |
| 04/2021 | 12 AUG 2021 | 12 AUG 2021 | |
| 05/2021 | 07 OCT 2021 | 07 OCT 2021 | |
| 06/2021 | 02 DEC 2021 | 02 DEC 2021 | |
| 01/2022 | 27 JAN 2022 | 27 JAN 2022 | |
| 02/2022 | 24 MAR 2022 | 24 MAR 2022 | |
| 03/2022 | 19 MAY 2022 | 19 MAY 2022 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

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 | |
| 071/2018 | Paya Lebar Airport - Saddle Cranes | AD | 13 NOV 2018 / 31 DEC 2023 | |
| 078/2018 | Paya Lebar Airport - Luffer Cranes | AD | 28 NOV 2018 / 30 DEC 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 | |
| 053/2019 | Paya Lebar Airport - Saddle Cranes and Luffer Crane | AD | 07 MAY 2019 / 31 DEC 2023 | |
| 126/2019 | Paya Lebar Airport - Luffer Cranes | AD | 12 NOV 2019 / 31 DEC 2022 | |
| 021/2020 | Singapore Changi Airport - Long term closure of aircraft stand E5 at Terminal 2, Singapore Changi Airport | AD | 30 MAR 2020 / 30 DEC 2024 | |
| 059/2020 | Singapore Changi Airport - Long term closure of aircraft stand E20 at Terminal 2, Singapore Changi Airport | AD | 25 AUG 2020 / 30 DEC 2026 | |
| 050/2021 | Paya Lebar Airport - Mobile Cranes | AD | 08 APR 2021 / 21 JUN 2022 | |
| 066/2021 | Paya Lebar Airport - Topless Cranes | AD | 19 MAY 2021 / 25 MAY 2022 | |
| 076/2021 | Paya Lebar Airport - Cranes | AD | 24 JUN 2021 / 11 JUN 2022 | |
| 077/2021 | Paya Lebar Airport - Cranes | AD | 24 JUN 2021 / 01 JUL 2022 | |
| 078/2021 | Paya Lebar Airport - Luffing Cranes | AD | 24 JUN 2021 / 01 JUN 2022 | |
| 084/2021 | Sembawang Aerodrome - Mobile Crane | AD | 24 JUN 2021 / 08 AUG 2022 | |
| 086/2021 | Release of weather balloon with dual radiosondes | ENR | 01 AUG 2021 / 01 AUG 2022 | |
| 088/2021 | Paya Lebar Airport - Luffer Tower Cranes | AD | 08 JUL 2021 / 11 JUN 2022 | |
| 089/2021 | Paya Lebar Airport - Crawler Crane | AD | 08 JUL 2021 / 30 JUN 2022 | |
| 090/2021 | Paya Lebar Airport - Mobile Cranes | AD | 08 JUL 2021 / 21 JUL 2022 | |
| 091/2021 | Paya Lebar Airport - Obstacles | AD | 08 JUL 2021 / 21 JUN 2022 | |
| 092/2021 | Paya Lebar Airport - Luffing Cranes | AD | 08 JUL 2021 / 15 JUN 2022 | |
| 093/2021 | Paya Lebar Airport - Tower Crane | AD | 08 JUL 2021 / 15 JUN 2022 | |
| 094/2021 | Paya Lebar Airport - Tower Crane | AD | 08 JUL 2021 / 10 JUN 2022 | |
| 096/2021 | Paya Lebar Airport - Tower Cranes | AD | 19 AUG 2021 / 01 AUG 2022 | |
| 097/2021 | Paya Lebar Airport - Luffer Crane | AD | 19 AUG 2021 / 01 AUG 2022 | |

| NR/Year | Subject | AIP section(s) affected | Period of validity (from/to) | Cancellation record |
|----------------|--|------------------------------------|---|----------------------------|
| 098/2021 | Paya Lebar Airport - Cranes | AD | 19 AUG 2021 / 01 AUG 2022 | |
| 099/2021 | Paya Lebar Airport - Mobile Cranes | AD | 19 AUG 2021 / 01 AUG 2022 | |
| 100/2021 | Paya Lebar Airport - Luffing Crane | AD | 19 AUG 2021 / 01 AUG 2022 | |
| 101/2021 | Paya Lebar Airport - Luffing Cranes | AD | 19 AUG 2021 / 01 OCT 2022 | |
| 102/2021 | Paya Lebar Airport - Topless Cranes | AD | 19 AUG 2021 / 01 AUG 2022 | |
| 104/2021 | Paya Lebar Airport - Luffing Cranes | AD | 19 AUG 2021 / 01 AUG 2022 | |
| 109/2021 | Paya Lebar Airport - Topless Cranes | AD | 10 SEP 2021 / 29 AUG 2022 | |
| 111/2021 | Paya Lebar Airport - Topless Crane | AD | 10 SEP 2021 / 01 SEP 2022 | |
| 112/2021 | Paya Lebar Airport - Luffing Cranes | AD | 10 SEP 2021 / 01 SEP 2022 | |
| 113/2021 | Paya Lebar Airport - Mobile Crane | AD | 10 SEP 2021 / 10 AUG 2022 | |
| 116/2021 | Sembawang Aerodrome - Lorry Crane | AD | 10 SEP 2021 / 10 AUG 2022 | |
| 120/2021 | Seletar Airport - Closure of Helicopter Landing Area | AD | 01 OCT 2021 / 30 SEP 2022 | |
| 123/2021 | Paya Lebar Airport - Topless Cranes | AD | 21 OCT 2021 / 26 SEP 2022 | |
| 124/2021 | Paya Lebar Airport - Topless Cranes | AD | 21 OCT 2021 / 22 SEP 2022 | |
| 125/2021 | Paya Lebar Airport - Tower Crane | AD | 21 OCT 2021 / 24 OCT 2022 | |
| 126/2021 | Paya Lebar Airport - Luffing Cranes | AD | 21 OCT 2021 / 21 SEP 2022 | |
| 127/2021 | Paya Lebar Airport - Luffing Cranes | AD | 21 OCT 2021 / 01 OCT 2022 | |
| 128/2021 | Paya Lebar Airport - Crawler Crane | AD | 21 OCT 2021 / 01 NOV 2022 | |
| 129/2021 | Paya Lebar Airport - Topless Cranes | AD | 21 OCT 2021 / 01 OCT 2022 | |
| 130/2021 | Paya Lebar Airport - Mobile Crane | AD | 21 OCT 2021 / 20 SEP 2022 | |
| 131/2021 | Paya Lebar Airport - Tower Cranes | AD | 21 OCT 2021 / 23 SEP 2022 | |
| 132/2021 | Paya Lebar Airport - Tower Cranes | AD | 21 OCT 2021 / 20 SEP 2022 | |
| 133/2021 | Paya Lebar Airport - Tower Crane | AD | 21 OCT 2021 / 06 AUG 2022 | |
| 134/2021 | Paya Lebar Airport - Mobile Cranes | AD | 21 OCT 2021 / 01 DEC 2022 | |
| 135/2021 | Paya Lebar Airport - Topless Cranes | AD | 09 NOV 2021 / 01 DEC 2022 | |
| 136/2021 | Paya Lebar Airport - Cranes | AD | 09 NOV 2021 / 01 NOV 2022 | |
| 137/2021 | Paya Lebar Airport - Cranes | AD | 09 NOV 2021 / 01 NOV 2022 | |
| 138/2021 | Paya Lebar Airport - Topless Tower Cranes | AD | 09 NOV 2021 / 11 JUN 2022 | |
| 139/2021 | Paya Lebar Airport - Luffing Cranes | AD | 09 NOV 2021 / 27 SEP 2022 | |
| 140/2021 | Paya Lebar Airport - Crawler Cranes | AD | 09 NOV 2021 / 31 DEC 2022 | |

| NR/Year | Subject | AIP section(s) affected | Period of validity (from/to) | Cancellation record |
|----------------|---|------------------------------------|---|----------------------------|
| 142/2021 | Sembawang Aerodrome - Bore Piling Rigs | AD | 09 NOV 2021 / 01 JUL 2022 | |
| 144/2021 | Paya Lebar Airport - Luffer Cranes | AD | 16 DEC 2021 / 01 DEC 2022 | |
| 145/2021 | Paya Lebar Airport - Cranes | AD | 16 DEC 2021 / 01 DEC 2022 | |
| 146/2021 | Paya Lebar Airport - Cranes | AD | 16 DEC 2021 / 01 DEC 2022 | |
| 147/2021 | Paya Lebar Airport - Cranes | AD | 16 DEC 2021 / 31 DEC 2022 | |
| 148/2021 | Paya Lebar Airport - Flat-Top Cranes | AD | 16 DEC 2021 / 31 DEC 2022 | |
| 149/2021 | Paya Lebar Airport - Topless Cranes | AD | 16 DEC 2021 / 31 DEC 2022 | |
| 150/2021 | Paya Lebar Airport - Cranes | AD | 16 DEC 2021 / 31 DEC 2022 | |
| 151/2021 | Paya Lebar Airport - Luffing Crane | AD | 16 DEC 2021 / 01 JUL 2022 | |
| 152/2021 | Paya Lebar Airport - Mobile Crane | AD | 16 DEC 2021 / 26 JUN 2022 | |
| 153/2021 | Paya Lebar Airport - Luffing Cranes | AD | 16 DEC 2021 / 31 DEC 2022 | |
| 154/2021 | Paya Lebar Airport - Luffing Tower Cranes | AD | 16 DEC 2021 / 15 DEC 2022 | |
| 156/2021 | Paya Lebar Airport - Crawler Cranes | AD | 16 DEC 2021 / 31 DEC 2022 | |
| 157/2021 | Paya Lebar Airport - Cranes | AD | 16 DEC 2021 / 01 DEC 2022 | |
| 158/2021 | Sembawang Aerodrome - Tower Cranes | AD | 16 DEC 2021 / 01 DEC 2022 | |
| 159/2021 | Sembawang Aerodrome - Mobile Crane | AD | 16 DEC 2021 / 08 NOV 2022 | |
| 161/2021 | Singapore Changi Airport - Steel Frame | AD | 17 JAN 2022 / 17 DEC 2024 | |
| 002/2022 | Paya Lebar Airport - Luffing Crane | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 004/2022 | Paya Lebar Airport - Tower Cranes | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 005/2022 | Paya Lebar Airport - Tower Cranes | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 006/2022 | Paya Lebar Airport - Luffer Cranes | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 007/2022 | Paya Lebar Airport - Cranes | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 008/2022 | Paya Lebar Airport - Luffing Crane | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 009/2022 | Paya Lebar Airport - Cranes | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 010/2022 | Paya Lebar Airport - Topless Cranes | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 011/2022 | Paya Lebar Airport - Luffing Crane | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 012/2022 | Paya Lebar Airport - Topless Cranes | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 013/2022 | Paya Lebar Airport - Topless Cranes | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 014/2022 | Paya Lebar Airport - Luffing Crane | AD | 11 JAN 2022 / 01 NOV 2022 | |
| 015/2022 | Paya Lebar Airport - Luffing Crane | AD | 11 JAN 2022 / 31 DEC 2022 | |

| NR/Year | Subject | AIP section(s) affected | Period of validity (from/to) | Cancellation record |
|----------------|--|------------------------------------|---|----------------------------|
| 017/2022 | Paya Lebar Airport - Flat-Top Cranes | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 018/2022 | Paya Lebar Airport - Luffing Crane | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 019/2022 | Paya Lebar Airport - Flat-Top Cranes | AD | 11 JAN 2022 / 01 OCT 2022 | |
| 020/2022 | Paya Lebar Airport - Luffing Crane | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 021/2022 | Paya Lebar Airport - Cranes | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 022/2022 | Paya Lebar Airport - Cranes | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 023/2022 | Paya Lebar Airport - Tower Cranes | AD | 11 JAN 2022 / 09 DEC 2022 | |
| 024/2022 | Paya Lebar Airport - Flat-Top Cranes | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 025/2022 | Paya Lebar Airport - Saddle Cranes | AD | 11 JAN 2022 / 31 DEC 2022 | |
| 028/2022 | Paya Lebar Airport - Flat-Top Cranes | AD | 12 JAN 2022 / 31 DEC 2023 | |
| 031/2022 | Implementation of Wake Turbulence Separation Minima based on Wake Turbulence Groups for Arrivals into Singapore Changi Airport | AD | 01 MAR 2022 PERM | |
| 032/2022 | Paya Lebar Airport - Cranes | AD | 10 FEB 2022 / 31 DEC 2023 | |
| 033/2022 | Paya Lebar Airport - Topless Cranes | AD | 10 FEB 2022 / 01 FEB 2023 | |
| 034/2022 | Paya Lebar Airport - Crawler Cranes | AD | 10 FEB 2022 / 31 JAN 2023 | |
| 035/2022 | Paya Lebar Airport - Suspended Scaffold | AD | 10 FEB 2022 / 31 DEC 2023 | |
| 036/2022 | Paya Lebar Airport - Mobile Crane | AD | 10 FEB 2022 / 31 DEC 2023 | |
| 037/2022 | Paya Lebar Airport - Crawler Cranes | AD | 10 FEB 2022 / 31 DEC 2023 | |
| 038/2022 | Paya Lebar Airport - Mobile Crane | AD | 10 FEB 2022 / 30 JUN 2022 | |
| 039/2022 | Paya Lebar Airport - Topless Cranes | AD | 10 FEB 2022 / 24 DEC 2022 | |
| 040/2022 | Paya Lebar Airport - Tower Cranes | AD | 10 FEB 2022 / 18 JAN 2023 | |
| 041/2022 | Paya Lebar Airport - Mobile Crane | AD | 10 FEB 2022 / 18 SEP 2022 | |
| 042/2022 | Paya Lebar Airport - Mobile Crane | AD | 10 FEB 2022 / 31 DEC 2023 | |
| 043/2022 | Paya Lebar Airport - Luffing Tower Crane | AD | 10 FEB 2022 / 08 JAN 2023 | |
| 044/2022 | Implementation of RNP 4 Navigation Specification on ATS Route M767 and Segment of N884 within Singapore FIR | ENR | 21 APR 2022 PERM | |
| 045/2022 | Singapore Changi Airport - Frangible Frames | AD | 01 APR 2022 / 31 JAN 2024 | |
| 046/2022 | Paya Lebar Airport - Crawler Cranes | AD | 10 MAR 2022 / 31 DEC 2022 | |
| 047/2022 | Paya Lebar Airport - Luffing Crane | AD | 10 MAR 2022 / 31 DEC 2022 | |
| 048/2022 | Paya Lebar Airport - Cranes | AD | 10 MAR 2022 / 31 DEC 2023 | |

| NR/Year | Subject | AIP section(s) affected | Period of validity (from/to) | Cancellation record |
|----------------|--|--------------------------------|-------------------------------------|----------------------------|
| 049/2022 | Paya Lebar Airport - Cranes | AD | 10 MAR 2022 / 31 JAN 2023 | |
| 050/2022 | Paya Lebar Airport - Luffing Crane | AD | 10 MAR 2022 / 14 SEP 2022 | |
| 051/2022 | Paya Lebar Airport - Tower Cranes | AD | 10 MAR 2022 / 31 DEC 2023 | |
| 052/2022 | Paya Lebar Airport - Topless Cranes | AD | 10 MAR 2022 / 03 FEB 2023 | |
| 053/2022 | Singapore Changi Airport - Closure of Runway 02C/20C and Taxiways due to Changi East Development Works | AD | 21 APR 2022 / 05 OCT 2022 | |
| 054/2022 | Singapore Changi Airport - Closure of aircraft stand F50 and taxilane R7 behind aircraft stand at Terminal 2 | AD | 10 MAR 2022 / 31 AUG 2022 | |
| 056/2022 | Singapore Changi Airport - Closure of aircraft stand D41 at Terminal 1 | AD | 21 APR 2022 / 25 JUL 2022 | |
| 057/2022 | Paya Lebar Airport - Luffing Cranes | AD | 12 APR 2022 / 31 MAR 2023 | |
| 058/2022 | Paya Lebar Airport - Mobile Cranes | AD | 12 APR 2022 / 30 SEP 2023 | |
| 059/2022 | Paya Lebar Airport - Topless Cranes | AD | 12 APR 2022 / 30 SEP 2023 | |
| 060/2022 | Paya Lebar Airport - Cranes | AD | 12 APR 2022 / 31 MAR 2023 | |
| 061/2022 | Paya Lebar Airport - Mobile Crane | AD | 12 APR 2022 / 30 JUN 2022 | |
| 062/2022 | Paya Lebar Airport - Cranes | AD | 12 APR 2022 / 31 MAR 2023 | |
| 063/2022 | Paya Lebar Airport - Topless Cranes | AD | 12 APR 2022 / 01 APR 2023 | |
| 064/2022 | Paya Lebar Airport - Mobile Cranes | AD | 12 APR 2022 / 30 SEP 2022 | |
| 065/2022 | Paya Lebar Airport - Mobile Crane | AD | 12 APR 2022 / 01 AUG 2022 | |
| 066/2022 | Paya Lebar Airport - Topless Cranes | AD | 12 APR 2022 / 19 MAR 2023 | |
| 067/2022 | Paya Lebar Airport - Obstacles | AD | 12 APR 2022 / 30 DEC 2023 | |
| 068/2022 | Paya Lebar Airport - Topless Cranes | AD | 12 APR 2022 / 09 MAR 2023 | |
| 069/2022 | Paya Lebar Airport - Luffing Crane | AD | 12 APR 2022 / 01 MAR 2023 | |
| 070/2022 | RSAF Aerial Flypast prior to and on Singapore's National Day, 09 th August 2022 | AD/ENR | 11 JUN 2022 / 13 AUG 2022 | |
| 071/2022 | Paya Lebar Airport - Mobile Crane | AD | 05 MAY 2022 / 31 DEC 2022 | |
| 072/2022 | Paya Lebar Airport - Tower Crane | AD | 05 MAY 2022 / 11 APR 2023 | |
| 073/2022 | Paya Lebar Airport - Cranes | AD | 05 MAY 2022 / 30 APR 2023 | |
| 074/2022 | Paya Lebar Airport - Cranes | AD | 05 MAY 2022 / 06 APR 2023 | |
| 075/2022 | Sembawang Aerodrome - Mobile Crane | AD | 05 MAY 2022 / 09 OCT 2022 | |
| 076/2022 | Sembawang Aerodrome - Mobile Crane | AD | 05 MAY 2022 / 11 DEC 2022 | |

PAGE INTENTIONALLY LEFT BLANK

GEN 0.4 CHECKLIST OF AIP PAGES

| Part 1 – General (GEN) | | | | | | | |
|-------------------------------|-------------|--------------------------------|-------------|--------------------------|-------------|--|--|
| GEN 0 | | GEN 3.2-2 | 31 MAR 2016 | ENR 1.6-7 | 29 MAR 2018 | | |
| GEN 0.1-1 | 26 MAR 2020 | GEN 3.2-3 | 31 MAR 2016 | ENR 1.6-8 | 29 MAR 2018 | | |
| GEN 0.1-2 | 07 OCT 2021 | GEN 3.2-4 | 19 MAY 2022 | ENR-1.6-9 | 21 JUL 2016 | | |
| GEN 0.1-3 | 19 MAY 2022 | GEN 3.2-5 | 19 MAY 2022 | ENR-1.6-11 | 21 JUL 2016 | | |
| GEN 0.2-1 | 13 SEP 2018 | GEN 3.2-6 | 19 MAY 2022 | ENR 1.7-1 | 15 AUG 2019 | | |
| GEN 0.2-2 | 19 MAY 2022 | GEN 3.3-1 | 19 MAY 2022 | ENR 1.7-2 | 24 MAR 2022 | | |
| GEN 0.3-1 | 19 MAY 2022 | GEN 3.3-2 | 19 MAY 2022 | ENR 1.7-3 | 15 AUG 2019 | | |
| GEN 0.3-2 | 19 MAY 2022 | GEN 3.3-4 | 19 MAY 2022 | ENR 1.7-4 | 15 AUG 2019 | | |
| GEN 0.3-3 | 19 MAY 2022 | GEN 3.4-1 | 19 MAY 2022 | ENR 1.7-5 | 15 AUG 2019 | | |
| GEN 0.3-4 | 19 MAY 2022 | GEN 3.4-2 | 19 MAY 2022 | ENR 1.7-6 | 15 AUG 2019 | | |
| GEN 0.3-5 | 19 MAY 2022 | GEN 3.4-3 | 10 SEP 2020 | ENR 1.7-7 | 15 AUG 2019 | | |
| GEN 0.4-1 | 19 MAY 2022 | GEN 3.4-4 | 19 MAY 2022 | ENR 1.8-1 | 10 OCT 2019 | | |
| GEN 0.4-2 | 19 MAY 2022 | GEN 3.4-5 | 12 NOV 2015 | ENR 1.8-2 | 02 DEC 2021 | | |
| GEN 0.4-3 | 19 MAY 2022 | GEN-3.4-7 | 10 SEP 2020 | ENR 1.8-3 | 02 DEC 2021 | | |
| GEN 0.5-1 | 30 JAN 2020 | GEN-3.4-9 | 21 JUL 2016 | ENR 1.8-4 | 02 DEC 2021 | | |
| GEN 0.6-1 | 05 NOV 2020 | GEN 3.5-1 | 19 MAY 2022 | ENR 1.8-5 | 02 DEC 2021 | | |
| GEN 0.6-2 | 19 MAY 2022 | GEN 3.5-2 | 19 MAY 2022 | ENR 1.8-6 | 02 DEC 2021 | | |
| GEN 0.6-3 | 19 MAY 2022 | GEN 3.5-3 | 19 MAY 2022 | ENR 1.8-7 | 02 DEC 2021 | | |
| GEN 1 | | GEN 3.5-4 | 22 APR 2021 | ENR 1.8-8 | 02 DEC 2021 | | |
| GEN 1.1-1 | 05 DEC 2019 | GEN 3.5-5 | 19 MAY 2022 | ENR 1.8-9 | 02 DEC 2021 | | |
| GEN 1.1-2 | 22 APR 2021 | GEN 3.5-6 | 31 DEC 2020 | ENR 1.8-10 | 02 DEC 2021 | | |
| GEN 1.2-1 | 05 NOV 2020 | GEN 3.5-7 | 19 MAY 2022 | ENR 1.8-11 | 02 DEC 2021 | | |
| GEN 1.2-2 | 30 JAN 2020 | GEN 3.5-8 | 19 MAY 2022 | ENR 1.8-12 | 02 DEC 2021 | | |
| GEN 1.2-3 | 19 MAY 2022 | GEN 3.5-9 | 19 MAY 2022 | ENR 1.8-13 | 02 DEC 2021 | | |
| GEN 1.2-4 | 19 MAY 2022 | GEN 3.6-1 | 19 MAY 2022 | ENR 1.8-14 | 02 DEC 2021 | | |
| GEN 1.2-5 | 02 DEC 2021 | GEN 3.6-2 | 19 MAY 2022 | ENR 1.8-15 | 02 DEC 2021 | | |
| GEN 1.2-6 | 16 JUL 2020 | GEN 3.6-3 | 07 OCT 2021 | ENR 1.8-16 | 02 DEC 2021 | | |
| GEN 1.2-7 | 30 JAN 2020 | GEN 3.6-4 | 07 OCT 2021 | ENR 1.8-17 | 02 DEC 2021 | | |
| GEN 1.3-1 | 25 APR 2019 | GEN 3.6-5 | 21 JUL 2016 | ENR 1.8-18 | 02 DEC 2021 | | |
| GEN 1.3-2 | 22 APR 2021 | GEN 4 | | ENR 1.8-19 | 02 DEC 2021 | | |
| GEN 1.3-3 | 22 APR 2021 | GEN 4.1-1 | 27 JAN 2022 | ENR 1.8-20 | 02 DEC 2021 | | |
| GEN 1.3-4 | 12 AUG 2021 | GEN 4.2-1 | 24 MAY 2018 | ENR 1.8-21 | 02 DEC 2021 | | |
| GEN 1.3-5 | 22 APR 2021 | GEN 4.2-2 | 12 NOV 2015 | ENR 1.8-22 | 02 DEC 2021 | | |
| GEN-1.3/ARR PAX FLOW | 25 APR 2019 | GEN 4.2-3 | 12 NOV 2015 | ENR 1.8-23 | 02 DEC 2021 | | |
| GEN-1.3/DEP PAX FLOW 1 | 25 APR 2019 | GEN 4.2-4 | 12 NOV 2015 | ENR 1.8-24 | 02 DEC 2021 | | |
| GEN-1.3/DEP PAX FLOW 2 | 25 APR 2019 | GEN 4.2-5 | 12 NOV 2015 | ENR 1.8-25 | 02 DEC 2021 | | |
| GEN 1.4-1 | 22 APR 2021 | GEN 4.2-6 | 12 NOV 2015 | ENR 1.8-26 | 02 DEC 2021 | | |
| GEN 1.4-2 | 05 NOV 2020 | Part 2 – EN-ROUTE (ENR) | | ENR 1.8-27 | 02 DEC 2021 | | |
| GEN 1.4-3 | 05 NOV 2020 | ENR 0 | | ENR 1.8-28 | 02 DEC 2021 | | |
| GEN 1.5-1 | 12 NOV 2015 | ENR 0.6-1 | 31 DEC 2020 | ENR 1.8-29 | 02 DEC 2021 | | |
| GEN 1.6-1 | 19 MAY 2022 | ENR 0.6-2 | 31 DEC 2020 | ENR 1.8-30 | 02 DEC 2021 | | |
| GEN 1.6-2 | 19 MAY 2022 | ENR 0.6-3 | 02 DEC 2021 | ENR 1.9-1 | 12 AUG 2021 | | |
| GEN 1.6-3 | 19 MAY 2022 | ENR 0.6-4 | 02 DEC 2021 | ENR 1.9-2 | 07 OCT 2021 | | |
| GEN 1.6-4 | 05 NOV 2020 | ENR 0.6-5 | 02 DEC 2021 | ENR 1.9-3 | 07 OCT 2021 | | |
| GEN 1.7-1 | 24 MAR 2022 | ENR 0.6-6 | 02 DEC 2021 | ENR 1.9-4 | 07 OCT 2021 | | |
| GEN 1.7-2 | 27 JAN 2022 | ENR 1 | | ENR 1.9-5 | 07 OCT 2021 | | |
| GEN 1.7-3 | 27 JAN 2022 | ENR 1.1-1 | 25 APR 2019 | ENR 1.10-1 | 25 FEB 2021 | | |
| GEN 1.7-4 | 27 JAN 2022 | ENR 1.1-2 | 12 NOV 2015 | ENR 1.10-2 | 25 FEB 2021 | | |
| GEN 2 | | ENR 1.1-3 | 12 NOV 2015 | ENR 1.10-3 | 25 FEB 2021 | | |
| GEN 2.1-1 | 24 MAR 2022 | ENR 1.1-4 | 12 NOV 2015 | ENR 1.10-4 | 16 JUL 2020 | | |
| GEN 2.1-2 | 24 MAR 2022 | ENR 1.1-5 | 12 NOV 2015 | ENR 1.11-1 | 12 NOV 2015 | | |
| GEN 2.2-1 | 02 MAR 2017 | ENR 1.1-6 | 12 NOV 2015 | ENR 1.12-1 | 12 NOV 2015 | | |
| GEN 2.2-2 | 02 MAR 2017 | ENR 1.1-7 | 12 NOV 2015 | ENR 1.12-2 | 12 NOV 2015 | | |
| GEN 2.2-3 | 02 MAR 2017 | ENR 1.1-8 | 12 NOV 2015 | ENR 1.12-3 | 12 NOV 2015 | | |
| GEN 2.2-4 | 05 JAN 2017 | ENR 1.1-9 | 12 NOV 2015 | ENR 1.12-4 | 12 NOV 2015 | | |
| GEN 2.2-5 | 10 NOV 2016 | ENR 1.1-10 | 12 NOV 2015 | ENR 1.13-1 | 12 NOV 2015 | | |
| GEN 2.3-1 | 12 NOV 2015 | ENR 1.1-11 | 12 NOV 2015 | ENR 1.14-1 | 10 DEC 2015 | | |
| GEN 2.3-2 | 12 NOV 2015 | ENR 1.1-12 | 12 NOV 2015 | ENR 1.14-2 | 15 SEP 2016 | | |
| GEN 2.3-3 | 12 NOV 2015 | ENR 1.1-13 | 12 NOV 2015 | ENR-1.14-3 to ENR-1.14-4 | 15 SEP 2016 | | |
| GEN 2.4-1 | 25 APR 2019 | ENR 1.1-14 | 12 NOV 2015 | ENR-1.14-5 to ENR-1.14-6 | 15 SEP 2016 | | |
| GEN 2.5-1 | 28 FEB 2019 | ENR 1.1-15 | 12 NOV 2015 | ENR-1.14-7 to ENR-1.14-8 | 15 AUG 2019 | | |
| GEN-2.5-3 | 21 JUL 2016 | ENR 1.2-1 | 24 MAR 2022 | ENR 2 | | | |
| GEN 2.6-1 | 12 NOV 2015 | ENR 1.3-1 | 12 NOV 2015 | ENR 2.1-1 | 12 AUG 2021 | | |
| GEN 2.6-2 | 12 NOV 2015 | ENR 1.4-1 | 12 NOV 2015 | ENR 2.1-2 | 03 JAN 2019 | | |
| GEN 2.7-1 | 05 DEC 2019 | ENR 1.5-1 | 31 DEC 2020 | ENR 2.1-3 | 03 JAN 2019 | | |
| GEN 3 | | ENR 1.5-2 | 31 DEC 2020 | ENR 2.1-4 | 25 APR 2019 | | |
| GEN 3.1-1 | 19 MAY 2022 | ENR 1.5-3 | 31 DEC 2020 | ENR 2.1-7 | 21 JUL 2016 | | |
| GEN 3.1-2 | 10 OCT 2019 | ENR 1.5-4 | 31 DEC 2020 | ENR-2.1-9 | 17 JUN 2021 | | |
| GEN 3.1-3 | 02 DEC 2021 | ENR 1.6-1 | 19 MAY 2022 | ENR-2.1-11A | 21 JUL 2016 | | |
| GEN 3.1-4 | 19 MAY 2022 | ENR 1.6-2 | 12 NOV 2015 | ENR-2.1-11B | 21 JUL 2016 | | |
| GEN 3.2-1 | 19 MAY 2022 | ENR 1.6-3 | 12 NOV 2015 | ENR-2.1-13 | 21 JUL 2016 | | |
| | | ENR 1.6-4 | 25 FEB 2021 | ENR-2.1-15 | 19 MAY 2022 | | |
| | | ENR 1.6-5 | 31 DEC 2020 | ENR 3 | | | |
| | | ENR 1.6-6 | 31 DEC 2020 | ENR 3.1-1 | 02 MAR 2017 | | |
| | | | | ENR 3.1-2 | 02 MAR 2017 | | |
| | | | | ENR 3.1-3 | 07 OCT 2021 | | |

| | | | | | |
|-------------------|-------------|---------------------------|-------------|---------------------------|-------------|
| ENR 3.1-4 | 07 OCT 2021 | ENR 4.4-2 | 12 AUG 2021 | AD 2.WSSS-28 | 31 DEC 2020 |
| ENR 3.1-5 | 12 NOV 2015 | ENR 4.4-3 | 12 AUG 2021 | AD 2.WSSS-29 | 31 DEC 2020 |
| ENR 3.1-6 | 07 OCT 2021 | ENR 4.4-4 | 12 AUG 2021 | AD 2.WSSS-30 | 17 JUN 2021 |
| ENR 3.1-7 | 07 OCT 2021 | ENR 4.4-5 | 17 JUN 2021 | AD 2.WSSS-31 | 17 JUN 2021 |
| ENR 3.1-8 | 17 JUN 2021 | ENR 4.4-6 | 17 JUN 2021 | AD 2.WSSS-32 | 31 DEC 2020 |
| ENR 3.1-9 | 07 OCT 2021 | ENR 4.5-1 | 10 SEP 2020 | AD 2.WSSS-33 | 31 DEC 2020 |
| ENR 3.1-10 | 07 OCT 2021 | | | AD 2.WSSS-34 | 31 DEC 2020 |
| ENR 3.1-11 | 07 OCT 2021 | | | AD 2.WSSS-35 | 31 DEC 2020 |
| ENR 3.1-12 | 17 JUN 2021 | ENR 5.1-1 | 30 JAN 2020 | AD 2.WSSS-36 | 31 DEC 2020 |
| ENR 3.1-13 | 17 JUN 2021 | ENR 5.1-2 | 27 JAN 2022 | AD 2.WSSS-37 | 31 DEC 2020 |
| ENR 3.1-14 | 17 JUN 2021 | ENR 5.1-3 | 10 OCT 2019 | AD 2.WSSS-38 | 31 DEC 2020 |
| ENR 3.1-15 | 17 JUN 2021 | ENR 5.1-4 | 10 OCT 2019 | AD 2.WSSS-39 | 17 JUN 2021 |
| ENR 3.1-16 | 17 JUN 2021 | ENR 5.1-5 | 10 OCT 2019 | AD 2.WSSS-40 | 17 JUN 2021 |
| ENR 3.1-17 | 17 JUN 2021 | ENR-5.1-7 | 17 JUN 2021 | AD 2.WSSS-41 | 31 DEC 2020 |
| ENR 3.1-18 | 17 JUN 2021 | ENR-5.1-9 | 30 JAN 2020 | AD 2.WSSS-42 | 07 OCT 2021 |
| ENR-3.1/ATS Chart | 24 MAR 2022 | ENR 5.2-1 | 03 JAN 2019 | AD 2.WSSS-43 | 12 AUG 2021 |
| ENR 3.3-1 | 17 JUN 2021 | ENR 5.2-2 | 03 JAN 2019 | AD 2.WSSS-44 | 12 AUG 2021 |
| ENR 3.3-2 | 02 MAR 2017 | ENR 5.2-3 | 03 JAN 2019 | AD 2.WSSS-45 | 31 DEC 2020 |
| ENR 3.3-3 | 19 JUL 2018 | ENR 5.3-1 | 10 SEP 2020 | AD 2.WSSS-46 | 31 DEC 2020 |
| ENR 3.3-4 | 12 NOV 2015 | ENR 5.4-1 | 12 NOV 2015 | AD-2.WSSS-ADC-1 | 31 DEC 2020 |
| ENR 3.3-5 | 12 NOV 2015 | ENR 5.5-1 | 03 JAN 2019 | AD-2.WSSS-ADC-2 | 19 MAY 2022 |
| ENR 3.3-6 | 12 AUG 2021 | ENR 5.6-1 | 21 MAY 2020 | AD-2.WSSS-ADC-3 | 12 AUG 2021 |
| ENR 3.3-7 | 10 OCT 2019 | ENR 5.6-2 | 12 NOV 2015 | AD-2.WSSS-AOC-1 | 16 JUL 2020 |
| ENR 3.3-8 | 02 MAR 2017 | | | AD-2.WSSS-AOC-2 | 31 DEC 2020 |
| ENR 3.3-9 | 07 DEC 2017 | | | AD-2.WSSS-AOC-3 | 12 AUG 2021 |
| ENR 3.3-10 | 07 DEC 2017 | | | AD-2.WSSS-AOC-4 | 22 APR 2021 |
| ENR 3.3-11 | 29 MAR 2018 | ENR 6-1 | 15 SEP 2016 | AD-2.WSSS-PATC-1 | 10 OCT 2019 |
| ENR 3.3-12 | 17 JUN 2021 | ERC-6-1 En-Route Chart | 19 MAY 2022 | AD-2.WSSS-PATC-2 | 01 FEB 2018 |
| ENR 3.3-13 | 12 AUG 2021 | WAC-2860-Singapore-Island | 19 MAY 2022 | AD-2.WSSS-PATC-3 | 31 DEC 2020 |
| ENR 3.3-14 | 12 AUG 2021 | | | AD-2.WSSS-PATC-4 | 31 DEC 2020 |
| ENR 3.3-15 | 07 DEC 2017 | | | AD-2.WSSS-SID-1 to 1.1 | 12 AUG 2021 |
| ENR 3.3-16 | 07 DEC 2017 | | | AD-2.WSSS-SID-2 to 2.1 | 12 AUG 2021 |
| ENR 3.3-17 | 07 DEC 2017 | AD 0.6-1 | 02 DEC 2021 | AD-2.WSSS-SID-3 to 3.1 | 12 AUG 2021 |
| ENR 3.3-18 | 12 AUG 2021 | AD 0.6-2 | 12 AUG 2021 | AD-2.WSSS-SID-4 to 4.1 | 12 AUG 2021 |
| ENR 3.3-19 | 19 JUL 2018 | AD 0.6-3 | 12 AUG 2021 | AD-2.WSSS-SID-5 to 5.1 | 12 AUG 2021 |
| ENR 3.3-20 | 07 DEC 2017 | AD 0.6-4 | 12 AUG 2021 | AD-2.WSSS-SID-6 to 6.1 | 12 AUG 2021 |
| ENR 3.3-21 | 19 JUL 2018 | AD 0.6-5 | 12 AUG 2021 | AD-2.WSSS-SID-7 to 7.1 | 12 AUG 2021 |
| ENR 3.3-22 | 19 JUL 2018 | AD 0.6-6 | 12 AUG 2021 | AD-2.WSSS-SID-8 to 8.1 | 12 AUG 2021 |
| ENR 3.3-23 | 07 DEC 2017 | AD 0.6-7 | 12 AUG 2021 | AD-2.WSSS-SID-9 to 9.1 | 12 AUG 2021 |
| ENR 3.3-24 | 17 JUN 2021 | | | AD-2.WSSS-SID-10 to 10.1 | 12 AUG 2021 |
| ENR 3.3-25 | 12 AUG 2021 | | | AD-2.WSSS-SID-11 to 11.1 | 12 AUG 2021 |
| ENR 3.3-26 | 07 DEC 2017 | AD 1.1-1 | 12 NOV 2015 | AD-2.WSSS-SID-12 to 12.1 | 12 AUG 2021 |
| ENR 3.3-27 | 12 AUG 2021 | AD 1.1-2 | 12 NOV 2015 | AD-2.WSSS-SID-13 to 13.1 | 12 AUG 2021 |
| ENR 3.3-28 | 07 DEC 2017 | AD 1.1-3 | 15 AUG 2019 | AD-2.WSSS-SID-14 to 14.1 | 12 AUG 2021 |
| ENR 3.3-29 | 12 AUG 2021 | AD 1.1-4 | 02 DEC 2021 | AD-2.WSSS-SID-15 to 15.1 | 12 AUG 2021 |
| ENR 3.3-30 | 12 AUG 2021 | AD 1.1-5 | 02 DEC 2021 | AD-2.WSSS-SID-16 to 16.1 | 12 AUG 2021 |
| ENR 3.3-31 | 12 AUG 2021 | AD 1.2-1 | 12 NOV 2015 | AD-2.WSSS-SID-17 to 17.1 | 12 AUG 2021 |
| ENR 3.3-32 | 07 DEC 2017 | AD 1.3-1 | 12 NOV 2015 | AD-2.WSSS-SID-18 to 18.1 | 12 AUG 2021 |
| ENR 3.3-33 | 22 APR 2021 | AD-1.3-3 | 21 JUL 2016 | AD-2.WSSS-SID-19 to 19.1 | 24 MAR 2022 |
| ENR 3.3-34 | 07 DEC 2017 | AD 1.4-1 | 12 NOV 2015 | AD-2.WSSS-STAR-1 to 1.1 | 12 AUG 2021 |
| ENR 3.3-35 | 22 APR 2021 | AD 1.5-1 | 10 SEP 2020 | AD-2.WSSS-STAR-2 to 2.1 | 12 AUG 2021 |
| ENR 3.3-36 | 07 DEC 2017 | | | AD-2.WSSS-STAR-3 to 3.1 | 12 AUG 2021 |
| ENR 3.3-37 | 07 DEC 2017 | | | AD-2.WSSS-STAR-4 to 4.1 | 12 AUG 2021 |
| ENR 3.3-38 | 17 JUN 2021 | AD 2.WSSS-1 | 31 DEC 2020 | AD-2.WSSS-STAR-5 to 5.1 | 12 AUG 2021 |
| ENR 3.3-39 | 17 JUN 2021 | AD 2.WSSS-2 | 31 DEC 2020 | AD-2.WSSS-STAR-6 to 6.1 | 12 AUG 2021 |
| ENR 3.3-40 | 17 JUN 2021 | AD 2.WSSS-3 | 31 DEC 2020 | AD-2.WSSS-STAR-7 to 7.1 | 12 AUG 2021 |
| ENR 3.3-41 | 17 JUN 2021 | AD 2.WSSS-4 | 07 OCT 2021 | AD-2.WSSS-STAR-8 to 8.1 | 12 AUG 2021 |
| ENR 3.3-42 | 17 JUN 2021 | AD 2.WSSS-5 | 25 FEB 2021 | AD-2.WSSS-STAR-9 to 9.1 | 12 AUG 2021 |
| ENR 3.3-43 | 02 DEC 2021 | AD 2.WSSS-6 | 31 DEC 2020 | AD-2.WSSS-STAR-11 to 11.1 | |
| ENR 3.4-1 | 12 NOV 2015 | AD 2.WSSS-7 | 31 DEC 2020 | | 12 AUG 2021 |
| ENR 3.4-2 | 12 OCT 2017 | AD 2.WSSS-8 | 31 DEC 2020 | AD-2.WSSS-STAR-13 to 13.1 | |
| ENR 3.4-3 | 28 FEB 2019 | AD 2.WSSS-9 | 31 DEC 2020 | | 12 AUG 2021 |
| ENR 3.4-4 | 12 NOV 2015 | AD 2.WSSS-10 | 31 DEC 2020 | AD-2.WSSS-STAR-14 to 14.1 | |
| ENR-3.4-5 | 31 DEC 2020 | AD 2.WSSS-11 | 31 DEC 2020 | | 07 OCT 2021 |
| ENR-3.4-7 | 21 JUL 2016 | AD 2.WSSS-12 | 31 DEC 2020 | AD-2.WSSS-STAR-15 to 15.1 | |
| ENR 3.5-1 | 02 MAR 2017 | AD 2.WSSS-13 | 07 OCT 2021 | | 07 OCT 2021 |
| ENR 3.5-2 | 02 MAR 2017 | AD 2.WSSS-14 | 31 DEC 2020 | AD-2.WSSS-STAR-16 to 16.1 | |
| ENR-3.5-3 | 31 DEC 2020 | AD 2.WSSS-15 | 31 DEC 2020 | | 12 AUG 2021 |
| ENR 3.6-1 | 27 APR 2017 | AD 2.WSSS-16 | 31 DEC 2020 | AD-2.WSSS-STAR-17 to 17.1 | |
| ENR 3.6-2 | 07 OCT 2021 | AD 2.WSSS-17 | 31 DEC 2020 | | 12 AUG 2021 |
| ENR-3.6-3 | 07 OCT 2021 | AD 2.WSSS-18 | 25 FEB 2021 | AD-2.WSSS-STAR-18 to 18.1 | |
| ENR-3.6-5 | 17 JUN 2021 | AD 2.WSSS-19 | 25 FEB 2021 | | 12 AUG 2021 |
| ENR-3.6-7 | 07 OCT 2021 | AD 2.WSSS-20 | 31 DEC 2020 | AD-2.WSSS-STAR-19 to 19.1 | |
| ENR-3.6-9 | 07 OCT 2021 | AD 2.WSSS-21 | 31 DEC 2020 | | 12 AUG 2021 |
| | | AD 2.WSSS-22 | 12 AUG 2021 | AD-2.WSSS-STAR-20 to 20.1 | |
| | | AD 2.WSSS-23 | 31 DEC 2020 | | 12 AUG 2021 |
| | | AD 2.WSSS-24 | 31 DEC 2020 | AD-2.WSSS-STAR-21 to 21.1 | |
| ENR 4.1-1 | 07 OCT 2021 | AD 2.WSSS-25 | 07 OCT 2021 | | 12 AUG 2021 |
| ENR 4.1-2 | 02 MAR 2017 | AD 2.WSSS-26 | 31 DEC 2020 | AD-2.WSSS-IAC-1 | 24 MAR 2022 |
| ENR 4.3-1 | 12 NOV 2015 | AD 2.WSSS-27 | 31 DEC 2020 | AD-2.WSSS-IAC-2 | 24 MAR 2022 |
| ENR 4.4-1 | 12 AUG 2021 | | | | |

| | | | |
|--------------------------|-------------|------------------|-------------|
| AD-2-WSSS-IAC-5 | 24 MAR 2022 | AD 2.WSAG-3 | 12 AUG 2021 |
| AD-2-WSSS-IAC-6 | 24 MAR 2022 | AD 2.WSAG-4 | 16 JUL 2020 |
| AD-2-WSSS-IAC-7 | 24 MAR 2022 | AD 2.WMKJ-1 | 12 NOV 2015 |
| AD-2-WSSS-IAC-9 to 9.1 | 24 MAR 2022 | AD 2.WIDD-1 | 12 NOV 2015 |
| AD-2-WSSS-IAC-10 to 10.1 | 24 MAR 2022 | AD 2.WIDD-2 | 12 NOV 2015 |
| AD-2-WSSS-IAC-11 to 11.1 | 24 MAR 2022 | AD-2-WIDD-SID-1 | 12 NOV 2015 |
| AD-2-WSSS-IAC-12 to 12.1 | 24 MAR 2022 | AD-2-WIDD-SID-2 | 12 NOV 2015 |
| AD-2-WSSS-IAC-13 to 13.1 | 24 MAR 2022 | AD-2-WIDD-SID-3 | 12 NOV 2015 |
| AD-2-WSSS-IAC-14 to 14.1 | 24 MAR 2022 | AD-2-WIDD-SID-4 | 12 NOV 2015 |
| AD-2-WSSS-VAC-1 | 31 DEC 2020 | AD-2-WIDD-STAR-1 | 12 NOV 2015 |
| AD 2.WSSL-1 | 10 SEP 2020 | AD-2-WIDD-STAR-2 | 12 NOV 2015 |
| AD 2.WSSL-2 | 28 FEB 2019 | AD-2-WIDD-STAR-3 | 12 NOV 2015 |
| AD 2.WSSL-3 | 15 AUG 2019 | AD-2-WIDD-STAR-4 | 12 NOV 2015 |
| AD 2.WSSL-4 | 05 DEC 2019 | AD 2.WIDN-1 | 03 JAN 2019 |
| AD 2.WSSL-5 | 12 AUG 2021 | AD 2.WIDN-2 | 03 JAN 2019 |
| AD 2.WSSL-6 | 15 AUG 2019 | AD-2-WIDN-SID-1 | 12 NOV 2015 |
| AD 2.WSSL-7 | 15 AUG 2019 | AD-2-WIDN-SID-2 | 12 NOV 2015 |
| AD 2.WSSL-8 | 15 AUG 2019 | AD-2-WIDN-SID-3 | 12 NOV 2015 |
| AD 2.WSSL-9 | 15 AUG 2019 | AD-2-WIDN-SID-4 | 12 NOV 2015 |
| AD 2.WSSL-10 | 15 AUG 2019 | AD-2-WIDN-STAR-1 | 12 NOV 2015 |
| AD 2.WSSL-11 | 15 AUG 2019 | AD-2-WIDN-STAR-2 | 12 NOV 2015 |
| AD 2.WSSL-12 | 26 MAR 2020 | AD-2-WIDN-STAR-3 | 21 JUL 2016 |
| AD 2.WSSL-13 | 05 DEC 2019 | AD-2-WIDN-STAR-4 | 12 NOV 2015 |
| AD 2.WSSL-14 | 15 AUG 2019 | | |
| AD 2.WSSL-15 | 12 AUG 2021 | | |
| AD 2.WSSL-16 | 10 OCT 2019 | | |
| AD 2.WSSL-17 | 05 NOV 2020 | | |
| AD 2.WSSL-18 | 05 NOV 2020 | | |
| AD 2.WSSL-19 | 15 AUG 2019 | | |
| AD 2.WSSL-20 | 10 OCT 2019 | | |
| AD 2.WSSL-21 | 05 NOV 2020 | | |
| AD 2.WSSL-22 | 10 OCT 2019 | | |
| AD 2.WSSL-23 | 25 FEB 2021 | | |
| AD 2.WSSL-24 | 15 AUG 2019 | | |
| AD 2.WSSL-25 | 25 FEB 2021 | | |
| AD-2-WSSL-ADC-1 | 12 AUG 2021 | | |
| AD-2-WSSL-ADC-2 | 12 AUG 2021 | | |
| AD-2-WSSL-ADC-3 | 16 JUL 2020 | | |
| AD-2-WSSL-AOC-1 | 16 JUL 2020 | | |
| AD-2-WSSL-AOC-2 | 16 JUL 2020 | | |
| AD-2-WSSL-VAC-1 | 16 JUL 2020 | | |
| AD-2-WSSL-VAC-2 | 16 JUL 2020 | | |
| AD-2-WSSL-VAC-3 | 16 JUL 2020 | | |
| AD-2-WSSL-VAC-4 | 16 JUL 2020 | | |
| AD-2-WSSL-VDC-1 | 16 JUL 2020 | | |
| AD-2-WSSL-VDC-2 to 2.1 | 25 FEB 2021 | | |
| AD-2-WSSL-VFR-1 | 31 DEC 2020 | | |
| AD-2-WSSL-IFR-1 | 31 DEC 2020 | | |
| AD-2-WSSL-IFR-2 | 31 DEC 2020 | | |
| AD 2.WSAP-1 | 16 JUL 2020 | | |
| AD 2.WSAP-2 | 19 JUL 2018 | | |
| AD 2.WSAP-3 | 10 OCT 2019 | | |
| AD 2.WSAP-4 | 19 JUL 2018 | | |
| AD 2.WSAP-5 | 10 OCT 2019 | | |
| AD 2.WSAP-6 | 12 OCT 2017 | | |
| AD 2.WSAP-7 | 19 JUL 2018 | | |
| AD 2.WSAP-8 | 12 AUG 2021 | | |
| AD 2.WSAP-9 | 07 OCT 2021 | | |
| AD 2.WSAP-10 | 16 JUL 2020 | | |
| AD 2.WSAP-11 | 07 OCT 2021 | | |
| AD-2-WSAP-ADC-1 | 16 JUL 2020 | | |
| AD-2-WSAP-ADC-2 | 16 JUL 2020 | | |
| AD-2-WSAP-AOC-1 | 24 MAR 2022 | | |
| AD-2-WSAP-IAC-1 | 31 DEC 2020 | | |
| AD-2-WSAP-IAC-2 | 07 OCT 2021 | | |
| AD-2-WSAP-IAC-3 | 07 OCT 2021 | | |
| AD-2-WSAP-IAC-4 | 07 OCT 2021 | | |
| AD-2-WSAP-IAC-5 | 31 DEC 2020 | | |
| AD-2-WSAP-IAC-6 | 07 OCT 2021 | | |
| AD 2.WSAT-1 | 16 JUL 2020 | | |
| AD 2.WSAT-2 | 26 MAR 2020 | | |
| AD 2.WSAT-3 | 25 FEB 2021 | | |
| AD 2.WSAT-4 | 25 FEB 2021 | | |
| AD 2.WSAT-5 | 12 AUG 2021 | | |
| AD 2.WSAT-6 | 07 OCT 2021 | | |
| AD 2.WSAT-7 | 12 NOV 2015 | | |
| AD 2.WSAT-8 | 25 FEB 2021 | | |
| AD-2-WSAT-ADC-1 | 17 JUN 2021 | | |
| AD 2.WSAG-1 | 16 JUL 2020 | | |
| AD 2.WSAG-2 | 08 NOV 2018 | | |

PAGE INTENTIONALLY LEFT BLANK

GEN 0.5 LIST OF HAND AMENDMENTS TO THE AIP

| <i>AIP page(s) affected</i> | <i>Amendment text</i> | <i>Introduced by AIP Amendment NR</i> |
|-----------------------------|-----------------------|---------------------------------------|
| NIL | NIL | NIL |

PAGE INTENTIONALLY LEFT BLANK

GEN 0.6 TABLE OF CONTENTS TO PART 1

| | | |
|-------------------------|---|-----------|
| GEN 0.1 | PREFACE | GEN 0.1-1 |
| 1 | Name of the publishing authority | GEN 0.1-1 |
| 2 | Applicable ICAO documents | GEN 0.1-1 |
| 3 | Publication Media | GEN 0.1-1 |
| 4 | The AIP structure and established regular amendment interval | GEN 0.1-1 |
| 5 | Service to contact in case of detected AIP errors or omissions | GEN 0.1-2 |
| GEN 0.2 | RECORD OF AIP AMENDMENTS | GEN 0.2-1 |
| GEN 0.3 | RECORD OF CURRENT AIP SUPPLEMENTS | GEN 0.3-1 |
| GEN 0.4 | CHECKLIST OF AIP PAGES | GEN 0.4-1 |
| GEN 0.5 | LIST OF HAND AMENDMENTS TO THE AIP | GEN 0.5-1 |
| GEN 0.6 | TABLE OF CONTENTS TO PART 1 | GEN 0.6-1 |
| GEN 1 | NATIONAL REGULATIONS AND REQUIREMENTS | |
| GEN 1.1 | DESIGNATED AUTHORITIES | GEN 1.1-1 |
| 1 | CIVIL AVIATION | GEN 1.1-1 |
| 2 | METEOROLOGY | GEN 1.1-1 |
| 3 | CUSTOMS | GEN 1.1-1 |
| 4 | IMMIGRATION | GEN 1.1-1 |
| 5 | HEALTH | GEN 1.1-1 |
| 6 | ENROUTE AND AERODROME CHARGES | GEN 1.1-2 |
| 7 | AGRICULTURE QUARANTINE | GEN 1.1-2 |
| 8 | TRANSPORT SAFETY INVESTIGATION BUREAU | GEN 1.1-2 |
| GEN 1.2 | ENTRY, TRANSIT AND DEPARTURE OF AIRCRAFT | GEN 1.2-1 |
| 1 | INTRODUCTION | GEN 1.2-1 |
| 2 | APPLICATION FOR SLOTS AT SINGAPORE CHANGI AIRPORT | GEN 1.2-1 |
| 3 | SUBMISSION OF FLIGHT DETAILS AND APPLICATION FOR SLOTS AT SELETAR AIRPORT | GEN 1.2-2 |
| 4 | CIVIL SCHEDULED FLIGHTS | GEN 1.2-3 |
| 5 | CIVIL NON-SCHEDULED FLIGHTS | GEN 1.2-3 |
| 6 | APPLICATION FOR TEST FLIGHTS | GEN 1.2-6 |
| 7 | AIRCRAFT BANNED FROM OPERATIONS AT SINGAPORE AERODROMES | GEN 1.2-7 |
| GEN 1.3 | ENTRY, TRANSIT AND DEPARTURE OF PASSENGERS AND CREW | GEN 1.3-1 |
| 1 | CUSTOMS REQUIREMENTS | GEN 1.3-1 |
| 2 | IMMIGRATION REQUIREMENTS | GEN 1.3-2 |
| 3 | PUBLIC HEALTH REQUIREMENTS | GEN 1.3-4 |
| 4 | FLYING LICENCES AND RATINGS | GEN 1.3-5 |
| GEN 1.4 | ENTRY, TRANSIT AND DEPARTURE OF CARGO | GEN 1.4-1 |
| 1 | CUSTOMS REQUIREMENTS CONCERNING CARGO AND OTHER ARTICLES | GEN 1.4-1 |
| 2 | VETERINARY, ANIMALS, BIRDS, MEAT, FISH AND PLANT QUARANTINE REQUIREMENTS | GEN 1.4-1 |
| 3 | REQUIREMENTS RELATING TO ARMS AND EXPLOSIVES | GEN 1.4-2 |
| 4 | REQUIREMENTS FOR THE CARRIAGE OF DANGEROUS GOODS IN AIRCRAFT | GEN 1.4-2 |
| 5 | REPORTING OF DANGEROUS GOODS ACCIDENT/INCIDENT | GEN 1.4-2 |
| GEN 1.5 | AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS | GEN 1.5-1 |
| 1 | MANDATORY CARRIAGE AND OPERATION OF AIRBORNE COLLISION AVOIDANCE SYSTEM (ACAS II) | GEN 1.5-1 |

| | | |
|------------------------------|---|-----------|
| GEN 1.6 | SUMMARY OF NATIONAL REGULATIONS AND INTERNATIONAL AGREEMENTS/CONVENTIONS | GEN 1.6-1 |
| 1 | LIST OF CIVIL AVIATION LEGISLATION, AIR NAVIGATION REGULATIONS AND ORDERS | GEN 1.6-1 |
| 2 | TAXATION IN THE FIELD OF INTERNATIONAL AIR TRANSPORT | GEN 1.6-4 |
| GEN 1.7 | DIFFERENCES FROM ICAO STANDARDS, RECOMMENDED PRACTICES AND PROCEDURES | GEN 1.7-1 |
| GEN 2 | TABLES AND CODES | |
| GEN 2.1 | MEASURING SYSTEM, AIRCRAFT MARKING, HOLIDAYS | GEN 2.1-1 |
| 2.1.1 | UNITS OF MEASUREMENT | GEN 2.1-1 |
| 2.1.2 | TEMPORAL REFERENCE SYSTEM | GEN 2.1-1 |
| 2.1.3 | HORIZONTAL REFERENCE SYSTEM | GEN 2.1-1 |
| 2.1.4 | VERTICAL REFERENCE SYSTEM | GEN 2.1-2 |
| 2.1.5 | AIRCRAFT NATIONALITY AND REGISTRATION MARKS | GEN 2.1-2 |
| 2.1.6 | PUBLIC HOLIDAYS IN SINGAPORE | GEN 2.1-2 |
| GEN 2.2 | ABBREVIATIONS USED IN AIS PUBLICATIONS | GEN 2.2-1 |
| GEN 2.3 | CHART SYMBOLS | GEN 2.3-1 |
| 1 | AERODROMES | GEN 2.3-1 |
| 2 | AERODROME INSTALLATIONS AND LIGHTS | GEN 2.3-2 |
| 3 | MISCELLANEOUS | GEN 2.3-3 |
| GEN 2.4 | LOCATION INDICATORS | GEN 2.4-1 |
| GEN 2.5 | LIST OF RADIO NAVIGATION AIDS | GEN 2.5-1 |
| GEN 2.6 | CONVERSIONS TABLES | GEN 2.6-1 |
| GEN 2.7 | SUNRISE/SUNSET TABLES | GEN 2.7-1 |
| GEN 3 | SERVICES | |
| GEN 3.1 | AERONAUTICAL INFORMATION SERVICES | GEN 3.1-1 |
| 3.1.1 | RESPONSIBLE SERVICE | GEN 3.1-1 |
| 3.1.2 | AREA OF RESPONSIBILITY | GEN 3.1-1 |
| 3.1.3 | AERONAUTICAL PUBLICATIONS | GEN 3.1-1 |
| 3.1.4 | AIRAC SYSTEM | GEN 3.1-4 |
| 3.1.5 | PRE-FLIGHT INFORMATION SERVICE AT AERODROMES | GEN 3.1-4 |
| 3.1.6 | DIGITAL DATA SETS | GEN 3.1-4 |
| GEN 3.2 | AERONAUTICAL CHARTS | GEN 3.2-1 |
| 3.2.1 | RESPONSIBLE SERVICES | GEN 3.2-1 |
| 3.2.2 | MAINTENANCE OF CHARTS | GEN 3.2-1 |
| 3.2.3 | PURCHASE ARRANGEMENTS | GEN 3.2-1 |
| 3.2.4 | AERONAUTICAL CHART SERIES AVAILABLE | GEN 3.2-1 |
| 3.2.5 | LIST OF AERONAUTICAL CHARTS AVAILABLE | GEN 3.2-4 |
| 3.2.6 | INDEX TO THE WORLD AERONAUTICAL CHART (WAC) - ICAO 1:1 000 000 | GEN 3.2-5 |
| 3.2.7 | TOPOGRAPHICAL CHARTS | GEN 3.2-5 |
| 3.2.8 | CORRECTIONS TO CHARTS NOT CONTAINED IN THE AIP | GEN 3.2-6 |
| GEN 3.3 | AIR TRAFFIC SERVICES | GEN 3.3-1 |
| 3.3.1 | RESPONSIBLE SERVICE | GEN 3.3-1 |
| 3.3.2 | AREA OF RESPONSIBILITY | GEN 3.3-1 |
| 3.3.3 | TYPES OF SERVICES | GEN 3.3-1 |
| 3.3.4 | CO-ORDINATION BETWEEN THE OPERATOR AND ATS | GEN 3.3-2 |
| 3.3.5 | MINIMUM FLIGHT ALTITUDE | GEN 3.3-2 |
| 3.3.6 | ATS UNITS ADDRESS LIST | GEN 3.3-2 |

←
←

←
←

| | | | |
|---|-------------------------|--|-----------|
| ← | GEN 3.4 | COMMUNICATION SERVICES | GEN 3.4-1 |
| ← | 3.4.1 | RESPONSIBLE SERVICE | GEN 3.4-1 |
| | 3.4.2 | AREA OF RESPONSIBILITY | GEN 3.4-1 |
| | 3.4.3 | TYPES OF SERVICE | GEN 3.4-1 |
| ← | GEN 3.5 | METEOROLOGICAL SERVICES | GEN 3.5-1 |
| ← | 3.5.1 | RESPONSIBLE SERVICE | GEN 3.5-1 |
| | 3.5.2 | AREA OF RESPONSIBILITY | GEN 3.5-1 |
| | 3.5.3 | METEOROLOGICAL OBSERVATIONS AND REPORTS | GEN 3.5-2 |
| | 3.5.4 | TYPES OF SERVICES | GEN 3.5-3 |
| | 3.5.5 | NOTIFICATION REQUIRED FROM OPERATORS | GEN 3.5-5 |
| | 3.5.6 | AIRCRAFT REPORTS REQUIRED FROM OPERATORS | GEN 3.5-5 |
| | 3.5.7 | VOLMET SERVICE | GEN 3.5-7 |
| | 3.5.8 | SIGMET SERVICE | GEN 3.5-8 |
| | 3.5.9 | OTHER AUTOMATED METEOROLOGICAL SERVICES | GEN 3.5-9 |
| ← | GEN 3.6 | SEARCH AND RESCUE | GEN 3.6-1 |
| ← | 3.6.1 | RESPONSIBLE SERVICE(S) | GEN 3.6-1 |
| | 3.6.2 | AREA OF RESPONSIBILITY | GEN 3.6-1 |
| | 3.6.3 | TYPES OF SERVICES | GEN 3.6-1 |
| | 3.6.4 | SAR AGREEMENTS | GEN 3.6-1 |
| | 3.6.5 | CONDITIONS OF AVAILABILITY | GEN 3.6-2 |
| | 3.6.6 | PROCEDURES AND SIGNALS USED | GEN 3.6-2 |
| ← | GEN 4 | CHARGES FOR AERODROMES/HELIPORT AND AIR NAVIGATION SERVICES | |
| ← | GEN 4.1 | AERODROME CHARGES | GEN 4.1-1 |
| | 1 | AIRPORT FEES AND CHARGES APPLICABLE AT SINGAPORE CHANGI AIRPORT | GEN 4.1-1 |
| | 2 | AIRPORT FEES AND CHARGES APPLICABLE AT SELETAR AIRPORT | GEN 4.1-1 |
| | 3 | HANGAR FEES | GEN 4.1-1 |
| | 4 | NOISE RELATED ITEMS | GEN 4.1-1 |
| | 5 | GROUND HANDLING SERVICE CHARGES | GEN 4.1-1 |
| | GEN 4.2 | AIR NAVIGATION SERVICES CHARGES | GEN 4.2-1 |
| | 1 | GENERAL | GEN 4.2-1 |
| | 2 | RANS CHARGES | GEN 4.2-1 |
| | 3 | EXEMPTION FROM RANS CHARGES | GEN 4.2-1 |
| | 4 | COLLECTION OF RANS CHARGES | GEN 4.2-1 |
| | 5 | PERSON LIABLE TO PAY RANS CHARGES | GEN 4.2-2 |
| | 6 | QUERIES ON LEVYING/BILLING OF RANS CHARGES | GEN 4.2-2 |

PAGE INTENTIONALLY LEFT BLANK

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 AVIATION 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

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

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](mailto: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.

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:

- 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://atlas.caas.gov.sg> 5 working days before flight changes take place.

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

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

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

← 4.2.6 All applications and required documents listed in paragraph 4.2.5 should be submitted via 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 | <u>General Declaration</u> | <u>Passenger Manifest</u> | <u>Cargo Manifest</u> |
|-------------|----------------------------|---------------------------|-----------------------|
| 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.

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 paragraph 4.2.5;
- e. Nature of flight including details of whether the flight is to carry passengers or cargo or both;
 - i. for passenger flights: points of origin and destination of passengers, purpose of flight e.g. special event charter, inclusive tours and own-use charter; and the names of passengers.
 - ii. for cargo flights: the origin, destination, description, quantities and dimensions of cargo; outbound/inbound or transshipment, as well as whether any item is perishable or classified as dangerous, explosive or munitions of war. (Please see regulations concerning importation, transshipment and exportation of cargo in subsection GEN 1.4).
- f. Details of route, points of landing and final destination;
- g. Date and time of arrival at, and departure from Singapore (Please see paragraph 5.1.3.4 below);
- h. Name, address and telephone number of operator's local agent and ground handling agent;
- i. Name and address of consignees and consignor, 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://atlas.caas.gov.sg>

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

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

- 5.1.3.5 All business aviation aircraft operating as executive jet charter may be permitted to remain on the ground or layover at Singapore Changi Airport.
- 5.1.3.6 All business aviation aircraft shall park in a nose-in position and be pushed back with the aid of an aircraft tow-bar and tow-tractor. Reverse thrust or variable pitch propellers shall not be used when parking or pushing back aircraft. The aircraft operator must ensure that an appropriate tow-bar for the aircraft type is available to facilitate push back operations from the aircraft stand. The aircraft operators may use their own tow-bar or approach ground handling agents in either Seletar or Singapore Changi Airport to secure the appropriate tow-bar.
- 5.1.3.7 All passengers of the business aviation flight will have to clear CIQ via the Commercially-Important-Persons facility located beside Terminal 2.
- 5.1.3.8 Requests to handle executive jet charter or charter flights via the main terminals are to be sent via email to csc@changiairport.com for exceptional consideration at all times.
- 5.1.3.9 All business aviation flights must engage a ground handling agent at Singapore Changi Airport.
- 5.1.3.10 The appropriate legislation dealing with non-scheduled flights for hire or reward is contained in PART III - *Permits For Journeys Other Than Scheduled Journeys* of the Air Navigation (Licensing of Air Services) Regulations. Any person who uses any aircraft in contravention of the provisions of Regulation 15 of the legislation shall be guilty of an offence and shall be liable on conviction to a fine not exceeding S\$2,500 or to imprisonment for a term not exceeding 3 months or to both and in the case of a second or subsequent offence, to a fine not exceeding S\$20,000 or to imprisonment for a term not exceeding 2 years or to both.

5.1.3.11 **Permit Fees**

(a) Normal Permits

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

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

(b) Express Permits

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

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

Note 1: "Working Day" means:

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

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

Definitions:

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

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

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

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

5.2 DOCUMENTARY REQUIREMENTS FOR CLEARANCE OF AIRCRAFT

- 5.2.1 Same requirements as for SCHEDULED FLIGHTS.

5.3 PERMIT CONDITIONS

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

5.4 APPLICATION FOR DIPLOMATIC CLEARANCE FOR FOREIGN STATE AIRCRAFT

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

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

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

5.4.2 Information to be provided when applying for Diplomatic Clearance

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

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

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

6 APPLICATION FOR 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.

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.

PAGE INTENTIONALLY LEFT BLANK

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.

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:

- 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.

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

4 FLYING LICENCES AND RATINGS

4.1 VISITING PILOTS - HOLDERS OF NON-SINGAPORE PILOT LICENCES

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

4.2 CONVERSION OF FOREIGN LICENCE TO SINGAPORE LICENCE

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

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

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

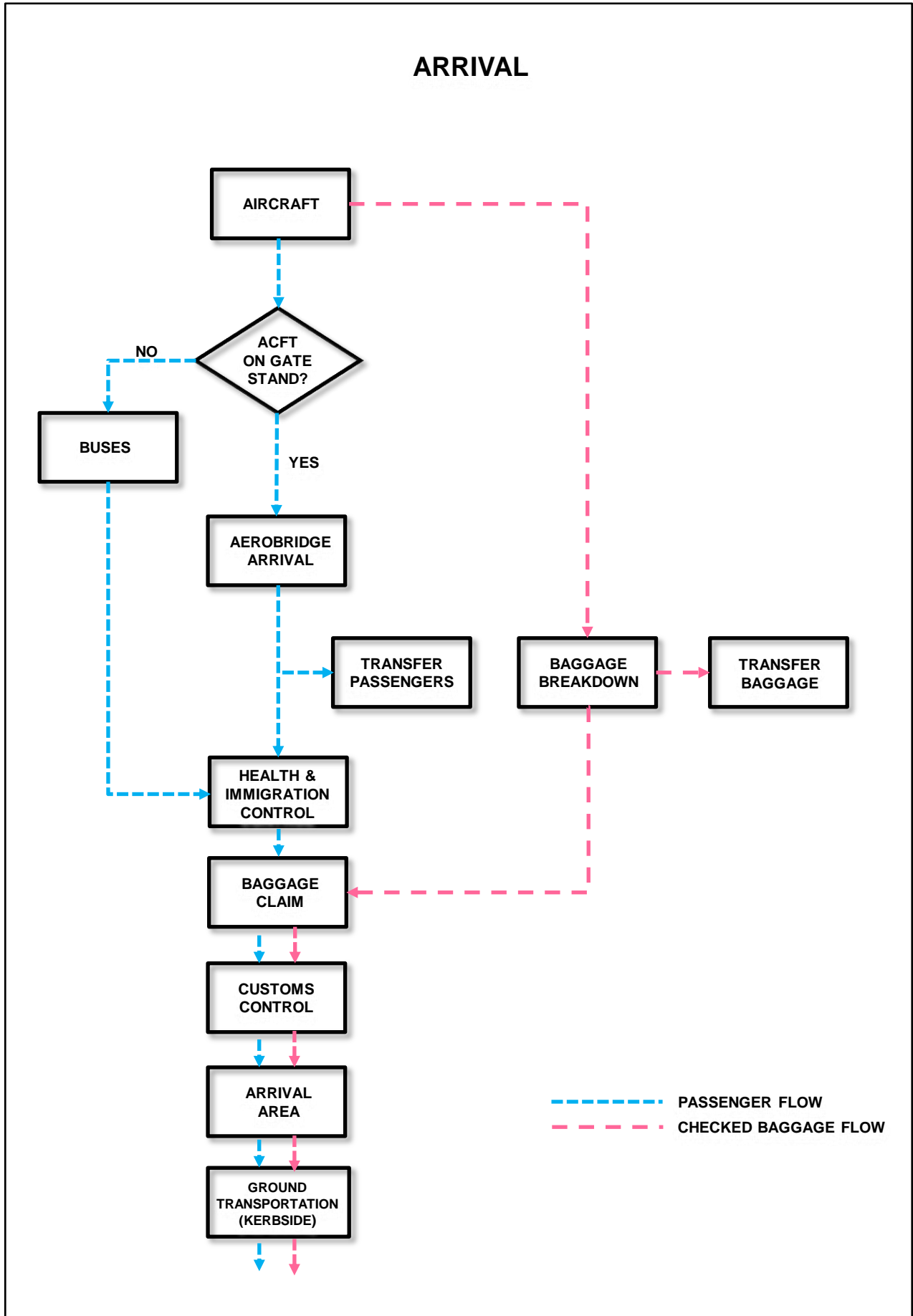
TEL: (65) 65412482
FAX: (65) 65434941

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.

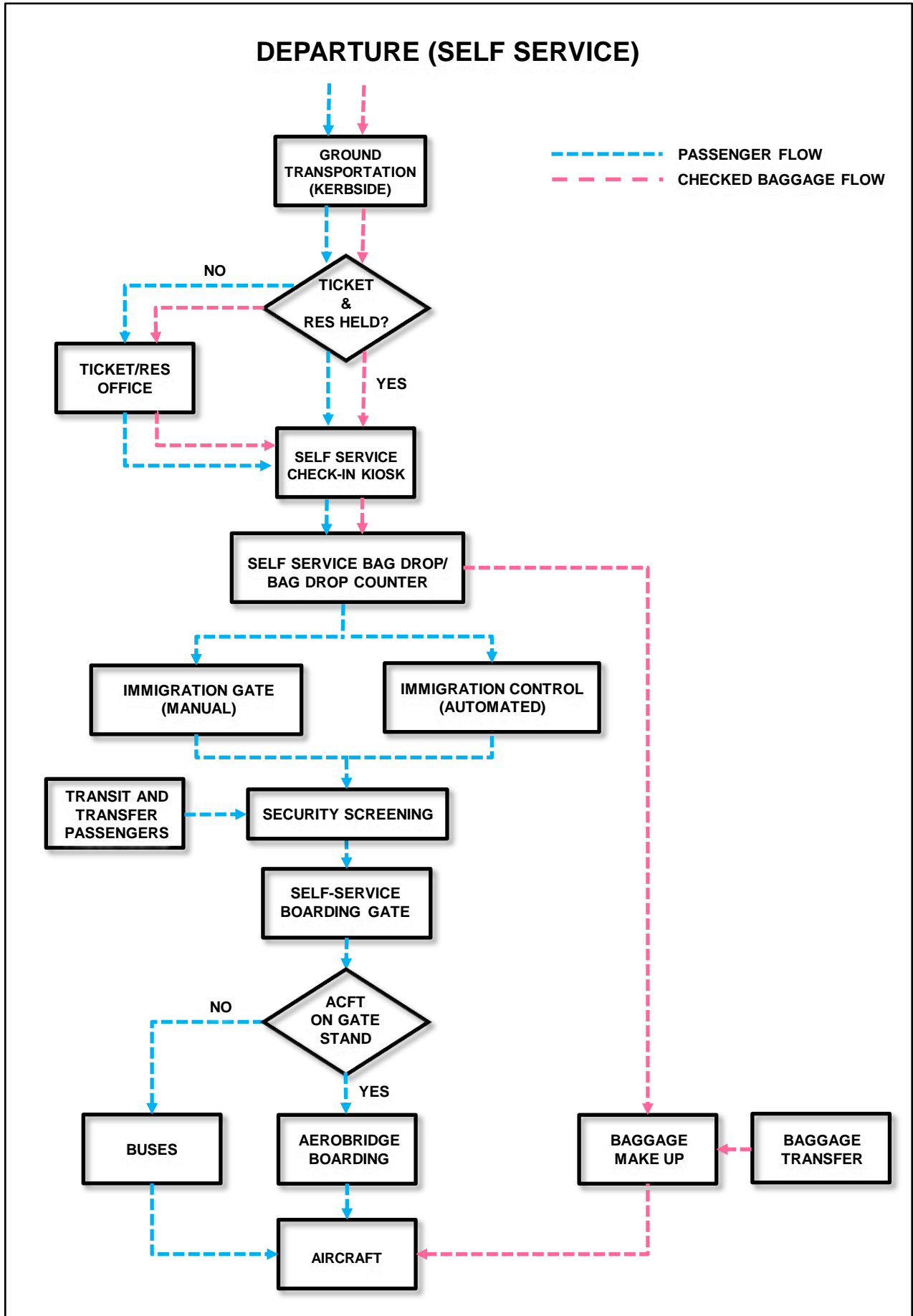
PAGE INTENTIONALLY LEFT BLANK

SINGAPORE CHANGI AIRPORT PASSENGER FACILITATION FLOW



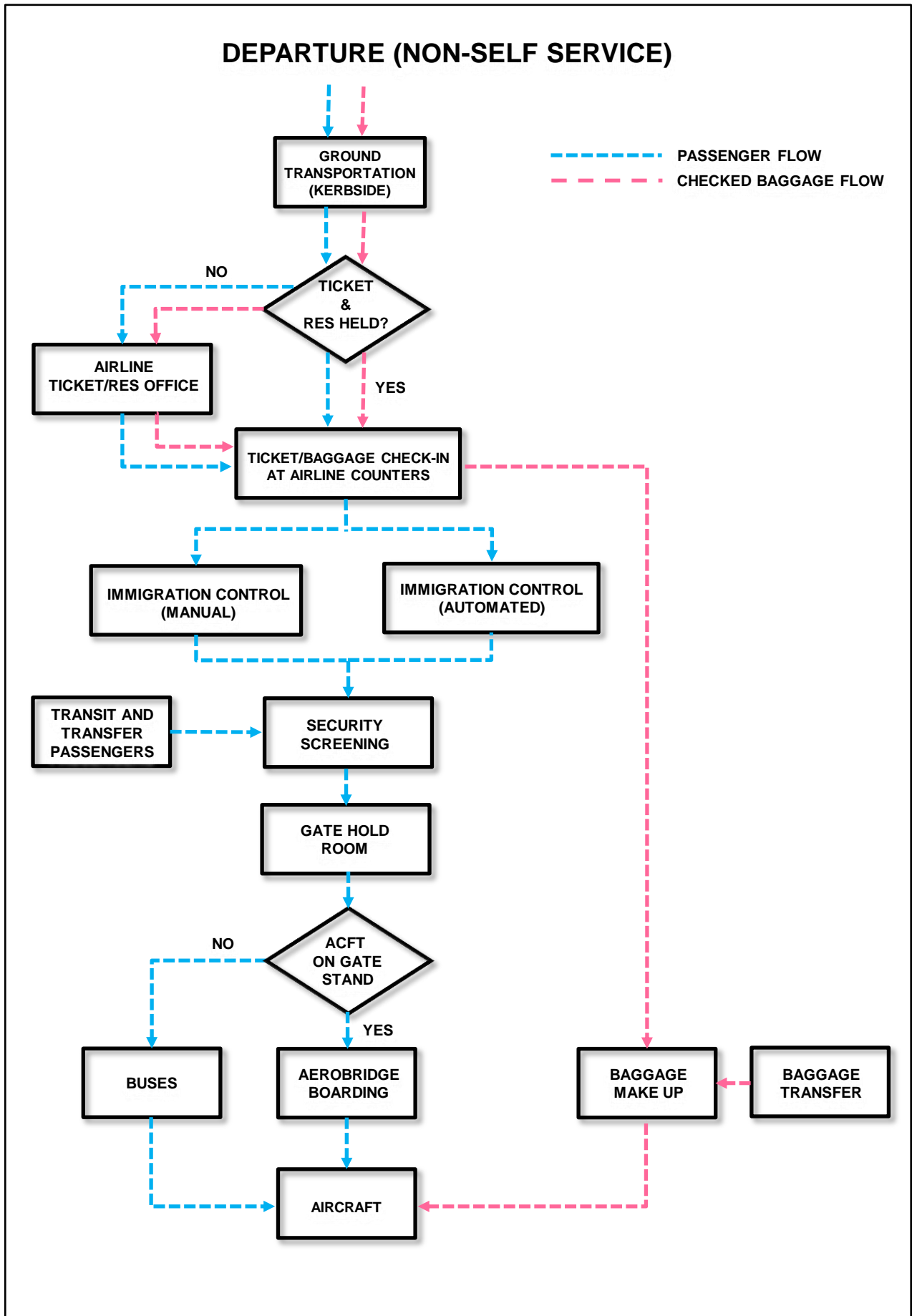
PAGE INTENTIONALLY LEFT BLANK

SINGAPORE CHANGI AIRPORT PASSENGER FACILITATION FLOW



PAGE INTENTIONALLY LEFT BLANK

SINGAPORE CHANGI AIRPORT PASSENGER FACILITATION FLOW



PAGE INTENTIONALLY LEFT BLANK

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. Transshipment 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. Transshipment 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 transshipment or transit are subject to controls under the full control list. No clearance documents are required for strategic goods in transshipment 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 transshipment 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).

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 transshipment (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.

- 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.

PAGE INTENTIONALLY LEFT BLANK

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.

PAGE INTENTIONALLY LEFT BLANK

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

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

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

<https://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 Lobby
Singapore 237994.

Tel: (65) 68269600

Fax: (65) 68203341

URL: www.toppanleefung.com

1.1 CIVIL AVIATION LEGISLATION

| No | Legislation | Citation |
|---|--|---------------------------|
| <i>Civil Aviation Authority of Singapore Act & related legislation</i> | | |
| 1 | Civil Aviation Authority of Singapore Act | 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 |
| <i>Air Navigation Act & related legislation</i> | | |
| 12 | Air Navigation Act 1966 | 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 |

| 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 |
| <i>Other Acts & related legislation</i> | | |
| 36 | Carriage by Air Act 1988 | 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 2007 | Cap. 32B (2008 Rev Ed.) |
| 40 | Carriage by Air (Montreal Convention, 1999) (Exclusion from Convention) Order | Cap. 32B, O1 |
| 41 | Tokyo Convention Act 1971 | 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 1978 | Cap. 124 (1997 Rev Ed.) |
| 45 | Infrastructure Protection Act 2017 | Act 41 of 2017 |
| 46 | International Interests in Aircraft Equipment Act 2009 | Cap. 144B (2012 Rev Ed.) |
| 47 | Immigration Act 1959 | 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 1913 | 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 1948 | Cap. 145 (2013 Rev Ed.) |
| 55 | International Organisations (Immunities and Privileges) (International Civil Aviation Organisation) Order | Cap. 145, OR 4 |

1.2 OTHER RELEVANT LEGISLATION

| No | Legislation | Citation |
|----|---|-------------------------|
| 1 | COVID-19 (Temporary Measures) Act 2020 | Act 14 of 2020 |
| 2 | COVID-19 (Temporary Measures) (Control Order) Regulations 2020 | S254/2020 |
| 3 | COVID-19 (Temporary Measures) (Extension of Prescribed Period) Order 2021 | S178/2021 |
| 4 | COVID-19 (Temporary Measures) (Extension of Prescribed Period) (No. 2) Order 2021 | S268/2021 |
| 5 | COVID-19 (Temporary Measures) (Extension of Prescribed Period) Order 2020 | S886/2020 |
| 6 | COVID-19 (Temporary Measures) (Prescribed Period) Order 2020 | S302/2020 |
| 7 | COVID-19 (Temporary Measures) (Substitution of Period) Order 2021 | S122/2021 |
| 8 | Infectious Diseases Act 1976 | Cap. 137 (2003 Rev Ed.) |
| 9 | Infectious Diseases (Certificates of Vaccination or Other Prophylaxis) Regulations 2008 | S611/2008 |
| 10 | Infectious Diseases (Quarantine) Regulations | Cap. 137, RG 1 |
| 11 | Arms and Explosives (Arms) Rules | Cap. 13, R1 |
| 12 | Inspector of Explosives | Cap. 13, N1 |
| 13 | Arms Offences Act 1973 | 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 |

2 TAXATION IN THE FIELD OF INTERNATIONAL AIR TRANSPORT

2.1 *Petroleum exemptions and income tax*

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

Where a non-resident person carries on either:

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

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

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

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

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

GEN 1.7 DIFFERENCES FROM ICAO STANDARDS, RECOMMENDED PRACTICES AND PROCEDURES

ANNEX 1 Personnel Licensing, 13th Edition

Chapter 2

- 2.3.3.1.2 Due to local geographical constraints and boundary, it is not possible to complete one cross-country flight totalling not less than 270km (150NM) in the course of which full- stop landings at two different aerodromes are made. In such cases, a Private Pilot Licence with restriction to fly within Singapore only will be issued.
- 2.8.2.1 Singapore issues two types of ratings for flying instructors: Flying Instructor Rating and Assistant Flying Instructor Rating. Both ratings meet the ICAO standards for flying instructors. Newly qualified instructors are issued with an Assistant Flying Instructor Rating, and may qualify for a Flying Instructor Rating after acquiring additional flying and instructional experience.
- An Assistant Flying Instructor Rating does not entitle the holder to:
- a. give flying instructions unless under the supervision of a person holding a Flying Instructor Rating; or
 - b. give directions in respect of the student pilot's first solo day/night flight and first solo cross-country day/night flight.
- 2.9.1.1 The applicant for a Commercial Pilot Licence (Gliders) shall not be less than 18 years of age.
- 2.10.1.1 The applicant for a Private Pilot Licence (Balloons and Airships) shall not be less than 17 years of age. The applicant for a Commercial Pilot Licence (Balloons and Airships) shall not be less than 18 years of age.

ANNEX 2 Rules of the Air, 10th Edition

Appendix 3

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

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

- NIL Difference

DOC 7030 Regional Supplementary Procedures, 5th Edition

MID/ASIA REGIONAL SUPPLEMENTARY PROCEDURES

- 1.2.1 Flights shall be conducted in accordance with the Instrument Flight Rules (even when not operating in instrument meteorological conditions) when operated:
- a. Above FL200.

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

- NIL Difference

ANNEX 4 Aeronautical Charts, 11th Edition

- NIL Difference

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

- NIL Difference

ANNEX 6 Operation of Aircraft

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

Chapter 12

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

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

Chapter 6

6.1.1 General aviation aircraft in Singapore are required to be registered in the Public Transport Category.

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

- NIL Difference

ANNEX 7 Aircraft Nationality and Registration Marks, 6th Edition

- NIL Difference.

ANNEX 8 Airworthiness of Aircraft, 12th Edition

- NIL Difference

ANNEX 9 Facilitation, 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.

-
- | | |
|------|--|
| 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, 12th EditionChapter 5

- | | |
|-------|---|
| 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. |
|-------|---|

ANNEX 14 Aerodromes

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

Chapter 3

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

Chapter 4

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

Chapter 6

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

Chapter 7

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

Chapter 9

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

Volume II (Heliports) - 5th Edition

- Not applicable

ANNEX 15 Aeronautical Information Services, 16th Edition

- NIL Difference

ANNEX 16 Environmental Protection

Volume I (Aircraft Noise) - 8th Edition

Volume II (Aircraft Engine Emissions) - 4th Edition

Volume III (Aeroplane CO₂ Emissions) - 1st 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, 2nd Edition

- NIL Difference

GEN 2 TABLES AND CODES

GEN 2.1 MEASURING SYSTEM, AIRCRAFT MARKING, HOLIDAYS

2.1.1 UNITS OF MEASUREMENT

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

2.1.2 TEMPORAL REFERENCE SYSTEM

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

2.1.3 HORIZONTAL REFERENCE SYSTEM

3.1 *Name/designation of system*

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

3.2 *Parameters of the Projection*

Projection is expressed in terms of Conical Conformal Projection.

| <i>Measurement of</i> | <i>Units</i> |
|--|---|
| 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 | |

3.3 *Ellipsoid*

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

3.4 *Datum*

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

3.5 *Area of application*

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

3.6 ***Use of an asterisk to identify published geographical coordinates***

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

2.1.4 **VERTICAL REFERENCE SYSTEM**

4.1 ***Name/designation of system***

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

4.2 ***Geoid model***

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

2.1.5 **AIRCRAFT NATIONALITY AND REGISTRATION MARKS**

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

2.1.6 **PUBLIC HOLIDAYS IN SINGAPORE**

The following dates are notified as public holidays:

| Name of Holiday | Date | Day |
|------------------------|-------------------|------------|
| New Year's Day | 01 January 2022 | Saturday |
| Chinese New Year | 01 February 2022 | Tuesday |
| | 02 February 2022 | Wednesday |
| Good Friday | 15 April 2022 | Friday |
| Labour Day | 01 May 2022* | Sunday |
| Hari Raya Puasa | 03 May 2022 | Tuesday |
| Vesak Day | 15 May 2022* | Sunday |
| Hari Raya Haji | 10 July 2022* | Sunday |
| National Day | 09 August 2022 | Tuesday |
| Deepavali | 24 October 2022 | Monday |
| Christmas Day | 25 December 2022* | Sunday |

* The following Monday will be a public holiday.

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

| | |
|----------|---|
| 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 |

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

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

Q

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

R

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

.

| | |
|-------|---|
| ... 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 |

| | |
|----------|--|
| TACAN | UHF tactical air navigation aid |
| TAF | Aerodrome forecast (in meteorological code) |
| TAIL | Tail wind |
| TAR | Terminal area surveillance radar |
| TAS | True airspeed |
| TAX | Taxiing or taxi |
| TCAS RA | Traffic alert and collision avoidance system resolution advisory |
| TCH | Threshold crossing height |
| TDZ | Touchdown zone |
| TECR | Technical reason |
| TEL | Telephone |
| TEMPO | Temporary or temporarily |
| TFC | Traffic |
| TGL | Touch-and-go landing |
| TGS | Taxiing guidance system |
| THR | Threshold |
| THRU | Through |
| THU | Thursday |
| TIBA | Traffic information broadcast by aircraft |
| TIL | Until |
| TKOF | Take off |
| TLOF | Touchdown and lift-off area |
| TMA | Terminal control area |
| TOC | Top of climb |
| TODA | Take-off distance available |
| TODAH | Take-off distance available, helicopter |
| TOP | Cloud top |
| TORA | Take-off run available |
| TP | Turning point |
| TR | Track |
| TRA | Temporary reserved airspace |
| TRANS | Transmits or transmitter |
| TRG | Training |
| TRL | Transition level |
| TT | Teletypewriter |
| TUE | Tuesday |
| TURB | Turbulence |
| T-VASIS | T visual approach slope indicator system |
| TWR | Aerodrome control tower or aerodrome control |
| TWY | Taxiway |
| TXL | Taxilane |
| TYP | Type of aircraft |
| TYPH | Typhoon |
| U | |
| UAC | Upper area control centre |
| UAR | Upper air route |
| UFN | Until further notice |
| UHF | Ultra high frequency (300 to 3 000 MHz) |
| UIC | Upper information centre |
| UIR | Upper flight information region |
| ULM | Ultra light motorized aircraft |
| UNL | Unlimited |
| UNREL | Unreliable |
| U/S | Unserviceable |
| UTA | Upper control area |
| UTC | Coordinated universal time |
| V | |
| VA | Volcanic ash |
| VAAC | Volcanic ash advisory centre |
| VAC | Visual approach chart (followed by name/title) |
| VAR | Magnetic variation |
| VASIS | Visual approach slope indicator system |
| VCY | Vicinity |
| VER | Vertical |
| VFR | Visual flight rules |
| VHF | Very high frequency (30 to 300 MHz) |
| VIP | Very important person |
| VIS | Visibility |
| VLR | Very long range |
| VMC | Visual meteorological conditions |
| VNAV | Vertical navigation |
| VOLMET | Meteorological information for aircraft in flight |
| VOR | VHF omnidirectional radio range |
| VORTAC | VOR and TACAN combination |
| VOT | VOR airborne equipment test facility |
| VRB | Variable |
| VSA | By visual reference to the ground |
| VSP | Vertical speed |
| VTOL | Vertical take-off and landing |
| VVIP* | Very, very important person |
| W | |
| W | West or western longitude or White |
| WAAS | Wide area augmentation system |
| WAC | World Aeronautical Chart - ICAO 1:1 000 000 (followed by name/title) |
| WBAR | Wing bar lights |
| WDI | Wind direction indicator |
| WED | Wednesday |
| WEF | With effect from or effective from |
| WGS-84 | World Geodetic System - 1984 |
| WI | Within |
| WID | Width or wide |
| WIE | With immediate effect or effective immediately |
| WIP | Work in progress |
| WPT | Way-point |
| WRNG | Warning |
| WS | Wind shear |
| WSPD | Wind speed |
| WT | Weight |
| WUT* | Wheels Up Time |
| WX | Weather |
| WXR | Weather radar |
| X | |
| XBAR | Crossbar (of approach lighting system) |
| XNG | Crossing |
| Y | |
| Y CZ | Yellow caution zone (runway lighting) |
| 4 | |
| 4D/15* | Four dimensional (latitude, longitude, altitude, time) position information at 15 minutes interval |

PAGE INTENTIONALLY LEFT BLANK

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


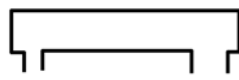


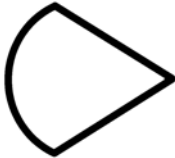


| | |
|---|------------------------------------|
| The aerodrome on which the procedure is based | |
| Aerodromes affecting the traffic pattern on the aerodrome on which the procedure is based | |
| MINIMUM SECTOR ALTITUDE (MSA) MSA provides 300m (984ft) obstacle clearance and rounding the resulting 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 | $\frac{8 \text{ DME}}{\text{VTK}}$ |
| VOR radial Radial bearing from, and identification of, VOR | R 295 VTK |
| Radio Marker Beacon Elliptical | |



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

1.3 Aerodrome charts


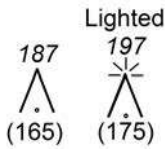
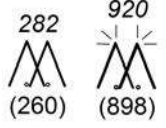
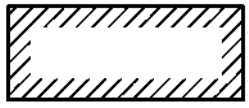



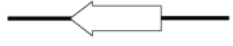


| | |
|---------------------|---|
| Hard surface runway |  |
| Stopway |  |
| Clearway |  |

2 AERODROME INSTALLATIONS AND LIGHTS

| | |
|--|---|
| Aerodrome reference point (ARP) |  |
| Taxiways and parking areas |  |
| Control tower | Control Tower  |
| Barrette |  |
| Runway visual range (RVR) observation site |  |
| Obstacle light |  |
| Aeronautical ground light |  |

| | |
|---------------------------------------|---|
| Wind direction indicator (lighted) |  |
| Landing direction indicator (lighted) |  |

3 MISCELLANEOUS

| | |
|---|--|
| Spot elevation |  |
| Obstacles | <p style="text-align: center;">Lighted</p>  |
| Group obstacles <i>Note: Numerals in italics indicate elevation of top of obstacle above sea level. Upright numerals in parentheses indicate height above specified datum.</i> |  |
| 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) |  |

PAGE INTENTIONALLY LEFT BLANK

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 |
| JOHOR BAHRU | WMKJ | | FISABILILLAH (INDONESIA) |
| 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 | WIDN | WSJC | SINGAPORE ACC/FIC |
| FISABILILLAH (INDONESIA) | | WSSL | SINGAPORE / SELETAR |
| TENGAH | WSAT | WSSS | SINGAPORE / SINGAPORE CHANGI INTL |

PAGE INTENTIONALLY LEFT BLANK

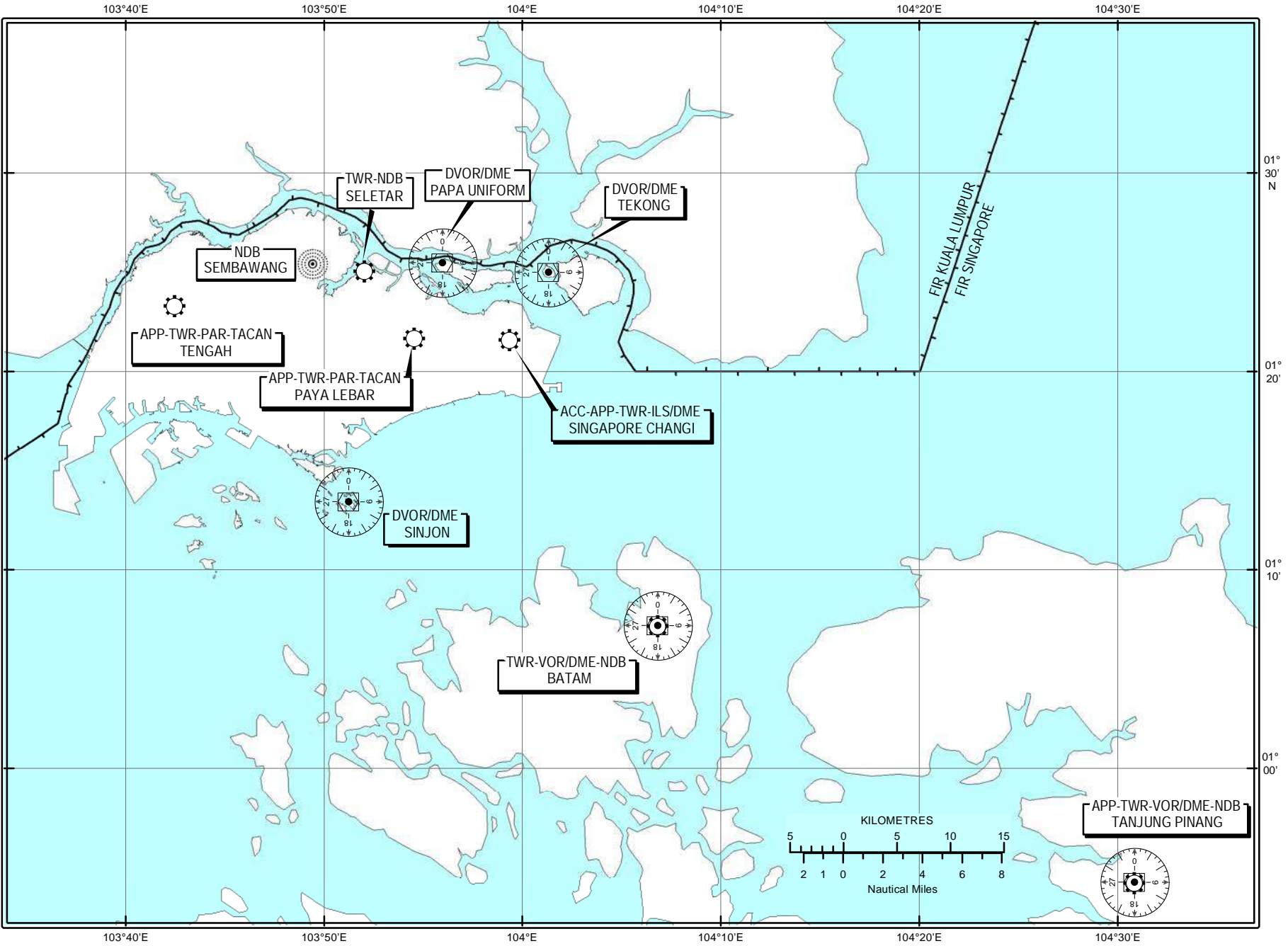
GEN 2.5 LIST OF RADIO NAVIGATION AIDS

| 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)

PAGE INTENTIONALLY LEFT BLANK

SINGAPORE RADIO FACILITY INDEX CHART



PAGE INTENTIONALLY LEFT BLANK

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 | |
|-----------------------------------|-----------|----------------------------------|-----------|-----------------------------------|-----------|----------------------------------|-----------|
| <i>NM</i> | <i>KM</i> | <i>KM</i> | <i>NM</i> | <i>FT</i> | <i>M</i> | <i>M</i> | <i>FT</i> |
| 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

| <i>MIN</i> | <i>SEC</i> | <i>MIN</i> | <i>SEC</i> | <i>MIN</i> | <i>SEC</i> | <i>MIN</i> | <i>SEC</i> |
|------------|------------|------------|------------|------------|------------|------------|------------|
| 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 |

| From decimal minutes of an arc to seconds of an arc | | | | | | | |
|---|------------|------------|------------|------------|------------|------------|------------|
| <i>MIN</i> | <i>SEC</i> | <i>MIN</i> | <i>SEC</i> | <i>MIN</i> | <i>SEC</i> | <i>MIN</i> | <i>SEC</i> |
| 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 | | | | | | | |
|---|------------|------------|------------|------------|------------|------------|------------|
| <i>MIN</i> | <i>SEC</i> | <i>MIN</i> | <i>SEC</i> | <i>MIN</i> | <i>SEC</i> | <i>MIN</i> | <i>SEC</i> |
| 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 | | |

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 | 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 |
| | | | | | | | | | | | |

PAGE INTENTIONALLY LEFT BLANK

GEN 3 SERVICES

GEN 3.1 AERONAUTICAL INFORMATION SERVICES

3.1.1 RESPONSIBLE SERVICE

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

1.2 *AIS Headquarters*

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

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

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

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

3.1.2 AREA OF RESPONSIBILITY

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

3.1.3 AERONAUTICAL PUBLICATIONS

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

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

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

3.2 *Aeronautical Information Publication (AIP)*

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

3.3 Amendment service to the AIP (AIP AMDT)

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

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

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

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

3.4 AIP Supplement (AIP SUP)

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

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

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

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

3.5 NOTAM and Pre-flight Information Bulletins (PIB)

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

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

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

SNOWTAM

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

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

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

3.6 Aeronautical Information Circular (AIC)

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

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

3.7 **Aeronautical Charts**

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

3.8 **Sale of publications**

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

3.1.4 **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.

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 2022 to 2026:

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

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.

3.1.5 **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 | | |

3.1.6 **DIGITAL DATA SETS**

To be developed.



GEN 3.2 AERONAUTICAL CHARTS

3.2.1 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.

3.2.2 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.

3.2.3 PURCHASE ARRANGEMENTS

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

3.2.4 AERONAUTICAL CHART SERIES AVAILABLE

- 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.

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.

k. Visual Approach Chart - ICAO

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

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

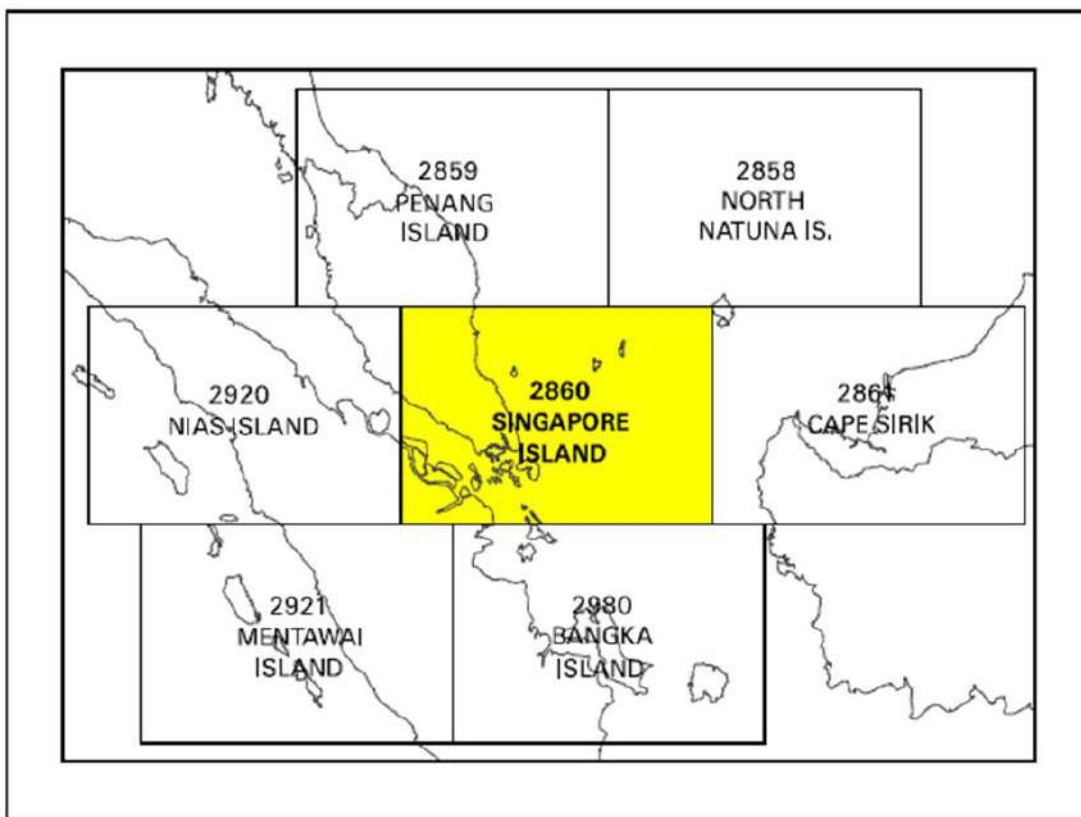
The aeronautical data shown include information on aerodromes obstacles, designated airspace, visual approach information, radio navigation aids and communication facilities, as appropriate.

3.2.5 LIST OF AERONAUTICAL CHARTS AVAILABLE

| GEN 3.2.5 LIST OF AERONAUTICAL CHARTS AVAILABLE | | | | | |
|--|--------------|---------------------------|--------------------|-------------------|---------------------|
| <i>Title of Chart Series</i> | <i>Scale</i> | <i>Name and/or number</i> | | <i>Price (\$)</i> | <i>Date</i> |
| World Aeronautical Chart ICAO (WAC) | 1:1 000 000 | WAC 2860 | | In AIP | 19 MAY 22 |
| Enroute Chart ICAO (ENRC) | | ERC 6-1 | | In AIP | 19 MAY 22 |
| Instrument Approach Chart ICAO (IAC) | | Singapore Changi | | | |
| | 1:400 000 | RWY 02L - ICW ILS/DME | AD-2-WSSS-IAC-1 | In AIP | 24 MAR 22 |
| | 1:400 000 | RWY 02C - ICE ILS/DME | AD-2-WSSS-IAC-2 | In AIP | 24 MAR 22 |
| | 1:400 000 | RWY 20R - ICH ILS/DME | AD-2-WSSS-IAC-5 | In AIP | 24 MAR 22 |
| | 1:400 000 | RWY 20C - ICC ILS/DME | AD-2-WSSS-IAC-6 | In AIP | 24 MAR 22 |
| | 1:400 000 | RWY 20C - VTK DVOR/DME | AD-2-WSSS-IAC-7 | In AIP | 24 MAR 22 |
| | 1:400 000 | RWY 02L - RNP | AD-2-WSSS-IAC-9 | In AIP | 24 MAR 22 |
| | 1:400 000 | RWY 02C - RNP | AD-2-WSSS-IAC-10 | In AIP | 24 MAR 22 |
| | 1:400 000 | RWY 20R - RNP | AD-2-WSSS-IAC-11 | In AIP | 24 MAR 22 |
| | 1:400 000 | RWY 20C - RNP | AD-2-WSSS-IAC-12 | In AIP | 24 MAR 22 |
| | 1:400 000 | RWY 02R - RNP | AD-2-WSSS-IAC-13 | In AIP | 24 MAR 22 |
| | 1:400 000 | RWY 20L - RNP | AD-2-WSSS-IAC-14 | In AIP | 24 MAR 22 |
| | | 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 | 07 OCT 21 |
| | 1:400 000 | RWY 20 - IPS ILS/DME | AD-2-WSAP IAC-3 | In AIP | 07 OCT 21 |
| | 1:400 000 | RWY 02 - IPN ILS/DME | AD-2-WSAP IAC-4 | In AIP | 07 OCT 21 |
| | 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 | 07 OCT 21 |
| 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 19 MAY 22 |
| | | Seletar | | AD-2-WSSL-ADC-1 | In AIP 12 AUG 21 |
| | | 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 | 24 MAR 22 |

| GEN 3.2.5 LIST OF AERONAUTICAL CHARTS AVAILABLE | | | | | |
|--|--------------|--|--|-------------------|-------------|
| <i>Title of Chart Series</i> | <i>Scale</i> | <i>Name and/or number</i> | | <i>Price (\$)</i> | <i>Date</i> |
| Aerodrome Obstacle Chart ICAO TYPE B (AOC) | 1:20 000 | Singapore Changi RWY 02L/20R, 02C/20C and RWY 02R/20L | | In AIP | 12 AUG 21 |
| | 1:20 000 | Seletar RWY 03/21 | | In AIP | 16 JUL 20 |
| Precision Approach Terrain Chart ICAO (PATC) | 1:2 500 | Singapore Changi RWY 02L | | In AIP | 10 OCT 19 |
| | 1:2 500 | RWY 20C | | In AIP | 01 FEB 18 |
| | 1:2 500 | RWY 02R | | In AIP | 31 DEC 20 |
| | 1:2 500 | RWY 20L | | In AIP | 31 DEC 20 |

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



3.2.7 TOPOGRAPHICAL CHARTS

NIL

3.2.8 CORRECTIONS TO CHARTS NOT CONTAINED IN THE AIP

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

←
←

GEN 3.3 AIR TRAFFIC SERVICES

3.3.1 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: | Tel: (65) 65412669 |
| Director (Air Traffic Services) | Fax: (65) 6441 0221 |
| Air Traffic Services Division | AFS: WSJCZQZX |
| Civil Aviation Authority of Singapore | |
| Singapore Changi Airport | |
| P. O. Box 1, Singapore 918141 | |

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.

3.3.2 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.

3.3.3 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.

- 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.

3.3.4 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).

3.3.5 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.

3.3.6 ATS UNITS ADDRESS LIST

| <i>Unit Name</i> | <i>Postal Address</i> | <i>Telephone Nr</i> | <i>Telefax Nr</i> | <i>Telex Nr</i> | <i>AFS Address</i> |
|---------------------|--|---|-------------------|-----------------|--------------------|
| 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 |

←
←

GEN 3.4 COMMUNICATION SERVICES

3.4.1 RESPONSIBLE SERVICE

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

Post: 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.

3.4.2 AREA OF RESPONSIBILITY

- 2.1 Communication services are provided for the entire SINGAPORE FIR.

3.4.3 TYPES OF SERVICE

3.1 *Radio navigation services*

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

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

3.2 *Voice/data link services*

- 3.2.1 *Voice service*

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

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

- 3.2.2 *Enroute Communications Organisation*

- a. The radio frequencies for enroute communications are listed in subsection ENR 2.1
- b. The Singapore HF network provides an umbrella communication coverage for the FIR and may be contacted if communication cannot be maintained on the primary channel.

- c. Aircraft approaching or departing from an airport is required to communicate with that airport on the appropriate surface movement, tower or approach control frequency.
- d. ADS-C and / or CPDLC services are available to suitably equipped aircraft operating outside radar cover and not in ADS-B exclusive airspace within the Singapore FIR. The hours when ADS-C and CPDLC services are available and the logon requirements are listed in ENR 2.1. Full details of the services are published in ENR 1.1 paragraphs 8.1 to 8.7.

3.2.3 Data link Service

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

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

3.2.4 General Aircraft Operating Agency Messages

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

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

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

3.3 **Broadcasting service**

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

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

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

3.4 **Language Used**

The language used is English.

3.5 **Obtaining Detailed Information**

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

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

3.4.4 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.

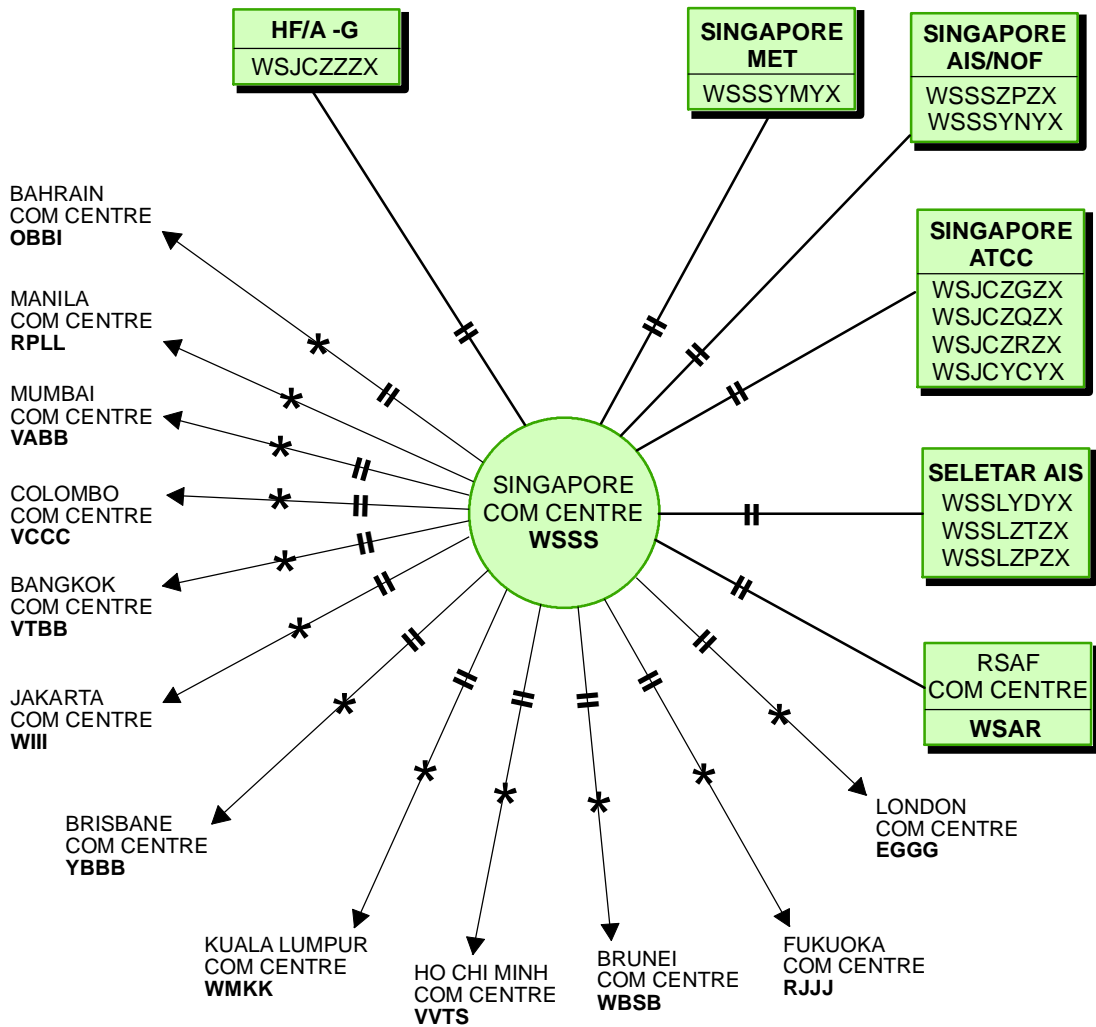
3.4.5 MISCELLANEOUS

NIL

| AERONAUTICAL FIXED SERVICES - INTERNATIONAL AND DOMESTIC CIRCUITS | | | | | | | | | | | | | |
|---|--------------------|-----------------------------|--------------------------|-----------------------------|-----------------|-----------|-----------------|-----|-------------------------------------|----|-----------------|---------------------------|---------|
| STATION | | | CORRESPONDENT | | | | TYPE OF CHANNEL | | RADIO FREQUENCIES | | TYPE OF TRAFFIC | HOURS (UTC) | REMARKS |
| NAME | LOCATION INDICATOR | CALLSIGN FOR RADIO CIRCUITS | NAME | CALLSIGN FOR RADIO CIRCUITS | TYPE OF CHANNEL | TRANS KHZ | REC KHZ | | | | | | |
| 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 | | | | | | | | | | | | | |

PAGE INTENTIONALLY LEFT BLANK

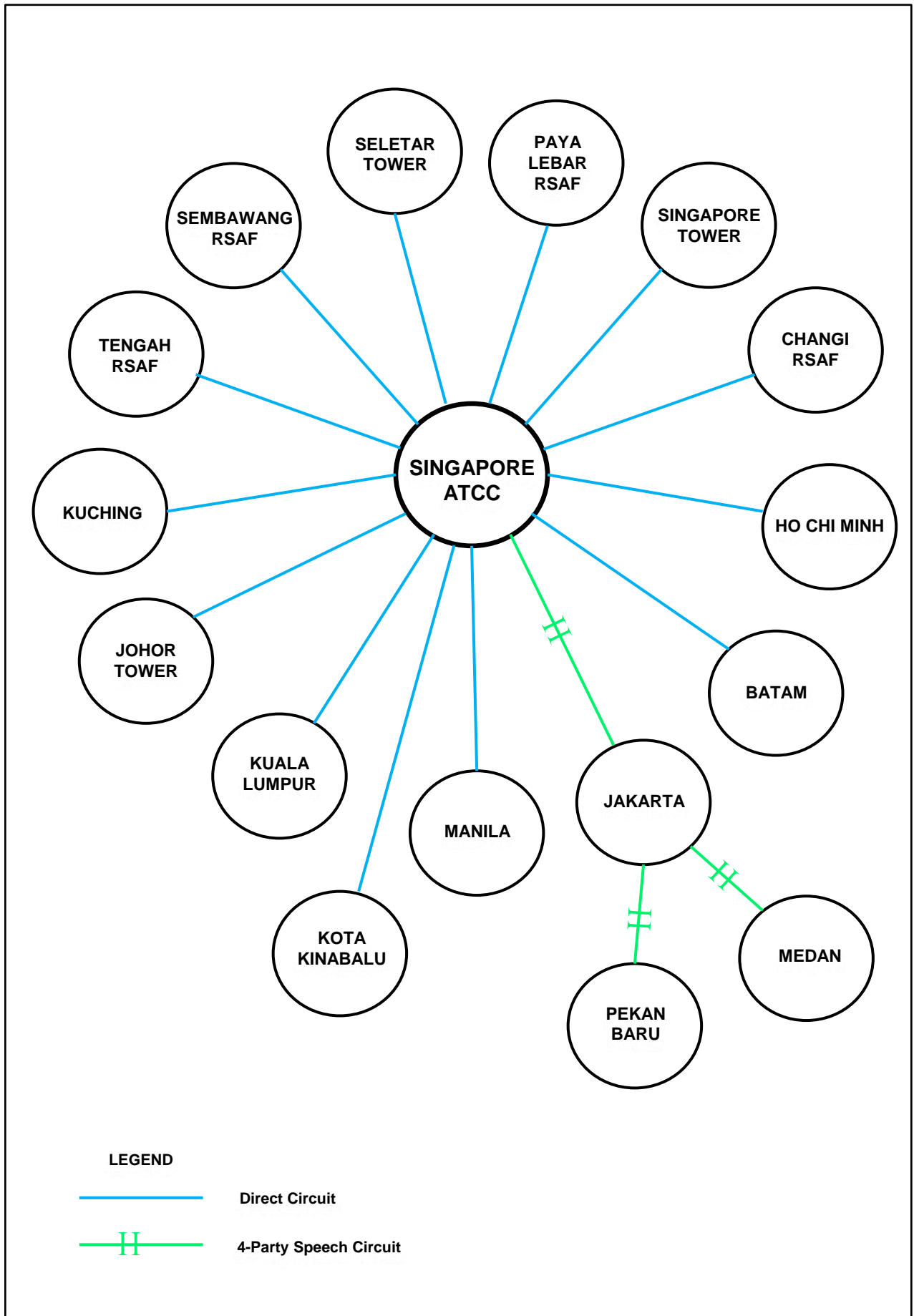
**AERONAUTICAL FIXED SERVICES -
AERONAUTICAL FIXED TELECOMMUNICATIONS NETWORK (AFTN)
AIR TRAFFIC SERVICES (ATS) MESSAGE HANDLING SERVICES (AMHS)**



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

PAGE INTENTIONALLY LEFT BLANK

AERONAUTICAL FIXED SERVICES - TELEPHONE



PAGE INTENTIONALLY LEFT BLANK

GEN 3.5 METEOROLOGICAL SERVICES

3.5.1 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.

3.5.2 AREA OF RESPONSIBILITY

- 2.1 Area meteorological watch is provided for the Singapore FIR.

3.5.3 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 |

3.5.4 TYPES OF SERVICES

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

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

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

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

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

4.8.1.1.4 Surface wind report in METAR and SPECI is taken from the wind sensor at the southern end of RWY 02L (with the sensor at the northern end of 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:

| | <u>DIST FROM END OF RWY</u> | <u>DIST FROM RWY CENTRELINE</u> |
|------------------|-----------------------------|---------------------------------|
| (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:

| | <u>DIST FROM END OF RWY</u> | <u>DIST FROM RWY CENTRELINE</u> |
|---------|-----------------------------|---------------------------------|
| 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:

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

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

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

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

4.8.1.4 Wind Shear Observations (Singapore Changi Airport)

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

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

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

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

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

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

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

4.8.2 SELETAR AERODROME

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

- 4.8.2.2 Wind Shear Observations (Seletar Aerodrome)

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

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

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

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

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

3.5.5 NOTIFICATION REQUIRED FROM OPERATORS

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

3.5.6 AIRCRAFT REPORTS 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:
- Aircraft callsign;
 - WIND SHEAR report;
 - Time (of wind shear occurrence);
 - Position (of wind shear);
 - Intensity (moderate, strong or severe);
 - Average height of wind shear layer.

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

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

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

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 |

3.5.7 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 TAF TAF SIGMET METAR METAR METAR METAR METAR METAR METAR METAR TAF TAF |
| Plain Language EN. | | | | | | |
| (1) SIGMET message or 'NIL' is transmitted. | | | | | | |
| (2) Latest routine report H+00 including trend statement; repeated at end of broadcast, time permitting. | | | | | | |
| (3) H+00 (or the previous H+30 report when the H+00 report is not available) including trend statement when appended. | | | | | | |
| (4) As available. | | | | | | |
| (5) Valid for 12 hours. | | | | | | |
| (6) Latest routine report H+30 including trend statement; repeated at end of broadcast, time permitting. | | | | | | |
| (7) H+30 (or the H+00 report when the H+30 report is not available) including trend statement when appended. | | | | | | |
| (8) Valid for 30 hours. | | | | | | |
| SINGAPORE | SINGAPORE VOLMET | D-VOLMET | as required | H24 | SINGAPORE KUALA LUMPUR SOEKARNO-HATTA SINGAPORE KUALA LUMPUR SUBANG AIRPORT SOEKARNO-HATTA KUCHING BRUNEI KOTA KINABALU DEN PASAR PENANG SINGAPORE KUALA IUMPUR SOEKARNO-HATTA | SIGMET SIGMET SIGMET METAR METAR METAR METAR METAR METAR METAR METAR METAR TAF TAF TAF |
| Data Link VOLMET (D-VOLMET) service available H24. AP Ident WSSS. Messages comply with ARINC 623 standards. | | | | | | |

3.5.8 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.

3.5.9 OTHER AUTOMATED METEOROLOGICAL SERVICES

- 9.1 Besides VOLMET and ATIS broadcasts, airline operators can obtain access to various operational meteorological information through 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

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

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

←
←

PAGE INTENTIONALLY LEFT BLANK

GEN 3.6 SEARCH AND RESCUE

3.6.1 RESPONSIBLE SERVICE(S)

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

Post:

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

Tel: (65) 65425024 - Singapore RCC

(65) 65412668 or (65) 65412672 - Singapore ACC

Fax: (65) 65422548

AFS: 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

3.6.2 AREA OF RESPONSIBILITY

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

3.6.3 TYPES OF SERVICES

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

3.6.4 SAR AGREEMENTS

- 4.1 SAR agreements have been concluded between Civil Aviation Authority of Singapore and the SAR authorities or agencies of Indonesia, Malaysia, Philippines, Thailand and Vietnam. These agreements provide for mutual assistance in the conduct of SAR operations within each others' SAR Regions (SRR) and approval for entry of SAR aircraft, vessels and personnel of one State into the SRR of another State, with prior permission, for the purpose of conducting SAR operations or rendering SAR assistance and for direct communications between the SAR authorities or agencies on all common SAR matters.
- 4.2 Requests for the entry of aircraft, equipment and personnel from other States to engage in search for aircraft in distress or to rescue survivors of aircraft accidents should be transmitted to the Rescue Coordination Centre. Instructions as to the control which will be exercised on entry of such aircraft and/ or personnel will be given by the Rescue Coordination Centre in accordance with the standing plan for the conduct of search and rescue in the area.

4.3 Civil Aviation Authority of Singapore has also concluded an SAR agreement with the SAR Coordinator Pacific RCC, United States Air Force (USAF). The agreement provides for all possible assistance to assist RCC Singapore in its response to United States (US) military SAR incidents within the Singapore SRR. It will also provide US assistance to RCC Singapore in its prosecution of civil SAR incidents when requested.

3.6.5 CONDITIONS OF AVAILABILITY

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

3.6.6 PROCEDURES AND SIGNALS USED

6.1 *Procedures and signals used by aircraft*

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

6.1.2 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

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

6.4 Search and Rescue Units

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

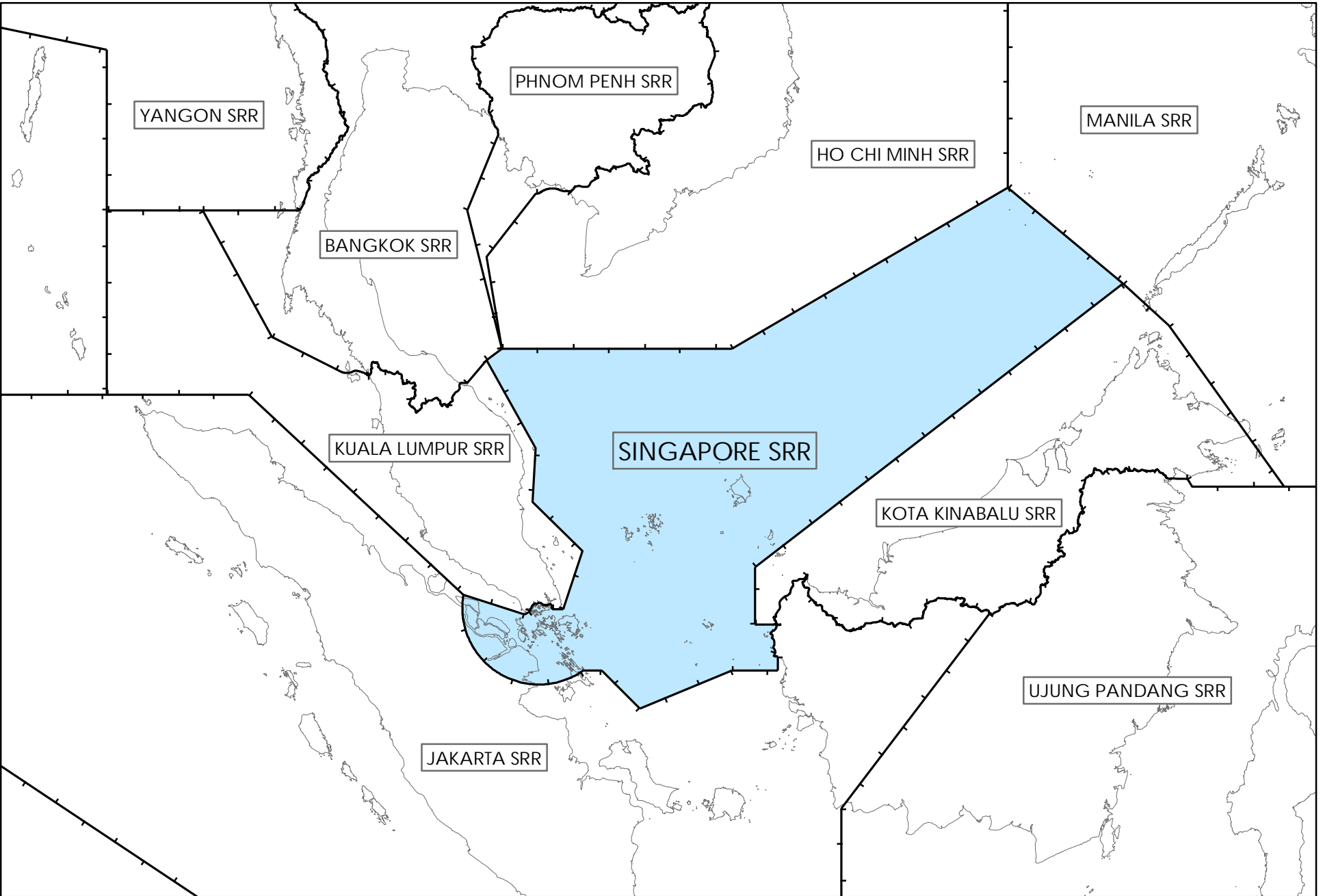
6.5 Search and Rescue Frequencies

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

Note:

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

SINGAPORE AND ADJACENT
SEARCH AND RESCUE REGIONS CHART



PAGE INTENTIONALLY LEFT BLANK

GEN 4 CHARGES FOR AERODROMES/HELIPORT AND AIR NAVIGATION SERVICES

GEN 4.1 AERODROME CHARGES

- 1 AIRPORT FEES AND CHARGES APPLICABLE AT SINGAPORE CHANGI AIRPORT**
- 1.1 These charges are set out in the website of the airport operator, Changi Airport Group (Singapore) Pte Ltd:
https://www.changiairport.com/content/dam/cacorp/documents/changiairportgroup/List_of_Fees_and_Charges.pdf
- 1.2 Exemption from payment of any Singapore Changi Airport charges are set out in the CAAS (Licensing of Airport Operators) Regulations 2009, accessible from the link below:
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 by JTC's tenants. Information on hangar fees may be obtained directly from the tenants.
- 4 NOISE RELATED ITEMS**
- 4.1 Please refer to AIP Singapore, Aerodrome sections of the respective airports.
- 5 GROUND HANDLING SERVICE CHARGES**
- 5.1 The ground handling services at Singapore Changi Airport have been out-sourced by the airport operator, Changi Airport Group (Singapore) Pte Ltd to the licensed ground handlers. Unlike the other 2 licensed ground handlers, SIA Engineering Company Limited is licenced to provide only a subset of the apron handling services. Please contact the following licensed ground handlers for information on ground handling services and related charges:
- | |
|--|
| DNATA Singapore Pte Ltd https://www.dnata.com/en/contact-us |
| SATS Ltd http://www.sats.com.sg/ContactUs/Pages/ContactUs.aspx |
| SIA Engineering Company Limited https://www.siaec.com.sg/contact_us.html |
- 5.2 The ground handling services at Seletar Airport have been out-sourced by the airport operator, Changi Airport Group (Singapore) Pte Ltd to the licensed ground handlers. Please contact the licensed ground handlers for information on ground handling services and related charges. The licensed ground handlers' contact details are set out in the website of the airport operator, Changi Airport Group (Singapore) Pte Ltd:
<http://www.seletarairport.com/ground-handling-agents-at-seletar-airport/>

PAGE INTENTIONALLY LEFT BLANK

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:
- all non-civil flights;
 - State aircraft belonging to Republic of Indonesia and Republic of Singapore;
 - VVIP flights such as aircraft used by a Head of State/Government and his group;
 - aircraft used for search and rescue purposes;
 - aircraft which have obtained exemption from the Directorate General of Civil Aviation, Indonesia;
 - aircraft which CAAS exempts from landing charges; and
 - 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:
- Singapore Changi Airport - cash payment at the Changi Apron Office.
 - 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.

5 PERSON LIABLE TO PAY RANS CHARGES

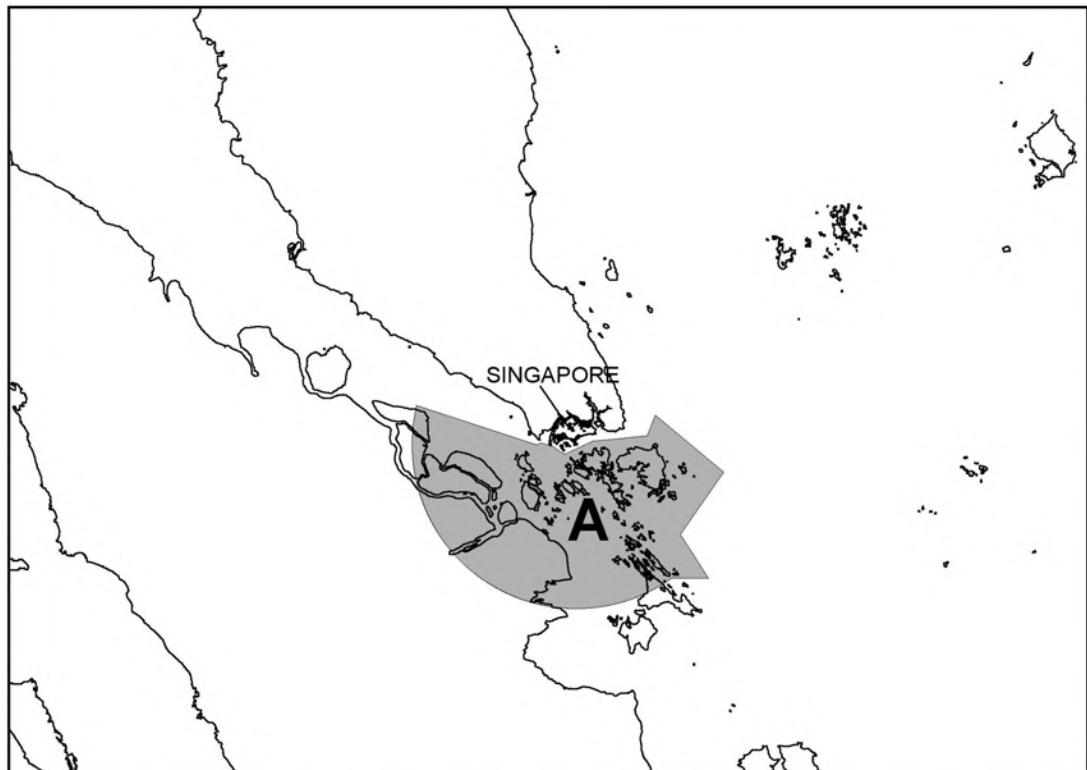
- 5.1 The person liable to pay the charges is the operator of the aircraft at the time of the flight concerned. If the operator of the aircraft is not known, the owner of the aircraft shall be liable.

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

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.

| 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 |

| 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 |

| 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 |

Part 2 — EN-ROUTE (ENR)

ENR 0

ENR 0.1 PREFACE

NIL (not applicable).

PAGE INTENTIONALLY LEFT BLANK

ENR 0.2 RECORD OF AIP AMENDMENTS

NIL (not applicable).

PAGE INTENTIONALLY LEFT BLANK

ENR 0.3 RECORD OF AIP SUPPLEMENTS

NIL (not applicable).

PAGE INTENTIONALLY LEFT BLANK

ENR 0.4 CHECKLIST OF AIP PAGES

NIL (not applicable).

PAGE INTENTIONALLY LEFT BLANK

ENR 0.5 LIST OF HAND AMENDMENTS TO THE AIP

NIL (not applicable).

PAGE INTENTIONALLY LEFT BLANK

ENR 0.6 TABLES OF CONTENTS TO PART 2

| | | |
|------------------------------|--|------------|
| ENR 0.1 | [NIL] PREFACE | ENR 0.1-1 |
| ENR 0.2 | [NIL] RECORD OF AIP AMENDMENTS | ENR 0.2-1 |
| ENR 0.3 | [NIL] RECORD OF AIP SUPPLEMENTS | ENR 0.3-1 |
| ENR 0.4 | [NIL] CHECKLIST OF AIP PAGES | ENR 0.4-1 |
| ENR 0.5 | [NIL] LIST OF HAND AMENDMENTS TO THE AIP | ENR 0.5-1 |
| ENR 0.6 | TABLES OF CONTENTS TO PART 2 | ENR 0.6-1 |
| ENR 1 | GENERAL RULES AND PROCEDURES | |
| ENR 1.1 | GENERAL RULES | ENR 1.1-1 |
| 1 | INTRODUCTION | ENR 1.1-1 |
| 2 | FLIGHTS ON AIRWAYS (AREA CONTROL) | ENR 1.1-1 |
| 3 | AIR TRAFFIC ADVISORY SERVICE | ENR 1.1-5 |
| 4 | FLIGHT INFORMATION SERVICE | ENR 1.1-6 |
| 5 | AERODROME/APPROACH CONTROL SERVICE | ENR 1.1-7 |
| 6 | REQUIREMENTS FOR AERIAL PHOTOGRAPHY | ENR 1.1-10 |
| 7 | LIGHT SIGNALS | ENR 1.1-11 |
| 8 | DATA LINK SERVICES IN SINGAPORE FIR | ENR 1.1-12 |
| 9 | WEATHER DEVIATION PROCEDURES FOR USE IN THE SINGAPORE FIR | ENR 1.1-14 |
| ENR 1.2 | VISUAL FLIGHT RULES | ENR 1.2-1 |
| ENR 1.3 | INSTRUMENT FLIGHT RULES | ENR 1.3-1 |
| ENR 1.4 | ATS AIRSPACE CLASSIFICATION | ENR 1.4-1 |
| 1 | INTRODUCTION | ENR 1.4-1 |
| 2 | AIRSPACE CLASSIFICATION | ENR 1.4-1 |
| ENR 1.5 | HOLDING, APPROACH AND DEPARTURE PROCEDURES | ENR 1.5-1 |
| 1 | GENERAL | ENR 1.5-1 |
| 1.2 | HOLDING PROCEDURES | ENR 1.5-1 |
| 1.3 | LOW LEVEL HOLDING AREAS | ENR 1.5-1 |
| 1.4 | HIGH LEVEL HOLDING AREAS | ENR 1.5-1 |
| 1.5 | HOLDING SPEEDS | ENR 1.5-1 |
| 1.6 | STANDARD INSTRUMENT DEPARTURE (SID) AND STANDARD INSTRUMENT ARRIVAL (STAR) | ENR 1.5-1 |
| 2 | ARRIVING FLIGHTS | ENR 1.5-1 |
| 2.1 | INSTRUMENT APPROACH PROCEDURES | ENR 1.5-1 |
| 2.2 | CATEGORY I ILS APPROACHES | ENR 1.5-2 |
| 2.3 | CATEGORY II ILS APPROACHES | ENR 1.5-2 |
| 2.4 | VISUAL APPROACH PROCEDURES | ENR 1.5-2 |
| 2.5 | VESSEL MOVEMENT AFFECTING INSTRUMENT APPROACHES ON RUNWAY 02 AND 20 | ENR 1.5-2 |
| 3 | DEPARTING FLIGHTS | ENR 1.5-2 |
| 3.1 | INTRODUCTION | ENR 1.5-2 |
| 3.2 | RUNWAY 02L | ENR 1.5-2 |
| 3.3 | RUNWAY 02C | ENR 1.5-3 |
| 3.4 | RUNWAYS 20L, 20C AND 20R | ENR 1.5-3 |
| 3.5 | RUNWAY 02R | ENR 1.5-3 |
| 3.6 | DETERMINATION OF CLIMB GRADIENT BY OPERATORS | ENR 1.5-3 |
| ENR 1.6 | ATC SURVEILLANCE SERVICES AND PROCEDURES | ENR 1.6-1 |

| | | |
|-------------------------|--|-----------|
| 1 | PRIMARY RADAR | ENR 1.6-1 |
| 1.1 | DESCRIPTION OF PRIMARY RADAR SERVICES AND PROCEDURES | ENR 1.6-1 |
| 1.2 | AIRCRAFT IDENTIFICATION PROCEDURES | ENR 1.6-1 |
| 1.3 | RADAR NAVIGATION | ENR 1.6-2 |
| 1.4 | WEATHER AVOIDANCE AND STORM WARNING RADAR | ENR 1.6-2 |
| 1.5 | MILITARY RADAR UNITS AUTHORISED TO PROVIDE RADAR CROSSING SERVICE | ENR 1.6-2 |
| 1.6 | RADAR FAILURE | ENR 1.6-2 |
| 1.7 | RADIO FAILURE | ENR 1.6-3 |
| 1.8 | TOTAL RADIO COMMUNICATION FAILURE PROCEDURES | ENR 1.6-3 |
| 1.9 | RADIO FAILURE - TRANSPONDER - EQUIPPED AIRCRAFT | ENR 1.6-3 |
| 1.10 | TOTAL RADIO FAILURE - SPECIAL PROCEDURES - SINGAPORE CHANGI AP - ARRIVALS | ENR 1.6-4 |
| 1.11 | IDENTIFICATION OF RUNWAY-IN-USE | ENR 1.6-4 |
| 1.12 | TOTAL RADIO FAILURE - SPECIAL PROCEDURES - SINGAPORE CHANGI AP - DEPARTURES | ENR 1.6-5 |
| 1.13 | TOTAL RADIO FAILURE - SPECIAL PROCEDURES - SELETAR AP - ARRIVALS | ENR 1.6-5 |
| 1.14 | TOTAL RADIO FAILURE - SPECIAL PROCEDURES - SELETAR AP - DEPARTURES | ENR 1.6-6 |
| 1.15 | RADIO FAILURE - SPECIAL PROCEDURES - SELETAR AP - HELICOPTERS | ENR 1.6-6 |
| 1.16 | RADIO FAILURE - SPECIAL PROCEDURES - SELETAR AP - FIXED WING AIRCRAFT | ENR 1.6-6 |
| 1.17 | ACTION TAKEN BY ATC DURING RADIO FAILURE | ENR 1.6-6 |
| 2 | SECONDARY SURVEILLANCE RADAR (SSR) | ENR 1.6-7 |
| 2.1 | OPERATING PROCEDURES | ENR 1.6-7 |
| 2.2 | EMERGENCY PROCEDURES | ENR 1.6-7 |
| 2.3 | RADIO COMMUNICATION FAILURE | ENR 1.6-7 |
| 2.4 | SYSTEM OF SSR CODE ASSIGNMENT | ENR 1.6-7 |
| ENR 1.7 | ALTIMETER SETTING PROCEDURES | ENR 1.7-1 |
| 1 | INTRODUCTION | ENR 1.7-1 |
| 1.4 | AREA QNH ZONES (AQZ) | ENR 1.7-1 |
| 1.5 | AREA QNH | ENR 1.7-1 |
| 2 | BASIC ALTIMETER SETTING PROCEDURES | ENR 1.7-1 |
| 2.1 | Altimeter Setting Procedures | ENR 1.7-1 |
| 2.2 | TAKE-OFF AND CLIMB | ENR 1.7-2 |
| 2.3 | VERTICAL SEPARATION - ENROUTE | ENR 1.7-2 |
| 2.4 | APPROACH AND LANDING | ENR 1.7-2 |
| 2.5 | MISSED APPROACH | ENR 1.7-2 |
| 3 | PROCEDURES APPLICABLE TO OPERATORS AND PILOTS | ENR 1.7-2 |
| 3.1 | Flight Planning | ENR 1.7-2 |
| 4 | TABLES OF CRUISING LEVELS | ENR 1.7-3 |
| 4.1 | SEMI-CIRCULAR SYSTEM OF CRUISING LEVELS WITHIN THE SINGAPORE FIR | ENR 1.7-3 |
| 4.2 | IFR FLIGHTS - CRUISING LEVELS WITHIN THE SINGAPORE FIR | ENR 1.7-3 |
| 4.3 | VFR FLIGHTS - CRUISING LEVELS WITHIN THE SINGAPORE FIR IN CONTROLLED AIRSPACE | ENR 1.7-3 |
| 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 | ENR 1.7-4 |
| 4.5 | TRANSIT PROCEDURES | ENR 1.7-4 |
| 4.6 | CHANGING LEVELS | ENR 1.7-4 |
| 4.7 | UNIDIRECTIONAL ATS ROUTES LEVEL ASSIGNMENTS - SINGAPORE/JAKARTA SECTOR | ENR 1.7-5 |

| | | |
|-------------------------|---|------------|
| 4.8 | POSITION REPORTS | ENR 1.7-5 |
| 4.9 | HOLDING | ENR 1.7-6 |
| 4.10 | FLIGHT IN CONTROLLED AIRSPACES | ENR 1.7-6 |
| 4.11 | TRANSFER OF COMMUNICATIONS | ENR 1.7-7 |
| 4.12 | ALERTING SERVICE | ENR 1.7-7 |
| ENR 1.8 | REGIONAL SUPPLEMENTARY PROCEDURES | ENR 1.8-1 |
| 1 | RVSM PROCEDURES IN THE SINGAPORE FIR | ENR 1.8-1 |
| 1.1 | IMPLEMENTATION OF REVISED FLOS (FLIGHT LEVEL ORIENTATION SCHEME) AND FLAS (FLIGHT LEVEL ALLOCATION SCHEME) IN THE WESTERN PACIFIC/SOUTH CHINA SEA AREA | ENR 1.8-1 |
| 1.2 | RVSM OPERATIONAL APPROVAL AND MONITORING | ENR 1.8-1 |
| 1.3 | ACAS II AND TRANSPONDER EQUIPAGE | ENR 1.8-2 |
| 1.4 | IN-FLIGHT PROCEDURES WITHIN RVSM AIRSPACE | ENR 1.8-2 |
| 1.5 | SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES IN OCEANIC AIRSPACE | ENR 1.8-2 |
| 1.6 | WEATHER DEVIATION PROCEDURES IN THE SINGAPORE FIR | ENR 1.8-4 |
| 1.7 | PROCEDURES TO MITIGATE WAKE TURBULENCE ENCOUNTERS AND DISTRACTING AIRCRAFT SYSTEM ALERTS IN THE OCEANIC AIRSPACE OF SINGAPORE FIR | ENR 1.8-5 |
| 1.8 | FLIGHT PLANNING REQUIREMENTS | ENR 1.8-6 |
| 1.9 | PROCEDURES FOR OPERATION OF NON-RVSM COMPLIANT AIRCRAFT IN RVSM AIRSPACE | ENR 1.8-6 |
| 1.10 | DELIVERY FLIGHTS FOR AIRCRAFT THAT ARE RVSM COMPLIANT ON DELIVERY | ENR 1.8-7 |
| 1.11 | PROCEDURES FOR SUSPENSION OF RVSM | ENR 1.8-7 |
| 1.12 | GUIDANCE FOR PILOTS AND CONTROLLERS FOR ACTIONS IN THE EVENT OF AIRCRAFT SYSTEM MALFUNCTION OR TURBULENCE GREATER THAN MODERATE | ENR 1.8-7 |
| 1.13 | PROCEDURES FOR AIR-GROUND COMMUNICATION FAILURE | ENR 1.8-7 |
| 2 | MACH NUMBER TECHNIQUE (MNT) AND AREA NAVIGATION (RNAV) | ENR 1.8-13 |
| 2.1 | INTRODUCTION | ENR 1.8-13 |
| 2.2 | MACH NUMBER IN A FLIGHT PLAN | ENR 1.8-13 |
| 2.3 | ATC CLEARANCE | ENR 1.8-13 |
| 2.4 | MAINTENANCE/CHANGE OF MACH NUMBER | ENR 1.8-13 |
| 2.5 | LONGITUDINAL SEPARATION ON ATS ROUTES M758 AND M761 | ENR 1.8-14 |
| 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 | ENR 1.8-14 |
| 3 | RNP 10 NAVIGATION REQUIREMENTS | ENR 1.8-16 |
| 3.1 | INTRODUCTION | ENR 1.8-16 |
| 3.2 | OPERATIONS BY AIRCRAFT NOT MEETING RNP 10 REQUIREMENTS | ENR 1.8-16 |
| 3.3 | SAFETY ASSESSMENT CRITERIA | ENR 1.8-16 |
| 3.4 | MONITORING OF AIRCRAFT NAVIGATION PERFORMANCE | ENR 1.8-17 |
| 3.5 | SEPARATION MINIMA | ENR 1.8-17 |
| 3.6 | OPERATORS' PROCEDURES | ENR 1.8-17 |
| 3.7 | CONTINGENCY PROCEDURES (including WEATHER DEVIATION) | ENR 1.8-17 |
| 4 | NO-PRE-DEPARTURE CO-ORDINATION (NO PDC) PROCEDURES | ENR 1.8-17 |
| 4.1 | INTRODUCTION | ENR 1.8-17 |
| 4.2 | NO PDC FLIGHT LEVEL ALLOCATION | ENR 1.8-18 |
| 5 | STRATEGIC LATERAL OFFSET PROCEDURES | ENR 1.8-19 |
| 5.1 | INTRODUCTION | ENR 1.8-19 |
| 5.2 | STRATEGIC LATERAL OFFSETS IN EN-ROUTE AIRSPACE | ENR 1.8-19 |

| | | |
|-------------------------|---|------------|
| 6 | CHANGI FLOW MANAGEMENT PROCEDURES | ENR 1.8-19 |
| 6.1 | INTRODUCTION | ENR 1.8-19 |
| 6.2 | ENTRY AND EXIT GATES | ENR 1.8-20 |
| 6.3 | ARRIVING AIRCRAFT TO SINGAPORE CHANGI AIRPORT | ENR 1.8-20 |
| 6.4 | APPROACH AIRSPACE HOLDING PROCEDURES | ENR 1.8-20 |
| 6.5 | EXPECTED TIME TO LEAVE HOLDING AREA | ENR 1.8-21 |
| 6.6 | DEPARTING AIRCRAFT FROM SINGAPORE CHANGI AIRPORT | ENR 1.8-21 |
| 7 | AUTOMATIC DEPENDENT SURVEILLANCE BROADCAST (ADS-B) OUT EXCLUSIVE AIRSPACE WITHIN PARTS OF THE SINGAPORE FIR | ENR 1.8-21 |
| 7.1 | ADS-B BASED SURVEILLANCE AIRSPACE AND AIRCRAFT OPERATOR APPROVAL | ENR 1.8-21 |
| 7.2 | FLIGHT PLANNING REQUIREMENTS | ENR 1.8-21 |
| 7.3 | STATE AIRCRAFT | ENR 1.8-22 |
| 7.4 | INFLIGHT CONTINGENCIES | ENR 1.8-22 |
| 7.5 | ATC-PILOT PHRASEOLOGIES | ENR 1.8-22 |
| 8 | AIR TRAFFIC MANAGEMENT CONTINGENCY PLAN | ENR 1.8-22 |
| 8.1 | INTRODUCTION | ENR 1.8-22 |
| 8.2 | REDUCED ATS AND PROVISION OF FLIGHT INFORMATION SERVICES (FIS) | ENR 1.8-23 |
| 8.3 | AIRCRAFT SEPARATION AND SPACING | ENR 1.8-23 |
| 8.4 | PRIORITY FOR FLIGHT LEVELS | ENR 1.8-23 |
| 8.5 | AIRSPACE CLASSIFICATIONS | ENR 1.8-23 |
| 8.6 | AIRCRAFT POSITION REPORTING | ENR 1.8-24 |
| 8.7 | EXCLUSIONS | ENR 1.8-24 |
| 8.8 | PILOT AND OPERATOR PROCEDURES | ENR 1.8-24 |
| 8.8.1 | Filing of flight plans | ENR 1.8-24 |
| 8.8.2 | Overflight approval | ENR 1.8-24 |
| 8.8.3 | Pilot operating procedures | ENR 1.8-24 |
| 8.8.4 | Interception of civil aircraft | ENR 1.8-25 |
| 8.9 | COMMUNICATION PROCEDURES | ENR 1.8-25 |
| 8.9.1 | Degradation of Communication - Pilot Radio Procedures | ENR 1.8-25 |
| 8.9.2 | Communication frequencies | ENR 1.8-25 |
| 8.10 | CONTINGENCY ROUTES | ENR 1.8-26 |
| 8.10.1 | Between Singapore and Manila FIR | ENR 1.8-26 |
| 8.10.2 | Between Singapore and Ho Chi Minh FIR | ENR 1.8-27 |
| 8.10.3 | Between Singapore and Kota Kinabalu FIR | ENR 1.8-28 |
| 8.10.4 | Between Singapore and Kuala Lumpur FIR | ENR 1.8-28 |
| 8.11 | TRAFFIC INFORMATION BROADCASTS BY AIRCRAFT (TIBA) | ENR 1.8-28 |
| 8.11.1 | Introduction and applicability of broadcasts | ENR 1.8-28 |
| 8.11.2 | Details of broadcasts | ENR 1.8-29 |
| ENR 1.9 | AIR TRAFFIC FLOW MANAGEMENT (ATFM) | ENR 1.9-1 |
| 1 | AIR TRAFFIC FLOW MANAGEMENT (ATFM) | ENR 1.9-1 |
| 2 | ATFM OPERATIONS FOR FLIGHTS ARRIVING AT SINGAPORE CHANGI AIRPORT | ENR 1.9-1 |
| 3 | ATFM OPERATIONS FOR FLIGHTS PLANNING TO OPERATE WITHIN THE SINGAPORE FIR | ENR 1.9-1 |
| 4 | SINGAPORE ATFMU CONTACT INFORMATION AND WEB CONFERENCE | ENR 1.9-2 |
| 5 | BAY OF BENGAL COOPERATIVE ATFM (BOBCAT) | ENR 1.9-2 |
| 5.1 | INTRODUCTION | ENR 1.9-2 |
| 5.2 | PROVISION OF ATFM SERVICES | ENR 1.9-2 |

| | | |
|--------------------------|--|------------|
| 5.3 | ATFM AFFECTED ATS ROUTES, FLIGHT LEVELS AND APPLICABLE HOURS | ENR 1.9-3 |
| 5.4 | MANDATORY CTOT AND KABUL FIR SLOT ALLOCATION | ENR 1.9-3 |
| 5.5 | BOBCAT OPERATING PROCEDURES | ENR 1.9-3 |
| 5.6 | SUBMISSION OF ATS FLIGHT PLAN | ENR 1.9-3 |
| 5.7 | AIRCRAFT OPERATOR / PILOT-IN-COMMAND AND ANSP RESPONSIBILITIES | ENR 1.9-4 |
| 5.8 | COORDINATION BETWEEN AIRCRAFT OPERATOR/PILOT-IN-COMMAND, ANSPs AND BANGKOK ATFMU | ENR 1.9-4 |
| 5.9 | BASIC COMPUTER REQUIREMENT | ENR 1.9-4 |
| 5.10 | ATFM USERS HANDBOOK | ENR 1.9-5 |
| 5.11 | CONTINGENCY PROCEDURES | ENR 1.9-5 |
| 5.12 | ATFM SYSTEM FAULT REPORTING | ENR 1.9-5 |
| 5.13 | ADDRESS OF AIR TRAFFIC FLOW MANAGEMENT UNIT (ATFMU) | ENR 1.9-5 |
| ENR 1.10 | FLIGHT PLANNING | ENR 1.10-1 |
| 1 | PROCEDURES FOR SUBMISSION OF A FLIGHT PLAN | ENR 1.10-1 |
| 1.1 | Requirement for submission of a Flight Plan | ENR 1.10-1 |
| 1.2 | Requirement for submission of a Flight Plan for Test Flights | ENR 1.10-1 |
| 1.3 | Lead time for filing flight plans and flight plan associated messages | ENR 1.10-1 |
| 1.4 | Persons on board (POB) | ENR 1.10-2 |
| 1.5 | DATA LINK Communication and Surveillance | ENR 1.10-2 |
| 1.6 | RNAV Approved Aircraft | ENR 1.10-2 |
| 1.7 | RVSM and NON-RVSM Approved Aircraft | ENR 1.10-3 |
| 1.8 | Other Documentary and / or Permit Requirements | ENR 1.10-3 |
| ENR 1.11 | ADDRESSING OF FLIGHT PLAN MESSAGES | ENR 1.11-1 |
| ENR 1.12 | INTERCEPTION OF CIVIL AIRCRAFT | ENR 1.12-1 |
| 1.1 | ACTION BY INTERCEPTED AIRCRAFT | ENR 1.12-1 |
| 1.2 | RADIO COMMUNICATION DURING INTERCEPTION | ENR 1.12-1 |
| ENR 1.13 | UNLAWFUL INTERFERENCE | ENR 1.13-1 |
| ENR 1.14 | AIR TRAFFIC INCIDENTS | ENR 1.14-1 |
| 1 | DEFINITION OF AIR TRAFFIC INCIDENTS | ENR 1.14-1 |
| 2 | USE OF AIR TRAFFIC INCIDENT REPORTING FORMS | ENR 1.14-1 |
| 3 | AIR TRAFFIC INCIDENT REPORTING PROCEDURES | ENR 1.14-1 |
| 4 | INVESTIGATION | ENR 1.14-2 |
| 5 | CO-ORDINATION/INVESTIGATION AUTHORITY | ENR 1.14-2 |
| 6 | OTHER REPORTS UNDER ICAO INITIATIVE FOR DATA COLLECTION AND ANALYSIS PURPOSES | ENR 1.14-2 |
| 7 | INDEX OF REPORTING FORMS APPENDED TO THIS SECTION | ENR 1.14-2 |
| ENR 2 | AIR TRAFFIC SERVICES AIRSPACE | |
| ENR 2.1 | FIR, UIR, TMA | ENR 2.1-1 |
| ENR 2.2 | [NIL] OTHER REGULATED AIRSPACE | ENR 2.2-1 |
| ENR 3 | ATS ROUTES | |
| ENR 3.1 | ATS ROUTES | ENR 3.1-1 |
| ENR 3.2 | [NIL] UPPER ATS ROUTES | ENR 3.2-1 |
| ENR 3.3 | AREA NAVIGATION (RNAV) ROUTES | ENR 3.3-1 |
| ENR 3.4 | HELICOPTER ROUTES | ENR 3.4-1 |
| 1 | HELICOPTER OPERATIONS OVER SINGAPORE ISLAND | ENR 3.4-1 |
| 2 | PROCEDURES FOR THE CONTROL OF HELICOPTER OPERATIONS AT SINGAPORE CHANGI AIRPORT | ENR 3.4-4 |
| ENR 3.5 | OTHER ROUTES | ENR 3.5-1 |

| | | |
|-------------------------|---|----------------|
| 1 | SINJON CROSSING BY MILITARY AIRCRAFT | ENR 3.5-1 |
| 2 | TRANSIT CHANNEL | ENR 3.5-2 |
| 3 | HORSBURGH LIGHTHOUSE | ENR 3.5-2 |
| ENR 3.6 | ENROUTE HOLDING | ENR 3.6-1 |
| ENR 4 | RADIO NAVIGATION AIDS/SYSTEMS | |
| ENR 4.1 | RADIO NAVIGATION AIDS - ENROUTE | ENR 4.1-1 |
| ENR 4.2 | [NIL] SPECIAL NAVIGATION SYSTEM | ENR 4.2-1 |
| ENR 4.3 | GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS) | ENR 4.3-1 |
| ENR 4.4 | NAME-CODE DESIGNATIONS FOR SIGNIFICANT POINTS | ENR 4.4-1 |
| ENR 4.5 | AERONAUTICAL GROUND LIGHTS - ENROUTE | ENR 4.5-1 |
| ENR 5 | NAVIGATION WARNINGS | |
| ENR 5.1 | PROHIBITED, RESTRICTED AND DANGER AREAS | ENR 5.1-1 |
| 1 | INTRODUCTION | ENR 5.1-1 |
| 2 | DANGER AREA | ENR 5.1-1 |
| 3 | PROHIBITED AREA | ENR 5.1-1 |
| 4 | RESTRICTED AREA | ENR 5.1-1 |
| 5 | DESIGNATION OF AREA | ENR 5.1-1 |
| ENR 5.2 | MILITARY EXERCISE AND TRAINING AREAS | ENR 5.2-1 |
| ENR 5.3 | OTHER ACTIVITIES OF A DANGEROUS NATURE AND OTHER POTENTIAL HAZARD | ENR 5.3-1 |
| 1 | OTHER ACTIVITIES OF DANGEROUS NATURE | ENR 5.3-1 |
| 2 | OTHER POTENTIAL HAZARDS | ENR 5.3-1 |
| ENR 5.4 | AIR NAVIGATION OBSTACLES - AREA 1 | ENR 5.4-1 |
| ENR 5.5 | AERIAL SPORTING AND RECREATIONAL ACTIVITIES | ENR 5.5-1 |
| 1 | AERO MODELLING AND KITE FLYING | ENR 5.5-1 |
| 2 | AIRCRAFT OPERATIONS PROHIBITED OVER THE TERRITORY OF SINGAPORE | ENR 5.5-1 |
| 3 | SEARCHLIGHT DISPLAY / LASER SHOWS - PAYA LEBAR CTR | ENR 5.5-1 |
| 4 | UNMANNED AIRCRAFT OPERATIONS - PAYA LEBAR CTR | ENR 5.5-1 |
| ENR 5.6 | BIRD MIGRATION | ENR 5.6-1 |
| 1 | BIRD MIGRATION | ENR 5.6-1 |
| 2 | REPORTING OF WILDLIFE STRIKE | ENR 5.6-1 |
| ENR 6 | EN-ROUTE CHARTS | ENR 6-1 |

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

ENR 1 GENERAL RULES AND PROCEDURES

ENR 1.1 GENERAL RULES

1 INTRODUCTION

- 1.1 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.

- 2.3.3 An air traffic control clearance will contain the following items:
- a. Aircraft identification;
 - b. Clearance limit and route instruction;
 - c. Level assignment;
 - d. Departure instruction when necessary;
 - e. Approach instruction when necessary;
 - f. Clearance expiry time when necessary; and
 - g. Any special instructions and information.
- 2.3.4 **Request for Amended Clearance.** If the amended clearance is requested at a time a position report is made, the information contained in that report shall be given on the assumption that the aircraft is proceeding in accordance with the current clearance, and not with that which is being requested.
- 2.3.5 The contents of an air traffic control clearance or any revisions thereto shall apply only to those portions of the flight conducted within controlled airspaces.
- 2.3.6 An air traffic control clearance may be issued direct to an aircraft by an ACC or through an aerodrome control unit or an air/ground HF RTF communications unit.
- 2.3.7 Phrases used in air traffic clearances will have the following meanings:
- a. "Clearance expires at (time)".
If the aircraft is not airborne by the time stated, a fresh clearance shall be obtained.
 - b. "Depart not before (time)".
An aircraft will not be cleared for departure until the time specified.
 - c. "Unable to approve (flight planned level)".
When ATC is unable to approve the flight planned level, an alternative level will be offered whenever possible, to avoid or reduce delay.
- 2.3.8 A pilot-in-command operating under VFR in controlled airspaces shall not enter instrument meteorological conditions without first obtaining an ATC clearance in accordance with the procedure laid down for flights joining airways. Until such clearance is received, the aircraft must remain in VMC.
- 2.3.9 Where a flight plan specifies IFR for the first portion of a flight and VFR for the latter portion, the aircraft will normally be cleared to the point where IFR terminates. (Clearance is not necessary beyond that point unless within the Singapore-Johor Airspace Complex and CTR).
- 2.3.10 If an ATC clearance stipulates VFR climb or descent and it becomes evident to the pilot-in-command that VMC cannot be maintained, he shall hold in VMC and request an alternative clearance.
- 2.3.11 The pilot-in-command having acknowledged an air traffic control clearance shall not deviate from the provisions of the clearance unless an amended clearance has been obtained.
- 2.3.12 Subsection [ENR 1.6](#) provides guidance to pilot-in-command compelled to deviate from the provisions of an air traffic control clearance because of communications failure.
- 2.3.13 A flight shall normally be cleared to the aerodrome of first intended landing and the point of leaving controlled airspace or, in the case of a flight where prior co-ordination with an adjacent unit cannot be established, the FIR boundary. This is known as the clearance limit.
- 2.3.14 An aircraft which has been cleared to an intermediate point en-route to await further ATC clearance will whenever possible, be issued the required ATC clearance at least 5 minutes before the aircraft arrives at the clearance limit, unless the pilot is instructed to hold over the intermediate holding point until a specified time.

- 2.3.15 In the event of an aircraft arriving at the clearance limit without having received a further clearance, the pilot-in-command shall immediately request a further clearance and hold in accordance with the specified holding pattern where one is established or otherwise the standard holding pattern, maintaining the last assigned cruising level until further clearance is received. Where no direct ATC coordination facilities between Regional Area Control Centres exist, pilots on such routes must endeavour, when airborne, to contact the Area Control Centre of the next FIR which the aircraft is entering and obtain clearance to enter its Control Area before reaching the transfer point of the two ACCs.
- 2.3.16 When a flight operates successively in a Control Area and subsequently along the advisory route or area, the clearance issued for the flight or any revisions thereto will only apply to those portions of the flight conducted within controlled airspaces.

2.4 ROUTE AND LEVEL ASSIGNMENT

- 2.4.1 The pilot-in-command shall fly in strict accordance to the route specified by ATC. Deviation from the specified route may be permitted by ATC if traffic conditions permit.
- 2.4.2 Traffic permitting ATC will assign the flight planned level if in accordance with the table of Semi-Circular System of Cruising Levels. Cruising levels below the minimum specified in subsection [ENR 3.1](#) will not be assigned.

2.5 ESSENTIAL TRAFFIC INFORMATION

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

- 2.5.2 Essential traffic information 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.

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.

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

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.

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:
- Prior to taxiing for departure; or
 - 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:
- Pass the aircraft's position, level, track and estimated time of crossing the zone boundary;
 - Maintain a continuous listening watch on that frequency while the aircraft is within the zone;
 - Navigate in accordance with the flight plan and ATC clearance;
 - 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:
- Must comply with ATC instructions;
 - 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;
 - 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.

- 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

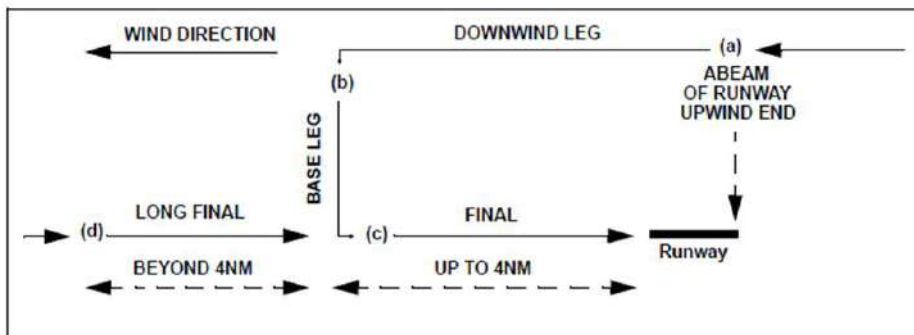
5.3.1 All flights VFR or IFR within CTRs will be regulated in accordance with IFR separation standards unless the conditions stated in page ENR 1.7-8 para 4.10.2 prevail. ATC Services are also provided to aircraft within ATZs.

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.

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.

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

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

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

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.

7 LIGHT SIGNALS**Appendix A**

| Light Directed towards aircraft concerned | From Aerodrome Control To: | |
|--|--|---|
| | 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.

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.

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:
- prior instruction to contact ATC on VHF;
 - receive notice that CPDLC service is not available; and
 - 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:
- upon position over first compulsory reporting point when aircraft enters Singapore FIR;
 - 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.

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.

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. for deviations greater than, or equal to 5.0NM from the originally cleared track or ATS route, when the aircraft is approximately 5.0NM from track, initiate a level change in accordance with the following table:

| Route Centreline Track | Deviations Greater than 5NM | Level Change |
|-------------------------------|--|------------------------------|
| East (000-179 Magnetic) | Left Right | Descend 300ft Climb 300ft |
| West (180-359 Magnetic) | Left Right | Climb 300ft Descend 300ft |

- f. when returning to track, be established at the assigned flight level or altitude when the aircraft is within approximately 5.0NM 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.

PAGE INTENTIONALLY LEFT BLANK

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

PAGE INTENTIONALLY LEFT BLANK

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.

PAGE INTENTIONALLY LEFT BLANK

ENR 1.4 ATS AIRSPACE CLASSIFICATION

1 INTRODUCTION

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

2 AIRSPACE CLASSIFICATION

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

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

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

PAGE INTENTIONALLY LEFT BLANK

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.

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.

- 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.)

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.

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

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.

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:
- Proceed according to the current flight plan, at the last assigned flight level, to the clearance limit and thereafter at the flight plan level.
 - Arrive at the destination as close as possible to ETA.
 - Commence descent as close as possible to EAT (or ETA if no EAT has been acknowledged).
 - 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
- Aircraft Unable to Receive**
Pilots shall adopt the complete RTF failure procedures specified in para 1.8.
 - 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.

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).

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.

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

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

1.16.3 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.

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 |

Table A

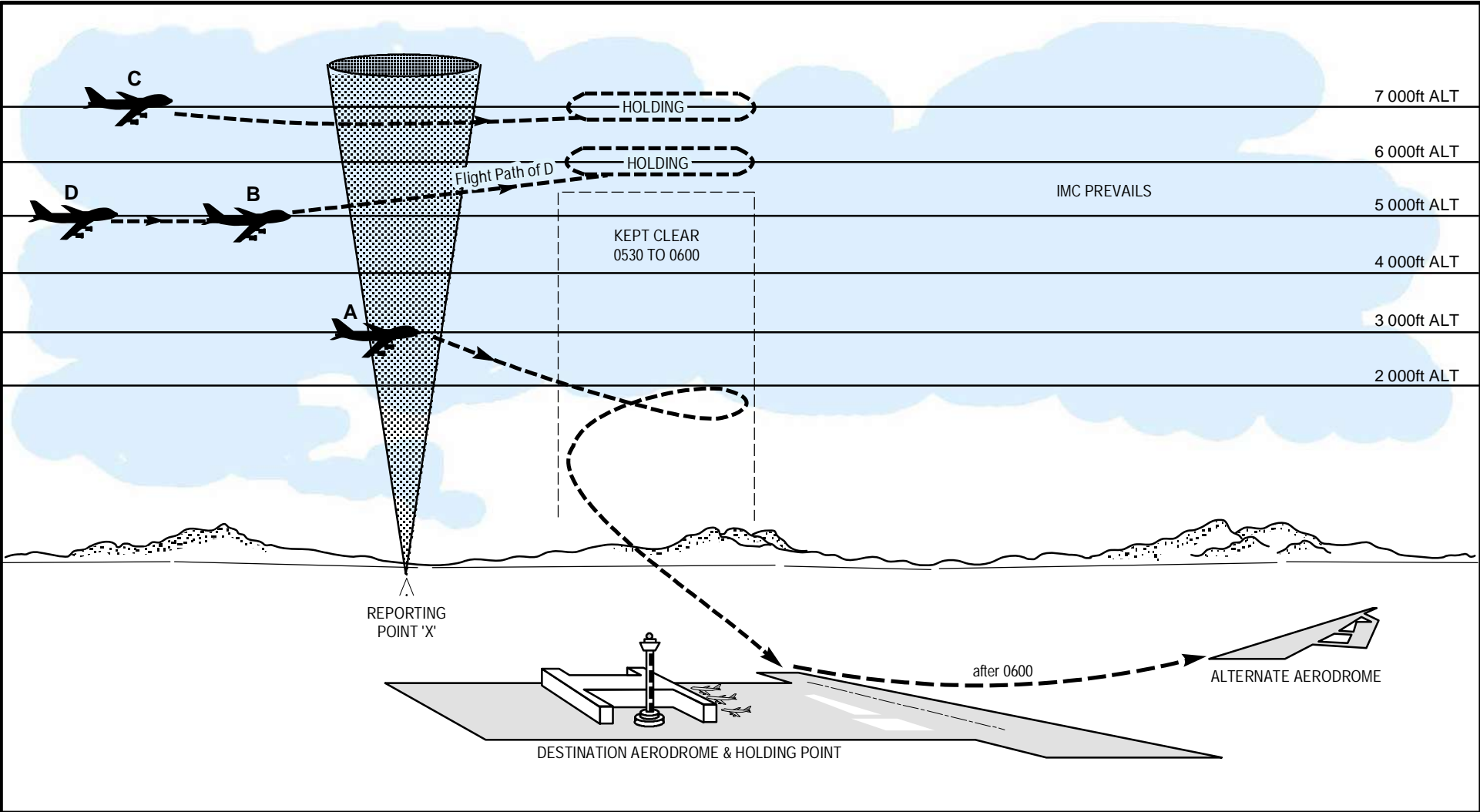
| AIR TRAFFIC CONTROL RADAR UNITS | | | |
|--|------------------------|------------------------------|--|
| LOCATION | PARENT ATC UNIT | RADAR UNIT CALLSIGN | SERVICE/FACILITIES PROVIDED |
| SINGAPORE CHANGI AIRPORT | SINGAPORE CONTROL | SINGAPORE RADAR (in general) | Radar surveillance and control of 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.

ATC PROCEDURE FOR RADIO FAILURE

APPENDIX 'A'

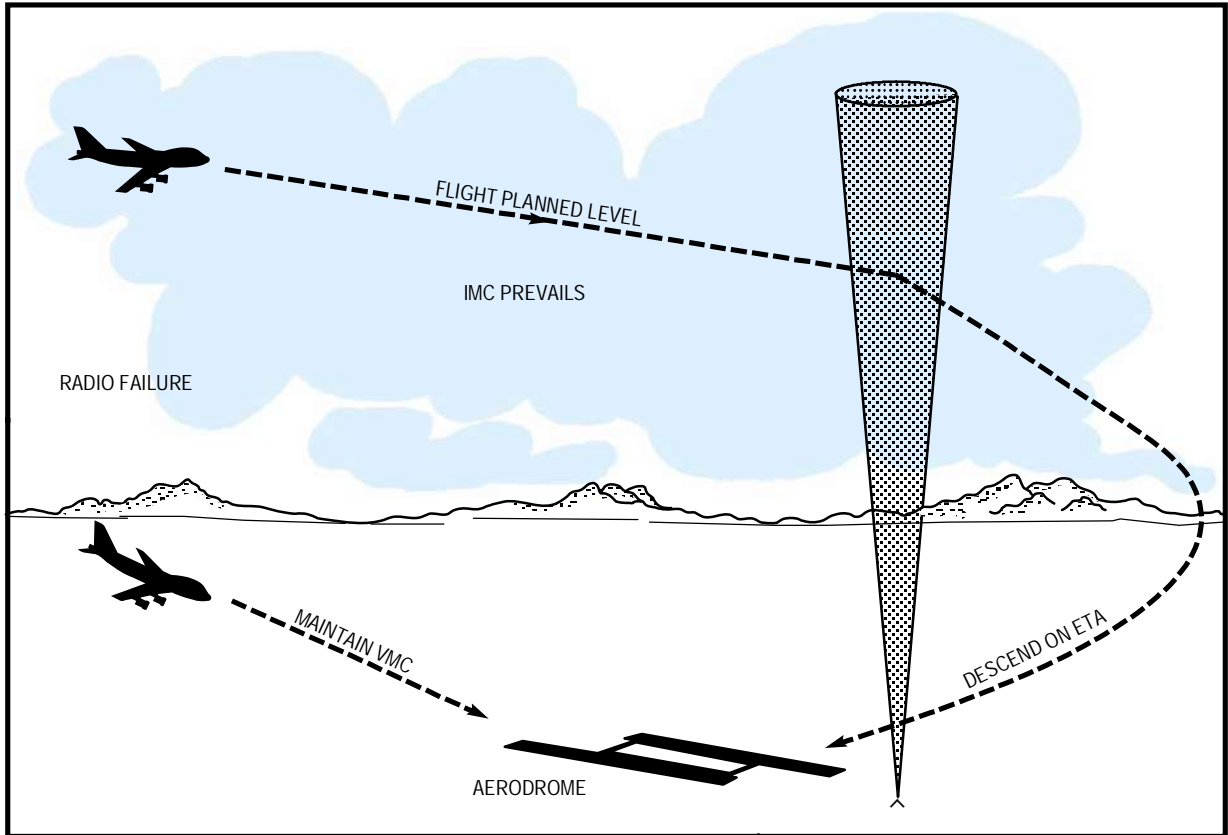


1. AIRCRAFT ETA(S) AT DESTINATION ARE **A** 0515, **B** 0530, **C** 0555, **D** 0555.
 2. AIRCRAFT **B** HAS NOT REPORTED.
 3. ATC WILL PERMIT AIRCRAFT **A** TO DESCEND AND LAND.
 4. AIRCRAFT **C** WILL BE INSTRUCTED TO HOLD OVER DESTINATION AT 7 000FT ALT.
 5. AIRCRAFT **D** WILL BE INSTRUCTED TO CLIMB 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.

PAGE INTENTIONALLY LEFT BLANK

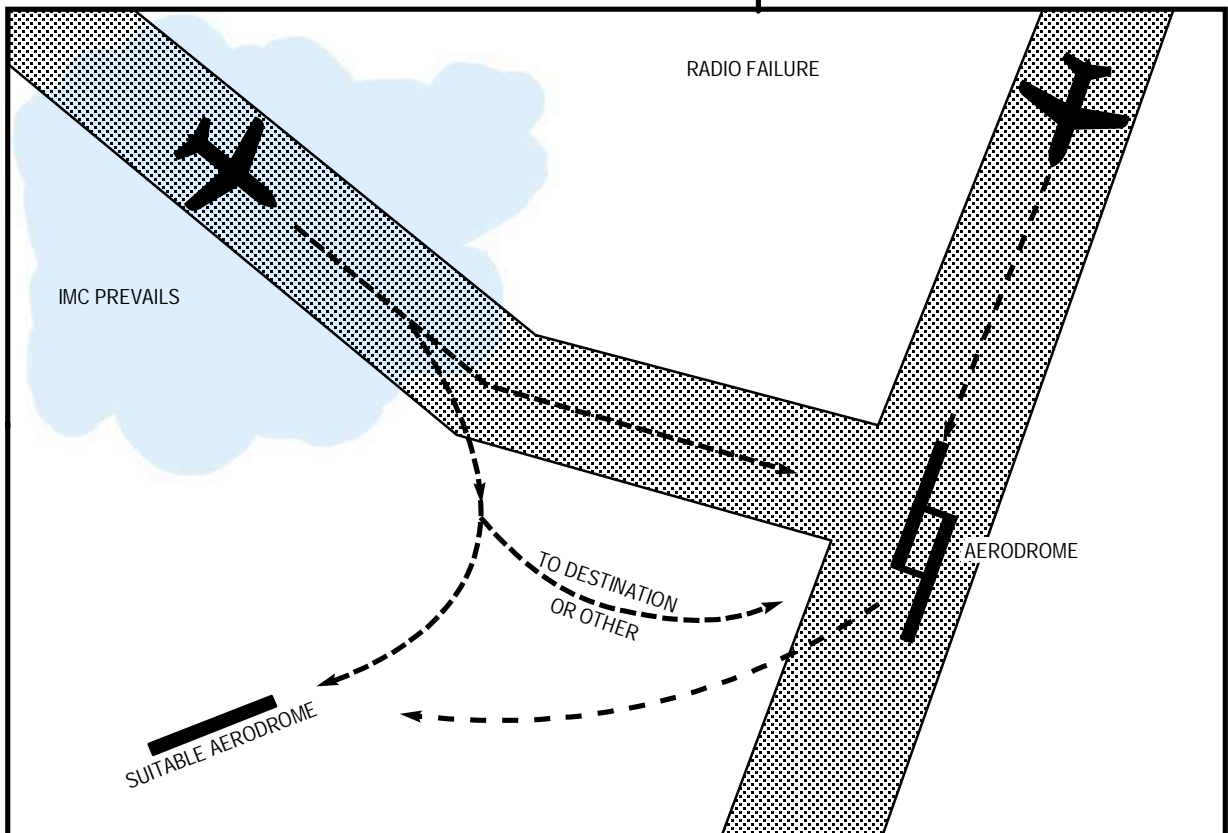
PILOT PROCEDURE FOR RADIO FAILURE

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



PAGE INTENTIONALLY LEFT BLANK

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.

Note:

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

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

2.2 TAKE-OFF AND CLIMB

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

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

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

2.3 VERTICAL SEPARATION - ENROUTE

2.3.1 Aircraft en-route in the Singapore FIR (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) (section ENR 1.7 para 4.2);
- b. VFR flights cruising levels up to FL150 within controlled airspace (section ENR 1.7 para 4.3);
- c. Quadrantal cruising levels in uncontrolled airspace of the Singapore FIR (section ENR 1.7 para 4.4).

2.4 APPROACH AND LANDING

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

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

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

2.5 MISSED APPROACH

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

3 PROCEDURES APPLICABLE TO OPERATORS AND PILOTS

3.1 Flight Planning

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

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

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

Note: 1:

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

Note: 2:

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

4 TABLES OF CRUISING LEVELS

4.1 SEMI-CIRCULAR SYSTEM OF CRUISING LEVELS WITHIN THE SINGAPORE FIR

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 |

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 transiting between areas where the Quadrantal System of cruising levels is in use and those where the Semi-Circular System is applicable, are indicated below.

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

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

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

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

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

4.6 CHANGING LEVELS

4.6.1 ATC may clear aircraft to change level at a specific time, place or rate. The pilot-in-command must acknowledge receipt of ATC instruction to a change of level and shall effect a change of level immediately unless a later time or place for the commencement is specified or is approved, as a result of a request by a pilot. The rate of change of level shall be the specific rate, or if no rate has been specified, a rate suitable for the type of aircraft.

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

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

4.6.3 A pilot-in-command shall report:

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

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

4.7 UNIDIRECTIONAL ATS ROUTES LEVEL ASSIGNMENTS - SINGAPORE/JAKARTA SECTOR

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

4.7.2 Level Assignments

4.7.2.1 Jakarta ACC shall assign:

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

4.7.2.2 Singapore ACC shall assign:

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

4.8 POSITION REPORTS

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

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

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

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

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

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

Section 1 (Position Information)

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

Section 2 (Operational Information)

7. estimated time of arrival
8. endurance

Section 3 (Meteorological Information)

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

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

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

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.

PAGE INTENTIONALLY LEFT BLANK

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>)

- 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

Introduction

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

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

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

General Procedures

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

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

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

Actions to be taken once offset from track

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

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

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

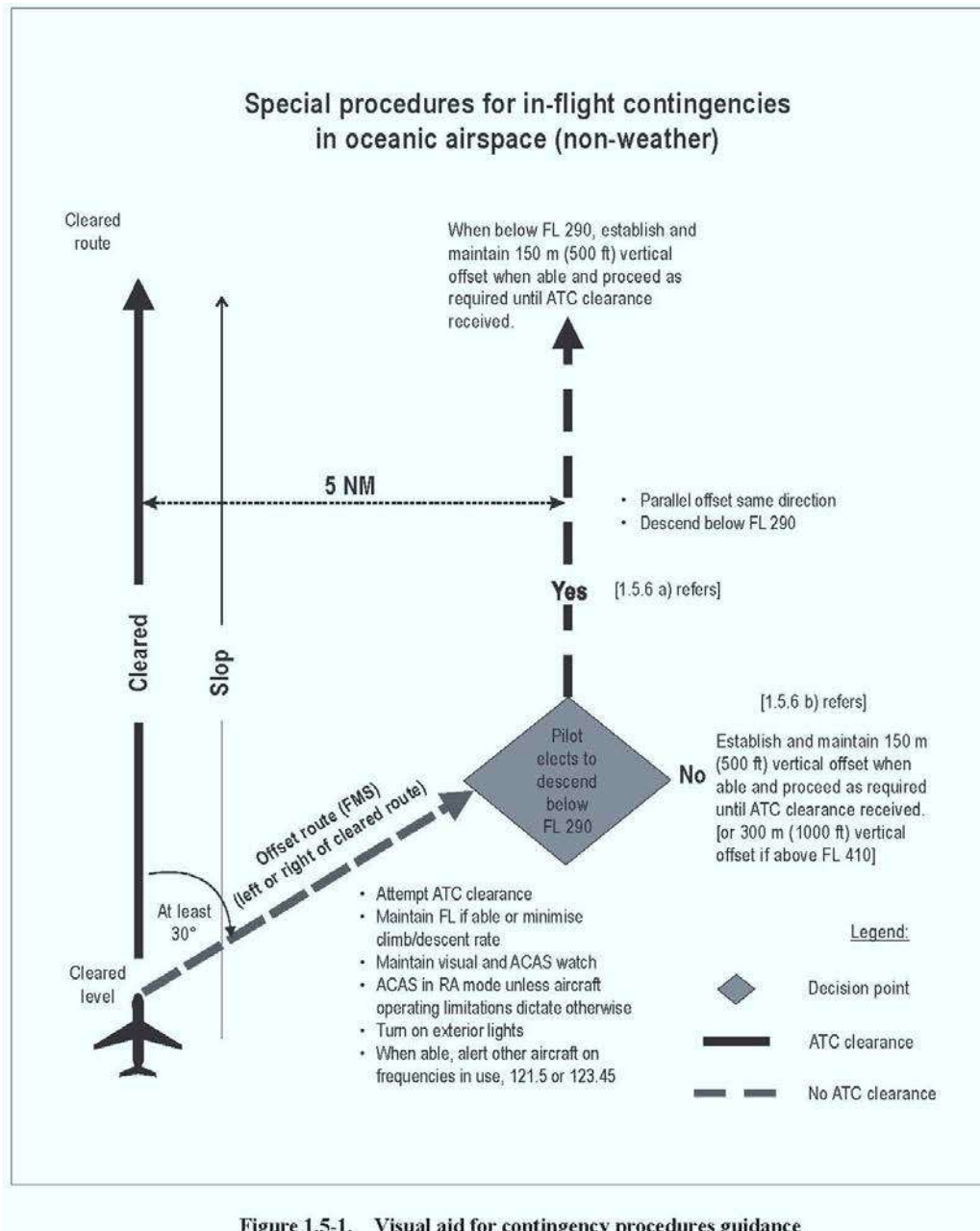


Figure 1.5-1. Visual aid for contingency procedures guidance

1.6 WEATHER DEVIATION PROCEDURES IN THE SINGAPORE FIR

GENERAL

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

1.6.1 When weather deviation is required, the pilot should initiate communications with ATC via voice or CPDLC. A rapid response may be obtained by either:

- stating “WEATHER DEVIATION REQUIRED” to indicate that priority is desired on the frequency and for ATC response; or
- requesting a weather deviation using a CPDLC lateral downlink message.

1.6.2 When necessary, the pilot should initiate the communications using the urgency call “PAN PAN” (preferably spoken three times) or by using a CPDLC urgency downlink message.

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

ACTIONS TO BE TAKEN WHEN CONTROLLER-PILOT COMMUNICATIONS ARE ESTABLISHED

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

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

1.6.5 After communicating with ATC, the pilot should take the following actions:

- a. comply with the ATC clearance issued; or
- b. advise ATC of intentions and execute the procedures detailed in 1.6.6

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

1.6.6 If the aircraft is required to deviate from track or ATS route to avoid adverse meteorological conditions and prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time. Until an ATC clearance is received, the pilot shall take the following actions:

- a. if possible, deviate away from an organized track or ATS route system;
- b. establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: aircraft identification, flight level, position (including ATS route designator or the track code) and intentions, on the frequency in use and on 121.5 MHz (or, as a backup, on the inter-pilot air-to-air frequency 123.45 MHz);
- 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 5.0 NM from the originally cleared track or ATS route, remain at a level assigned by ATC;
- f. for deviations greater than, or equal to 5.0 NM from the originally cleared track or ATS route, when the aircraft is approximately 5.0 NM from track, initiate a level change in accordance with the following table:

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

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

Note.- If, as a result of actions taken under the provisions of 1.6.6, the pilot determines that there is another aircraft at or near the same flight level with which a conflict may occur, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.

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

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

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

1.7.2 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).

1.8 FLIGHT PLANNING REQUIREMENTS

1.8.1 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.

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

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

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

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

1.9.4 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.

1.9.5 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).

1.9.6 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.

1.9.7 Contact details for approval request are as follows:

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

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

1.10 DELIVERY FLIGHTS FOR AIRCRAFT THAT ARE RVSM COMPLIANT ON DELIVERY

1.10.1 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.

1.11 PROCEDURES FOR SUSPENSION OF RVSM

1.11.1 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.

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

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

1.13 PROCEDURES FOR AIR-GROUND COMMUNICATION FAILURE

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

CONTINGENCY SCENARIOS

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

* **Scenario 1** : The pilot is

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

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

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

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

EXPANDED EQUIPMENT FAILURE AND TURBULENCE ENCOUNTER SCENARIOS

Operators may consider this material for use in training programs.

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

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

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

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

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

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

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

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

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

| The pilot should: | ATC can be expected to: |
|--|--|
| Watch for conflicting traffic both visually and by reference to ACAS, if equipped. | |
| If considered necessary, alert nearby aircraft by: a) Making maximum use of exterior lights; b) Broadcasting position, FL, and intentions on 121.5MHz (as a back-up, the VHF inter-pilot air-to-air frequency 123.45MHz may be used). | |
| Notify ATC of intended course of action as soon as possible. <u>Possible courses of action include:</u> a) Maintaining CFL and route, provided ATC can provide lateral, longitudinal or conventional vertical separation. b) Requesting flight level change, if necessary c) Executing the contingency manoeuvre shown in paragraphs 1.5 and 1.6 to offset from the assigned track and FL, if ATC clearance cannot be obtained and the aircraft cannot maintain CFL. | Assess traffic situation to determine if the aircraft can be accommodated through the provision of lateral, longitudinal, or conventional vertical separation, and if so, apply the appropriate minimum. If unable to provide adequate separation, advise the pilot of essential traffic information and request pilot's intentions. Notify other aircraft in the vicinity and monitor the situation. Notify adjoining ATC facilities/sectors of the situation. |

CONTROLLER / PILOT PHRASEOLOGY

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

* indicates a pilot transmission

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

2.1 INTRODUCTION

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

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.

APPENDIX ATable

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

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

3 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).

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.

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.

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

5 STRATEGIC LATERAL OFFSET PROCEDURES

5.1 INTRODUCTION

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

5.2 STRATEGIC LATERAL OFFSETS IN EN-ROUTE AIRSPACE

- 5.2.1 Offsets may only be applied outside surveillance cover in en-route airspace within the Singapore FIR.
- 5.2.2 Offsets may only be applied by aircraft with automatic offset tracking capability.
- 5.2.3 The following requirements may apply to the use of the offset:
- The decision to apply a strategic lateral offset is the responsibility of the flight crew;
 - The offset shall be established at a distance of one or two nautical miles to the right of the centre line relative to the direction of flight. Offsets are not to exceed two nautical miles right of centre line;
 - The strategic lateral offset procedure has been designed to include offsets to mitigate the effects of wake turbulence of preceding aircraft. If wake turbulence needs to be avoided, offsets to the right of the centreline relative to the direction of flight in tenths of a nautical mile up to a maximum of 3.7km (2nm) shall be used.
Pilots may contact other aircraft on the air to air frequency, 123.45MHz, as necessary, to coordinate the best wake turbulence offset option. As noted below, it is not necessary to notify air traffic control of approved offsets;
 - 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;
 - 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.

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:

| <u>Entry Gate</u> | <u>Coordinates</u> |
|-------------------|--------------------|
| 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 to enhance predictability and planning of air traffic in the Approach airspace. Pilots shall adhere to the speed control restrictions published in the STAR procedures unless otherwise advised. ATC may issue further speed adjustment during the different phases of the flight if traffic situation warrants.

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) |

- 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), 045224N 1041442E (ENREP), 045000N 1034400E, thence north along the Singapore FIR boundary to 070000N 1080000E at or above FL290 must carry serviceable ADS-B transmitting equipment that has been certified as meeting:
- European Aviation Safety Agency - Certification Considerations for the Enhanced ATS in Non-Radar Areas using ADS-B Surveillance (ADS-B-NRA) Application via 1090MHz Extended Squitter (AMC 20-24), or
 - European Aviation Safety Agency (EASA) CS-ACNS (Subpart D - Surveillance - SUR), or
 - Federal Aviation Administration - Advisory Circular No: 20-165A (or later versions) Airworthiness Approval of Automatic Dependent Surveillance - Broadcast (ADS-B) Out Systems, or
 - 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 in 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

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.

- 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.

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;

- 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.

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 |

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 | |

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

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"

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

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, WMKL |
| Myanmar | VYMD, VYNT, VYYY |
| Philippines | RPLL |
| Thailand | VTBS, VTSP, VTBD, VTBU, VTCC, VTCT, VTSB, VTSG, VTSM, 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.

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

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

3.3 FPLs and ATS messages should be addressed to WSJCZQZX.

4 SINGAPORE ATFMU CONTACT INFORMATION AND WEB CONFERENCE

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

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

Email: CAAS_ATFMU@caas.gov.sg

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

Fax: (+65) 62414034

5 BAY OF BENGAL COOPERATIVE ATFM (BOBCAT)

5.1 INTRODUCTION

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

5.2 PROVISION OF ATFM SERVICES

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

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

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

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

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

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 | FL300, FL320, FL340, FL360, FL380, FL400 |
| N636 - P628 | SERKA | FL280, FL300, FL320, FL340, FL360, FL380, FL400 |

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 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.

5.3.4 Flights exempted from ATFM procedures shall indicate the exemption in their flight plan as follows: (Field 18 - STS-BOB 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 5.5.

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 Stakeholders are able to view the slot allocation results at <https://www.bobcat.aero> which will be published no later than 1230 UTC. Alternative arrangements for notification of slot distribution (e.g. e-mail, fax, telephone) should be coordinated with the Bangkok ATFMU.

5.5.3 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.

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

5.6 **SUBMISSION OF ATS FLIGHT PLAN**

5.6.1 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.

- 5.6.2 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 Bangkok ATFMU via AFTN address VTBBZDZX for all flights that have submitted a slot request.

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

Aircraft Operator / Pilot-in-Command

- 5.7.1 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.

- 5.7.2 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

- 5.7.3 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.
- 5.7.4 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 allocated CTOT and CTO at Kabul FIR entry waypoint.

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

- 5.8.1 The PIC shall include the CTOT in the initial ATC clearance request.
- 5.8.2 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.
- 5.8.3 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.
- 5.8.4 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 Bangkok ATFMU for a revised slot allocation.
- 5.8.5 The Bangkok ATFMU (VTBBZDZX) shall be included in the list of AFTN addressees for NOTAMs regarding any planned activities that may affect slot availability (e.g. reservation of airspace / closure of airspace, non-availability of routes, etc.).
- 5.8.6 The Bangkok ATFMU (VTBBZDZX) shall be included in the list of AFTN addressees for ATS messages (e.g. FPL, DEP, DLA, CHG, CNL) relating to flights subject to ATFM procedures.
- 5.8.7 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 Bangkok ATFMU;
 - b. If the flight has left the gate, coordination to Bangkok ATFMU may also take place via the ATS unit presently communicating with the flight.

5.9 BASIC COMPUTER REQUIREMENT

- 5.9.1 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.

5.10 ATFM USERS HANDBOOK

- 5.10.1 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>
- 5.10.2 ANSPs and aircraft operators shall ensure that they are conversant with and able to apply the relevant procedures described in the ATFM Users Handbook.

5.11 CONTINGENCY PROCEDURES

- 5.11.1 In the event that an aircraft operator or Singapore ATC is unable to access the Bangkok ATFMU website, the Bangkok ATFMU shall be contacted via the alternative means (telephone, fax, AFTN) described in paragraph 5.13.
- 5.11.2 Contingency procedures for submission of slot request, including activation of Contingency Slot Request Templates (CSRT), are included in the ATFM Users Handbook.
- 5.11.3 In the event of system failure of BOBCAT, Bangkok ATFMU shall notify all parties concerned and advise that ATFM slot allocation procedures are suspended. In this event, all parties concerned will revert to the existing ATM procedures as applicable outside the daily period of ATFM metering.

5.12 ATFM SYSTEM FAULT REPORTING

- 5.12.1 An ATFM system fault is defined as a significant occurrence affecting an ATS unit, an aircraft operator or Bangkok ATFMU resulting from the application of ATFM procedures.
- 5.12.2 Aircraft operators and Singapore ATC experiencing an ATFM system fault should complete an ATFM System Fault Report Form from the ATFM Users Handbook and forward it to the Bangkok ATFMU at the address indicated on the form. The Bangkok ATFMU will analyse all reports, make recommendations / suggestions as appropriate and provide feedback to the parties concerned to enable remedial action.

5.13 ADDRESS OF AIR TRAFFIC FLOW MANAGEMENT UNIT (ATFMU)

- 5.13.1 The Bangkok 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 : atfm@bobcat.aero
AFTN : VTBBZDZX
Website : <https://www.bobcat.aero>

PAGE INTENTIONALLY LEFT BLANK

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:
- Flights on airways, associated holding areas and all other controlled airspaces whether IFR or VFR;
 - Any flight or portion thereof to be provided with air traffic control service;
 - 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;
 - 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.

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

1.6.2 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.

PAGE INTENTIONALLY LEFT BLANK

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).

PAGE INTENTIONALLY LEFT BLANK

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)* | <u>KOL</u> SA-IN (call sign) | My call sign is (call sign) |
| WILCO | <u>VILL</u> -KO | Understood. Will comply |
| CAN NOT | <u>KANN</u> NOTT | Unable to comply |
| REPEAT | REE- <u>PEET</u> | Repeat your instruction |
| AM LOST | <u>AM</u> LOST | Position unknown |
| MAYDAY | <u>MAYDAY</u> | I am in distress |
| HIJACK [#] | <u>HI</u> - <u>JACK</u> | I have been hijacked |
| LAND (place name) | LAAND (place name) | I request to land at (place name) |
| DESCEND | DEE- <u>SEND</u> | I require descent |
| <p>[@] In the second column, syllables to be emphasised are underlined.</p> <p>* 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.</p> <p>[#] Circumstances may not always permit, nor make desirable, the use of the phrase "HIJACK".</p> | | |

- 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 | <u>KOL</u> SA-IN | What is your call sign? |
| FOLLOW | <u>FOL</u> -LO | Follow me |
| DESCEND | DEE- <u>SEND</u> | Descend for landing |
| YOU LAND | <u>YOU</u> <u>LAAND</u> | Land at this aerodrome |
| PROCEED | PRO- <u>SEED</u> | 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

SIGNALS INITIATED BY INTERCEPTING AIRCRAFT AND RESPONSES BY INTERCEPTED AIRCRAFT

| Series | INTERCEPTING Aircraft Signals | Meaning | INTERCEPTED Aircraft Responds | Meaning |
|---------------|---|--------------------------------------|---|--------------------------|
| 1 | <p>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.</p> <p><i>Note: 1. Meteorological conditions or terrain may require the intercepting aircraft to reverse the positions and direction of turn given above in Series 1.</i></p> <p><i>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.</i></p> | You have been intercepted, Follow me | <p>DAY or NIGHT - Rocking aircraft, flashing navigational lights at irregular intervals and following.</p> <p><i>Note: Additional action required to be taken by intercepted aircraft is prescribed in Chapter 3 para 3.8, Annex 2, Rules of the Air.</i></p> | 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. |

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. |

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.

PAGE INTENTIONALLY LEFT BLANK

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.

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

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



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

g) Traffic avoidance advice issued by ATS

- | | | |
|--|--|--|
| <input type="checkbox"/> Yes, based on ATS surveillance system | <input type="checkbox"/> Yes, based on visual sighting | <input type="checkbox"/> Yes, based on other information |
| <input type="checkbox"/> No | <input type="checkbox"/> Unknown | |

h) Traffic information issued

- | | | |
|--|--|--|
| <input type="checkbox"/> Yes, based on ATS surveillance system | <input type="checkbox"/> Yes, based on visual sighting | <input type="checkbox"/> Yes, based on other information |
| <input type="checkbox"/> No | <input type="checkbox"/> Unknown | |

i) Avoiding action taken

- | | | |
|------------------------------|-----------------------------|----------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> 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

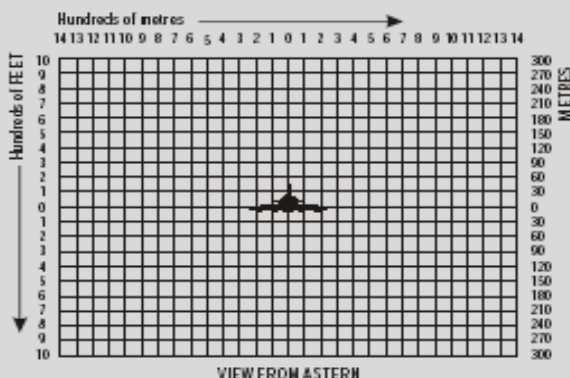
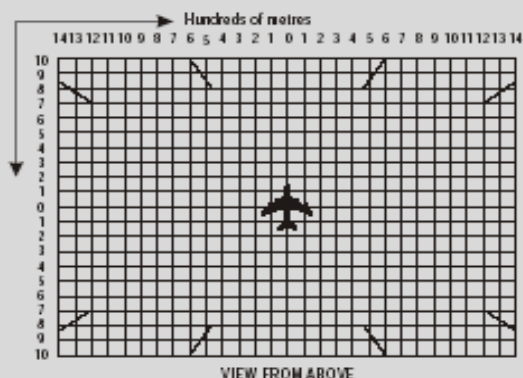
- a) Report received via AFTN / radio / telephone / other (specify)* _____
- b) Report received by _____ (name of ATS unit)

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.



| WAKE VORTEX ENCOUNTER REPORTING FORM FOR PILOTS | | |
|---|--|--|
| Date and Time | Date of incident | |
| | Time (UTC) | |
| Aircraft Type | Make | |
| | Model | |
| | Series | |
| Altitude | Height | <input type="checkbox"/> m or <input type="checkbox"/> ft |
| | Altitude | <input type="checkbox"/> m or <input type="checkbox"/> ft |
| | Flight level | |
| Geographical Position | Location | |
| | State | |
| | Airport | |
| | Runway | <input type="checkbox"/> L <input type="checkbox"/> C <input type="checkbox"/> R |
| Details | Phase of flight | <input type="checkbox"/> take-off <input type="checkbox"/> initial climb <input type="checkbox"/> climb <input type="checkbox"/> cruise <input type="checkbox"/> descent <input type="checkbox"/> approach <input type="checkbox"/> final <input type="checkbox"/> touch-down <input type="checkbox"/> taxiing <input type="checkbox"/> other |
| | Were you turning? | <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> L <input type="checkbox"/> R |
| | Which holding pattern were you in, if any? | |
| | Were you: | <input type="checkbox"/> high <input type="checkbox"/> low <input type="checkbox"/> on the glide path |
| | Were you: | <input type="checkbox"/> left of <input type="checkbox"/> right of <input type="checkbox"/> 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? | <input type="checkbox"/> yes <input type="checkbox"/> no | Please describe: |
| What was the change in attitude? Please estimate angle. | Pitch: Roll: Yaw: | |

| | |
|---|---|
| Was there any change in altitude? | <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> n/a |
| Was there buffeting? | <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> n/a |
| Was there stall warning? | <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> n/a |
| Was the autopilot engaged? | <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> n/a |
| What control action was taken? | <input type="checkbox"/> none <input type="checkbox"/> go-around <input type="checkbox"/> runway change <input type="checkbox"/> other Please describe briefly: |
| Could you see the aircraft suspected of generating the wake vortex? | <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> 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? | <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> 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

ENR 2 AIR TRAFFIC SERVICES AIRSPACE

ENR 2.1 FIR, UIR, TMA

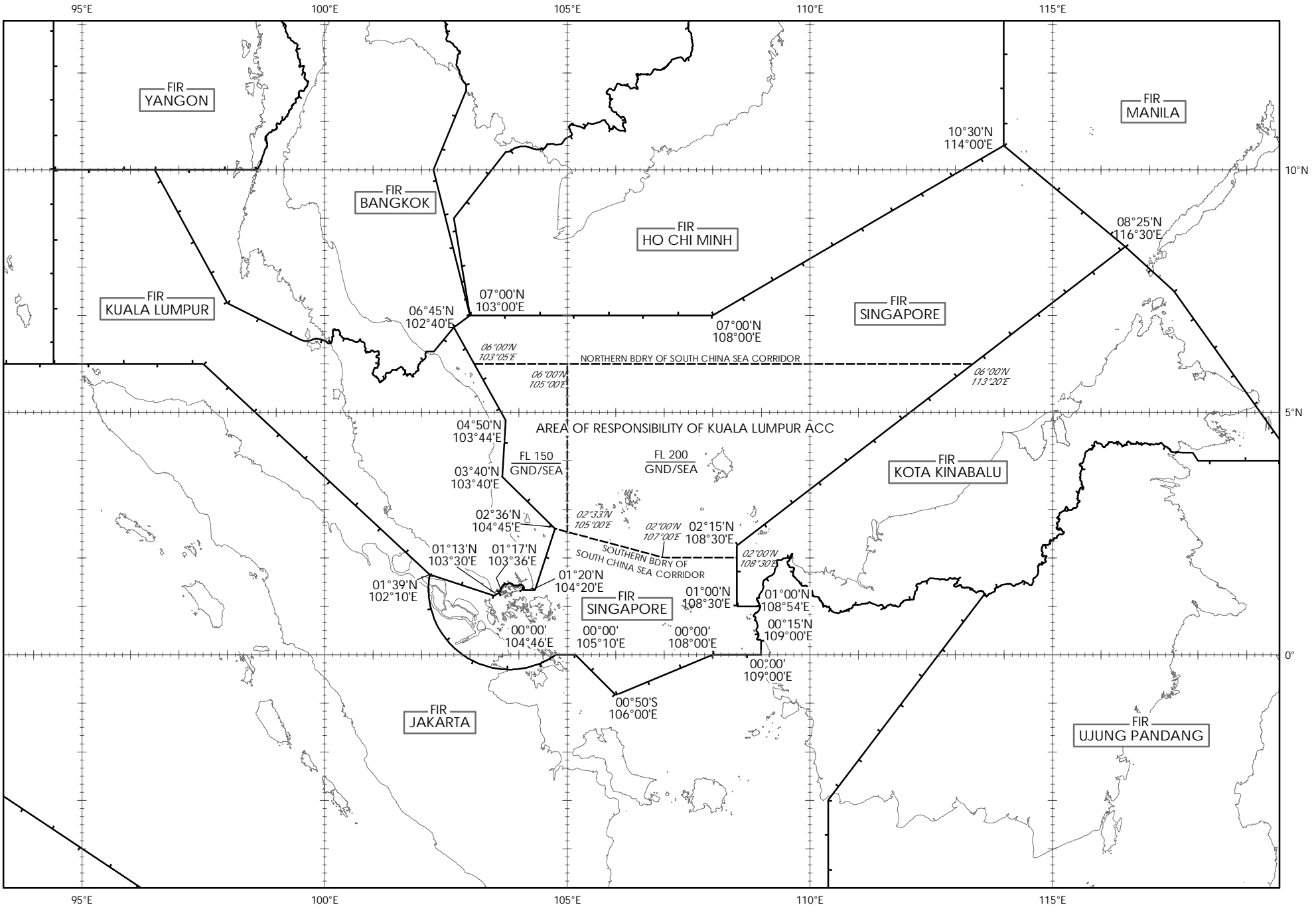
| Name Lateral limits Upper limit/Lower limit Class of airspace | Unit providing service | Call sign Languages Area and conditions of use Hr of ser | Frequency /Purpose | Remarks |
|---|------------------------------|--|---|---|
| 1 | 2 | 3 | 4 | 5 |
| SINGAPORE FIR | SINGAPORE ACC | SINGAPORE RADAR English H24 | 255.4MHz | <p>The responsibility for providing air traffic services to flights within the following portions of the Singapore FIR is vested in the Kuala Lumpur ACC:</p> <p>The airspace between a line from 023600N 1044500E to 020000N 1070000E and thereafter along 020000N, in the south, and a line along 060000N in the north, and from surface to FL150 west of longitude 105E and from surface level to FL200 east of longitude 105E. (Ref ANP-ASIA/PAC, Rec 7/4)</p> <p>SEA 1, SEA 2, SEA 3: SSB Suppressed Carriers.</p> |
| <p>070000N 1030000E 070000N 1080000E 103000N 1140000E 082500N 1163000E 021500N 1083000E 010000N 1083000E 010000N 1085400E, thence along Kalimantan west coast to 001500N 1090000E to 000000N/S 1090000E 000000N/S 1080000E 005000S 1060000E 000000N/S 1051000E 000000N/S 1044600E, thence following the arc of a circle radius 100NM centred on Singapore Island 012136N 1034825E clockwise to 013900N 1021000E 011300N 1033000E 011700N 1033600E, thence east along the national boundary of Singapore/Malaysia, thence along 012000N to 012000N 1042000E 023600N 1044500E 034000N 1034000E 045000N 1034400E 064500N 1024000E 070000N 1030000E.</p> <p>UNL SFC</p> | | | <p><u>Primary</u> 123.7 MHz 133.25MHz 134.4MHz 133.8MHz 134.2MHz 134.35 MHz</p> <p><u>Secondary</u> 127.3 MHz 135.8MHz 128.1MHz 133.35MHz 133.6 MHz</p> <p><u>SEA 1</u> 6556kHz 11297kHz</p> <p><u>SEA 2</u> 5655kHz 8942kHz 11396kHz</p> <p><u>SEA 3</u> 6556kHz</p> | |
| | | SINGAPORE CONTROL SOUTH CHINA SEA English H24 | <p><u>AFN</u> <u>LOGON</u> WSJC</p> | <p>Suitably equipped aircraft operating outside radar cover and not in ADS-B exclusive airspace within the Singapore FIR should log on to Singapore's AFN LOGON address at least 10 minutes prior to entering the above-mentioned airspace in Singapore FIR. Area Navigation (RNAV) routes suitable for ADS-C and / or CPDLC logon are described in ENR 3.3.</p> |

| Name Lateral limits Upper limit/Lower limit Class of airspace | Unit providing service | Call sign Languages Area and conditions of use Hr of ser | Frequency /Purpose | Remarks |
|--|------------------------------|---|---|--|
| 1 | 2 | 3 | 4 | 5 |
| AREAS WITHIN THE KUALA LUMPUR FIR FOR WHICH SINGAPORE ACC IS RESPONSIBLE FOR PROVIDING ATS | | | | |
| <p>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:</p> <p>a. AREA B (SJ DVOR/DME - 35 DME SJ) - 3 000ft to FL245</p> <p>b. AREA D (35 DME SJ - 45 DME SJ) - 5 500ft to FL245</p> <p>c. AREA F (45 DME SJ - 50 DME SJ) - 9 500ft to FL245</p> | SINGAPORE ACC | SINGAPORE RADAR English H24 | <p><u>Primary</u> 133.25MHz</p> <p><u>Secondary</u> 135.8MHz</p> | <p>Controlling Authority: Johor APP for airspaces below Sectors 1 and 2, Airway W401 and south of VMR DVOR.</p> <p><u>Note:</u> <i>In the event an aircraft in the areas is forced to make an emergency descent which will penetrate Malaysian airspace, the pilot shall advise Singapore ATC immediately.</i></p> |
| <p>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:</p> <p>a. AREA A (PU DVOR/DME - 30 DME PU excluding the northern portion of Changi CTR) - 2 000FT to FL245</p> <p>b. AREA C (30 DME PU - 61 DME PU) - 5 500FT to FL300</p> <p>c. AREA E (61 DME PU - 90 DME PU) - FL120 to FL360</p> <p>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</p> | SINGAPORE ACC | SINGAPORE RADAR English H24 | <p><u>Primary</u> 123.7 MHz 133.8 MHz</p> <p><u>Secondary</u> 127.3 MHz</p> | |
| <p>ATS ROUTES W401 and G579</p> <p>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].</p> <p>b. G579 from 2000ft to FL460.</p> | SINGAPORE ACC | SINGAPORE RADAR English H24 | | |

| <i>Name</i> <i>Lateral limits</i> <i>Upper limit/Lower limit</i> <i>Class of airspace</i> | <i>Unit providing service</i> | <i>Call sign</i> <i>Languages</i> <i>Area and conditions of use</i> <i>Hr of ser</i> | <i>Frequency /Purpose</i> | <i>Remarks</i> |
|---|-------------------------------|---|--|---|
| 1 | 2 | 3 | 4 | 5 |
| <p>SINGAPORE /JOHOR AIRSPACE COMPLEX</p> <p>All controlled airspace within 022600N 1025605E 022600N 1043400E 004300N 1043400E 004300N 1025605E.</p> <p>*FL250 2 000ft ALT</p> | SINGAPORE ACC | SINGAPORE RADAR English H24 | <u>Primary</u> 123.7 MHz 133.8 MHz <u>Secondary</u> 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. |
| <p>ALL AIRWAYS WITHIN THE SINGAPORE FIR, KUALA LUMPUR FIR AND ITS TRANSFER AREAS AND KOTA KINABALU FIR</p> <p>(see subsection ENR 3.1)</p> | SINGAPORE ACC | SINGAPORE RADAR English H24 | <u>Primary</u> 133.25MHz 123.7 MHz 133.8 MHz <u>Secondary</u> 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 |
| <p>OCEANIC CONTROL AREA WITHIN SINGAPORE FIR (CTA)</p> <p>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</p> <p>FL460 6 000ft ALT</p> | 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. |

| <p><i>Name</i> <i>Lateral limits</i> <i>Upper limit/Lower limit</i> <i>Class of airspace</i></p> | <p><i>Unit providing service</i></p> | <p><i>Call sign</i> <i>Languages</i> <i>Area and conditions of use</i> <i>Hr of ser</i></p> | <p><i>Frequency</i> <i>/Purpose</i></p> | <p><i>Remarks</i></p> |
|---|---|---|---|--|
| 1 | 2 | 3 | 4 | 5 |
| <p>TANJUNG PINANG TMA</p> <p>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</p> <p>10 000ft 3000 FT</p> <p>TANJUNG PINANG NORTH CONTROL ZONE (CTR)</p> <p>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</p> <p>3 000ft GND/MSL</p> <p>TANJUNG PINANG SOUTH CONTROL ZONE (CTR)</p> <p>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</p> <p>6 000ft GND/MSL</p> | <p>TANJUNG PINANG APPROACH CONTROL OFFICE (APP)</p> | <p>TANJUNG PINANG APPROACH</p> <p>English</p> <p>H24</p> | <p>130.2MHz</p> | <p>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.</p> <p><u>Position Reporting Procedures</u> Aircraft operating within or about to enter Tanjung Pinang CTR shall report position:</p> <ol style="list-style-type: none"> Over Tanjung Pinang TMA boundary. Over any other point or time as instructed by ATC. <p><u>VFR Flights</u></p> <ol style="list-style-type: none"> 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. No aircraft shall operate under VFR within Tanjung Pinang TMA/CTR until prior authorization has been obtained from Tanjung Pinang Approach. <p><u>Altimeter Setting Procedures</u> The ICAO Standard Altimeter Setting Procedures shall be used by aircraft operating within Tanjung Pinang CTR:</p> <p>Transition Level: FL130 Transition Altitude: 11 000ft</p> |

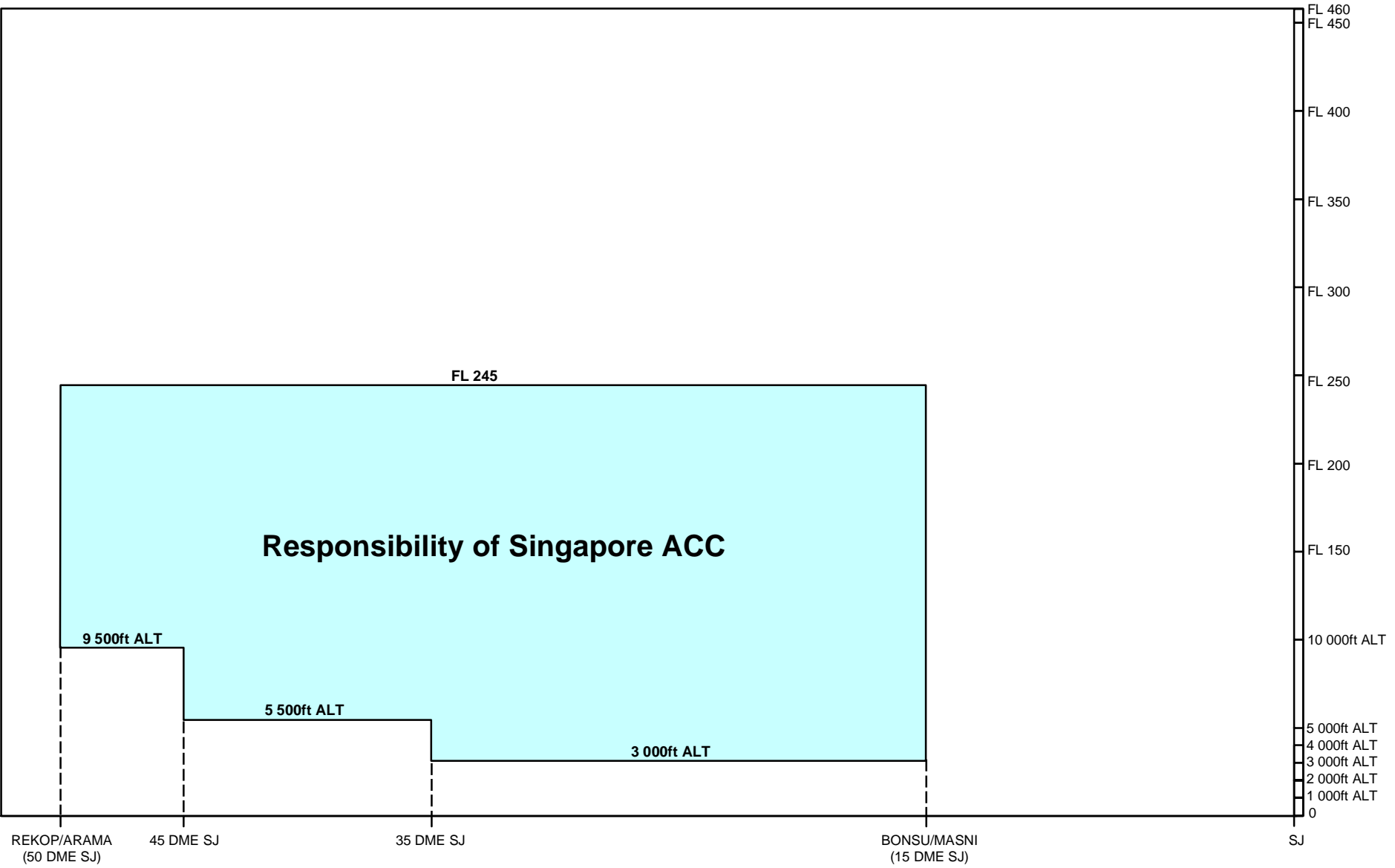
SINGAPORE AND ADJACENT FLIGHT INFORMATION REGIONS



PAGE INTENTIONALLY LEFT BLANK

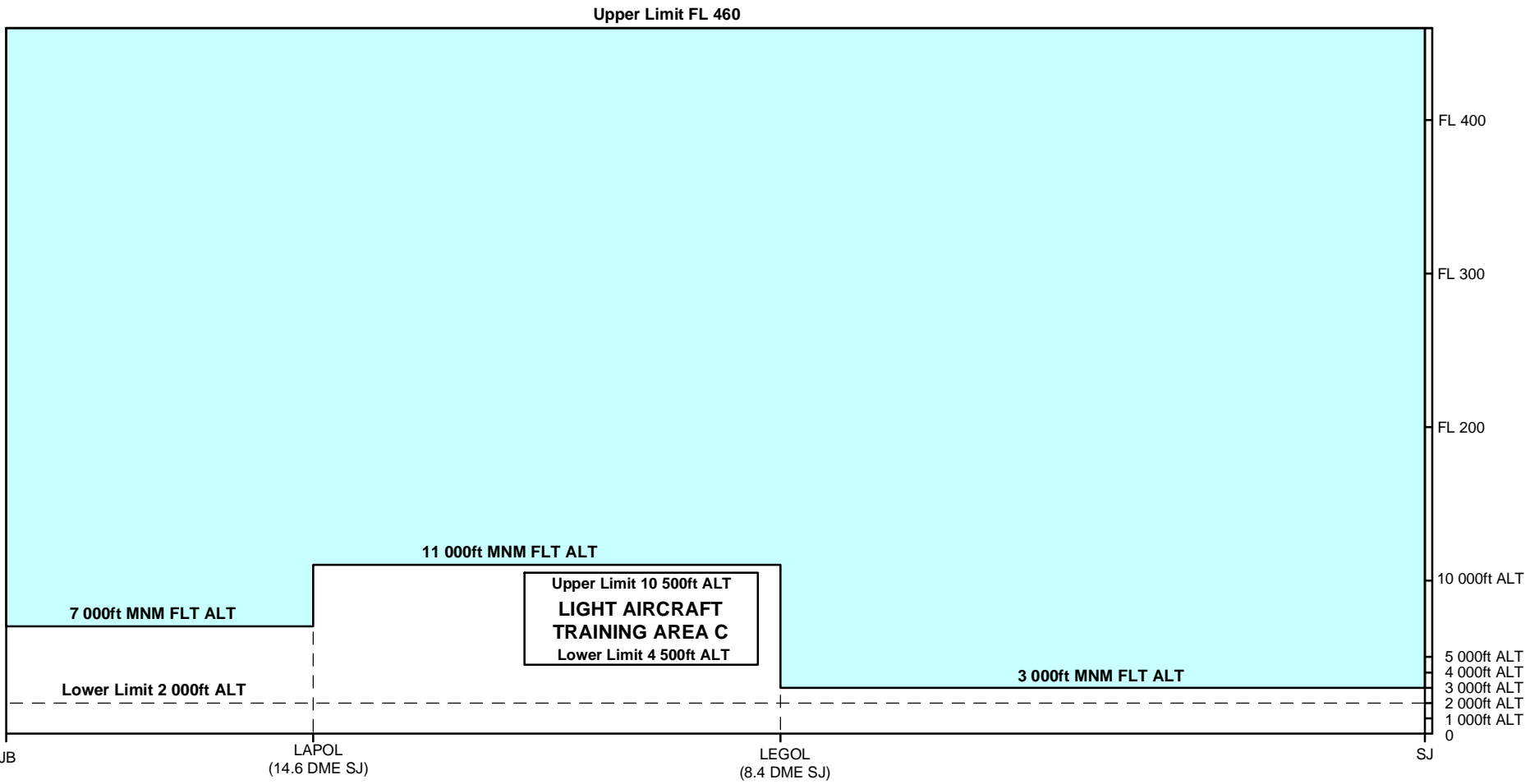
PAGE INTENTIONALLY LEFT BLANK

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



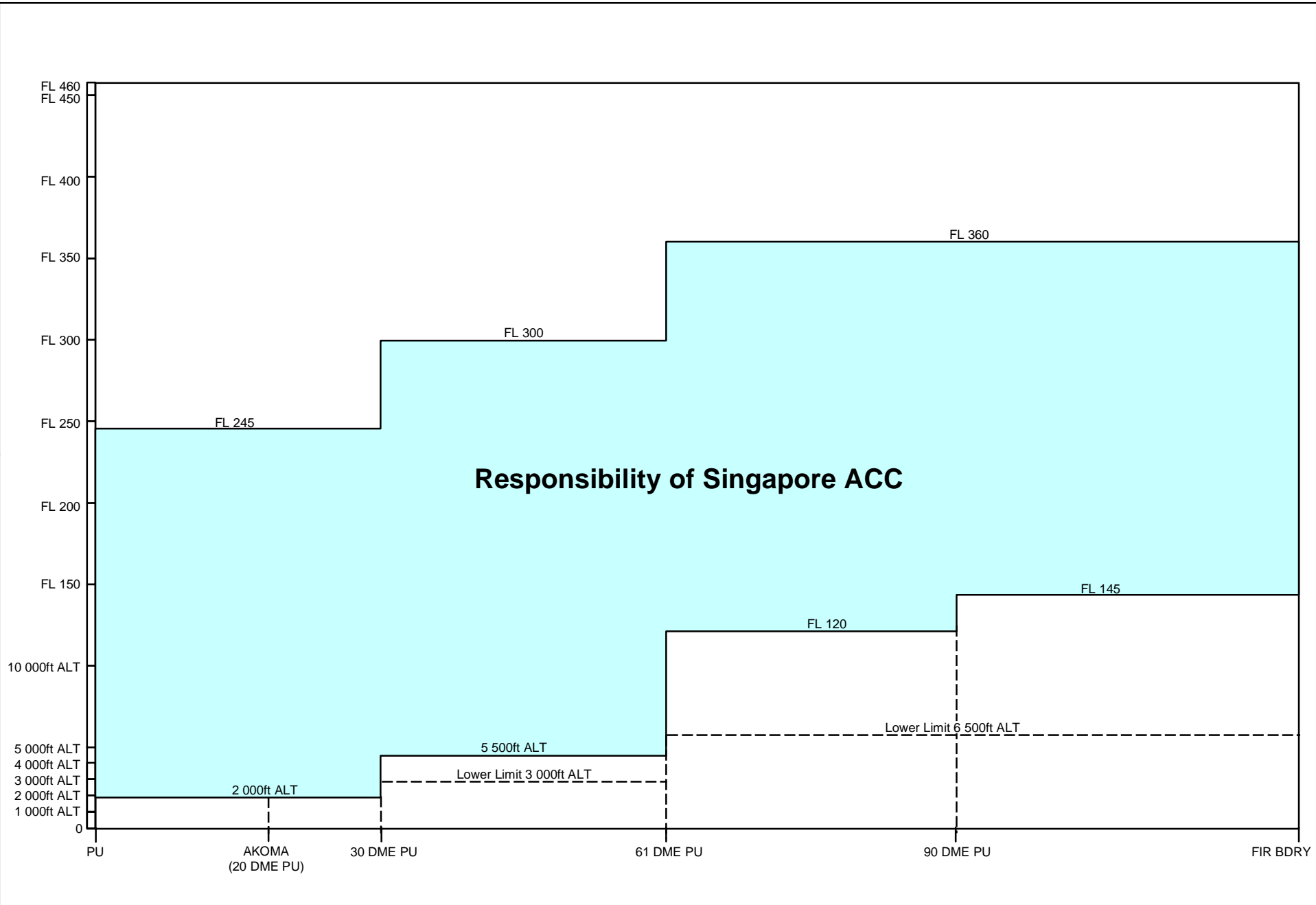
PAGE INTENTIONALLY LEFT BLANK

LONGITUDINAL CROSS-SECTION OF G579 FROM JB TO SJ



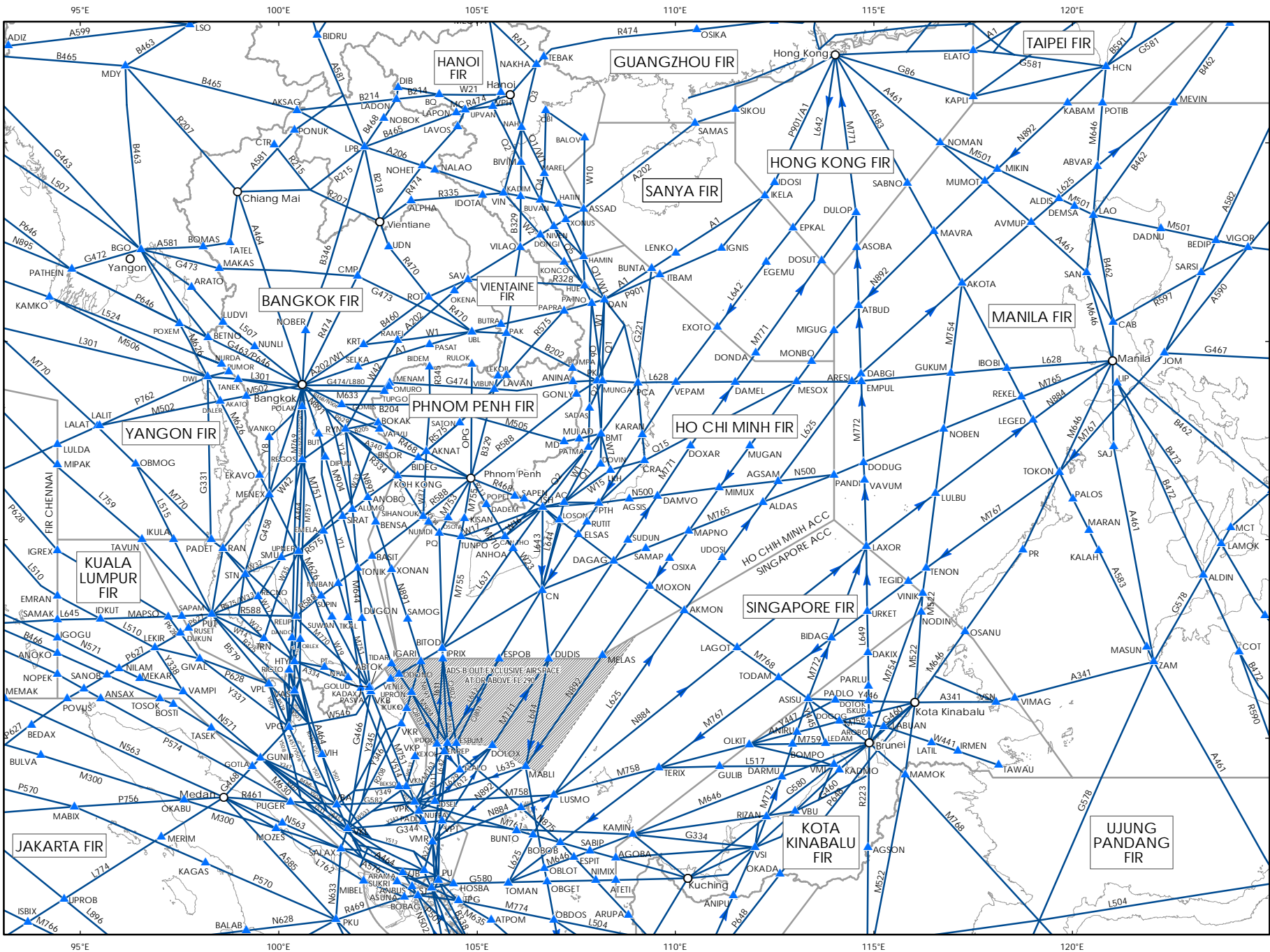
PAGE INTENTIONALLY LEFT BLANK

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



PAGE INTENTIONALLY LEFT BLANK

ATS ROUTE STRUCTURE WITHIN SINGAPORE & ADJACENT FIRS



PAGE INTENTIONALLY LEFT BLANK

ENR 2.2 OTHER REGULATED AIRSPACE

NIL (not applicable).

PAGE INTENTIONALLY LEFT BLANK

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 ↓ ↑ | | 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 ↓ ↑ | | 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] |
| Δ SABKA | 015051N 1031713E | | | | | | | | |
| | 296° 116° | 27.1NM | | FL 460 4500 FT ALT | 5000 FT | 20 | Even ⁽¹⁾ | | [Class A –ABV FL150 Class B –BLW FL150] |
| Δ MASBO | 020248N 1025251E | | | | | | | | |
| <p><u>Route Remarks:</u> <u>Flight Planning:</u> Northbound flights landing at WMKK and WMSA are to flight plan via A457. Tolerances of airway infringe WMD222 ASAHAN (activated by NOTAM) – Military activities</p> | | | | | | | | | |

| Route Designator {RNP Type} | [Route Usage Notes] | | | | | | | | | |
|--|--------------------------------|---------|-------|----------------------------|----------------|----------------------|-----------------------|---------------------|--|--|
| Significant Point Name | Significant Point Coordinates | | | | | | | Remarks | | |
| {RNP Type} | Track MAG ↓ ↑ | Dist NM | (COP) | Upper limit Lower limit | MNM FLT ALT | Lateral limits NM | 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) | 011321.34N 1035115.22E | | | | | | | | | |
| | 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 | | | | | | | | | |
| <p><u>Route Remarks:</u> <u>Flight Planning:</u> 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.</p> <p>Singapore ACC FREQ: P133.25 MHz S128.1 MHz</p> <p><u>Point/Segment Remarks:</u> (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.</p> | | | | | | | | | | |

| Route Designator {RNP Type} | [Route Usage Notes] | | | | | | | | | |
|---|--------------------------------|---------|-------|----------------------------|----------------|----------------------|-----------------------|---------------------|--|--|
| Significant Point Name | Significant Point Coordinates | | | | | | | | Remarks | |
| {RNP Type} | Track MAG ↓ ↑ | Dist NM | (COP) | Upper limit Lower limit | MNM FLT ALT | Lateral limits NM | 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) | |
| Δ PIMOK | 012648N 1032008E | | | | | | | | | |
| | 113° 293° | 18.6NM | | FL 460 6500 FT ALT | 7000 FT | | Odd ⁽¹⁾ | | [Class A –ABV FL150 Class B –BLW FL150] (2) | |
| ▲ BONSU (FIR BDRY) | 011928N 1033710E | | | | | | | | | |
| | 113° 293° | 15.4NM | | FL 460 6500 FT ALT | 7000 FT | | Odd ⁽¹⁾ | | [Class A –ABV FL150 Class B –BLW FL150] (2) | |
| ▲ SINJON DVOR/DME (SJ) | 011321.34N 1035115.22E | | | | | | | | | |
| <p><u>Route Remarks:</u> 15 min longitudinal separation.</p> <p>RMK: AVBL for southbound FLT only BTN PIMOK and SJ DVOR/DME.</p> <p>Southbound FLT landing at WSSS are to flight plan via ATS Route A464.</p> <p>Singapore ACC FREQ: P133.25MHz S135.8MHz (westbound) P134.4MHz S128.1MHz (southbound)</p> <p><u>Point/Segment Remarks:</u> (2) 5NM either side of a rhumb line joining MDN and SJ, funnelling out at 7.5° to a width of 15NM either side of track.</p> | | | | | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | | | | | | |
|---|--|--------------------------------|---------|-------|----------------------------|----------------|----------------------|-----------------------|---------------------|--|--|
| Significant Point Name | | Significant Point Coordinates | | | | | | | | Remarks | |
| {RNP Type} | | Track MAG ↓ ↑ | Dist NM | (COP) | Upper limit Lower limit | MNM FLT ALT | Lateral limits NM | 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 | | | | | | | | | |
| <i>Point/Segment Remarks:</i> | | | | | | | | | | | |
| (2) Not a REP | | | | | | | | | | | |
| (3) Kuala Lumpur/Singapore FIR boundary approximately 1.2NM north of VTK. | | | | | | | | | | | |

| Route Designator {RNP Type} | [Route Usage Notes] | | | | | | | | |
|--|--------------------------------|---------|-------|----------------------------|----------------|----------------------|-----------------------|---------------------|--|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | | | | | | | Remarks |
| | Track MAG ↓ ↑ | Dist NM | (COP) | Upper limit Lower limit | MNM FLT ALT | Lateral limits NM | 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) | 011321.34N 1035115.22E | | | | | | | | |
| | 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.

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | | | | | Remarks | |
|---|------------------------|--------------------------------|-------|----------------------------|----------------|----------------------|--------------------|---------------------|--|--|--|
| Significant Point Name | | Significant Point Coordinates | | | | | | FL series | | Controlling unit Frequency {Airspace class} Remarks | |
| {RNP Type} | Track MAG ↓ ↑ | Dist NM | (COP) | Upper limit Lower limit | MNM FLT ALT | Lateral limits NM | ↓ | ↑ | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| B470 | | Route availability: (1) H24 | | | | | | | | | |
| ▲ SINJON DVOR/DME (SJ) | 011321.34N 1035115.22E | | | | | | | | | | |
| | 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 | | | | | | | | | | |
| <p><u>Route Remarks:</u> Singapore ACC FREQ: P134.4MHz S128.1MHz</p> <p><u>Point/Segment Remarks:</u> (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.</p> <p>(3) Not a REP. Reduced separation minima will be applied on B470 south of ANITO between RNAV-equipped aircraft using MNT.</p> | | | | | | | | | | | |

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

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | | | | | |
|---|--------------------------------|---------------------|-------|----------------------------|----------------|----------------------|-----------------------|---------------------|--|--|
| 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 ↓ ↑ | | Controlling unit Frequency {Airspace class} Remarks | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| G334 | Route availability: (1) H24 | | | | | | | | | |
| ▲ 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) | 025224N 1042818E | | | | | | | | | |
| | 097° 277° | 92.7NM | | FL 285 FL 240 | FL 250 | 20 NM | Odd ⁽¹⁾ | Even ⁽¹⁾ | [Class A] | |
| ▲ BUNTO | 024200N 1060000E | | | | | | | | | |
| | 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 | | | | | | | | | |
| <u>Route Remarks:</u> | | | | | | | | | | |
| 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. | | | | | | | | | | |
| <u>Flight Planning</u> | | | | | | | | | | |
| Non-PBN and Non-RVSM equipped aircraft on ATS route G334: | | | | | | | | | | |
| 1. To destinations other than WMKK to flight plan via G334-KIBOL-VPK. Alternative route to G334 for non-PBN equipped aircraft to destinations within WMFC may flight plan via G580-HOSBA-VJB-A457. | | | | | | | | | | |
| 2. For departure from WMFC to flight plan via VPK-KIBOL-G334. Alternative route to G334 for non-PBN equipped aircraft for departure from WMFC may flight plan via A464-TOPOR-W534-VJB-HOSBA-G580. | | | | | | | | | | |

| 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 ↓ ↑ | | 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 | | | | | | | | |
| | 163° 343° | 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) |
| | 152° 332° | 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) |
| | 153° 333° | 6.1NM | | FL 460 2000 FT ALT | 11000 FT | 3 | Odd ⁽¹⁾ | Even ⁽¹⁾ | [Class A –ABV FL150 Class B –BLW FL150] |
| LEGOL | 012053N 1034723E | | | | | | | | (5) |
| | 153° 333° | 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) | 011321.34N 1035115.22E | | | | | | | | (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 | | | | | | | | |
| <p><u>Route Remarks:</u> Unidirectional route (Northbound) for flights from Jakarta FIR to Singapore FIR and beyond. Bi-directional route between Palembang and Singapore below FL200.</p> <p><u>Point/Segment Remarks:</u> (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.</p> <p>(3) All FLT between SJ and JB are to avoid at all times WSR38 which overlaps the eastern edge of the airway.</p> <p>(4) Kuala Lumpur/Singapore FIR boundary is approximately 2NM south of JB.</p> <p>(5) Not a REP</p> | | | | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | | | | | | |
|---|--|--------------------------------|---------|-------|----------------------------|----------------|----------------------|--------------------|---------------------|--|--|
| Significant Point Name | | Significant Point Coordinates | | | | | | FL series | | Remarks | |
| {RNP Type} | | Track MAG ↓ ↑ | Dist NM | (COP) | Upper limit Lower limit | MNM FLT ALT | Lateral limits NM | ↓ | ↑ | 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) | | 011321.34N 1035115.22E | | | | | | | | | |
| | | 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 | | | | | | | | | |
| <p><u>Route Remarks:</u> 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</p> <p><u>Point/Segment Remarks:</u> (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</p> | | | | | | | | | | | |

| Route Designator {RNP Type} | [Route Usage Notes] | | | | | | | | | |
|--|--------------------------------|---------|-------|----------------------------|----------------|----------------------|-----------------------|---------------------|--|--|
| Significant Point Name | Significant Point Coordinates | | | | | | | | Remarks | |
| {RNP Type} | Track MAG ↓ ↑ | Dist NM | (COP) | Upper limit Lower limit | MNM FLT ALT | Lateral limits NM | 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 | | | | | | | | | |
| <p><i>Route Remarks:</i> Portion of R208 within the Singapore FIR to be released to Lumpur ACC daily subject to coordination BTN Singapore ACC and Lumpur ACC. 15 min longitudinal separation.</p> <p>Singapore ACC FREQ: P127.3MHz, S123.7MHz</p> <p>Lumpur ACC FREQ: P132.6MHz</p> | | | | | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | | | | | | |
|---|--|--------------------------------|---------|-------|----------------------------|----------------|----------------------|-----------------------|---------------------|--|--|
| Significant Point Name | | Significant Point Coordinates | | | | | | | | Remarks | |
| {RNP Type} | | Track MAG ↓ ↑ | Dist NM | (COP) | Upper limit Lower limit | MNM FLT ALT | Lateral limits NM | 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 | | | | | | | | | |
| <p><i>Route Remarks:</i> 15 min longitudinal separation.</p> <p>Singapore ACC FREQ: P133.25MHz, S135.8MHz</p> | | | | | | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | | | | | |
|--|---|---------------------|-------|----------------------------|----------------|----------------------|-----------------------|--------------------|--|--|
| Significant Point Name | Significant Point Coordinates | | | | | | | | Remarks | |
| {RNP Type} | Track MAG ↓ ↑ | Dist NM | (COP) | Upper limit Lower limit | MNM FLT ALT | Lateral limits NM | 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] | |
| Δ 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] | |
| Δ 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] | |
| Δ PIMOK | 012648N 1032008E | | | | | | | | | |
| <u>Route Remarks:</u> Controlling Authority: Singapore ACC Airspace below airway controlled by Johor Approach. | | | | | | | | | | |

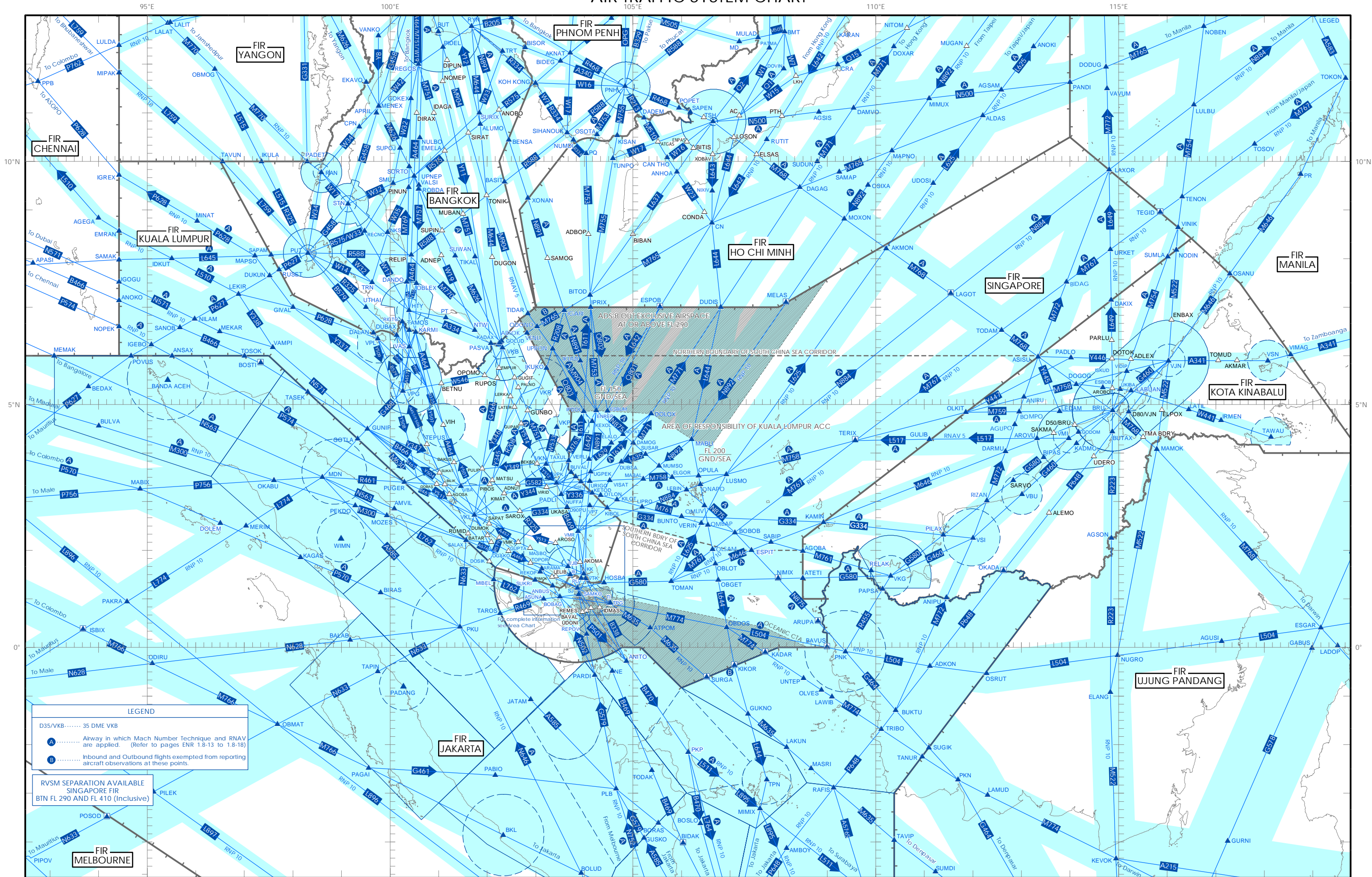
| <i>Route Designator {RNP Type}</i> | <i>[Route Usage Notes]</i> | | | | | | | | |
|--|--------------------------------------|----------------|--------------|------------------------------------|------------------------|------------------------------|------------------------------|--------------------|--|
| <i>Significant Point Name</i> | <i>Significant Point Coordinates</i> | | | | | | | | <i>Remarks</i> |
| <i>{RNP Type}</i> | <i>Track MAG</i> ↓ ↑ | <i>Dist NM</i> | <i>(COP)</i> | <i>Upper limit Lower limit</i> | <i>MNM FLT ALT</i> | <i>Lateral limits NM</i> | <i>FL series</i> ↓ ↑ | | <i>Controlling unit Frequency {Airspace class} Remarks</i> |
| 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 | | | | | | | | |

| 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 ↓ ↑ | | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| W534 | Route availability: (1) H24 | | | | | | | | |
| Δ TOPOR | 014412N 1025330E | | | | | | | | |
| | 275° 095° | 46.5NM | | FL 460 4500 FT ALT | 5000 FT | 8 | Odd ⁽¹⁾ | | [Class A – ABV FL150 Class B – BLW FL150] |
| ▲ JOHOR BAHRU DVOR/DME (VJB) | 013950.4N 1033939.2E | | | | | | | | |

| <i>Route Designator {RNP Type}</i> | <i>[Route Usage Notes]</i> | | | | | | | | |
|--|---------------------------------------|----------------|--------------|------------------------------------|------------------------|------------------------------|------------------------------|---------------------|--|
| <i>Significant Point Name</i> | <i>Significant Point Coordinates</i> | | | | | | | | <i>Remarks</i> |
| <i>{RNP Type}</i> | <i>Track MAG</i> ↓ ↑ | <i>Dist NM</i> | <i>(COP)</i> | <i>Upper limit Lower limit</i> | <i>MNM FLT ALT</i> | <i>Lateral limits NM</i> | <i>FL series</i> ↓ ↑ | | <i>Controlling unit Frequency {Airspace class} Remarks</i> |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| W651 | <i>Route availability:</i> (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 | | | | | | | | |

Chart

AIR TRAFFIC SYSTEM CHART



PAGE INTENTIONALLY LEFT BLANK

ENR 3.2 UPPER ATS ROUTES

NIL (not applicable).

PAGE INTENTIONALLY LEFT BLANK

ENR 3.3 AREA NAVIGATION (RNAV) ROUTES

| Route Designator {RNP Type} | [Route Usage Notes] | | | | | |
|---|--------------------------------|-------------------------|----------------------------|--------------------|---------------------|--|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | Upper limit Lower limit | FL series | | Remarks |
| | Initial Track MAG ↓ ↑ | Great Circle Dist NM | | ↓ | ↑ | 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 | | | | | |
| <p><u>Route Remarks:</u> Lateral Limits: 25NM either side of line joining OBDOS to BAVUS.</p> <p>Singapore ACC FREQ: P134.4 MHz S128.1 MHz</p> <p>ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover within the Singapore FIR.</p> <p><u>Flight Planning:</u> 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 Y513.</p> <p>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.</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--------------------------------|-------------------------|----------------------------|-----------|---------------------|--|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | | FL series | | Remarks |
| | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | 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) |
| <p><u>Route Remarks:</u> Lateral Limits: 25NM either side of line joining GULIB to TERIX.</p> <p>ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover within the Singapore FIR.</p> <p><u>Point/Segment Remarks:</u> (2) NIL (3) VMI 269° 173NM</p> | | | | | | |

| 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 ↓ ↑ | | 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) | |
| <u>Route Remarks:</u> 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. | | | | | | |
| <u>Point/Segment Remarks:</u> | | | | | | |
| (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 | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|--|--------------------------------|--------------------------------|----------------------------|-----------|--------------------|--|
| Significant Point Name | Significant Point Coordinates | | | FL series | | Remarks |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | 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/MMFC FIR BDRY) | 033622N 1034341E | | | | | |
| | | 22.6NM | FL 460 FL 240 | | Odd ⁽¹⁾ | [Class A] ⁽²⁾ |
| ▲ PEKAN DVOR/DME (VPK) | 032259N 1032524E | | | | | |
| <p><u>Route Remarks:</u> Lateral Limits: 10NM either side of line joining VPK DVOR/DME to BUVAL and 25NM either side of line joining BUVAL to DOLOX.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.3 MHz</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p> | | | | | | |

| <i>Route Designator {RNP Type}</i> | | <i>[Route Usage Notes]</i> | | | | |
|--|--------------------------------------|---------------------------------------|------------------------------------|---------------------|----------------|--|
| <i>Significant Point Name</i> | <i>Significant Point Coordinates</i> | | | | <i>Remarks</i> | |
| <i>{RNP Type}</i> | <i>Initial Track MAG</i> | <i>Great Circle Dist NM</i> | <i>Upper limit Lower limit</i> | <i>FL series</i> | | <i>Controlling unit Frequency {Airspace class} Remarks</i> |
| | ↓ ↑ | | | ↓ | ↑ | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| L635 | | <i>Route availability:</i> (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/MMFC FIR BDRY) | 033047N 1034923E | | | | | |
| | | 25.2NM | FL 460 FL 240 | Even ⁽¹⁾ | | [Class A] (2) |
| ▲ PEKAN DVOR/DME (VPK) | 032259N 1032524E | | | | | |
| <i>Route Remarks:</i> | | | | | | |
| 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 | | | | | | |
| <i>Point/Segment Remarks:</i> (2) NIL | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | | Remarks |
|--------------------------------------|------------------|--------------------------------|-------------------------|----------------------------|---------------------|--------------------------|--|
| Significant Point Name {RNP Type} | | Significant Point Coordinates | | Upper limit Lower limit | FL series | | Controlling unit Frequency {Airspace class} Remarks |
| | | Initial Track MAG ↓ ↑ | Great Circle Dist NM | | ↓ | ↑ | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| L642 | | Route availability: (1) H24 | | | | | |
| ▲ ESPOB (VVT/WSJC FIR BDRY) | 070000N 1053318E | | | | | (7) | |
| (10) | | 149.2NM | FL 460 FL 135 | | | [Class A] (2) (3) (4) | |
| ▲ ENREP | 045224N 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/MMFC 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

| 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 ↓ ↑ | | 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) | |
| <u>Route Remarks:</u> | | | | | | |
| 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. | | | | | | |
| <u>Point/Segment Remarks:</u> | | | | | | |
| (2) ADS-C service is available to suitably equipped aircraft operating outside radar cover (between DUDIS and MABLI) and not in the exclusive ADS-B airspace within Singapore FIR. | | | | | | |
| (3) Segment from DUDIS to MABLI use: P134.35 MHz S133.6 MHz | | | | | | |
| (4) Segment from MABLI to 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 | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|--|--------------------------------|--------------------------------|----------------------------|-----------|---------------------|--|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | Upper limit Lower limit | FL series | | Remarks |
| | Initial Track MAG ↓ ↑ | Great Circle Dist NM | | ↓ | ↑ | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| L649 | | Route availability: (1) H24 | | | | |
| ▲ LAXOR (WSJC/RPHI FIR BDRY) | 094937N 1144829E | | | | | |
| (10) | | 98.0NM | FL 460 FL 240 | | Even ⁽¹⁾ | [Class A] |
| ▲ URKET (WSJC/WBFC FIR BDRY) | 081130N 1145000E | | | | | ⁽²⁾ |
| (10) | | 62.0NM | FL 460 FL 240 | | Even ⁽¹⁾ | [Class A] |
| ▲ DAKIX (WBFC/WSJC FIR BDRY) | 070854N 1145054E | | | | | ⁽³⁾ |
| <p><u>Route Remarks:</u> Lateral Limits: 25NM either side of line joining DAKIX to LAXOR. 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.</p> <p><u>Point/Segment Remarks:</u> (2) NIL (3) BRU 359° 136NM</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|--|--|---------------------------------|------------------------------------|--------------------|---------------------|--|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | Upper limit Lower limit | FL series | | Remarks |
| | Initial Track MAG ↓ ↑ | Great Circle Dist NM | | ↓ | ↑ | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| L762 | <i>Route availability:</i> (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) |
| <i>Route Remarks:</i> | | | | | | |
| 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 | | | | | | |
| <i>Flight Planning:</i> Westbound - Aircraft originating only from airports within Singapore FIR to Medan and destinations beyond Jakarta FIR. Eastbound - Aircraft to destinations within Singapore FIR only. | | | | | | |
| <i>Point/Segment Remarks:</i> (2) NIL | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--------------------------------|--------------------------------|----------------------------|---------------------|--------------------|--|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | | FL series | | Remarks |
| | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | |
| 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) |
| <p><u>Route Remarks:</u> Portion of M522 within the Singapore FIR has been delegated to Kota Kinabalu ACC for provision of ATS</p> <p>Kinabalu ACC FREQ: 126.1 MHz</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--------------------------------|-------------------------|----------------------------|--------------------|---|--|
| Significant Point Name | Significant Point Coordinates | | | FL series | | Remarks |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| M630 | Route availability: (1) H24 | | | | | |
| ▲ SUKRI | 012306N 1025904E | | | | | |
| (5) | | 37.3NM | FL 460 5500 FT ALT | Odd ⁽¹⁾ | | [Class A - ABV FL150 Class B - BLW FL150] |
| Δ 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 | | | | | |
| <p><u>Route Remarks:</u> Lateral Limits: 11.5NM either side of line joining SUKRI to TPG.</p> <p>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.</p> <p><u>Flight Planning:</u> 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.</p> <p>Singapore ACC FREQ: P133.25 MHz S135.8 MHz</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|--|--------------------------------|--------------------------------|----------------------------|--------------------|---------------------|---|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | Upper limit Lower limit | FL series | | Remarks Controlling unit Frequency {Airspace class} Remarks |
| | Initial Track MAG ↓ ↑ | Great Circle Dist NM | | ↓ | ↑ | |
| 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 | | | | | |
| <p>Route Remarks: Lateral Limits: 25NM either side of line joining VTK to SURGA.</p> <p>Singapore ACC FREQ: P134.4 MHz S128.1 MHz</p> <p>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 Y513.</p> <p>Flights overflying Singapore to land at Kuala Lumpur and Subang are to flight plan via SURGA M635 TPG A464 SJ G579 VJB A457.</p> <p>Point/Segment Remarks: (2) NIL (3) TPG 120.5° 58.5NM (4) Kuala Lumpur / Singapore FIR boundary approximately 1.2NM north of VTK.</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--------------------------------|-------------------------|----------------------------|---------------------|--------------------|--|
| Significant Point Name | Significant Point Coordinates | | | FL series | | Remarks |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | 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 | | | | | |
| (10) | | 69.6NM | FL 460 FL 240 | Even ⁽¹⁾ | Odd ⁽¹⁾ | [Class A] (2) |
| ▲ SABIP | 020940N 1075044E | | | | | |
| (10) | | 26.1NM | FL 460 FL 240 | Even ⁽¹⁾ | Odd ⁽¹⁾ | [Class A] (2) |
| ▲ ESPIT | 020011N 1072624E | | | | | |
| (10) | | 47.9NM | FL 460 FL 240 | Even ⁽¹⁾ | Odd ⁽¹⁾ | [Class A] (2) |
| ▲ OBLOT | 014256N 1064147E | | | | | |
| (10) | | 58.5NM | FL 460 FL 240 | Even ⁽¹⁾ | Odd ⁽¹⁾ | [Class A] (2) |
| ▲ TOMAN | 012147N 1054717E | | | | | |
| <p><u>Route Remarks:</u> Lateral Limits: 25NM either side of TOMAN to KAMIN.</p> <p>ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between SABIP and KAMIN) within the Singapore FIR.</p> <p>Singapore ACC FREQ: P134.2 MHz S133.35 MHz</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | | |
|---|--------------------------------|-------------------------|----------------------------|-----------------------|---------------------|--|--|
| Significant Point Name | Significant Point Coordinates | | | | | Remarks | |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | 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 | 045224N 1041442E | | | | | | |
| <p><u>Route Remarks:</u> Singapore ACC FREQ: P134.35 MHz S133.6 MHz</p> <p>ADS-C service is available to suitably equipped aircraft operating outside radar cover and not in the exclusive ADS-B airspace within the Singapore FIR.</p> <p><u>Lateral Limits:</u> 25NM either side of line joining ENREP to IPRIX.</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p> | | | | | | | |

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

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | | Remarks |
|--|--------------------------------|--------------------------------|------------------|----------------------------|---------------------|---------------------------------|--|
| Significant Point Name | | Significant Point Coordinates | | Upper limit Lower limit | FL series | | |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | | | ↓ | ↑ | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| M758 | | Route availability: (1) H24 | | | | | |
| ▲ PEKAN DVOR/DME (VPK) | 032259N 1032524E | | | | | | |
| | | 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 | | | | | | | |

| 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 ↓ ↑ | | 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 | | | | | |
| <p><u>Route Remarks:</u> 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</p> <p><u>Point/Segment Remarks:</u> (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</p> | | | | | | |

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

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

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--------------------------------|--------------------------------|----------------------------|-----------|---|---|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | Upper limit Lower limit | FL series | | Remarks Controlling unit Frequency {Airspace class} Remarks |
| | Initial Track MAG ↓ ↑ | Great Circle Dist NM | | ↓ | ↑ | |
| 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) |
| <p><u>Route Remarks:</u> Lateral Limits: 25NM either side of line joining TOMAN to TEGID.</p> <p>ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between TEGID and BOBOB) within the Singapore FIR.</p> <p>Singapore ACC FREQ: P134.2 MHz S133.35 MHz</p> <p>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.</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--------------------------------|--------------------------------|----------------------------|-----------------------|---------------------|--|
| Significant Point Name | Significant Point Coordinates | | | | Remarks | |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | 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) | |
| <p><i>Route Remarks:</i> Lateral Limits: 25NM either side of line joining ASISU to AKMON.</p> <p>ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover within the Singapore FIR.</p> <p><i>Point/Segment Remarks:</i> (2) NIL (3) BRU 305° 113.3NM</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | | |
|---|--|--------------------------------|-------------------------|----------------------------|-----------|---|--|
| Significant Point Name {RNP Type} | | Significant Point Coordinates | | | FL series | | Remarks |
| | | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | 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 | | | | | |
| <u>Route Remarks:</u> | | | | | | | |
| 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. | | | | | | | |
| <u>Point/Segment Remarks:</u> | | | | | | | |
| (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 | | | | | | | |

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

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|--|--------------------------------|--------------------------------|----------------------------|--------------------|---------------------|---|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | Upper limit Lower limit | FL series | | Remarks Controlling unit Frequency {Airspace class} Remarks |
| | Initial Track MAG ↓ ↑ | Great Circle Dist NM | | ↓ | ↑ | |
| 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 (10) | 002503N 1065551E | | | | | (3) |
| | | 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) |
| <p><u>Route Remarks:</u> Lateral Limits: 25NM either side of line joining TPG to KADAR.</p> <p>Singapore ACC FREQ: P134.4 MHz S128.1 MHz</p> <p><u>Flight Planning:</u> Flights overflying Singapore to destinations north of Kuala Lumpur and Subang are to flight plan via KADAR M774 TPG A464 SJ G579 VJB Y342 AROSO Y513. Flights overflying Singapore to land at Kuala Lumpur and Subang are to flight plan via KADAR M774 TPG A464 SJ G579 VJB A457.</p> <p><u>Point/Segment Remarks:</u> (2) NIL (3) TPG 101.3° 148.1NM</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--------------------------------|--------------------------------|----------------------------|--------------------|---------------------|--|
| Significant Point Name | Significant Point Coordinates | | | FL series | | Remarks |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| M904 | | Route availability: (1) H24 | | | | |
| ▲ TIDAR (WSJC/VTBB FIR BDRY) | 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 | 045224N 1041442E | | | | | |
| <p><i>Route Remarks:</i> Singapore ACC FREQ: P134.35 MHz S133.6 MHz</p> <p>ADS-C service is available to suitably equipped aircraft operating outside radar cover and not in the exclusive ADS-B airspace within the Singapore FIR.</p> <p>Lateral Limits: 25NM</p> <p><i>Point/Segment Remarks:</i> (2) NIL</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--------------------------------|--------------------------------|----------------------------|-----------|---------------------|--|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | | FL series | | Remarks |
| | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | |
| 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) |
| <p><u>Route Remarks:</u> Lateral Limits: 10NM on the western side and 5NM on the eastern side of line joining BOBAG to PARDI.</p> <p>Singapore ACC FREQ: P134.4 MHz S128.1 MHz</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|--|--------------------------------|--------------------------------|----------------------------|-----------------------|---------------------|--|
| Significant Point Name | Significant Point Coordinates | | | | Remarks | |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | FL series ↓ ↑ | | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| N875 | | Route availability: (1) H24 | | | | |
| ▲ ENREP | 045224N 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 | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--------------------------------|-------------------------|----------------------------|-----------|---|--|
| Significant Point Name | Significant Point Coordinates | | | FL series | | Remarks |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | 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/MMFC FIR BDRY) | 024124N 1043932E | | | | | (9) |
| (10) | | 50.6NM | FL 460 6500 FT ALT | | | [Class A] (4) |
| ▲ MERSING DVOR/DME (VMR) | 022318N 1035218E | | | | | |
| <u>Route Remarks:</u> | | | | | | |
| 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. | | | | | | |
| <u>Point/Segment Remarks:</u> | | | | | | |
| (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 | | | | | | |

| 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 ↓ ↑ | | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| N891 | Route availability: (1) H24 | | | | | |
| ▲ IGARI (WSJC/VVTS FIR BDRY) | 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 | 045224N 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) | 031430N 1040554E | | | | | (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 | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|--|--|--------------------------------|-------------------------|----------------------------|-----------------------|----------------------|
| Significant Point Name {RNP Type} | | Significant Point Coordinates | | | Remarks | |
| | | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | FL series ↓ ↑ | |
| 1 | | 2 | 3 | 4 | 5 | 6 |
| 7 | | | | | | |
| N892 | | Route availability: (1) H24 | | | | |
| ▲ MELAS (VTS/WSJC FIR BDRY) | | 070518N 1080912E | | | | |
| (10) | | | 203.6NM | FL 460 FL 135 | | [Class A] (2) (3) |
| ▲ MABLI | | 041717N 1061247E | | | | |
| (10) | | | 52.1NM | FL 460 FL 135 | | [Class A] (4) |
| ▲ MUMSO | | 034420N 1053213E | | | | |
| (10) | | | 25.2NM | FL 460 FL 135 | | [Class A] (4) |
| ▲ MABAL | | 032826N 1051236E | | | | |
| (10) | | | 41.4NM | FL 460 FL 135 | | [Class A] (4) |
| ▲ KILOT | | 030217N 1044023E | | | | |
| (10) | | | 15.7NM | FL 460 FL 135 | | [Class A] (4) |
| ▲ KIBOL WSJC/WMFC FIR BDRY | | 025224N 1042818E | | | | |
| (10) | | | 28.1NM | FL 460 FL 135 | | [Class A] (5) |
| ▲ PEKLA | | 023437N 1040618E | | | | |
| (10) | | | 18.0NM | FL 460 FL 135 | | [Class A] (5) |
| ▲ MERSING DVOR/DME (VMR) | | 022318N 1035218E | | | | |
| <p><u>Route Remarks:</u> Lateral Limits: 10NM either side of line joining VMR DVOR/DME to KIBOL and 25NM either side of line joining KIBOL to MELAS.</p> <p>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.</p> <p><u>Point/Segment Remarks:</u> (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</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|--|--------------------------------|-------------------------|----------------------------|--------------------|---|--|
| Significant Point Name | Significant Point Coordinates | | | FL series | | Remarks |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| P501 | Route availability: (1) H24 | | | | | |
| ▲ ARAMA (50DME SJ) (delegated airspace BDRY) | 013654N 1030712E | | | | | (6) |
| (10) | 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) | 011554N 1032100E | | | | | (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) |
| <u>Point/Segment Remarks:</u> | | | | | | |
| (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 | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--|---------------------------------------|------------------------------------|------------------|----------|--|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | | FL series | | Remarks |
| | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Q801 | | <i>Route availability:</i> (1) H24 | | | | |
| ▲ ESPOB (VVTS/WSJC FIR BDRY) | 070000N 1053318E | | | | | |
| | | 143.0NM | FL 460 FL 200 | | | [Class A] |
| ▲ ESBUM | 045210N 1042830E | | | | | |
| <p><i>Route Remarks:</i> Lateral Limits: 15NM either side of line joining ESPOB TO ESBUM.</p> <p>Uni-directional for southbound flights from ESPOB to ESBUM. No PDC Flight Levels FL310, F320, F350, FL360, FL390, FL400 applicable. Other levels available with prior approval.</p> <p>Singapore ACC FREQ: P134.35 MHz S133.6 MHz</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--------------------------------|-------------------------|----------------------------|--------------------|---|--|
| Significant Point Name | Significant Point Coordinates | | | FL series | | Remarks |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | 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 | | | | | |
| <p><i>Route Remarks:</i> Lateral Limits: 15NM either side of line joining IPRIX to ELALO</p> <p>Singapore ACC FREQ: P134.35 MHz S133.6 MHz</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--------------------------------|--------------------------------|----------------------------|--------------------|---|--|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | Upper limit Lower limit | FL series | | Remarks |
| | Initial Track MAG ↓ ↑ | Great Circle Dist NM | | ↓ | ↑ | 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 | | | | | |
| <p><u>Route Remarks:</u> Lateral Limits: 15NM either side of line joining UPRON to ELALO</p> <p>Singapore ACC FREQ: P134.35 MHz S133.6 MHz</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--------------------------------|--------------------------------|----------------------------|-----------|---------------------|--|
| Significant Point Name | Significant Point Coordinates | | | FL series | | Remarks |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | 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 | | | | | |
| <p><u>Route Remarks:</u> Lateral Limits: 15NM either side of line joining IDSEL to IPRIX.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.3 MHz</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|-------------------------------------|--------------------------------|----------------------------|-----------|--------|---|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | Upper limit Lower limit | FL series | | Remarks Controlling unit Frequency {Airspace class} Remarks |
| 1 | Initial Track MAG ↓ ↑ 2 | Great Circle Dist NM 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 | | | | | |
| <p><u>Route Remarks:</u> Lateral Limits: 15NM either side of line joining IDSEL to DOLOX.</p> <p>Uni-directional for north-east bound flights from IDSEL to DOLOX. No PDC Flight Levels FL310, FL320, FL350, FL360, FL390, FL400 applicable. Other levels available with prior approval.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.30 MHz</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--------------------------------|-------------------------|----------------------------|---------------------|---|--|
| Significant Point Name | Significant Point Coordinates | | | FL series | | Remarks |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Y332 | Route availability: (1) H24 | | | | | |
| ▲ TAXUL (WSJC/MMFC FIR BDRY) | 035035N 1034037E | | | | | (2) |
| | 192° - | 42.1NM | FL 460 FL 245 | Even ⁽¹⁾ | | |
| ▲ PADLI | 030918N 1033133E | | | | | (2) |
| <p><u>Route Remarks:</u> Lateral Limits: 10NM either side of line joining TAXUL to PADLI.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.3 MHz</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|---|--------------------------------|-------------------------|----------------------------|---------------------|---|--|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | | FL series | | Remarks |
| | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | |
| Y334 | Route availability: (1) H24 | | | | | |
| ▲ DOVOL (WSJC/MMFC FIR BDRY) | 033047N 1034923E | | | | | (2) |
| | 219° - | 27.8NM | FL 460 FL 245 | Even ⁽¹⁾ | | |
| ▲ PADLI | 030918N 1033133E | | | | | (2) |
| <p><u>Route Remarks:</u> Lateral Limits: 10NM either side of line joining DOVOL to PADLI.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.3 MHz</p> <p><u>Point/Segment Remarks:</u> (2) NIL</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|--|--------------------------------|-------------------------|----------------------------|---------------------|--------------------|--|
| Significant Point Name | Significant Point Coordinates | | | FL series | | Remarks |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Y335 | Route availability: (1) H24 | | | | | |
| ▲ IDSEL (WMFC/WSJC FIR BDRY) | 032432N 1035544E | | | | | |
| (2) | 057° 237° | 28.5NM | FL 460 FL 245 | Even ⁽¹⁾ | Odd ⁽¹⁾ | ⁽²⁾ |
| ▲ PADLI | 030918N 1033133E | | | | | |
| <p><i>Route Remarks:</i> Lateral Limits: 10NM on either side of line joining IDSEL to PADLI.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.3 MHz</p> <p><i>Point/Segment Remarks:</i> (2) NIL</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|--|--------------------------------|-------------------------|----------------------------|---------------------|--------------------|--|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | | FL series | | Remarks |
| | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | ↓ | ↑ | Controlling unit Frequency {Airspace class} Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Y336 | Route availability: (1) H24 | | | | | |
| ▲ KETOD (WMFC/WSJC FIR BDRY) | 031042N 1040942E | | | | | |
| (2) | 087° 267° | 38.2NM | FL 460 FL 245 | Even ⁽¹⁾ | Odd ⁽¹⁾ | |
| ▲ PADLI | 030918N 1033133E | | | | | |
| <p><u>Route Remarks:</u> Lateral Limits: 10NM on either side of line joining KETOD to PADLI.</p> <p>Singapore ACC FREQ: P123.7 MHz S127.3 MHz</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | |
|--|--|---------------------------------------|------------------------------------|---------------------|----------------|--|
| Significant Point Name | | Significant Point Coordinates | | | Remarks | |
| {RNP Type} | Initial Track MAG ↓ ↑ | Great Circle Dist NM | Upper limit Lower limit | FL series | | Controlling unit Frequency {Airspace class} Remarks |
| | | | | ↓ | ↑ | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Y339 | | <i>Route availability:</i> (1) H24 | | | | |
| Δ | AKOMA (20 DME PU) | 014522N 1035443E | | | | |
| (2) | | 38.3NM | FL 460 5500 FT ALT | Even ⁽¹⁾ | | [Class A-ABV FL150 Class B-BLW FL150] |
| Δ | AROSO | 020846N 1032421E | | | | |
| <p><i>Route Remarks:</i> Lateral Limits: 11.5NM either side of line joining AKOMA to AROSO.</p> <p>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.</p> <p>Singapore ACC FREQ: P133.25 MHz S135.8 MHz</p> | | | | | | |

| Route Designator {RNP Type} | | [Route Usage Notes] | | | | | Remarks |
|---|--------------------------------|--------------------------------|----------------------------|---------------------|---|--|---------|
| Significant Point Name {RNP Type} | Significant Point Coordinates | | Upper limit Lower limit | FL series | | Controlling unit Frequency {Airspace class} Remarks | |
| | Initial Track MAG ↓ ↑ | Great Circle Dist NM | | ↓ | ↑ | | |
| 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] | |
| Δ AROSO | 020846N 1032421E | | | | | | |
| <i>Route Remarks:</i> Lateral Limits: 10NM either side of line joining VJB to AROSO. | | | | | | | |

| <i>Route Designator {RNP Type}</i> | | <i>[Route Usage Notes]</i> | | | | |
|--|-------|---------------------------------------|---------------------------------|------------------------------------|--------------------|-----------------------------|
| <i>Significant Point Name</i> | | <i>Significant Point Coordinates</i> | | | <i>Remarks</i> | |
| <i>{RNP Type}</i> | | <i>Initial Track MAG</i> | <i>Great Circle Dist NM</i> | <i>Upper limit Lower limit</i> | <i>FL series</i> | |
| | | ↓ ↑ | | | ↓ | ↑ |
| 1 | | 2 | 3 | 4 | 5 | 6 |
| Y514 | | <i>Route availability:</i> (1) H24 | | | | |
| Δ | VIRID | 031728.05N 1031318.04E | | | | |
| (2) | | | 34.57 | FL 460 11000 FT ALT | Odd ⁽¹⁾ | [Class A] ⁽²⁾ |
| ▲ | NUFFA | 025341.40N 1033829.80E | | | | |
| <p><i>Route Remarks:</i> Singapore ACC FREQ: P123.7MHz S127.3MHz</p> <p><i>Flight Planning</i> Arrivals into Changi to flight plan via Y514 - NUFFA - PIBAP - PASPU. After PASPU, expect radar vectors. All other flights to flight plan via Y514 - NUFFA - BIKTA -B469</p> <p><i>Point/Segment Remarks:</i> (2) NIL</p> | | | | | | |

PAGE INTENTIONALLY LEFT BLANK

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.

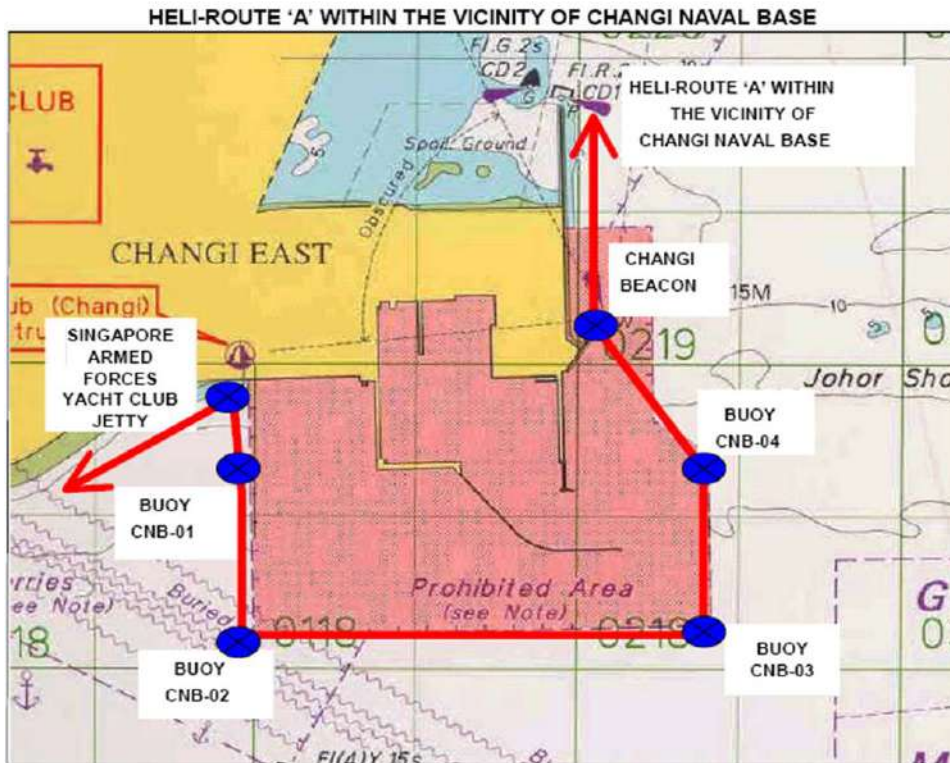
1.4.1.1 Heli-Route Alpha

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](#)).

| | <i>Markers Description</i> | <i>Coordinates</i> | <i>Remarks</i> |
|----|---|--------------------|---|
| a) | CHANGI BEACON | 011909N 1040206E | White lights, 3 flashes every 15 sec |
| b) | BUOY CNB-04 | 011844N 1040224E | Yellow buoy, 3m above waterline Yellow lights, 1 flash every 2 sec |
| c) | BUOY CNB-03 | 011809N 1040224E | Yellow buoy, 3m above waterline Yellow lights, 1 flash every 2 sec |
| d) | BUOY CNB-02 | 011806N 1040100E | Yellow buoy, 3m above waterline Yellow lights, 1 flash every 2 sec |
| e) | BUOY CNB-01 | 011829N 1040059E | Yellow buoy, 3m above waterline Yellow lights, 1 flash every 2 sec |
| f) | Singapore Armed Forces Yacht Club Jetty | 011851N 1040058E | Yellow lights, 3 lamp posts along jetty |

Note: Pilots are to adhere strictly to the above transit routes.

Height: Minimum 200ft AMSL or as specified by the appropriate air traffic control authority.



1.4.1.2 **Heli-Route Bravo**

Originates from Bedok Jetty (011819N 1035632E), following the coastline of Singapore Island via the southern tip and contour of Sentosa towards Tuas and vice versa.

Height : Minimum 200ft AMSL or as specified by the appropriate air traffic control authority.

1.5 OVER-LAND ROUTE

1.5.1 The over-land transit route established to facilitate helicopter movements across the Singapore Island is as follows:

1.5.1.1 **Heli-Route Charlie**

Originates from Johor Causeway, southbound to Murnane Reservoir (012104N1034710E) along the eastern side of Bukit Timah Expressway. From Murnane Reservoir 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.

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.

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 lightings 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

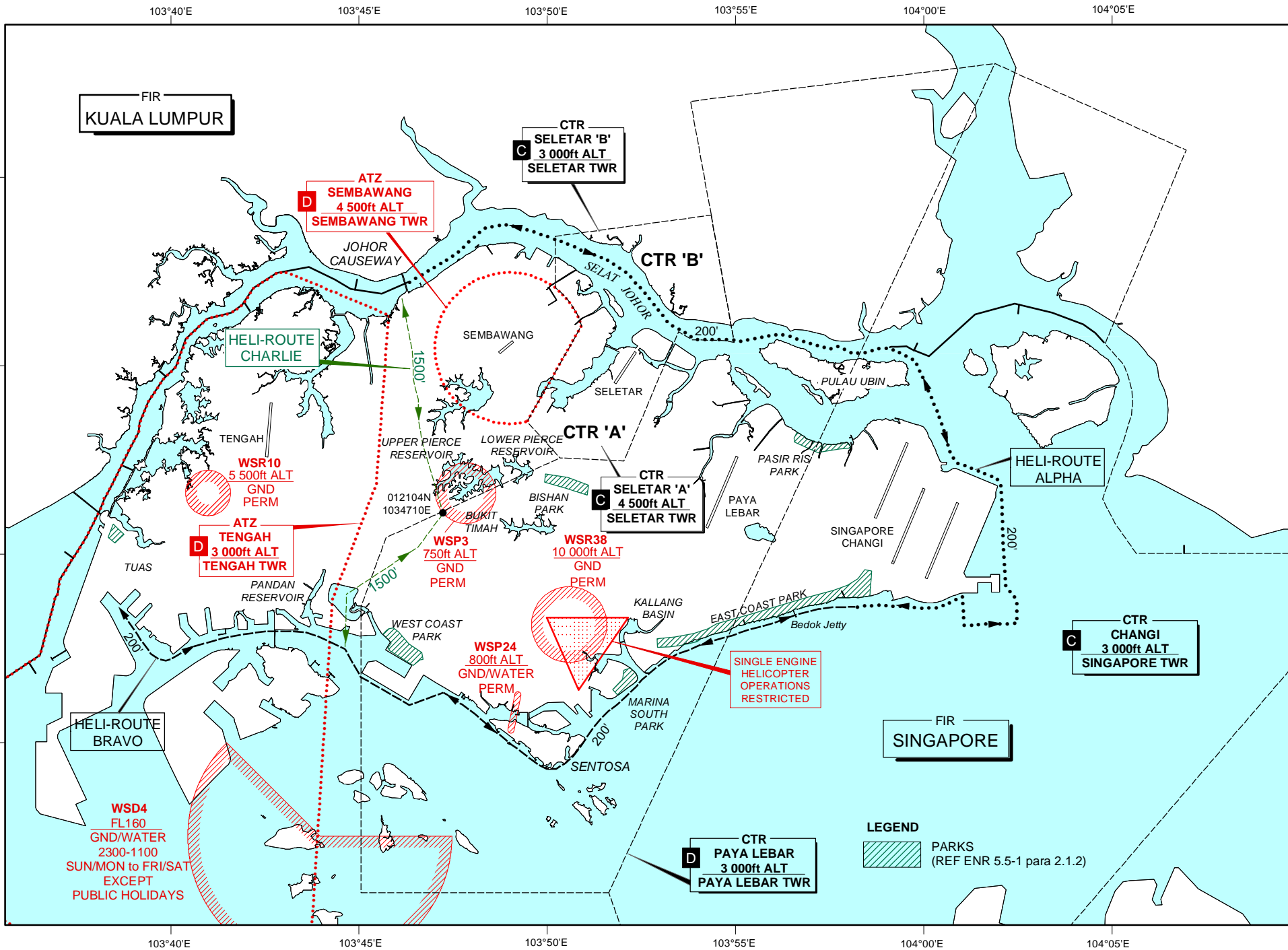
2.4.1 In the event of radio failure, the helicopter affected if on the ground shall not take-off

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'.

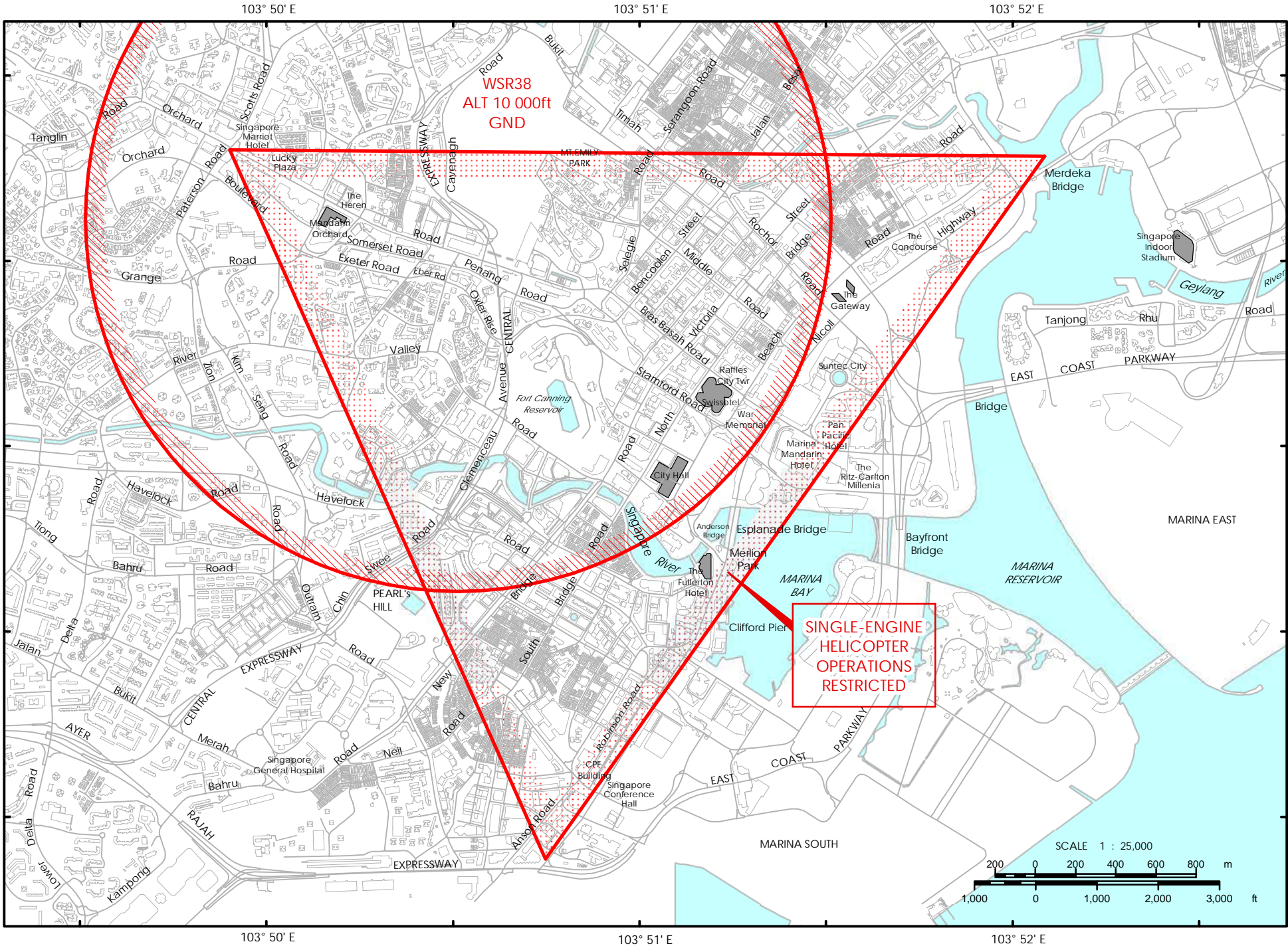
2.5 NIGHT OPERATIONS BY HELICOPTERS

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.

HELICOPTER ROUTES IN VMC



PAGE INTENTIONALLY LEFT BLANK



RESTRICTED AREA-SINGLE-ENGINE HELICOPTER OPERATIONS RESTRICTED

PAGE INTENTIONALLY LEFT BLANK

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.

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](#)).

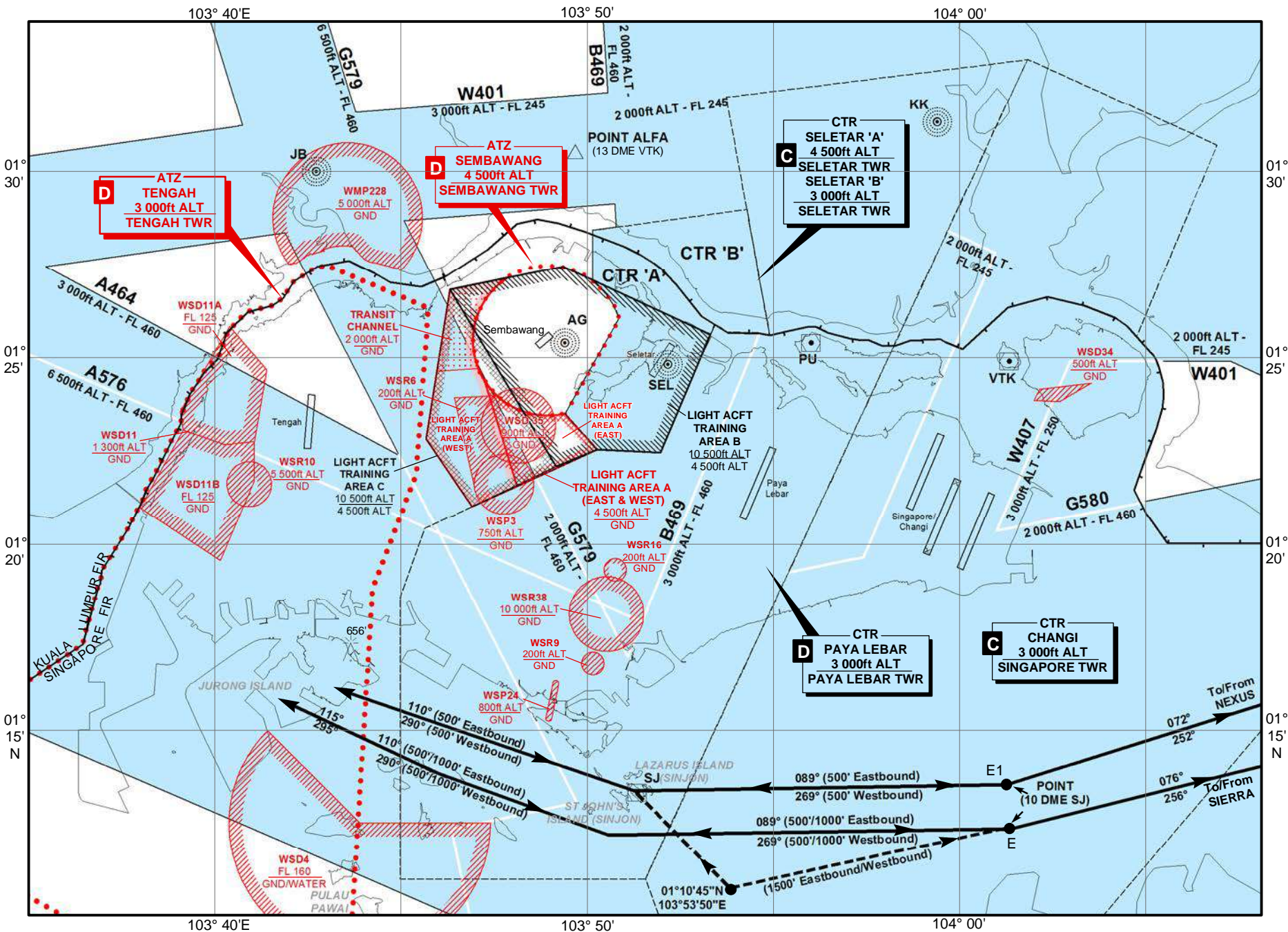
2.4 Vertical Limits

- 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.

VMC CROSSING BY MILITARY AIRCRAFT



PAGE INTENTIONALLY LEFT BLANK

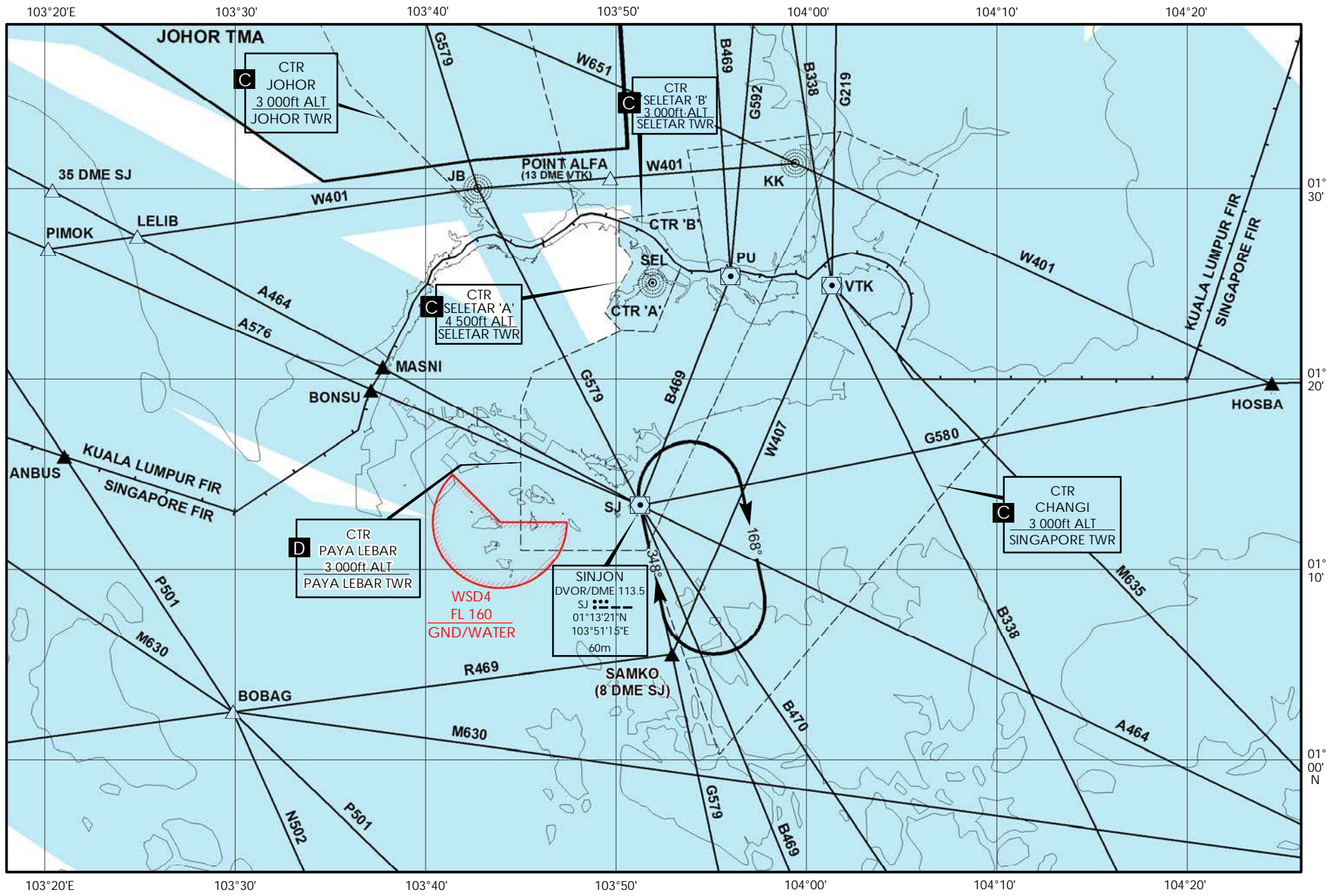
ENR 3.6 ENROUTE HOLDING

| <i>HLDG ID/FIX/WPT Coordinates</i> | <i>INBD TR (*Mag)</i> | <i>Direction of Procedure Turn</i> | <i>MAX IAS</i> | <i>MNM-MAX HLDG Level</i> | <i>Time (min)</i> | <i>Controlling Unit and Frequency</i> |
|--|-------------------------------|--|----------------|-------------------------------|-----------------------|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| BOBAG 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) |

| <i>HLDG ID/FIX/WPT Coordinates</i> | <i>INBD TR (°Mag)</i> | <i>Direction of Procedure Turn</i> | <i>MAX IAS</i> | <i>MNM-MAX HLDG Level</i> | <i>Time (min)</i> | <i>Controlling Unit and Frequency</i> |
|---|-------------------------------|--|----------------|-------------------------------|-----------------------|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| SAMKO (SHA) - 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 011321.34N 1035115.22E | 348 | Right | 230kt* | FL 140 4500 FT ALT | 1 | Singapore ACC 120.3 MHz (PRI) 124.6 MHz (SRY) |

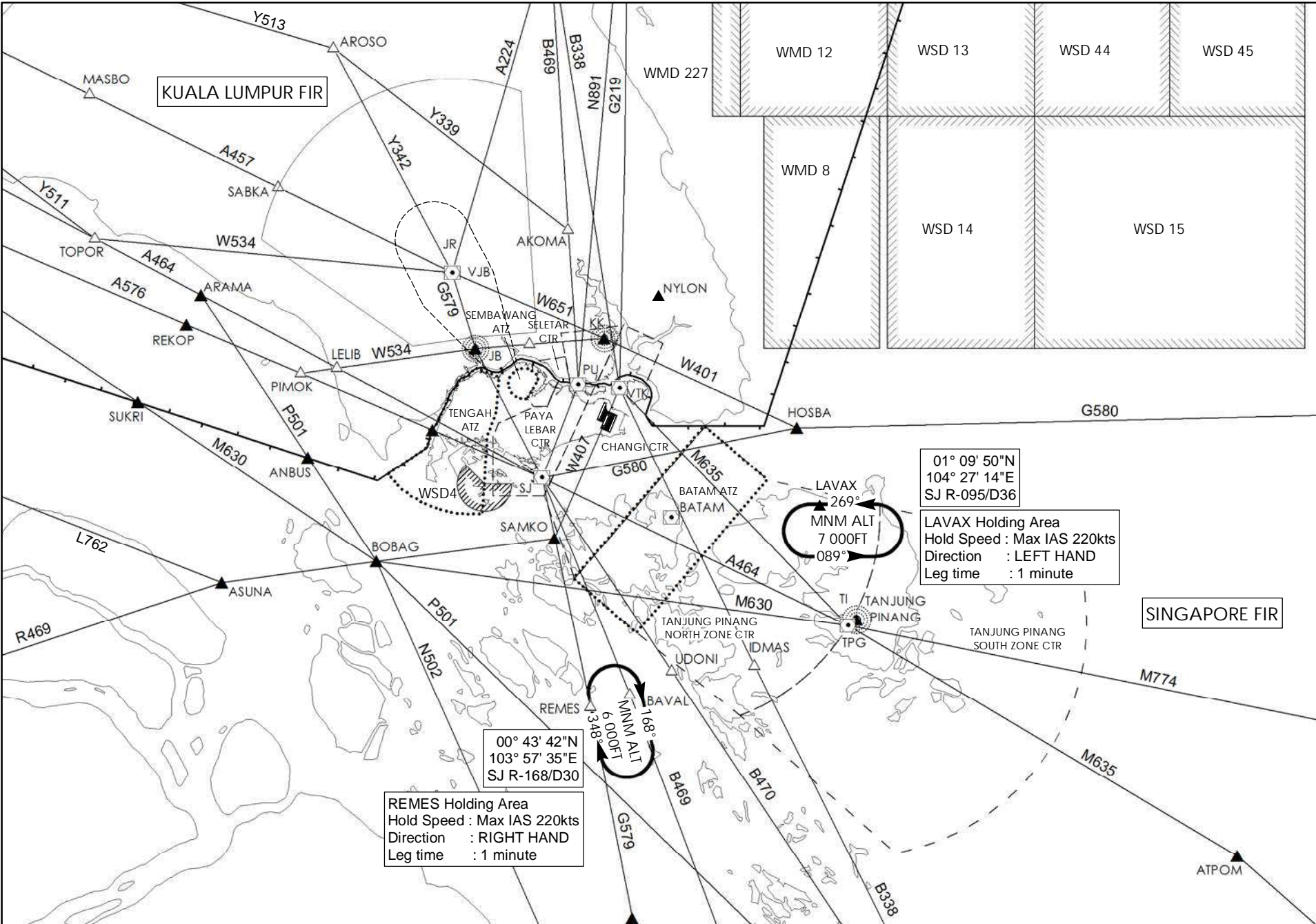
* Maximum speed of 280kt in conditions of turbulence subject to ATC clearance.

SINJON DVOR/DME LOW LEVEL HOLDING AREA



PAGE INTENTIONALLY LEFT BLANK

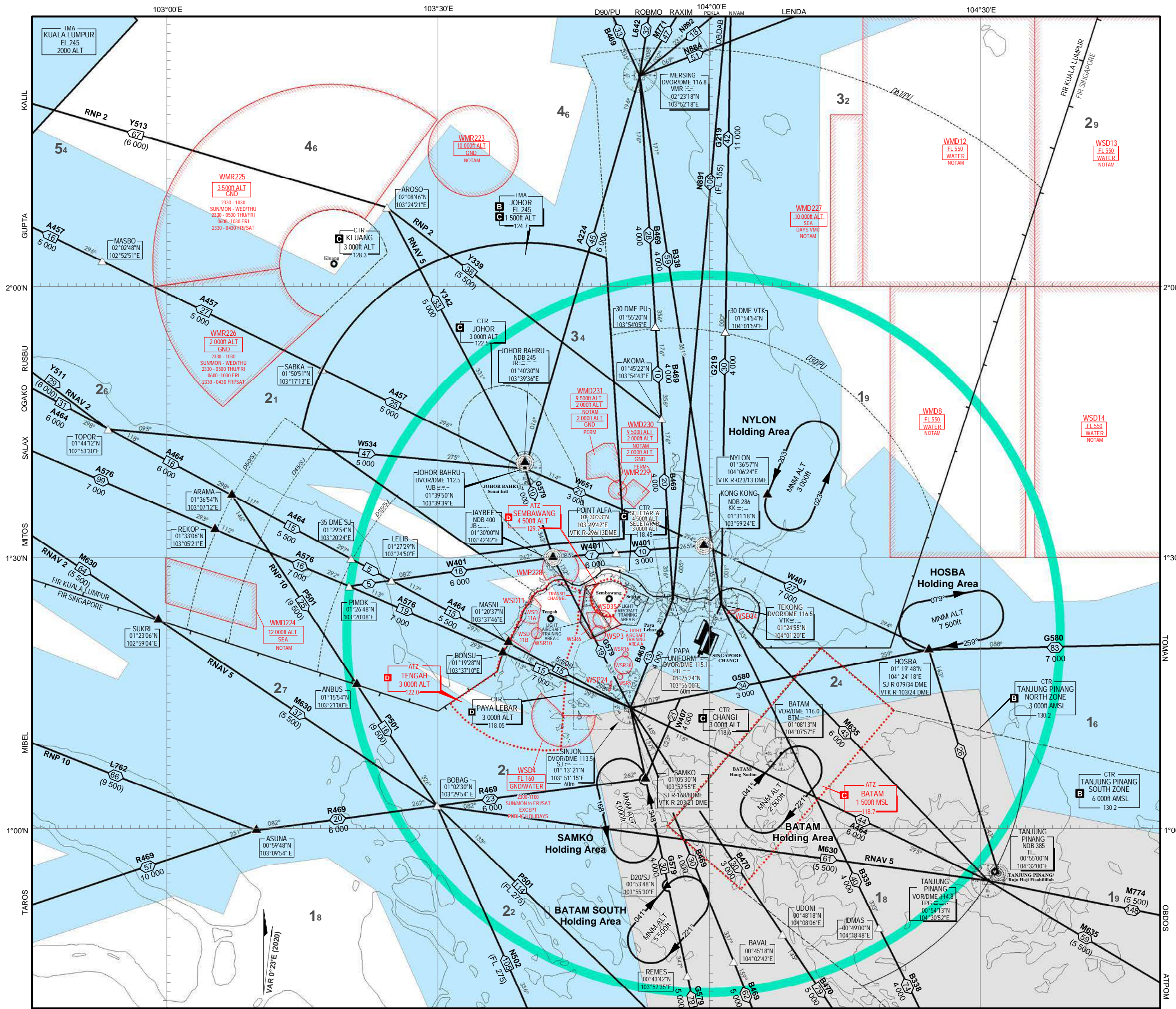
REMES AND LAVAX LOW LEVEL HOLDING AREAS



PAGE INTENTIONALLY LEFT BLANK

AREA CHART - ICAO

SINGAPORE/JOHOR AIRSPACE COMPLEX
LOW LEVEL HOLDING AREAS



| LEGEND | |
|---|--|
| Terminal Control Area (TMA) | <ul style="list-style-type: none"> Name of TMA: TMA JOHOR Airspace Classification: FL 145 Upper Limit: 1500ft Lower Limit: 124.7 Radio frequency(ies): 124.7 |
| Control Zone (CTR) | <ul style="list-style-type: none"> Name of CTR: CTR CHANGI Airspace Classification: 3000ft Upper Limit: 118.6m Radio frequency(ies): 118.6m |
| Aerodrome Traffic Zone (ATZ) | <ul style="list-style-type: none"> Name of ATZ: ATZ TENGAH Airspace Classification: 3000ft Upper Limit: 122.0 Radio frequency(ies): 122.0 |
| ATS Routes | <ul style="list-style-type: none"> Route designator: B469 Distance in nautical miles: 4 000/FL 160 Minimum flight altitude (ft)/flight level: (4 000)/(FL 160) Lower limit (ft)/flight level: (4 000)/(FL 160) |
| Oceanic Control Area (OCA) | |
| Reporting Point | <ul style="list-style-type: none"> Compulsory: ▲ On request: △ |
| DME distance from SJ Navaid | D25/SJ |
| Radio Navigation Aid | <ul style="list-style-type: none"> Name: SINJON DVOR/DME 113.5 Identification and frequency: 512.5 113.5 Geographical Coordinates: 01°12'21"N 103°51'15"E Elevation of DME site: 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) | <ul style="list-style-type: none"> Identification of area: WSD13 Nationality letter: FL 100 Vertical limits: FL 100 Activation by NOTAM: WATER |

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 terrain and obstacles in the quadrilateral. It is represented in thousands and hundreds of feet above mean sea level.

Example: 3 400 feet **34**

NOTE: - In computing the area minimum altitude, a margin of 200 feet (60m) for vegetation has been added for spot elevations.

Speed Control Procedures

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

All arriving turbo-propeller and turbo-jet aircraft are to fly at not faster than indicated air speed 250 knots when within 40nm from Singapore Changi Airport or when at or below 10,000ft except all arriving aircraft into Singapore Changi Airport shall comply with the speed restrictions depicted on the transitions and RNAV STARs. Further speed reductions will be regulated by ATC as necessary.

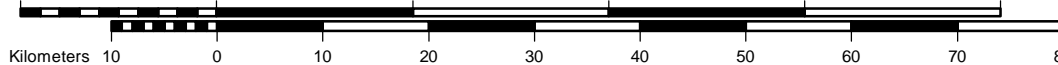
Pilots who may not be able to comply with the speed limits specified above for reasons of flight safety and/or weather should inform ATC and state the speed(s) acceptable.

| AIRSPACE CLASSIFICATION IN THE SINGAPORE FIR | | |
|---|------------------------|----------------|
| Airspace | Levels | Classification |
| Controlled airspace | FL150 to FL460 | A |
| | Surface to FL150 | B |
| Controlled airspace more than 100 nm seaward from the shoreline | Lower limit to FL460 | A |
| Control Zone (CTRs) | Changi CTR | 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 | |
| | 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



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 |

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 RESPECTIVELY. 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.

* In Transit Channel

* AEROBATICS IS PROHIBITED IN LIGHT AIRCRAFT TRAINING AREAS A, B and C.

AREA CHART - ICAO

SINGAPORE/JOHOR AIRSPACE COMPLEX
HIGH LEVEL HOLDING AREAS



| LEGEND | |
|---|---|
| Terminal Control Area (TMA) | <ul style="list-style-type: none"> Name of TMA: TMA JOHOR Airspace Classification: FL 145 Upper Limit: 1500ft Lower Limit: 124.7 Radio frequency(ies): |
| Control Zone (CTR) | <ul style="list-style-type: none"> Name of CTR: CTR CHANGI Airspace Classification: 3 000ft Upper Limit: 118.6m Radio frequency(ies): |
| Aerodrome Traffic Zone (ATZ) | <ul style="list-style-type: none"> Name of ATZ: ATZ TENGAH Airspace Classification: 3 000ft Upper Limit: 122.0 Radio frequency(ies): |
| ATS Routes | <ul style="list-style-type: none"> Route designator: B469 Distance in nautical miles: 4 000/FL 160 Minimum flight altitude (ft)/flight level: (4 000)/(FL 160) Lower limit (ft)/flight level: |
| Oceanic Control Area (OCA) | |
| Reporting Point | <ul style="list-style-type: none"> Compulsory: ▲ On request: △ |
| DME distance from SJ Navaid | 025/51 |
| Radio Navigation Aid | <ul style="list-style-type: none"> Name: SINJON DVOR/DME 113.5 Vertical limits: 512.5 - 1013.217m Geographical Coordinates: 01°13'21"N 103°51'15"E Elevation of DME site: 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) | <ul style="list-style-type: none"> Identification of area: WSD13 Nationality letter: FL 100 Vertical limits: FL 100 Activation by NOTAM: WATER |

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 terrain and obstacles in the quadrilateral. It is represented in thousands and hundreds of feet above mean sea level.

Example: 3 400 feet **34**

NOTE: - In computing the area minimum altitude, a margin of 200 feet (60m) for vegetation has been added for spot elevations.

Speed Control Procedures

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

All arriving turbo-propeller and turbo-jet aircraft are to fly at not faster than indicated air speed 250 knots when within 40nm from Singapore Changi Airport or when at or below 10,000ft except all arriving aircraft into Singapore Changi Airport shall comply with the speed restrictions depicted on the transitions and RNAV STARS. Further speed reductions will be regulated by ATC as necessary.

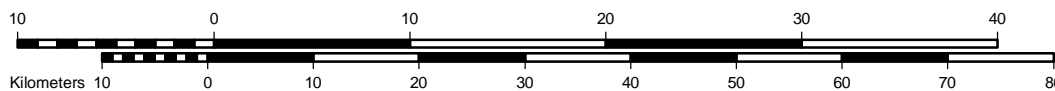
Pilots who may not be able to comply with the speed limits specified above for reasons of flight safety and/or weather should inform ATC and state the speed(s) acceptable.

| AIRSPACE CLASSIFICATION IN THE SINGAPORE FIR | | |
|---|------------------------|----------------|
| Airspace | Levels | Classification |
| Controlled airspace | FL150 to FL460 | A |
| | Surface to FL150 | B |
| Controlled airspace more than 100 nm seaward from the shoreline | Lower limit to FL460 | A |
| | | |
| Control Zone (CTRs) | Changi CTR | 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 ATIS authority.

| SINGAPORE | D-ATIS | DEP | 128.6 |
|-----------|--------|---------|-------|
| | ARR | 128.025 | |
| | DEP | 120.3 | |
| | ARR | 119.3 | |
| | APP | 124.05 | |
| | TWR | 118.6 | |
| | | 118.25 | |

Note:
FOR DEPARTURE AND ARRIVAL ROUTES
REFER TO AD-2-WSS-SID-1 TO AD-2-WSS-SID-18 AND
AD-2-WSS-STAR-1 TO AD-2-WSS-STAR-9,
AD-2-WSS-STAR-11, AD-2-WSS-STAR-13 TO AD-2-WSS-STAR-21



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 |

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 RESPECTIVELY. 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.

* In Transit Channel

* AEROBATICS IS PROHIBITED IN LIGHT AIRCRAFT TRAINING AREAS A, B and C.

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 | 011321.34N 1035115.22E | 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) |

| <i>Name of station (VOR/VAR)</i> | <i>Id</i> | <i>Frequency (CH)</i> | <i>Hours of operation</i> | <i>Co-ordinates</i> | <i>ELEV DME antenna</i> | <i>Remarks</i> |
|----------------------------------|-----------|------------------------|--|---------------------|-----------------------------------|---|
| 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. |

ENR 4.2 SPECIAL NAVIGATION SYSTEM

NIL (not applicable).

PAGE INTENTIONALLY LEFT BLANK

ENR 4.3 GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)

| <i>Name of GNSS element</i> | <i>Frequency</i> | <i>Coordinates</i> | <i>Remarks</i> |
|-----------------------------|------------------|---|----------------|
| | | <i>Nominal SVC area</i> <i>Coverage area</i> | |
| 1 | 2 | 3 | 4 |
| Nil | Nil | Nil | Nil |

PAGE INTENTIONALLY LEFT BLANK

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 | 011554N 1032100E | 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 |

| Name-code designator | Co-ordinates | ATS route or other route | Terminal Area |
|----------------------|---------------------------|--|--------------------|
| 1 | 2 | 3 | 4 |
| BONSU | 011928N 1033710E | A576 | |
| BUNTO | 024200N 1060000E | G334 | |
| BUVAL | 033622N 1034341E | L629 | |
| 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 | 045224N 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 | |

| <i>Name-code designator</i> | <i>Co-ordinates</i> | <i>ATS route or other route</i> | <i>Terminal Area</i> |
|-----------------------------|---------------------------|--|----------------------|
| 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 | 025224N 1042818E | 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, |

| <i>Name-code designator</i> | <i>Co-ordinates</i> | <i>ATS route or other route</i> | <i>Terminal Area</i> |
|-----------------------------|---------------------------|----------------------------------|---|
| 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 |
| LEND A | 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 | 031430N 1040554E | N891 | |
| MASBO | 020248N 1025251E | A457 | SID-WSSS |
| MASNI | 012037N 1033746E | A464 | |
| MELAS | 070518N 1080912E | N892 | |
| 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 |
| OB DAB | 031153N 1040538E | N891 | |
| OB DOS | 002503N 1065551E | L504, M774 | STAR-WSSS |
| OB GET | 012307N 1064531E | G580, L644 | |
| OB LOT | 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 | |
| ONAPO | 032116N 1062318E | L644 | |

| <i>Name-code designator</i> | <i>Co-ordinates</i> | <i>ATS route or other route</i> | <i>Terminal Area</i> |
|-----------------------------|---------------------------|--|----------------------|
| 1 | 2 | 3 | 4 |
| OPULA | 033155N 1062118E | L644 | |
| OTLON | 030752N 1042006E | M761 , M771 | |
| PADLI | 030918N 1033133E | B469 , Y332 , 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 | |
| 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 | |
| UDONI | 004818N 1040806E | B470 | |
| UGPEK | 033647N 1040752E | L635 , N891 | |

| <i>Name-code designator</i> | <i>Co-ordinates</i> | <i>ATS route or other route</i> | <i>Terminal Area</i> |
|-----------------------------|---------------------------|---------------------------------|----------------------|
| 1 | 2 | 3 | 4 |
| 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 | |

ENR 4.5 AERONAUTICAL GROUND LIGHTS - ENROUTE

| <i>Name Ident (Coordinates)</i> | <i>Type and Intensity (1,000 Candelas)</i> | <i>Characteristics</i> | <i>Operating Hours</i> | <i>Remarks</i> |
|---|--|-------------------------|------------------------|----------------|
| 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 | - |

PAGE INTENTIONALLY LEFT BLANK

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.

| Identification, Name and Lateral Limits | Upper limit Lower limit | Remarks (time of activity, type of restriction, nature of hazard, risk of interception) |
|---|-----------------------------|---|
| 1 | 2 | 3 |
| PROHIBITED AREAS | | |
| WSP3 A circle, 0.8NM radius centred at 012136N 1034746E | 750 FT GND | Active: Permanent. Under no circumstances shall a forced landing be permitted within the area. Rotary wing aircraft shall avoid overflying the area. |
| WSP24 Area within two circles, 150m radius, centred at Mt. Faber (011616N 1034910E) and Sentosa Island (011520N 1034904E) and the tangential lines joining these circles. | 800 FT ALT GND/WATER | Active: Permanent. |
| WMP228 BUKIT SERENE Area within 2NM centred at 012845N 1034334E with the southern border of the Prohibited Area coinciding with the coastline of South Johor. | 5000 FT ALT GND | Sultan's Palace. Active: Permanent. (refer to AIP Malaysia) |
| 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/JP 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) |

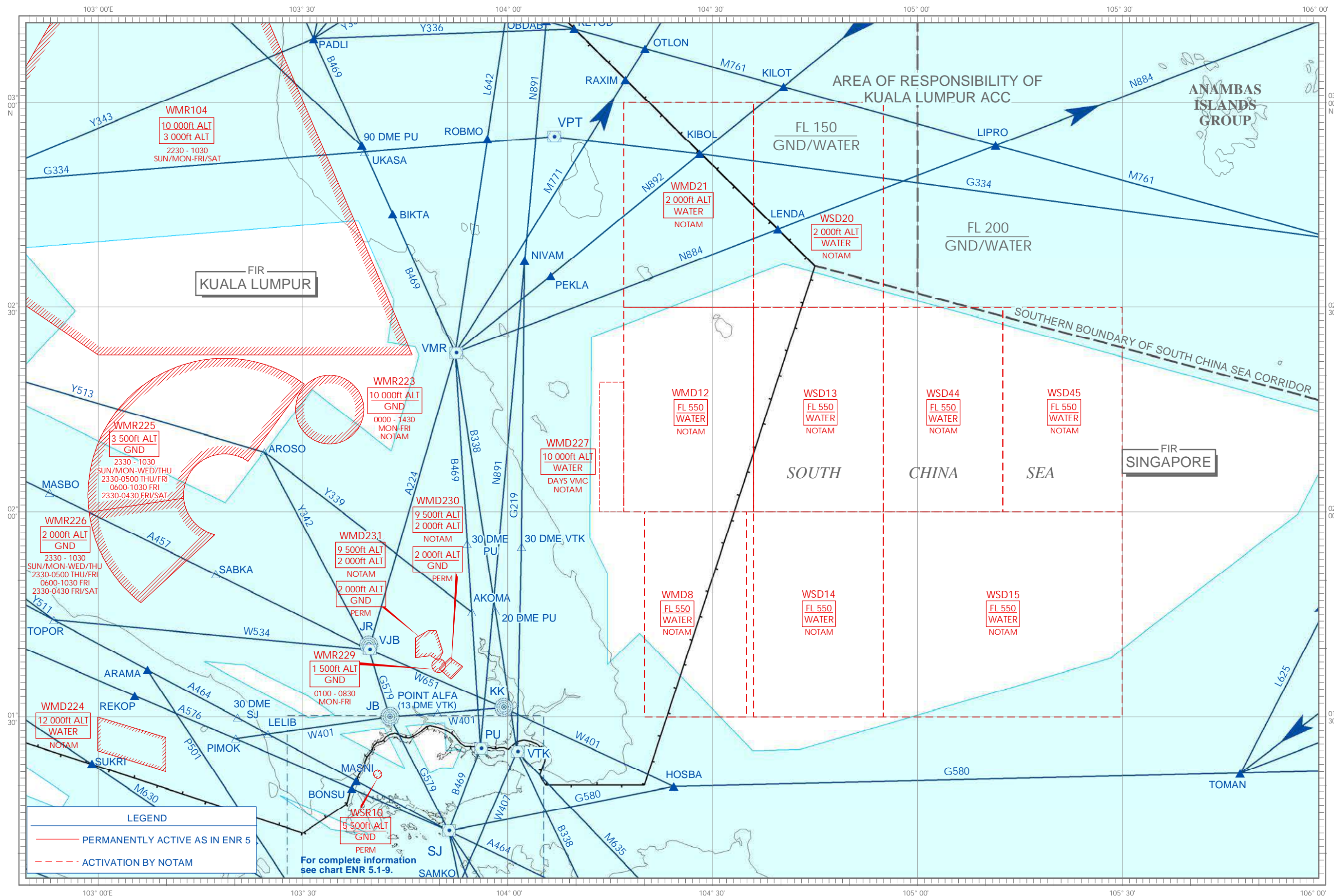
| Identification, Name and Lateral Limits | Upper limit | Remarks (time of activity, type of restriction, nature of hazard, risk of interception) |
|--|---------------------|--|
| | Lower limit | |
| 1 | 2 | 3 |
| RESTRICTED AREAS | | |
| WMR223 KANGAR KAHANG A circle, 5NM radius, centred at 021500N 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 |
| 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 | 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) |
| 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. |

| 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) |

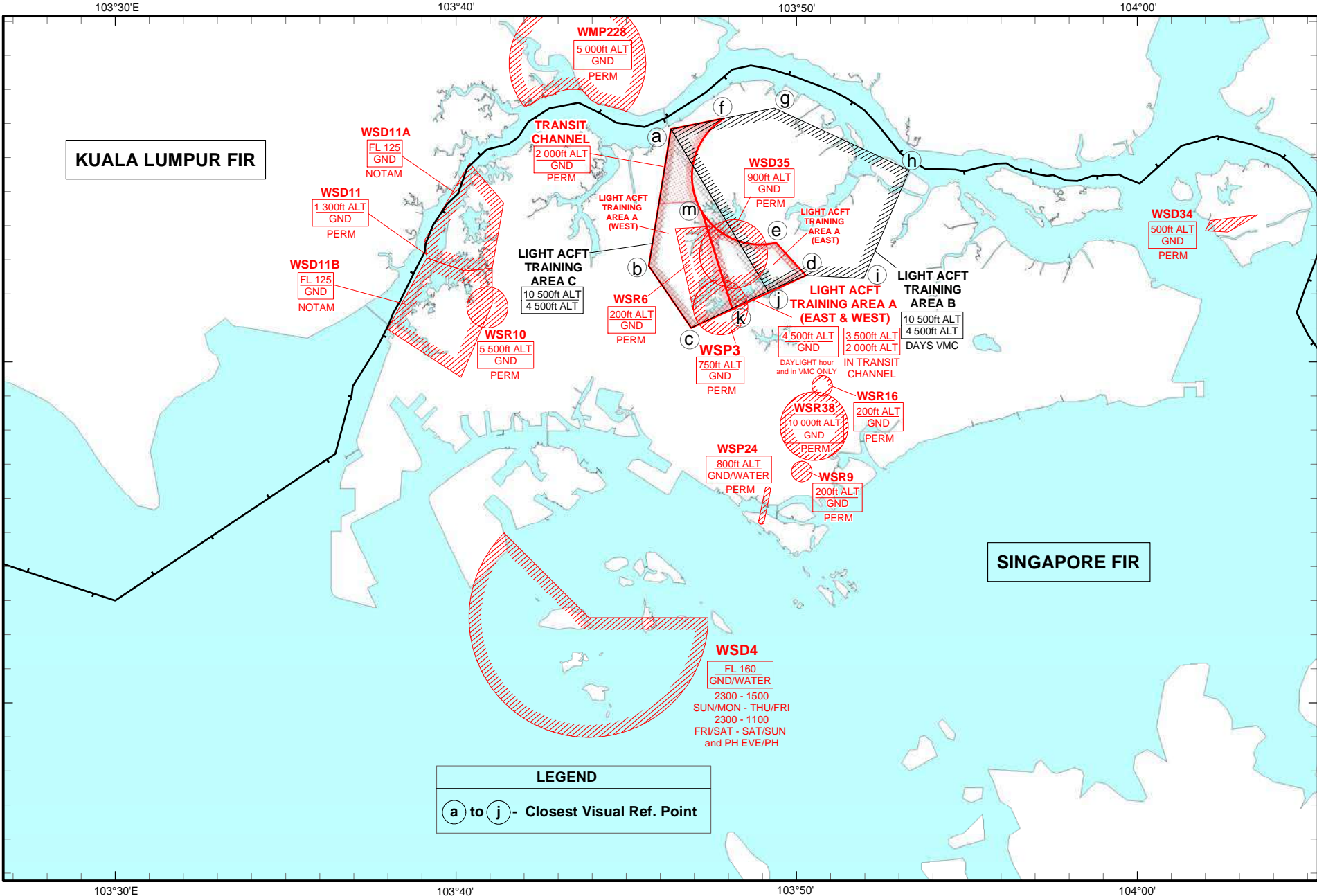
| <i>Identification, Name and Lateral Limits</i> | <i>Upper limit</i> | <i>Remarks (time of activity, type of restriction, nature of hazard, risk of interception)</i> |
|---|----------------------|---|
| | <i>Lower limit</i> | |
| 1 | 2 | 3 |
| DANGER AREAS | | |
| WMD230 ULU TIRAM (SOUTH) 013720N 1035324E 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) |

PAGE INTENTIONALLY LEFT BLANK

PROHIBITED, RESTRICTED AND DANGER AREAS - CHART 1



PAGE INTENTIONALLY LEFT BLANK



PROHIBITED, RESTRICTED AND DANGER AREAS - CHART 2

PAGE INTENTIONALLY LEFT BLANK

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 | Remarks Time of Act |
|---|--------------------------------|---|
| | Lower Limit | |
| 1 | 2 | 3 |
| LIGHT AIRCRAFT TRAINING AREA A | | |
| (Training and Local Flying) All the airspace contained within the boundaries bounded by the following: | 4 500ft ALT GND | # Above Transit Channel (see chart ENR 3.5-3) |
| 012650N 1034619E @ (Woodlands Customs Checkpoint) (a) | 3 500ft ALT 2 000ft ALT# | @ Closest Visual Reference Point (see chart ENR 5.1-9) |
| 012249N 1034540E @ (cross-road junction of Upper Bukit Timah Road and Bukit Panjang Road/Choa Chu Kang Road) (b) | Maximum Usable ALT: 4 000ft | Daylight hour and in VMC only |
| 012100N 1034654E @ (Bukit Timah) (c) | | |
| 012232N 1035016E @ (Mayflower Garden) (d) | | |
| 012327N 1034922E @ (Sembawang ATZ bdry) and along the bdry of Sembawang ATZ (e) | | |
| 012714N 1034752E @ (Admiralty Road West/Attap Valley Road) (f) | | |
| 012650N 1034619E @ (Woodlands Customs Checkpoint) (a) | | |

| Name and Lateral limits | <i>Upper Limit</i> <i>Lower Limit</i> | Remarks Time of Act |
|--|--|---|
| 1 | 2 | 3 |
| LIGHT AIRCRAFT TRAINING AREA A (EAST) | | |
| 012423N 1034714E (m) thence along the boundary of Sembawang ATZ to 012327N 1034922E (e) 012232N 1035016E (d) 012133N 1034807E (k) 012423N 1034714E (m) | 4 500ft ALT GND 3 500ft ALT 2 000ft ALT# Maximum Usable ALT: 4 000ft | To enable aircraft on ILS for landing into WSSL to carry out missed approach safely and efficiently, Light Aircraft Training Area A would be temporarily segregated into Area A (East) and Area A (West). When instructed, all aircraft operating in Light Aircraft Training Area A are to vacate the Area A (East) and operate only in Area A (West) or operate in the other Light Aircraft Training Areas B or C. Whenever there is an aircraft on ILS for landing into WSSL, Light Aircraft Training Area A (East) will temporarily be designated as Class D airspace to facilitate the nominal path for the missed approach aircraft. |
| LIGHT AIRCRAFT TRAINING AREA A (WEST) | | |
| 012650N 1034619E (a) 012714N 1034752E (f) thence along the boundary of Sembawang ATZ to 012423N 1034714E (m) 012133N 1034807E (k) 012100N 1034654E (c) 012249N 1034540E (b) 012650N 1034619E (a) | 4 500ft ALT GND 3 500ft ALT 2 000ft ALT# Maximum Usable ALT: 4 000ft | |
| LIGHT AIRCRAFT TRAINING AREA B | | |
| (High Flying Training Ops) The area includes the airspace above Seletar CTR A, Sembawang ATZ, parts of Paya Lebar CTR and Light Aircraft Training Area A and is contained within the following: 012650N 1034619E @ (Woodlands Customs Checkpoint) (a) 012205N 1034910E @ (Eastern Edge of Pierce Reservoir) (j) 012232N 1035016E @ (Mayflower Garden) (d) 012227N 1035158E @ (Seletar Hill Estate) (i) 012537N 1035319E @ (East of Seletar Airfield) (h) 012727N 1034921E @ (Canberra/Admiralty Rd) (g) 012650N 1034619E @ (Woodlands Customs Checkpoint) (a) | 10 500ft ALT 4 500ft ALT Maximum Usable ALT: 10 000ft Minimum Usable ALT: 5 000ft | |

| Name and Lateral limits | <u>Upper Limit</u> <u>Lower Limit</u> | 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 | | |
| <u>Helicopter Operations</u> 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. |

PAGE INTENTIONALLY LEFT BLANK

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.

PAGE INTENTIONALLY LEFT BLANK

ENR 5.4 AIR NAVIGATION OBSTACLES - AREA 1

(Height 100m AGL or higher)

| <i>OBST ID or designation</i> | <i>OBST type</i> | <i>OBST position</i> | <i>ELEV/HGT (M)</i> | <i>OBST LGT Type/Colour</i> | <i>Remarks</i> |
|-------------------------------|------------------|----------------------|---------------------|-----------------------------|----------------|
| Under development | | | | | |

PAGE INTENTIONALLY LEFT BLANK

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.

PAGE INTENTIONALLY LEFT BLANK

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: changj.airside@changiairport.com

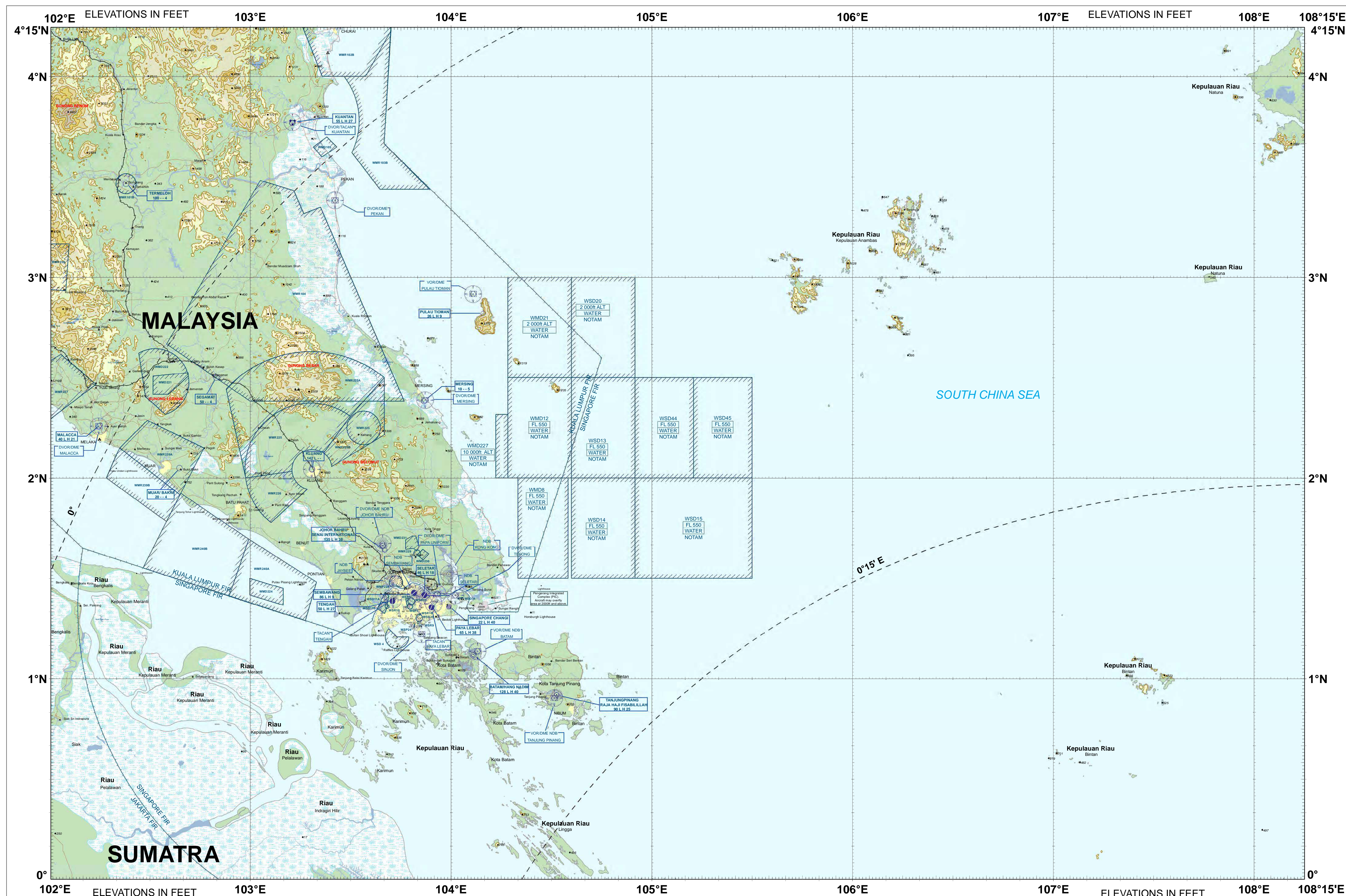
| WILDLIFE STRIKE REPORTING FORM | | | | | |
|---|-----------------------------|---|----------------------------|---|-----------------------------|
| (This information is required for aviation safety) | | | | | |
| OPERATOR or CALL SIGN | | AIRCRAFT TYPE | | | |
| ENGINE TYPE | | AIRCRAFT REGISTRATION | | | |
| DATE: Day | | TIME OF INCIDENT | | (L) | (UTC) |
| Month Year | | | | | |
| | | Dawn | | Day | Dusk Night |
| AERODROME NAME | | RUNWAY USED | | | |
| HEIGHT AGL ft | SPEED (IAS) kt | | APRX LOC | | |
| PHASE OF FLIGHT | | <input type="checkbox"/> Unknown <input type="checkbox"/> En-route | | SKY CONDITION | |
| | | <input type="checkbox"/> Taxi <input type="checkbox"/> Descend | | <input type="checkbox"/> No Cloud | |
| | | <input type="checkbox"/> Take-off run <input type="checkbox"/> Approach | | <input type="checkbox"/> Some Cloud | |
| | | <input type="checkbox"/> Climb <input type="checkbox"/> Landing Roll | | <input type="checkbox"/> Overcast | |
| | | | | PRECIPITATION | |
| | | | | <input type="checkbox"/> Fog | |
| | | | | <input type="checkbox"/> Rain | |
| PART(S) OF AIRCRAFT | | | | | |
| | Struck | Damaged | | | |
| Radome | <input type="checkbox"/> | <input type="checkbox"/> | | BIRD SPECIES | |
| Windshield | <input type="checkbox"/> | <input type="checkbox"/> | | | |
| Nose (excluding above) | <input type="checkbox"/> | <input type="checkbox"/> | | NUMBER OF BIRDS | |
| | | | | Seen | Struck |
| | | | | | |
| Engine No. 1 | <input type="checkbox"/> | <input type="checkbox"/> | | SIZE OF BIRD | |
| Engine No. 2 | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> Small <input type="checkbox"/> Medium <input type="checkbox"/> Large | |
| Engine No. 3 | <input type="checkbox"/> | <input type="checkbox"/> | | | |
| Engine No. 4 | <input type="checkbox"/> | <input type="checkbox"/> | | PILOT WARNED OF BIRDS | |
| | | | | Yes | No |
| Propeller | <input type="checkbox"/> | <input type="checkbox"/> | | LIGHTS USED: | |
| Wing/Rotor | <input type="checkbox"/> | <input type="checkbox"/> | | Landing | |
| Fuselage | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Landing gear | <input type="checkbox"/> | <input type="checkbox"/> | | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Tail | <input type="checkbox"/> | <input type="checkbox"/> | | | |
| Lights | <input type="checkbox"/> | <input type="checkbox"/> | | | |
| Others (specify) | <input type="checkbox"/> | <input type="checkbox"/> | | | |
| EFFECT ON FLIGHT | | | | REMARKS | |
| <input type="checkbox"/> None | | <input type="checkbox"/> Precautionary landing | | (Describe damage, injuries and other pertinent information) | |
| <input type="checkbox"/> Aborted take-off | | <input type="checkbox"/> Engines shut down | | | |
| <input type="checkbox"/> Others (specify) | | | | | |
| NAME OF REPORTING OFFICER: | | | ORGANISATION: | | |
| <p><i>Please send completed Wildlife Strike Reporting Form to:</i> Airside Management Centre (email: changi.airside@changiairport.com) CHANGI AIRPORT GROUP (SINGAPORE) PTE LTD P.O. Box 168, Singapore Changi Airport Singapore 918146</p> | | | | | |

ENR 6 EN-ROUTE CHARTS

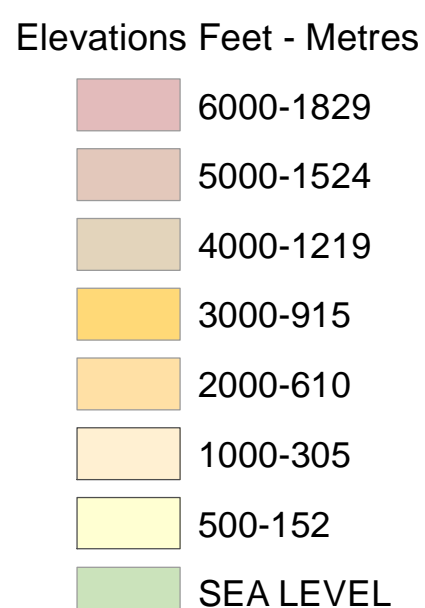
ENROUTE CHART - ICAO [ERC-6-1 En-Route Chart](#)
WORLD AERONAUTICAL CHART - ICAO [WAC-2860-Singapore-Island](#)

PAGE INTENTIONALLY LEFT BLANK

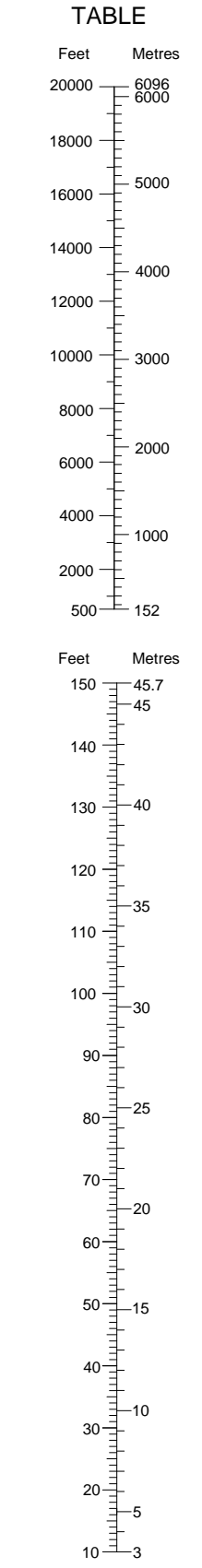
PAGE INTENTIONALLY LEFT BLANK



HYPSONETRIC TINTS



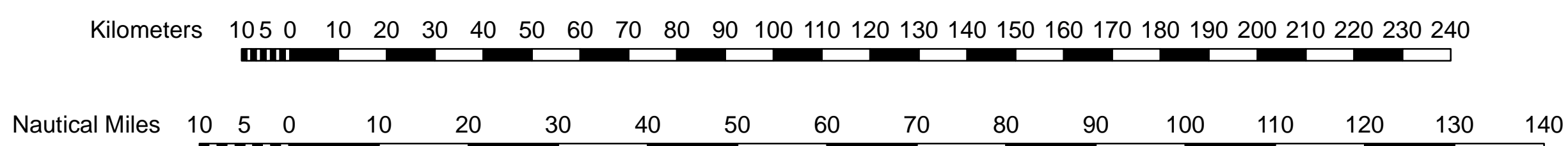
CONVERSION TABLE



PROJECTION Lambert Conformal Conic Projection Standard Parallels 0°40' and 3°20' Spheroid - World Geodetic System 1984 (WGS-84)

Published by the Civil Aviation Authority of Singapore, 2022 Produced by SLC Geomatic Solutions Ltd, United Kingdom © 2022 Civil Aviation Authority of Singapore

CHANGES : Updated Chart.



Contours basic interval 1000 feet. Intermediate contours shown at 500 feet.

CAUTION Consult respective NOTAMs and AIPs of States concerned for the latest aeronautical information AND the Civil Aviation Authority of Singapore does not accept responsibility for any errors or omissions in the information shown outside of Singapore Territory.

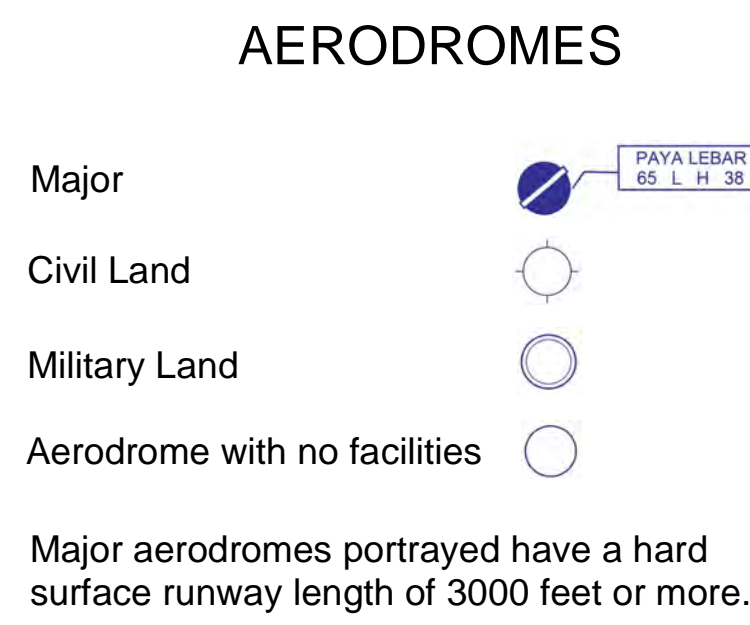
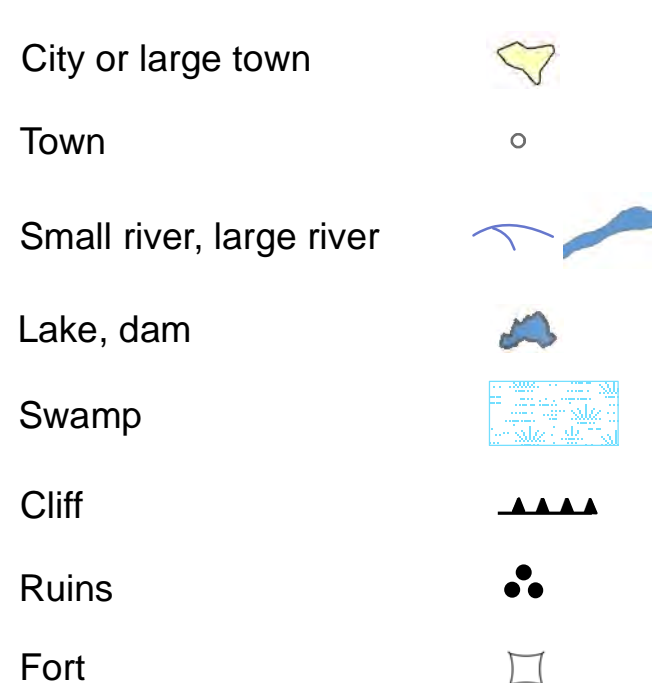
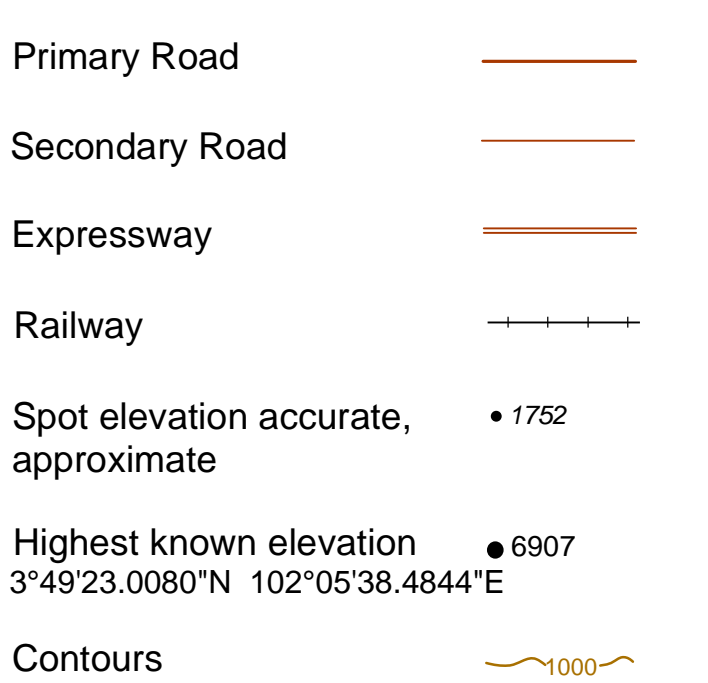
NOTE Due to congestion in the Singapore area, only selected Navigation Aids and Restricted Airspace are shown.

Compiled by Civil Aviation Authority of Singapore and SLC Geomatic Solutions Ltd, United Kingdom from the following sources: a) Digital World Ocean Basemap, Sources: Esri b) Magnetic information for the year 2020, NOAA World Magnetic Model produced by National Geospatial-Intelligence Agency (NGA), United States and the Defence Geographic Centre (DGC), United Kingdom. c) Aeronautical information supplied by the Civil Aviation Authority of Singapore. d) Terrain data used for topography information, Contours, Spot Elevations and Hypsometric tints Source: SRTM Plus/V3 Worldwide Elevation data, 1-arc-second resolution. e) Culture information Source: OpenStreetMap datasets published by Geofabrik GmbH, last updated 2021.

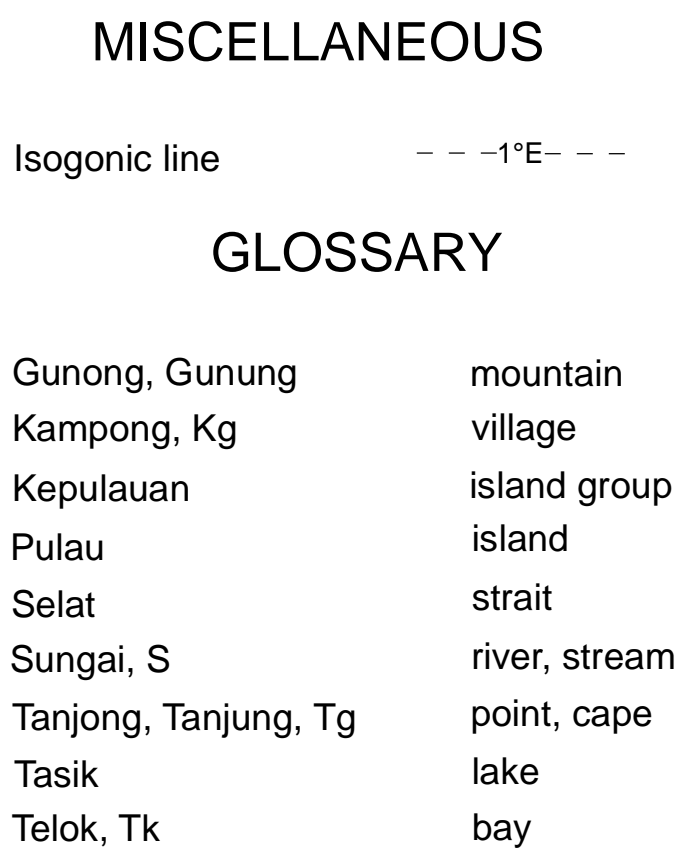
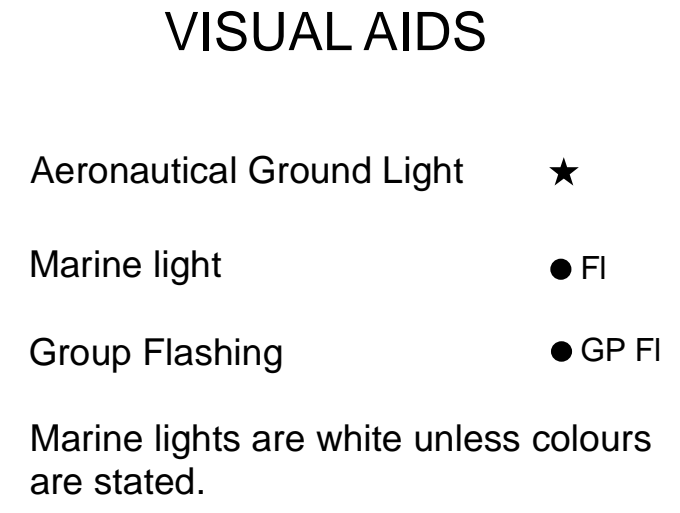
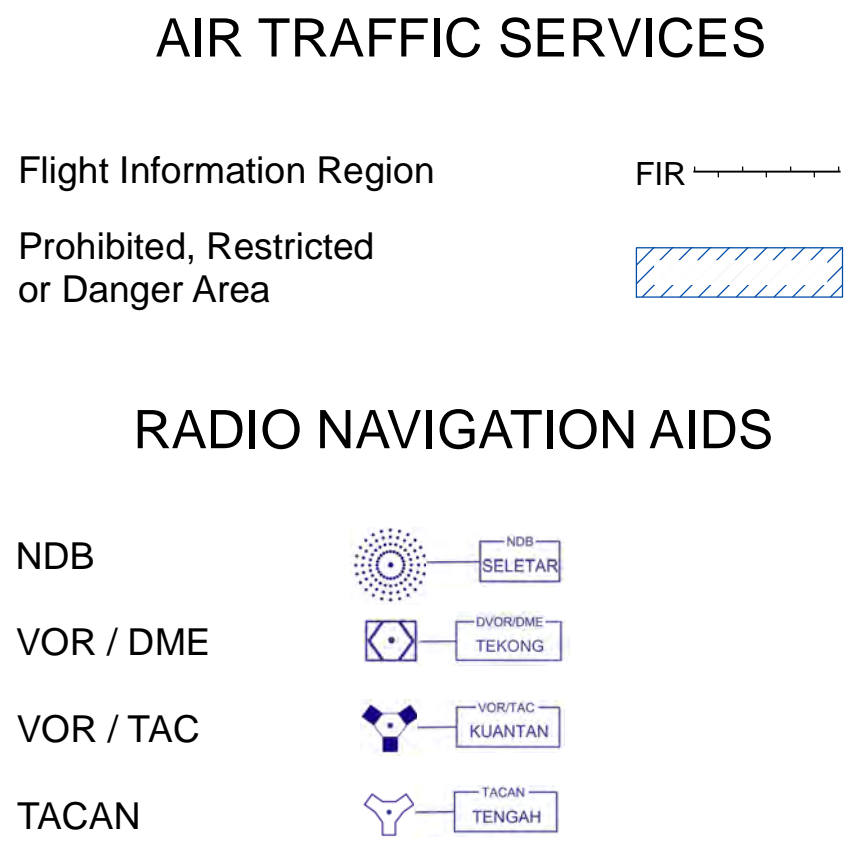
AERONAUTICAL INFORMATION

MAGNETIC INFORMATION FOR THE YEAR 2020

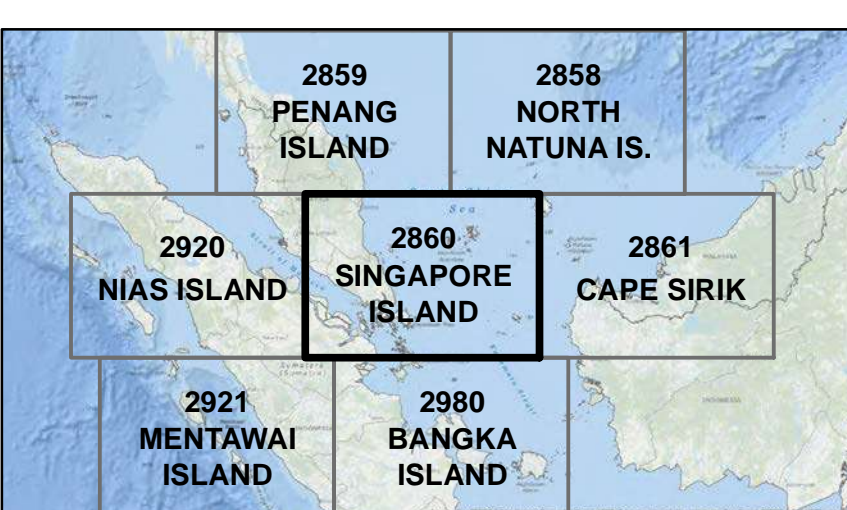
Aeronautical Information: March 2022



Obstacle, Lighted Obstacle, Lighted Group Obstacles, Elevation of top above mean sea level (AMSL), 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 quality.



INDEX TO ADJOINING SHEETS



PAGE INTENTIONALLY LEFT BLANK

Part 3 — AERODROMES (AD)

AD 0

AD 0.1 PREFACE

NIL (not applicable).

PAGE INTENTIONALLY LEFT BLANK

AD 0.2 RECORD OF AIP AMENDMENTS

NIL (not applicable).

PAGE INTENTIONALLY LEFT BLANK

AD 0.3 RECORD OF AIP SUPPLEMENTS

NIL (not applicable).

PAGE INTENTIONALLY LEFT BLANK

AD 0.4 CHECKLIST OF AIP PAGES

NIL (not applicable).

PAGE INTENTIONALLY LEFT BLANK

AD 0.5 LIST OF HAND AMENDMENTS TO THE AIP

NIL (not applicable).

PAGE INTENTIONALLY LEFT BLANK

AD 0.6 TABLE OF CONTENTS TO PART 3

| | | |
|------------------------------|---|--------------|
| AD 0.1 | [NIL] PREFACE | AD 0.1-1 |
| AD 0.2 | [NIL] RECORD OF AIP AMENDMENTS | AD 0.2-1 |
| AD 0.3 | [NIL] RECORD OF AIP SUPPLEMENTS | AD 0.3-1 |
| AD 0.4 | [NIL] CHECKLIST OF AIP PAGES | AD 0.4-1 |
| AD 0.5 | [NIL] LIST OF HAND AMENDMENTS TO THE AIP | AD 0.5-1 |
| AD 0.6 | TABLE OF CONTENTS TO PART 3 | AD 0.6-1 |
| AD 1 | AERODROMES/HELIPORTS - INTRODUCTION | |
| AD 1.1 | AERODROME AVAILABILITY | AD 1.1-1 |
| 1 | INTRODUCTION | AD 1.1-1 |
| 2 | APPLICABLE ICAO DOCUMENTS | AD 1.1-2 |
| 3 | CIVIL USE OF MILITARY AIR BASES | AD 1.1-2 |
| 4 | CAT II / III OPERATIONS AT AERODROMES | AD 1.1-3 |
| 5 | FRICITION MEASURING DEVICE USED AND FRICTION LEVEL BELOW WHICH THE RUNWAY IS DECLARED SLIPPERY WHEN IT IS WET | AD 1.1-3 |
| 6 | RUNWAY SURFACE CONDITION ASSESSMENT AND REPORTING | AD 1.1-4 |
| AD 1.2 | RESCUE AND FIRE FIGHTING SERVICES | AD 1.2-1 |
| AD 1.3 | INDEX TO AERODROMES | AD 1.3-1 |
| AD 1.4 | GROUPING OF AERODROMES | AD 1.4-1 |
| 1 | Primary/Major International Aerodrome | AD 1.4-1 |
| 2 | Secondary/Other International Aerodrome | AD 1.4-1 |
| 3 | National Aerodrome | AD 1.4-1 |
| AD 1.5 | STATUS OF CERTIFICATION OF AERODROMES | AD 1.5-1 |
| AD 2 | AERODROMES | |
| WSSS | SINGAPORE / SINGAPORE CHANGI INTL | |
| WSSS AD 2.1 | AERODROME LOCATION INDICATOR AND NAME | AD 2.WSSS-1 |
| WSSS AD 2.2 | AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA | AD 2.WSSS-1 |
| WSSS AD 2.3 | OPERATIONAL HOURS | AD 2.WSSS-2 |
| WSSS AD 2.4 | HANDLING SERVICES AND FACILITIES | AD 2.WSSS-2 |
| WSSS AD 2.5 | PASSENGER FACILITIES | AD 2.WSSS-3 |
| WSSS AD 2.6 | RESCUE AND FIRE FIGHTING SERVICES | AD 2.WSSS-3 |
| WSSS AD 2.7 | SEASONAL AVAILABILITY - CLEARING | AD 2.WSSS-3 |
| WSSS AD 2.8 | APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA | AD 2.WSSS-4 |
| WSSS AD 2.9 | SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS | AD 2.WSSS-5 |
| 1 | ADB SAFEGATE AIRCRAFT DOCKING GUIDANCE SYSTEM - SAFEDOCK | AD 2.WSSS-6 |
| 2 | PROCEDURES FOR START-UP AND PUSHBACK OF AIRCRAFT | AD 2.WSSS-11 |
| 3 | ADVANCED MULTILATERATION SYSTEM | AD 2.WSSS-11 |
| 4 | AIRFIELD GROUND LIGHTING CONTROL AND MONITORING SYSTEM (AGLCMS) AND MARKINGS | AD 2.WSSS-12 |
| WSSS AD 2.10 | AERODROME OBSTACLES | AD 2.WSSS-13 |
| WSSS AD 2.11 | METEOROLOGICAL INFORMATION PROVIDED | AD 2.WSSS-15 |
| WSSS AD 2.12 | RUNWAY PHYSICAL CHARACTERISTICS | AD 2.WSSS-16 |
| WSSS AD 2.13 | DECLARED DISTANCES | AD 2.WSSS-18 |
| WSSS AD 2.14 | APPROACH AND RUNWAY LIGHTING | AD 2.WSSS-18 |
| WSSS AD 2.15 | OTHER LIGHTING, SECONDARY POWER SUPPLY | AD 2.WSSS-21 |
| WSSS AD 2.16 | HELICOPTER LANDING AREA | AD 2.WSSS-21 |

| | | |
|------------------------------|---|-------------|
| WSSS AD 2.17 | ATS AIRSPACE | AD2.WSSS-21 |
| WSSS AD 2.18 | ATS COMMUNICATION FACILITIES | AD2.WSSS-22 |
| WSSS AD 2.19 | RADIO NAVIGATION AND LANDING AIDS | AD2.WSSS-25 |
| WSSS AD 2.20 | LOCAL TRAFFIC REGULATIONS | AD2.WSSS-26 |
| 1 | DESIGNATION OF PAYA LEBAR AIRPORT AS AN ALTERNATE AERODROME FOR SINGAPORE CHANGI AIRPORT | AD2.WSSS-26 |
| 2 | WRONG APPROACHES AND LANDINGS OF AIRCRAFT BOUND FOR SINGAPORE CHANGI AND PAYA LEBAR AIRPORTS | AD2.WSSS-26 |
| WSSS AD 2.21 | NOISE ABATEMENT PROCEDURES | AD2.WSSS-28 |
| WSSS AD 2.22 | FLIGHT AND GROUND PROCEDURES | AD2.WSSS-29 |
| 1 | LOW VISIBILITY PROCEDURES (LVP) FOR CATEGORY II ILS OPERATIONS | AD2.WSSS-29 |
| 2 | RUNWAY UTILISATION | AD2.WSSS-29 |
| 3 | AIRPORT COLLABORATIVE DECISION MAKING (A-CDM) MODE OF OPERATIONS | AD2.WSSS-31 |
| 4 | A-CDM PRE-DEPARTURE PROCEDURES | AD2.WSSS-31 |
| 5 | A-CDM START-UP PROCEDURES | AD2.WSSS-32 |
| 6 | A-CDM INFORMATION VIA AIRCRAFT DOCKING GUIDANCE SYSTEM (ADGS) | AD2.WSSS-34 |
| 7 | CONTACT AND INFORMATION | AD2.WSSS-35 |
| 8 | DEPARTURE CLEARANCE (DCL) VIA DATALINK PROCEDURES | AD2.WSSS-35 |
| 9 | ASSIGNMENT OF FLIGHT LEVELS TO AIRCRAFT DEPARTING FROM SINGAPORE CHANGI AIRPORT | AD2.WSSS-37 |
| 10 | DELAY IN PUSHBACK AND/OR TAXIING DUE TO OTHER AIRCRAFT | AD2.WSSS-37 |
| 11 | DELAY IN TAKE-OFF DUE TO RESTRICTIONS IN THE ATC CLEARANCE | AD2.WSSS-37 |
| 12 | DELAY DUE TO OVERFLIGHTS | AD2.WSSS-37 |
| 13 | NON-CDM MODE OF OPERATIONS | AD2.WSSS-37 |
| 14 | GATE HOLD PROCEDURES FOR DEPARTING AIRCRAFT (DURING NON-CDM MODE OF OPERATIONS) | AD2.WSSS-38 |
| 15 | GROUND MOVEMENT PLANNER ON VHF 121.65MHz | AD2.WSSS-38 |
| 16 | GROUND MOVEMENT CONTROL ON VHF 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz, 125.65MHz AND 127.275MHz | AD2.WSSS-38 |
| 17 | TAXIING | AD2.WSSS-38 |
| 18 | TAKE-OFF AND LANDING | AD2.WSSS-39 |
| 19 | STANDARD INSTRUMENT DEPARTURE (SID) AND STANDARD INSTRUMENT ARRIVAL (STAR) | AD2.WSSS-39 |
| 19.1 | INTRODUCTION | AD2.WSSS-39 |
| 19.2 | ARRIVALS | AD2.WSSS-39 |
| 19.3 | DEPARTURES | AD2.WSSS-40 |
| 19.4 | VERTICAL AND SPEED RESTRICTIONS | AD2.WSSS-40 |
| 19.5 | OPERATORS' PROCEDURES | AD2.WSSS-41 |
| 20 | COORDINATES OF SID/STAR WAYPOINTS (WGS84 DATUM) | AD2.WSSS-41 |
| 21 | SID / STAR PHRASEOLOGIES | AD2.WSSS-42 |
| 22 | LIGHT AIRCRAFT OPERATIONS | AD2.WSSS-43 |
| 23 | SIMULTANEOUS INDEPENDENT PARALLEL APPROACHES | AD2.WSSS-43 |
| 23.1 | Introduction | AD2.WSSS-43 |
| 23.2 | Procedures for simultaneous independent parallel approaches | AD2.WSSS-43 |
| 23.3 | Break-out manoeuvre | AD2.WSSS-44 |
| 23.4 | Pilot notification and conditions for operations | AD2.WSSS-44 |
| WSSS AD 2.23 | ADDITIONAL INFORMATION | AD2.WSSS-44 |
| 1 | BIRD CONCENTRATION IN THE VICINITY OF THE AIRPORT | AD2.WSSS-44 |
| WSSS AD 2.24 | CHARTS RELATED TO AN AERODROME | AD2.WSSS-45 |

| <u>WSSL</u> | SINGAPORE / SELETAR | |
|-------------------------------------|--|--------------|
| <u>WSSL AD 2.1</u> | AERODROME LOCATION INDICATOR AND NAME | AD 2.WSSL-1 |
| <u>WSSL AD 2.2</u> | AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA | AD 2.WSSL-1 |
| <u>WSSL AD 2.3</u> | OPERATIONAL HOURS | AD 2.WSSL-2 |
| <u>WSSL AD 2.4</u> | HANDLING SERVICES AND FACILITIES | AD 2.WSSL-2 |
| <u>WSSL AD 2.5</u> | PASSENGER FACILITIES | AD 2.WSSL-2 |
| <u>WSSL AD 2.6</u> | RESCUE AND FIRE FIGHTING SERVICES | AD 2.WSSL-2 |
| <u>WSSL AD 2.7</u> | SEASONAL AVAILABILITY - CLEARING | AD 2.WSSL-2 |
| <u>WSSL AD 2.8</u> | APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA | AD 2.WSSL-3 |
| <u>WSSL AD 2.9</u> | SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS | AD 2.WSSL-4 |
| <u>WSSL AD 2.10</u> | AERODROME OBSTACLES | AD 2.WSSL-11 |
| <u>WSSL AD 2.11</u> | METEOROLOGICAL INFORMATION PROVIDED | AD 2.WSSL-11 |
| <u>WSSL AD 2.12</u> | RUNWAY PHYSICAL CHARACTERISTICS | AD 2.WSSL-12 |
| <u>WSSL AD 2.13</u> | DECLARED DISTANCES | AD 2.WSSL-12 |
| <u>WSSL AD 2.14</u> | APPROACH AND RUNWAY LIGHTING | AD 2.WSSL-13 |
| <u>WSSL AD 2.15</u> | OTHER LIGHTING, SECONDARY POWER SUPPLY | AD 2.WSSL-13 |
| <u>WSSL AD 2.16</u> | HELICOPTER LANDING AREA | AD 2.WSSL-14 |
| <u>WSSL AD 2.17</u> | ATS AIRSPACE | AD 2.WSSL-14 |
| <u>WSSL AD 2.18</u> | ATS COMMUNICATION FACILITIES | AD 2.WSSL-15 |
| <u>WSSL AD 2.19</u> | RADIO NAVIGATION AND LANDING AIDS | AD 2.WSSL-16 |
| <u>WSSL AD 2.20</u> | LOCAL TRAFFIC REGULATIONS | AD 2.WSSL-16 |
| <u>1</u> | LOCAL FLYING RESTRICTIONS: | AD 2.WSSL-16 |
| <u>2</u> | TEST/TRAINING FLIGHTS | AD 2.WSSL-16 |
| <u>3</u> | WRONG APPROACHES AND LANDINGS OF AIRCRAFT BOUND FOR SELETAR AERODROME AND SEMBAWANG MILITARY AERODROME | AD 2.WSSL-17 |
| <u>WSSL AD 2.21</u> | NOISE ABATEMENT PROCEDURES | AD 2.WSSL-19 |
| <u>WSSL AD 2.22</u> | FLIGHT PROCEDURES | AD 2.WSSL-20 |
| <u>1</u> | PROCEDURES FOR ARRIVALS INTO SELETAR AERODROME | AD 2.WSSL-20 |
| <u>2</u> | DEPARTURES FROM SELETAR AERODROME | AD 2.WSSL-23 |
| <u>WSSL AD 2.23</u> | ADDITIONAL INFORMATION | AD 2.WSSL-24 |
| <u>1</u> | BIRD CONCENTRATION IN THE VICINITY OF THE AIRPORT | AD 2.WSSL-24 |
| <u>2</u> | HELICOPTER CROSSING SELETAR NORTHERN EXTENDED CENTRELINE | AD 2.WSSL-24 |
| <u>WSSL AD 2.24</u> | CHARTS RELATED TO SELETAR AIRPORT | AD 2.WSSL-25 |
| | | |
| <u>WSAP</u> | PAYA LEBAR | |
| <u>WSAP AD 2.1</u> | AERODROME LOCATION INDICATOR AND NAME | AD 2.WSAP-1 |
| <u>WSAP AD 2.2</u> | AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA | AD 2.WSAP-1 |
| <u>WSAP AD 2.3</u> | OPERATIONAL HOURS | AD 2.WSAP-1 |
| <u>WSAP AD 2.4</u> | HANDLING SERVICES AND FACILITIES | AD 2.WSAP-2 |
| <u>WSAP AD 2.5</u> | PASSENGER FACILITIES | AD 2.WSAP-2 |
| <u>WSAP AD 2.6</u> | RESCUE AND FIRE FIGHTING SERVICES | AD 2.WSAP-2 |
| <u>WSAP AD 2.7</u> | SEASONAL AVAILABILITY - CLEARING | AD 2.WSAP-2 |
| <u>WSAP AD 2.8</u> | APRONS, TAXIWAYS AND CHECK LOCATIONS DATA | AD 2.WSAP-2 |
| <u>WSAP AD 2.9</u> | SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS | AD 2.WSAP-3 |
| <u>WSAP AD 2.10</u> | AERODROME OBSTACLES | AD 2.WSAP-5 |
| <u>WSAP AD 2.11</u> | METEOROLOGICAL INFORMATION PROVIDED | AD 2.WSAP-6 |
| <u>WSAP AD 2.12</u> | RUNWAY PHYSICAL CHARACTERISTICS | AD 2.WSAP-6 |
| <u>WSAP AD 2.13</u> | DECLARED DISTANCES | AD 2.WSAP-6 |

| | | |
|------------------------------|---|-------------|
| WSAP AD 2.14 | APPROACH AND RUNWAY LIGHTING | AD 2.WSAP-7 |
| WSAP AD 2.15 | OTHER LIGHTING, SECONDARY POWER SUPPLY | AD 2.WSAP-7 |
| WSAP AD 2.16 | [NIL] HELICOPTER LANDING AREA | NIL |
| WSAP AD 2.17 | ATS AIRSPACE | AD 2.WSAP-7 |
| WSAP AD 2.18 | ATS COMMUNICATION FACILITIES | AD 2.WSAP-8 |
| WSAP AD 2.19 | RADIO NAVIGATION AND LANDING AIDS | AD 2.WSAP-9 |
| WSAP AD 2.20 | LOCAL TRAFFIC REGULATIONS - DESIGNATION OF PAYA LEBAR AIRPORT AS AN ALTERNATE AD FOR SINGAPORE CHANGI AIRPORT | AD 2.WSAP-9 |
| 1 | INTRODUCTION | AD 2.WSAP-9 |
| 2 | MANNING OF PAYA LEBAR AIRPORT | AD 2.WSAP-9 |
| 3 | OPERATIONAL SERVICES | AD2.WSAP-10 |
| 4 | PASSENGER CLEARANCE | AD2.WSAP-10 |
| 5 | SECURITY | AD2.WSAP-10 |
| 6 | AIRCRAFT STAND ALLOCATION | AD2.WSAP-10 |
| 7 | AIRCRAFT REFUELLING | AD2.WSAP-10 |
| 8 | GROUND OPERATIONS | AD2.WSAP-10 |
| 9 | FULL EMERGENCY/CRASH PROCEDURE | AD2.WSAP-10 |
| 10 | METEOROLOGICAL AND AERONAUTICAL INFORMATION SERVICE | AD2.WSAP-10 |
| 11 | ATC SERVICE OUTSIDE STIPULATED OPERATING HOURS | AD2.WSAP-10 |
| WSAP AD 2.21 | [NIL] NOISE ABATEMENT PROCEDURES | NIL |
| WSAP AD 2.22 | FLIGHT AND GROUND PROCEDURES | AD2.WSAP-11 |
| 1 | DEPARTURE AND ARRIVAL PROCEDURES | AD2.WSAP-11 |
| 2 | STANDARD INSTRUMENT DEPARTURES | AD2.WSAP-11 |
| 3 | STANDARD ARRIVALS | AD2.WSAP-11 |
| WSAP AD 2.23 | ADDITIONAL INFORMATION | AD2.WSAP-11 |
| 1 | OUTDOOR LIGHT AND WATER SHOW | AD2.WSAP-11 |
| WSAP AD 2.24 | CHARTS RELATED TO PAYA LEBAR AIRPORT | AD2.WSAP-11 |
| WSAT | TENGAH | |
| WSAT AD 2.1 | AERODROME LOCATION INDICATOR AND NAME | AD 2.WSAT-1 |
| WSAT AD 2.2 | AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA | AD 2.WSAT-1 |
| WSAT AD 2.3 | OPERATIONAL HOURS | AD 2.WSAT-1 |
| WSAT AD 2.4 | HANDLING SERVICES AND FACILITIES | AD 2.WSAT-2 |
| WSAT AD 2.5 | PASSENGER FACILITIES | AD 2.WSAT-2 |
| WSAT AD 2.6 | RESCUE AND FIRE FIGHTING SERVICES | AD 2.WSAT-2 |
| WSAT AD 2.7 | SEASONAL AVAILABILITY - CLEARING | AD 2.WSAT-2 |
| WSAT AD 2.8 | APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA | AD 2.WSAT-2 |
| WSAT AD 2.9 | [NIL] SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS | NIL |
| WSAT AD 2.10 | AERODROME OBSTACLES | AD 2.WSAT-3 |
| WSAT AD 2.11 | [NIL] METEOROLOGICAL INFORMATION PROVIDED | NIL |
| WSAT AD 2.12 | RUNWAY PHYSICAL CHARACTERISTICS | AD 2.WSAT-3 |
| WSAT AD 2.13 | DECLARED DISTANCES | AD 2.WSAT-3 |
| WSAT AD 2.14 | APPROACH AND RUNWAY LIGHTING | AD 2.WSAT-4 |
| WSAT AD 2.15 | OTHER LIGHTING, SECONDARY POWER SUPPLY | AD 2.WSAT-4 |
| WSAT AD 2.16 | [NIL] HELICOPTER LANDING AREA | NIL |
| WSAT AD 2.17 | ATS AIRSPACE | AD 2.WSAT-4 |
| WSAT AD 2.18 | ATS COMMUNICATION FACILITIES | AD 2.WSAT-5 |
| WSAT AD 2.19 | RADIO NAVIGATION AND LANDING AIDS | AD 2.WSAT-6 |

| | | |
|------------------------------|--|-------------|
| WSAT AD 2.20 | LOCAL TRAFFIC REGULATIONS - USE OF RSAF TENGAH AIR BASE AS AN EMERGENCY DIVERSION AERODROME FOR SINGAPORE CHANGI AIRPORT | AD 2.WSAT-7 |
| 1 | INTRODUCTION | AD 2.WSAT-7 |
| 2 | MANNING OF TENGAH AIR BASE | AD 2.WSAT-7 |
| 3 | OPERATIONAL SERVICES | AD 2.WSAT-7 |
| 4 | PASSENGER CLEARANCE | AD 2.WSAT-7 |
| 5 | SECURITY | AD 2.WSAT-7 |
| 6 | AIRCRAFT STAND ALLOCATION | AD 2.WSAT-7 |
| 7 | COMMUNICATIONS | AD 2.WSAT-7 |
| 8 | FUEL | AD 2.WSAT-8 |
| 9 | AIRCRAFT SERVICES | AD 2.WSAT-8 |
| 10 | RESCUE AND FIRE FIGHTING FACILITIES | AD 2.WSAT-8 |
| 11 | FULL EMERGENCY/CRASH PROCEDURE | AD 2.WSAT-8 |
| 12 | ATC SERVICE OUTSIDE OPERATING HOURS | AD 2.WSAT-8 |
| WSAT AD 2.21 | [NIL] NOISE ABATEMENT PROCEDURES | NIL |
| WSAT AD 2.22 | [NIL] FLIGHT PROCEDURES | NIL |
| WSAT AD 2.23 | [NIL] ADDITIONAL INFORMATION | NIL |
| WSAT AD 2.24 | CHARTS RELATED TO AN AERODROME | AD 2.WSAT-8 |
| WSAG | SEMBAWANG | |
| WSAG AD 2.1 | AERODROME LOCATION INDICATOR AND NAME | AD 2.WSAG-1 |
| WSAG AD 2.2 | AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA | AD 2.WSAG-1 |
| WSAG AD 2.3 | OPERATIONAL HOURS | AD 2.WSAG-1 |
| WSAG AD 2.4 | [NIL] HANDLING SERVICES AND FACILITIES | NIL |
| WSAG AD 2.5 | [NIL] PASSENGER FACILITIES | NIL |
| WSAG AD 2.6 | RESCUE AND FIRE FIGHTING SERVICES | AD 2.WSAG-1 |
| WSAG AD 2.7 | [NIL] SEASONAL AVAILABILITY - CLEARING | NIL |
| WSAG AD 2.8 | APRON, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA | AD 2.WSAG-1 |
| WSAG AD 2.9 | [NIL] SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS | NIL |
| WSAG AD 2.10 | AERODROME OBSTACLES | AD 2.WSAG-2 |
| WSAG AD 2.11 | [NIL] METEOROLOGICAL INFORMATION PROVIDED | NIL |
| WSAG AD 2.12 | RUNWAY PHYSICAL CHARACTERISTICS | AD 2.WSAG-2 |
| WSAG AD 2.13 | DECLARED DISTANCES | AD 2.WSAG-2 |
| WSAG AD 2.14 | [NIL] APPROACH AND RUNWAY LIGHTING | NIL |
| WSAG AD 2.15 | OTHER LIGHTING, SECONDARY POWER SUPPLY | AD 2.WSAG-2 |
| WSAG AD 2.16 | [NIL] HELICOPTER LANDING AREA | NIL |
| WSAG AD 2.17 | ATS AIRSPACE | AD 2.WSAG-2 |
| WSAG AD 2.18 | COMMUNICATION FACILITIES | AD 2.WSAG-3 |
| WSAG AD 2.19 | RADIO NAVIGATION AND LANDING AIDS | AD 2.WSAG-4 |
| WSAG AD 2.20 | [NIL] LOCAL TRAFFIC REGULATIONS | NIL |
| WSAG AD 2.21 | [NIL] NOISE ABATEMENT PROCEDURES | NIL |
| WSAG AD 2.22 | [NIL] FLIGHT PROCEDURES | NIL |
| WSAG AD 2.23 | [NIL] ADDITIONAL INFORMATION | NIL |
| WSAG AD 2.24 | [NIL] CHARTS RELATED TO AN AERODROME | NIL |
| WMKJ | JOHOR BAHRU | |
| WMKJ AD 2.1 | AERODROME LOCATION INDICATOR AND NAME | AD 2.WMKJ-1 |
| WMKJ AD 2.2 | [NIL] AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA | NIL |

| | | |
|------------------------------|---|-------------|
| WMKJ AD 2.3 | [NIL] OPERATIONAL HOURS | NIL |
| WMKJ AD 2.4 | [NIL] HANDLING SERVICES AND FACILITIES | NIL |
| WMKJ AD 2.5 | [NIL] PASSENGER FACILITIES | NIL |
| WMKJ AD 2.6 | [NIL] RESCUE AND FIRE FIGHTING SERVICES | NIL |
| WMKJ AD 2.7 | [NIL] SEASONAL AVAILABILITY - CLEARING | NIL |
| WMKJ AD 2.8 | [NIL] APRONS, TAXIWAYS AND CHECK LOCATIONS DATA | NIL |
| WMKJ AD 2.9 | [NIL] SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS | NIL |
| WMKJ AD 2.10 | [NIL] AERODROME OBSTACLES | NIL |
| WMKJ AD 2.11 | [NIL] METEOROLOGICAL INFORMATION PROVIDED | NIL |
| WMKJ AD 2.12 | [NIL] RUNWAY PHYSICAL CHARACTERISTICS | NIL |
| WMKJ AD 2.13 | [NIL] DECLARED DISTANCES | NIL |
| WMKJ AD 2.14 | [NIL] APPROACH AND RUNWAY LIGHTING | NIL |
| WMKJ AD 2.15 | [NIL] OTHER LIGHTING, SECONDARY POWER SUPPLY | NIL |
| WMKJ AD 2.16 | [NIL] HELICOPTER LANDING AREA | NIL |
| WMKJ AD 2.17 | ATS AIRSPACE | AD 2.WMKJ-1 |
| WMKJ AD 2.18 | [NIL] ATS COMMUNICATION FACILITIES | NIL |
| WMKJ AD 2.19 | [NIL] RADIO NAVIGATION AND LANDING AIDS | NIL |
| WMKJ AD 2.20 | [NIL] LOCAL TRAFFIC REGULATIONS | NIL |
| WMKJ AD 2.21 | [NIL] NOISE ABATEMENT PROCEDURES | NIL |
| WMKJ AD 2.22 | [NIL] FLIGHT PROCEDURES | NIL |
| WMKJ AD 2.23 | [NIL] ADDITIONAL INFORMATION | NIL |
| WMKJ AD 2.24 | [NIL] CHARTS RELATED TO AN AERODROME | NIL |
| | | |
| WIDD | BATAM/HANG NADIM (INDONESIA) | |
| WIDD AD 2.1 | AERODROME LOCATION INDICATOR AND NAME | AD 2.WIDD-1 |
| WIDD AD 2.2 | [NIL] AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA | NIL |
| WIDD AD 2.3 | [NIL] OPERATIONAL HOURS | NIL |
| WIDD AD 2.4 | [NIL] HANDLING SERVICES AND FACILITIES | NIL |
| WIDD AD 2.5 | [NIL] PASSENGER FACILITIES | NIL |
| WIDD AD 2.6 | [NIL] RESCUE AND FIRE FIGHTING SERVICES | NIL |
| WIDD AD 2.7 | [NIL] SEASONAL AVAILABILITY - CLEARING | NIL |
| WIDD AD 2.8 | [NIL] APRONS, TAXIWAYS AND CHECK LOCATIONS DATA | NIL |
| WIDD AD 2.9 | [NIL] SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS | NIL |
| WIDD AD 2.10 | [NIL] AERODROME OBSTACLES | NIL |
| WIDD AD 2.11 | [NIL] METEOROLOGICAL INFORMATION PROVIDED | NIL |
| WIDD AD 2.12 | [NIL] RUNWAY PHYSICAL CHARACTERISTICS | NIL |
| WIDD AD 2.13 | [NIL] DECLARED DISTANCES | NIL |
| WIDD AD 2.14 | [NIL] APPROACH AND RUNWAY LIGHTING | NIL |
| WIDD AD 2.15 | [NIL] OTHER LIGHTING, SECONDARY POWER SUPPLY | NIL |
| WIDD AD 2.16 | [NIL] HELICOPTER LANDING AREA | NIL |
| WIDD AD 2.17 | ATS AIRSPACE | AD 2.WIDD-1 |
| WIDD AD 2.18 | ATS COMMUNICATION FACILITIES | AD 2.WIDD-1 |
| WIDD AD 2.19 | [NIL] RADIO NAVIGATION AND LANDING AIDS | NIL |
| WIDD AD 2.20 | [NIL] LOCAL TRAFFIC REGULATIONS | NIL |
| WIDD AD 2.21 | [NIL] NOISE ABATEMENT PROCEDURES | NIL |
| WIDD AD 2.22 | [NIL] FLIGHT PROCEDURES | NIL |
| WIDD AD 2.23 | [NIL] ADDITIONAL INFORMATION | NIL |

| | | |
|------------------------------|---|-------------|
| WIDD AD 2.24 | CHARTS RELATED TO AN AERODROME | AD 2.WIDD-2 |
| WIDN | TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) | |
| WIDN AD 2.1 | AERODROME LOCATION INDICATOR AND NAME | AD 2.WIDN-1 |
| WIDN AD 2.2 | [NIL] AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA | NIL |
| WIDN AD 2.3 | [NIL] OPERATIONAL HOURS | NIL |
| WIDN AD 2.4 | [NIL] HANDLING SERVICES AND FACILITIES | NIL |
| WIDN AD 2.5 | [NIL] PASSENGER FACILITIES | NIL |
| WIDN AD 2.6 | [NIL] RESCUE AND FIRE FIGHTING SERVICES | NIL |
| WIDN AD 2.7 | [NIL] SEASONAL AVAILABILITY – CLEARING | NIL |
| WIDN AD 2.8 | [NIL] APRONS, TAXIWAYS AND CHECK LOCATIONS DATA | NIL |
| WIDN AD 2.9 | [NIL] SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS | NIL |
| WIDN AD 2.10 | [NIL] AERODROME OBSTACLES | NIL |
| WIDN AD 2.11 | [NIL] METEOROLOGICAL INFORMATION PROVIDED | NIL |
| WIDN AD 2.12 | [NIL] RUNWAY PHYSICAL CHARACTERISTICS | NIL |
| WIDN AD 2.13 | [NIL] DECLARED DISTANCES | NIL |
| WIDN AD 2.14 | [NIL] APPROACH AND RUNWAY LIGHTING | NIL |
| WIDN AD 2.15 | [NIL] OTHER LIGHTING, SECONDARY POWER SUPPLY | NIL |
| WIDN AD 2.16 | [NIL] HELICOPTER LANDING AREA | NIL |
| WIDN AD 2.17 | ATS AIRSPACE | AD 2.WIDN-1 |
| WIDN AD 2.18 | ATS COMMUNICATION FACILITIES | AD 2.WIDN-1 |
| WIDN AD 2.19 | [NIL] RADIO NAVIGATION AND LANDING AIDS | NIL |
| WIDN AD 2.20 | [NIL] LOCAL TRAFFIC REGULATIONS | NIL |
| WIDN AD 2.21 | [NIL] NOISE ABATEMENT PROCEDURES | NIL |
| WIDN AD 2.22 | [NIL] FLIGHT PROCEDURES | NIL |
| WIDN AD 2.23 | [NIL] ADDITIONAL INFORMATION | NIL |
| WIDN AD 2.24 | CHARTS RELATED TO AN AERODROME | AD 2.WIDN-1 |

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

PAGE INTENTIONALLY LEFT BLANK

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.

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

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 **FRICION MEASURING DEVICE USED AND FRICION 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) |

6 RUNWAY SURFACE CONDITION ASSESSMENT AND REPORTING

The following information are based on the implementation of the new ICAO methodology for assessing and reporting runway surface conditions, commonly known as the ICAO Global Reporting Format (GRF). Aircraft operators should utilize the information in conjunction with the performance data provided by the aircraft manufacturer to determine if landing or take-off operations can be conducted safely and provide runway braking action special air reports (AIREP) to ATC.

6.1 Assessment and Reporting

- 6.1.1 Runway surface conditions are assessed and reported in the ICAO GRF whenever water is present on an operational runway.
- 6.1.2 Runway Condition Report (RCR) is disseminated when there are significant changes in the runway surface condition.
- 6.1.3 The RCR contains Runway Condition Code (RWYCC) and information that describes the runway surface condition, i.e., type of contaminants, depth, coverage for each runway third. Other relevant information is reported in the situational awareness section of the RCR.
- 6.1.4 The RWYCC is derived from the Runway Condition Assessment Matrix (RCAM), which contains the information that is relevant to the current weather environment in Singapore.

Runway condition assessment matrix (RCAM)

| Assessment criteria | | Downgrade assessment criteria | |
|-------------------------------|--|---|---------------------------------------|
| Runway condition code (RWYCC) | Runway surface description | Aeroplane deceleration or directional control observation | Pilot report of runway braking action |
| 6 | Dry | -- | -- |
| 5 | WET (The runway surface is covered by any visible dampness or water up to and including 3 mm depth) | Braking deceleration is normal for the wheel braking effort applied AND directional control is normal. | Good |
| 3 | WET ("slippery wet" runway) | Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced. | Medium |
| 2 | STANDING WATER (more than 3 mm depth) | Braking deceleration OR directional control is between Medium and Poor. | Medium to Poor |

- 6.1.5 The RCR is disseminated via ATIS, SNOWTAM, and Air-Ground Voice Communications.

Communication Channels for RCR

| Runway condition code (RWYCC) | Air-Ground Voice Communications | ATIS | SNOWTAM |
|--------------------------------------|---------------------------------|------|---------|
| 6 (Dry) | Yes* | No | No** |
| 5 (Wet) | Yes | Yes | No** |
| 3 (Slippery Wet) | Yes | Yes | No** |
| 2 (Standing Water more than 3 mm) | Yes | Yes | Yes |

* Upon request

** Except when RWYCC 2 was previously reported

6.2 *Dissemination of Runway Condition Report (RCR)***6.2.1 ATIS**

6.2.1.1 The RCR is communicated in addition to the MET REPORT elements. The information is communicated for each runway third in the direction of landing/take-off.

6.2.2 SNOWTAM

6.2.2.1 The SNOWTAM will be promulgated whenever RWYCC 2 is reported. The assessment and reporting of runway surface conditions continue until the runway is no longer contaminated. The RCR is communicated from the lowest runway designation number.

6.2.3 Air-Ground Voice Communications

6.2.3.1 Only the Runway Condition Code (RWYCC) for each runway third will be communicated through the frequency. The contamination type, contamination depth, and coverage will be provided upon request by the pilot. The information is communicated for each runway third in the direction of landing/take-off.

6.2.4 Pilots are to make special air reports (AIREP) whenever worse braking action than previously reported is experienced. Otherwise, the pilots may be asked by the ATC to report their assessment of the braking performance. The terms to describe braking action are provided in the RCAM in para 6.1.4.

PAGE INTENTIONALLY LEFT BLANK

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.

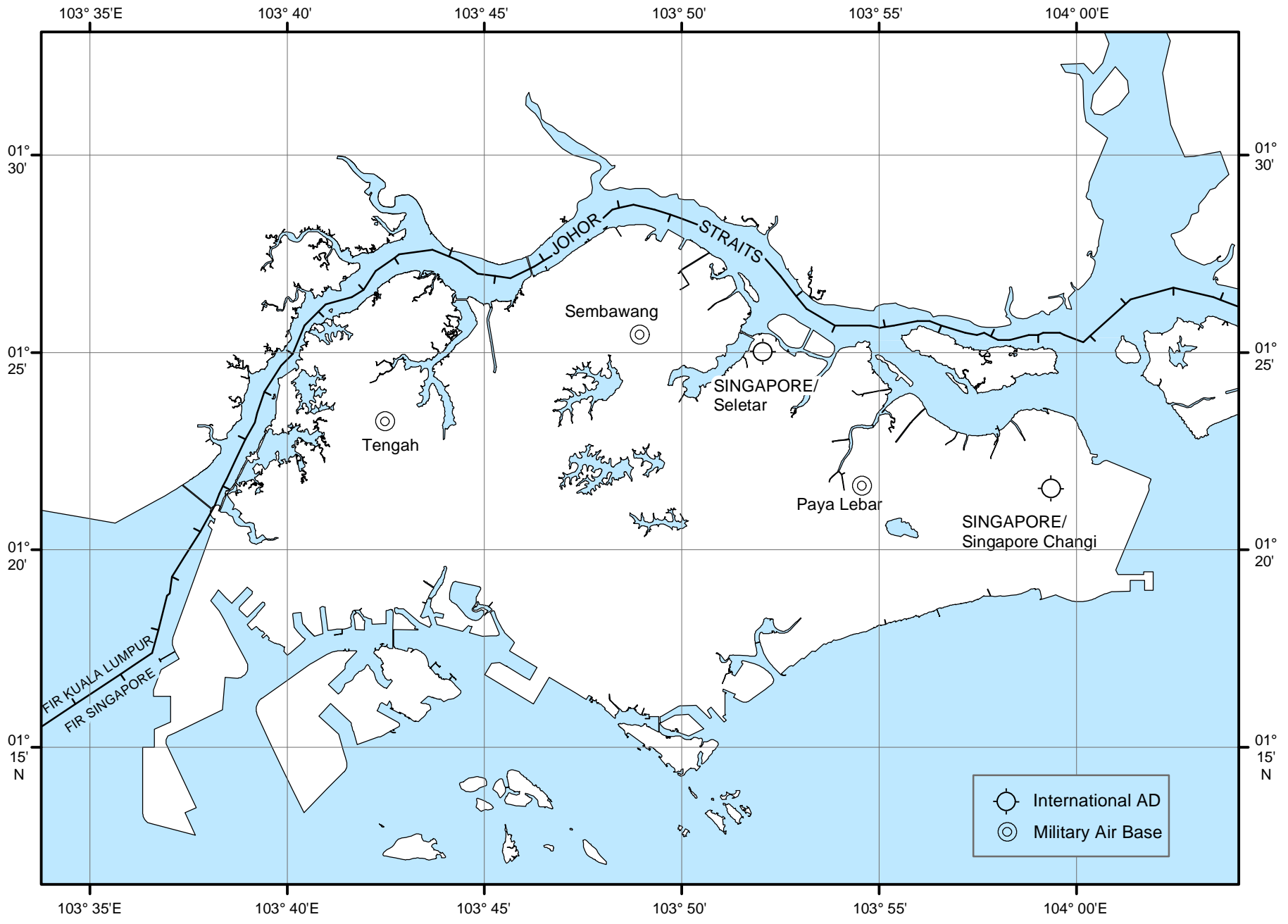
PAGE INTENTIONALLY LEFT BLANK

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 |

PAGE INTENTIONALLY LEFT BLANK

AERODROME INDEX - CHART



PAGE INTENTIONALLY LEFT BLANK

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.

PAGE INTENTIONALLY LEFT BLANK

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) |

PAGE INTENTIONALLY LEFT BLANK

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 | <i>ARP coordinates and site at AD</i> | 012133.16N 1035921.57E (Control Tower) |
| 2 | <i>Direction and distance from (city)</i> | 17.2km North-East from City Centre (The Fullerton Hotel, Singapore) |
| 3 | <i>Elevation/Reference temperature</i> | 6.66 M / 32.8°C |
| 4 | <i>Geoid Undulation (AD elevation position)</i> | 10.24 M |
| 5 | <i>MAG VAR /Annual change</i> | 0°23' E (2020) / Negligible |
| 6 | <i>AD Administration, address, telephone, telefax, AFS</i> | |
| CHANGI AIRPORT GROUP (SINGAPORE) PTE LTD Singapore Changi Airport P.O.Box 168, SINGAPORE 918146 Tel: (65)65956868 | | |
| 7 | <i>Types of traffic permitted</i> | IFR |
| 8 | <i>Remarks</i> | |
| 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 | |

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 | <i>Cargo Handling Facilities</i> | 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 | <i>Fuel / Oil Types</i> | JET A1 (for aircraft). Oils: Various by arrangement with fuel companies. |
| 3 | <i>Fuelling Facilities / Capacity</i> | Hydrant refueling |
| 4 | <i>Hangar space for visiting aircraft</i> | By arrangement with SIA Engineering Company (SIAEC) or ST Aerospace Services Co. |
| 5 | <i>Repair facilities for visiting aircraft</i> | Maintenance and repairs for commercial aircraft up to and including A380 is by arrangement. |
| 6 | <i>Remarks</i> | <p>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.</p> <p>b. Oxygen and related servicing: Oxygen for all cabin and aircraft system. No CO₂ recharging facilities.</p> |

WSSS AD 2.5 PASSENGER FACILITIES

| | | |
|---|-----------------------------|---|
| 1 | <i>Hotels</i> | Transit area and adjacent to airport terminal. |
| 2 | <i>Restaurants</i> | Transit and public areas of terminal building. |
| 3 | <i>Transportation</i> | Buses, taxis, MRT train and car rental service. |
| 4 | <i>Medical Facilities</i> | Available at airport. |
| 5 | <i>Bank and Post Office</i> | Available at airport. |
| 6 | <i>Tourist Office</i> | Available at airport. |
| 7 | <i>Remarks</i> | 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 | <i>AD category for fire fighting</i> | <u>RWY 02L/20R, RWY 02C/20C and RWY 02R/20L</u> CAT10 (No facilities for foaming of runways) |
| 2 | <i>Rescue equipment</i> | Adequately provided as recommended by ICAO. |
| 3 | <i>Capability for removal of disabled aircraft</i> | Specialised aircraft recovery equipment available for up to and including A380 size aircraft operation. |
| 4 | <i>Remarks</i> | All Airport Emergency Service personnel are trained in rescue and fire-fighting as well as medical first-aid. |

WSSS AD 2.7 SEASONAL AVAILABILITY - CLEARING

| | |
|---|--|
| There is no requirement for clearing. The aerodrome is available throughout the year. | |
|---|--|

WSSS AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

| | | |
|---|---|--|
| 1 | <i>Apron surface and strength</i> | Concrete surface, strength PCN 85/R/B/W/U |
| 2 | <i>Taxiway width, surface and strength</i> | <p>Minimum width 23m for all taxiways</p> <p>TWY W1, W9, T2, T4, T12 and T (between T11 and T12) – Concrete surface; strength PCN 85/R/B/W/U</p> <p>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</p> <p>TWY T (BETWEEN TWY P AND TWY J), TWY J and TWY K (between TWY K2 and TWY J12) – Asphalt surface; strength PCN 80/F/B/X/T</p> <p>TWY P1 (between N and N5) and all other TWYs A, B, J, K – Asphalt surface; strength PCN 82/F/B/X/T</p> <p>All other taxiways – Asphalt surface, strength PCN 72/F/B/W/U</p> <p><u>Note:</u> 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.</p> |
| 3 | <i>Altimeter checkpoints location and elevation</i> | See AD-2-WSSS-ADC-2/ Chart (flip side) for coordinates and elevations of aircraft stands. |
| 4 | VOR checkpoint location | NIL |
| 5 | <i>INS checkpoints position</i> | See AD-2-WSSS-ADC-2/ Chart (flip side) for coordinates and elevations of aircraft stands. |
| 6 | <i>Remarks</i> | NIL |

WSSS AD 2.9 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS

| | |
|---|--|
| 1 | <p>Use of aircraft stand ID signs, TWY guidelines and visual docking/parking guidance system of aircraft stands.</p> <p>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.</p> <p>Aircraft stand manoeuvring guidance lights are provided at aircraft stands at Terminal 3, Terminal 4 and South Aprons.</p> |
| 2 | <p>RWY and TWY markings and LGT.</p> <p><u>RWY 02L/02C and RWY 20C</u></p> <p>RWY LGT: refer to WSSS AD 2.14 and WSSS AD 2.15.</p> <p>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.</p> <p>Internally/externally lighted mandatory or information TWY signboards.</p> <p>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</p> <p>MARKING AIDS: THR, touchdown zone, centreline, side stripe, RWY designations, aiming point markings, TWY centreline, taxi holding positions - all taxiways, apron guide lines.</p> <p>For positions of aircraft nosewheel in relation to stopbar and description of the Safegate Aircraft Docking Guidance System - refer to WSSS AD 2.9.</p> <p><u>RWY 20R</u></p> <p>RWY LGT: refer to WSSS AD 2.14 and WSSS AD 2.15.</p> <p>TWY LGT: same as for RWY 02L/02C and RWY 20C.</p> <p>MARKING AIDS: Pre-threshold centreline, transverse stripe for displaced THR, RWY designations, THR, touchdown zone, aiming point marking, RWY centreline and stripe marking aids.</p> <p><u>RWY 02R/20L</u></p> <p>RWY LGT: refer to WSSS AD 2.14 and WSSS AD 2.15.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>MARKING AIDS: THR, touchdown zone, RWY centreline, RWY side stripe, RWY designations, aiming point markings, TWY centreline, taxi holding positions – all taxiways.</p> |
| 3 | <p><i>Stop bars</i>: Stop bars where appropriate.</p> |
| 4 | <p><i>Remarks</i>: 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.</p> |

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.

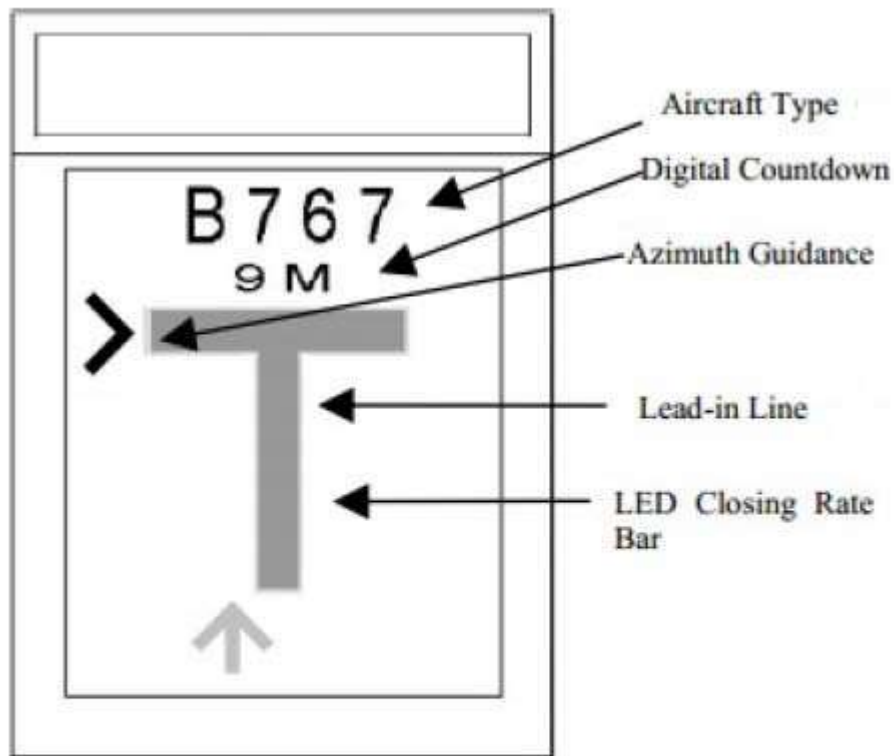
1.2 DESCRIPTION OF SYSTEM

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.


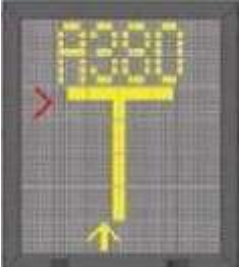
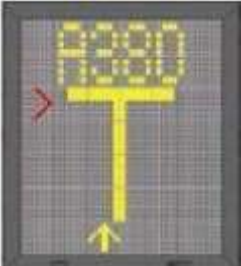


LED DISPLAY AND LASER SCANNING UNIT









Safedock Type 1



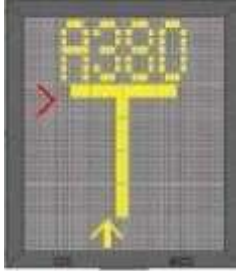


Figure A





1.3 DOCKING PROCEDURES

| Description | Display on ADGS |
|--|---|
| <p>Checking of Aircraft Type</p> <ul style="list-style-type: none"> Check that the correct aircraft type is displayed. The scrolling arrows indicate that the system is activated. Follow the lead-in line. |  |
| <p>Capture of Correct Aircraft Type</p> <ul style="list-style-type: none"> 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. |  |
| <p>Steering and Alignment of Aircraft</p> <ul style="list-style-type: none"> 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. |  |
| <p>Distance of Aircraft from STOP Position</p> <ul style="list-style-type: none"> 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. |  |
| <p>STOP Position</p> <ul style="list-style-type: none"> 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. |  |

| Description | Display on ADGS |
|--|--|
| <p>Checking of STOP Position</p> <ul style="list-style-type: none"> If the aircraft stops at the correct position, "OK" will be displayed after a few seconds. |  |
| <p>Overshooting of STOP Position</p> <ul style="list-style-type: none"> If the aircraft has gone past the correct stop position, the display will show "TOO FAR" after the aircraft comes to a complete stop. |  |
| <p>Object Blocking the View</p> <ul style="list-style-type: none"> 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". |  |
| <p>Identification of Aircraft</p> <ul style="list-style-type: none"> The aircraft must be identified at least 12m before the correct stop position. Otherwise, the display will show "WAIT", "STOP" and "ID FAIL". |    |

1.4 SAFETY MEASURES

| Description | Display on ADGS |
|---|--|
| <p>ADGS Blank / Wrong Aircraft Type</p> <ul style="list-style-type: none"> 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. |  |
| <p>Proceeding beyond Passenger Loading Bridges</p> <ul style="list-style-type: none"> 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). |  <p style="text-align: center;">Figure 1</p>  <p style="text-align: center;">Figure 2</p> |
| <p>Minimum Speed</p> <ul style="list-style-type: none"> 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. |  |
| <p>Slow Down (In Abnormal Situations)</p> <ul style="list-style-type: none"> 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. |  <p style="text-align: center;">Figure 1</p> |

| Description | Display on ADGS |
|---|--|
| <p>Overshooting</p> <ul style="list-style-type: none"> 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. |   |
| <p>No Display</p> <ul style="list-style-type: none"> 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. |  <p>Figure 1</p>  <p>Figure 2</p> |

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).

- 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.

WSSS AD 2.10 AERODROME OBSTACLES

1. Obstacles in Approach / TKOF areas

| IN APPROACH / TKOF AREAS | | |
|---|--|---|
| RWY/Area affected | <i>Obstacles type, ELEV, Markings/LGT</i> | 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 | 011931.7N 1040008.8E |
| 3) RWY 20L Anemometer, 48ft AMSL | 012105.7N 1040048.5E |
| 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 | 011929.1N 1040007.3E |
| 9) RWY 20L GP Antenna, 67ft AMSL | 012108.9N 1040049.4E |
| 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 |

| 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. | |

WSSS AD 2.11 METEOROLOGICAL INFORMATION PROVIDED

| | | |
|----|---|--|
| 1 | <i>Associated MET Office</i> | Singapore Changi (WSSS) |
| 2 | <i>Hours of service</i> | H24 |
| 3 | <i>Office responsible for TAF preparation</i> <i>Periods of validity</i> | Singapore Changi (WSSS) 12, 30 |
| 4 | <i>Type of landing forecast, Interval of issuance</i> | TREND |
| 5 | <i>Briefing/consultation provided</i> | P |
| 6 | <i>Flight documentation, Language used</i> | Charts or Tabular forms, English |
| 7 | <i>Charts and other information available for briefing or consultation</i> | S, U, P |
| 8 | <i>Supplementary equipment available for providing information</i> | 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 | <i>ATS units provided with information</i> | Singapore ACC, Singapore RCC |
| 10 | <i>Additional information</i> | Tel: 65422837 (MET Office) |

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 |

| 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

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 |

| 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 |

| 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 |

WSSS AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

| | | |
|---|---|---|
| 1 | <i>ABN/IBN location, characteristics and hours of operation</i> | 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 | <i>LDI location and LGT Anemometer location and LGT</i> | 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 | <i>TWY Edge and Centreline Lighting</i> | 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 | <i>Secondary power supply/switch-over time</i> | Automatic standby generator power supply AVBL for airfield lighting with switchover time of 1 second during Category II low visibility operations. |
| 5 | <i>Remarks</i> | Vehicles painted yellow or displaying chequered red/white or orange/white flag at highest point of vehicle |

WSSS AD 2.16 HELICOPTER LANDING AREARefer to [ENR 3.4](#)**WSSS AD 2.17 ATS AIRSPACE**

| | | |
|---|--|---|
| 1 | <i>Designation and Lateral Limits</i> | 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 | <i>Vertical Limits</i> | SFC to 3,000ft ALT |
| 3 | <i>Airspace Classification</i> | C |
| 4 | <i>ATS Unit Callsign Language(s)</i> | Singapore Tower English |
| 5 | <i>Transition Altitude</i> | 11000 FT (3,350m) |
| 6 | <i>Remarks</i> | A helicopter shall not be operated within the Changi CTR unless prior permission has been obtained from the Director-General of Civil Aviation, CAAS. Email to caas_ats_ansp@caas.gov.sg |

WSSS AD 2.18 ATS COMMUNICATION FACILITIES

| Service Designation | Call sign | Frequency (P-Pri, S-Sec) | Hours of operation | Remarks | |
|----------------------------|---------------------|---|---------------------------|--|---|
| 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, L762, M630 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), 045224N 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 | |

| 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 | <p>Requests for engine runs on aprons and taxiways, excluding runways, would be regulated by Changi Apron. All towing request to contact Changi Apron followed by instruction to contact respective Singapore Ground frequency for towing clearance.</p> <p>Request for vehicular movements on taxiways, excluding runways, would be regulated by Changi Tower.</p> <p>For aircraft on tow and vehicular movements on the runway when the runway is closed for maintenance.</p> <p>All personnel operating the radio station on board an aircraft that is on the ground in Changi Airport should possess the Aircraft Radio Operator Approval (AROA) or other equivalent certification.</p> |
| Changi East Tower | 119.675 MHz | H24 | <p>Request for vehicular movements on taxiways, excluding runway, 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.</p> <p>For aircraft on tow and vehicular movements on RWY 02R/20L when the runway is closed for maintenance.</p> <p>All personnel operating the radio station on board an aircraft that is on the ground in Changi Airport should possess the Aircraft Radio Operator Approval (AROA) or other equivalent certification.</p> | |
| Changi East Ground | 120.95 MHz | Not for use, unless with prior coordination | For start-up / taxiing of all aircraft | |

| 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) |
| | Changi Airport Arrival Information | 128.025 MHz | H24 | Data Link Service available. AP IDENT WSSS Messages comply with ARINC 623 Standards. Updating of data: H+00 to H+10 and H+30 to H+40 |
| ATIS | Changi East Information (02R/ 20L) | 139.95 MHz | Not for use, unless with prior coordination | NIL |

WSSS AD 2.19 RADIO NAVIGATION AND LANDING AIDS

| Type of aid and Variation | IDENT | Frequency | OPR Hour | Position of Transmitting Antenna Coordinates | DME Transmitting Antenna Elevation / Remarks |
|---------------------------|-------|---------------------|----------|--|---|
| 1 | 2 | 3 | 4 | 5 | 6 & 7 |
| SINJON DVOR/DME | SJ | 113.5 MHz CH82X | H24 | 011321.34N 1035115.22E | 201° MAG 14.5km from THR RWY 02 (Paya Lebar). Antenna HGT: 194ft AMSL. Coverage 200NM. EM: F1. Maintenance period: Third Thursday of every month between 0200-0600 |
| TEKONG DVOR/DME | VTK | 116.5 MHz CH112X | H24 | 012455.36N 1040120.17E | 023° MAG 6.4km from THR RWY 20C (Singapore Changi). Antenna HGT: 150ft AMSL. Coverage 200NM. EM: F1 Maintenance Period: Third Friday of every month between 0200-0600 |
| RWY 20C ILS LLZ | ICC | 109.7MHz | H24 | 011932.48N 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. |

| Type of aid and Variation | IDENT | Frequency | OPR Hour | Position of Transmitting Antenna Coordinates | DME Transmitting Antenna Elevation / Remarks |
|---------------------------|-------|-----------|----------|--|---|
| 1 | 2 | 3 | 4 | 5 | 6 & 7 |
| RWY 02L ILS LLZ | ICW | 110.9MHz | H24 | 012307.03N 1035934.03E | Located 1105m (3625ft) from displaced THR RWY 20R, along centreline of RWY. Course width 2.81°. EM:A0/A2. |
| RWY 02L ILS GP | - | 330.8MHz | H24 | 012108.35N 1035838.86E | Located 343m (1125ft) from THR RWY 02L on left side of RWY, 143m (469ft) from RWY centreline. GP angle 3°. HGT of ILS Reference Datum: 17m (56ft). EM:A0/A2. |
| RWY 02L ILS DME | ICW | CH46X | H24 | 012108.35N 1035838.86E | DME co-located with GP. EM:P9. |
| RWY 02L ILS MM | - | 75MHz | H24 | 012027.54N 1035826.68E | Located 957m (3140ft) from THR RWY 02L along extended centreline of RWY. No back beam. |
| RWY 20L ILS LLZ | ICZ | 108.55MHz | H24 | 011909.54N 1035954.79E | Located 367m (1204ft) from THR RWY 02R, along RWY centreline. Course width 2.80°. EM: A0/A2. |
| RWY 20L ILS GP | - | 329.75MHz | H24 | 012108.89N 1040049.38E | Located 335m (1099ft) from THR RWY 20L on left side of the RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS REF datum: 16.8m (55ft). EM: A0/A2. |
| RWY 20L ILS DME | ICZ | CH22Y | H24 | 012108.89N 1040049.38E | DME co-located with GP. EM: P9. |
| RWY 20L ILS MM | - | 75MHz | H24 | 012149.37N 1040102.55E | Located 968m (3176ft) from THR RWY 20L, along extended centreline of the RWY. |
| RWY 02R ILS LLZ | ICX | 110.5MHz | H24 | 012131.46N 1040054.70E | Located 367m (1204ft) from THR RWY 20L, along RWY centreline. Course width 2.80°. EM: A0/A2. |
| RWY 02R ILS GP | - | 329.6MHz | H24 | 011929.11N 1040007.26E | Located 335m (1099ft) from THR RWY 02R on right side of the RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS REF datum: 16.2m (53ft). EM: A0/A2. |
| RWY 02R ILS DME | ICX | CH42X | H24 | 011929.11N 1040007.26E | DME co-located with GP EM: P9 |
| RWY 02R ILS MM | - | 75MHz | H24 | 011851.60N 1035947.22E | Located 974m (3196ft) from THR RWY 02R, along extended centreline of the RWY. |

WSSS AD 2.20 LOCAL TRAFFIC REGULATIONS

1 DESIGNATION OF PAYA LEBAR AIRPORT AS AN ALTERNATE AERODROME FOR SINGAPORE CHANGI AIRPORT

Please refer to section WSAP AD 2.20 for details.

2 WRONG APPROACHES AND LANDINGS OF AIRCRAFT BOUND FOR SINGAPORE CHANGI AND PAYA LEBAR AIRPORTS

2.1 INTRODUCTION

2.1.1 The attention of all pilots is drawn to the existence of Paya Lebar Airport close to Singapore Changi Airport. The runway at Singapore Changi Airport is orientated in the same true bearing as the runway at Paya Lebar Airport i.e. 023°/203°. Due to the close proximity of these two runways, pilots are cautioned against mistaking Paya

Lebar Airport for the runway of Singapore Changi Airport and thus making an inadvertent visual landing or approach to land at Paya Lebar.

2.1.2 Erroneous approaches or landings usually occurred during the hours of darkness. In almost every instance, the weather prevailing at the time of the incident was generally good or fair.

2.1.3 There is intensive local flying at Paya Lebar and Seletar during the day and night. Thus, the risk of collision is very great if a wrong approach is made to any of the above two airports. Likewise, wrong approaches into Singapore Changi Airport can also be disastrous.

2.2 POINTS TO BEAR IN MIND WHEN APPROACHING SINGAPORE CHANGI AIRPORT OR PAYA LEBAR

2.2.1 The following points are highlighted to serve as a guide to assist pilots in making a correct approach into Singapore Changi Airport or Paya Lebar Airport and should be remembered and followed:

- a. The runways at Singapore Changi Airport and Paya Lebar Airport are identically aligned on 02/ 20. Therefore exercise extreme vigilance when leaving NYLON or SAMKO Holding Areas inbound and maintain correct tracks to the respective runways as listed below.
- b. Adhere strictly to IFR procedures even in VMC which calls for a procedure turn over NYLON Holding Area or SAMKO Holding Area as prescribed.
- c. Make full use of all available navigational and landing aids available and positively identify every aid used.
- d. Switch to the correct ILS localizer frequency at Singapore Changi Airport under all conditions.

2.3 AERODROME CHARACTERISTICS OF SINGAPORE CHANGI AND PAYA LEBAR AIRPORTS

2.3.1 Tabulated below are details of aerodrome characteristics of Singapore Changi Airport and Paya Lebar Airport which indicate the similarities and significant differences for ease of identification by pilots operating into these two airports.

| Aeronautical Service | PAYA LEBAR Airport | SINGAPORE CHANGI Airport | Significant Differences and Remarks |
|-------------------------|--|---|---|
| Magnetic heading of RWY | 02/20 | 02L/20R 02C/20C 02R/20L | Exercise caution due to similar RWY alignment |
| Approach Lights | RWY 02 Modified Calvert High INTST with centreline and 3 crossbars. High INTST white LGT with brilliancy control and sequenced flashing lights. | RWY 02L Precision APCH LGT CAT II. Extended centreline with red side row barettes, 2 crossbars, 2 APCH beacons and sequenced flashing lights. | |
| | RWY 20 Modified Calvert High INTST with centreline and 3 crossbars. High INTST white LGT with brilliancy control and sequenced flashing lights. | RWY 20R Precision APCH LGT CAT I. Centreline barettes flashing white, 2 APCH beacons and sequenced flashing lights. (refer to chart AD-2-WSSS-ADC-2) | |
| ILS | RWY 20 - NIL | RWY 20R IDENT ICH No back beam LLZ 108.9 MHz GP 329.3 MHz | |
| | RWY 02 - NIL | RWY 02L IDENT ICW No back beam LLZ 110.9 MHz GP 330.8 MHz | |
| IBN | Flashing R 'PL' HN and IMC | Flashing G 'SS' HN and IMC | |
| ABN | NIL | ALTN Flashing W G every 2.3 SEC | |

WSSS AD 2.21 NOISE ABATEMENT PROCEDURES

- 1.1 To alleviate the problem of noise, all aircraft on AWY G579 between SINJON (SJ) and 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.

WSSS AD 2.22 FLIGHT AND GROUND PROCEDURES

1 LOW VISIBILITY PROCEDURES (LVP) FOR CATEGORY II ILS OPERATIONS

1.1 Introduction

1.1.1 Category II ILS approaches will be made available at Singapore Changi Airport to authorised flights during prolonged periods of low visibility, except during thunderstorms. RVR minima for CAT II ILS operations is limited to 350m due to runway and taxiway light spacing requirements on the airfield.

1.2 Authorisation for Category II ILS Approaches

1.2.1 Operators who wish to conduct Category II ILS operations at Singapore Changi Airport must have obtained operational approval from the relevant State of Operator and be authorised by the Civil Aviation Authority of Singapore.

1.3 Category II ILS Runways

1.3.1 At Singapore Changi Airport, Category II ILS approaches are available only on RWY 02L and RWY 20C, which are also equipped with precision approach Category II lighting system. When required, pilots making Category II ILS approaches to Singapore Changi Airport should refer to the procedures in the Instrument Approach Charts AD-2-WSSS-IAC-1 to AD-2-WSSS-IAC-11 and the Precision Approach Terrain Charts for RWY 02L and RWY 20C at AD-2-WSSS-PATC-1 and AD-2-WSSS-PATC-2 respectively.

1.4 Initiation of Category II ILS Operations

1.4.1 Preparations will be made to implement LVP for Category II ILS operations at Singapore Changi Airport during prolonged period of low visibility, except during thunderstorms, when the RVR drops below 800 metres.

1.4.2 Availability of the Category II ILS approaches will be made known through NOTAM and ATIS broadcasts as well as air traffic control radio communications.

1.4.3 During LVP operations, aircraft will not be cleared for Category II ILS approach if any of the ILS or approach/runway lights fall below Category II requirements. Aircraft will not be cleared for landing if the Touchdown Zone RVR is unserviceable.

1.5 ILS Sensitive Areas

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

1.6 Termination of LVP for Category II ILS Operations

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

1.7 Operations of flights Not Authorised for Category II ILS Operations

1.7.1 During Category II ILS operations, if the RVR is 550 metres or above, flights not authorised for Category II ILS operations may continue to make approaches and land. Airlines planning to operate flights not authorised for Category II ILS operations into Changi shall monitor the METAR to ascertain the RVR values when launching their flights and be prepared to divert if the RVR is below 550 metres.

2 RUNWAY UTILISATION

2.1 Runway-in-use

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

2.2 Departures

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

- 2.2.2 Pilots should complete cockpit checks prior to line-up for departure and keep any checks on the runway to a minimum.
- 2.2.3 Conditional line-up clearance may be used by ATC to facilitate an expeditious flow of traffic. On receipt of line-up clearance, pilots should taxi into position promptly without delay. Unless given instructions to line-up and wait, pilots should be ready and prepared to depart without stopping. On receipt of take-off clearance, pilots to commence take-off roll without delay.

2.3 Clearance for Immediate Take-Off

- 2.3.1 A pilot receiving the ATC instruction ‘cleared for immediate take-off’ is required to act as follows:
 - a. if waiting clear of the runway, taxi immediately on to it and begin take-off run immediately without stopping the aircraft;
 - b. if already lined-up on the runway, take-off without delay;
 - c. if unable to comply with the instruction, inform ATC immediately.

2.4 Arrivals - Minimum Runway Occupancy Time (ROT)

- 2.4.1 Arriving aircraft upon landing are reminded that it is imperative to vacate the runway as quickly as practicable to enable ATC to apply minimum spacing on final approach and minimise the occurrence of “go-arounds”.
- 2.4.2 To achieve minimum ROT and reduce missed approaches due to occupied runway, pilots should vacate the runway via the first available exit taxiway corresponding to operational requirements, or as instructed by ATC. If an exit taxiway other than the first available exit taxiway is required, pilots shall advise the Tower Controller on first contact.
- 2.4.3 To enhance planning, pilots can make reference to the Landing Exit Distance (LED), information below which is measured from threshold to tangent point where the exit taxiway centreline starts to curve away from the runway centreline:

| RWY | Exit Taxiway (LED in metres) | Remarks |
|-----|--|---|
| 20R | <u>W6*(1655)</u> , <u>W7*(2123)</u> and W8 (3061) | Note 1: Recommended exit taxiways are bold and underlined. |
| 20C | <u>T7*(1948)</u> , <u>T8*(2391)</u> and T9 (3152) | |
| 20L | <u>A7* (1750)</u> , <u>A8* (2225)</u> and A9* (2700) | Note 2: * Indicates Rapid Exit Taxiway (RET) and maximum design ground speed for the exit taxiway is 50kts. |
| 02L | <u>W5*(1966)</u> , <u>W4*(2491)</u> and W3* (2876) | |
| 02C | <u>T6*(2055)</u> , <u>T5*(2565)</u> and T4* (3267) | |
| 02R | <u>A6* (1900)</u> , <u>A5* (2375)</u> and A4* (2850) | |

- 2.4.4 Pilots can expect initial taxi instructions from the Runway Controller before clearing the exit taxiway. Aircraft vacating the runway-in-use should not stop on the exit taxiway until the entire aircraft has passed the runway holding point.
- 2.4.5 BTN 0830-1030 daily estimated delays of about 15 minutes can be expected for arrivals into Singapore Changi Airport.

2.5 Reduced Runway Separation Minima

- 2.5.1 Reduced Runway Separation Minima may be applied between a departing aircraft and a succeeding landing aircraft or between two successive landing aircraft on the same runway provided the following conditions exist:
 - a. During the hours of daylight from 30 minutes after local sunrise to 30 minutes before local sunset;
 - b. Visibility of at least 5km;
 - c. Cloud ceiling shall not be lower than 1,000ft;
 - d. Tailwind component shall not exceed 5 knots;
 - e. The second aircraft will be able to see the first aircraft clearly and continuously until the first aircraft is clear of the runway;
 - f. Traffic information shall be provided to the flight crew of the succeeding aircraft concerned;
 - g. The braking action shall not be adversely affected by runway contaminants such as water;
 - h. Wake turbulence separation minima shall be applied; and
 - i. Responsibility for ensuring adequate separation between the two aircraft rests with the pilot of the second aircraft.

- 2.5.2 When reduced Runway Separation Minima is applied, the successive landing aircraft may be given a clearance to land before the first aircraft has cleared the runway-in-use after landing or crossed the runway end on departure provided there is reasonable assurance that the following separation distances will exist when the landing aircraft crosses the runway threshold:

| | Landing following Landing | Landing following Departure |
|--------------------|--|---|
| RWY 02L/20R | The preceding aircraft has landed and has passed a point at least 2500m from the threshold of runway (abeam TWY W4 for RWY 02L or TWY V8 for RWY 20R), is in motion and will vacate the runway without backtracking. | The departing aircraft is/will be airborne and has passed a point at least 2500m from the threshold of the runway (abeam TWY W4 for RWY 02L or TWY V8 for RWY 20R). |
| RWY 02C/20C | The preceding aircraft has landed and has passed a point at least 2500m from the threshold of the runway (abeam TWY T5 for RWY 02C or TWY T8 for RWY 20C), is in motion and will vacate the runway without backtracking. | The departing aircraft is/will be airborne and has passed a point at least 2500m from the threshold of the runway (abeam TWY T5 for RWY 02C or TWY T8 for RWY 20C). |
| RWY 02R/20L | The preceding aircraft has landed and has passed a point at least 2500m from the threshold of the runway, (abeam TWY A5 for RWY 02R or TWY A8 for RWY 20L) is in motion and will vacate the runway without backtracking. | The departing aircraft is/will be airborne and has passed a point at least 2500m from the threshold of the runway (abeam TWY A5 for RWY 02R or TWY A8 for RWY 20L). |

2.6 **Phraseology**

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

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

3 **AIRPORT COLLABORATIVE DECISION MAKING (A-CDM) MODE OF OPERATIONS**

- 3.1 A-CDM aims to optimise airport operations by having an efficient turnaround process and improving the predictability of operational events. It also helps to improve gate management, flight punctuality, reduce apron taxiway and holding point congestion which is beneficial to all airport partners. A-CDM involves sharing of accurate and timely operational information amongst airport partners through different airport systems and improving work processes by implementing a set of operational procedures.

- 3.2 The A-CDM procedures apply to all scheduled flights departing Singapore Changi Airport except for VVIP, CASEVAC, SAR and aircraft on special tasks. ATC shall have full discretion in conduct of such operations.

3.3 Definition of commonly used terms in A-CDM

- 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.
- Target Start Up Approval Time (TSAT) – The time provided by ATC that an aircraft can expect start-up / push back approval.
- Calculated Take Off Time (CTOT) – A time calculated as a result of tactical slot allocation, at which a flight is expected to become airborne.

4 **A-CDM PRE-DEPARTURE PROCEDURES**

- 4.1 Singapore Changi Airport's A-CDM portal will automatically calculate a system TOBT for each departure flight taking into account the estimated or actual in-block time (EIBT / AIBT), minimum turnaround time (MTT) and scheduled time of departure (STD)

- 4.2 If the calculated TOBT (EIBT / AIBT + MTT) is earlier than STD, the system will take the STD as TOBT.

- 4.3 If the calculated TOBT (EIBT / AIBT + MTT) is later than STD, the amount of turnaround delay that system predicts is equal to TOBT – STD.

- 4.4 AO are required to assess the system generated TOBT at 40 minutes prior to departure and update it if the prediction of departure readiness is different. Thereafter, TOBT needs to be monitored and updated constantly if it is expected to differ by 5 minutes or more until the flight commences pushback. AO can consider delegating the responsibility of TOBT submission to their ground handling agent (GHA) subject to prior internal arrangements between AO and GHA.

- 4.5 TOBT shall be updated through the following systems:
- a. Airport Operations Centre System (AOCS) A-CDM web based portal; or
 - b. Gate Message Input Display (GMID) at boarding rooms;
- 4.6 AO/GHA is encouraged to update TOBT through ONLY one of the above systems in order to avoid any chance of a miscommunication.
- 4.7 TOBT information is available through the following channels:
- a. AOCS A-CDM portal;
 - b. GMID;
 - c. Aircraft Docking Guidance System (ADGS) at contact stands;
 - d. Radio communication with GHA or AO.
- 4.8 The Pre-Departure Sequencer (PDS) will calculate the TSAT automatically by taking into account factors such as TOBT, calculated take-off time (CTOT), variable taxi times (VTT), wake turbulence category, departure separation, etc. A pre-departure sequence is determined from the calculated TSATs, thus the accuracy of TOBT is vital to an optimal TSAT.
- 4.9 Flights with an invalid or expired TOBT will be instructed by ATC to update TOBT when requesting for clearance. For non-compliant flights, delays can be expected. AO or GHA are strongly encouraged to update TOBT as soon as any expected delay to the aircraft readiness for pushback is made available to avoid unnecessary hold-ups.
- 4.10 TSAT information is available through the following channels:
- a. AOCS A-CDM portal;
 - b. GMID;
 - c. ADGS at contact stands;
 - d. Radio communication with GHA or AO;
 - e. ATC - Upon issuance of ATC clearance (for flights parked at aircraft stands without ADGS).

5 A-CDM START-UP PROCEDURES

- 5.1 Pilot shall ensure aircraft is ready for pushback at TOBT.
- 5.2 Pilot to maintain communication with the AO / GHA as they are responsible for updating the TOBT. Notify the AO / GHA to update the TOBT if it is expected to differ by 5 minutes or more.
- 5.3 Pilot utilising the DCL service on selected routes shall request for ATC clearance through 'Request for Departure Clearance Downlink' (RCD) message no earlier than 20 minutes before TOBT. Refer to WSSS AD 2.22 paragraph 8.4 on the applicable routes for DCL service and procedures.
- 5.4 Pilot using voice request to contact Ground Movement Planner (Clearance Delivery) and request for ATC clearance within 5 minutes of TOBT using the following phraseology:
- Callsign
 - Destination
 - Proposed flight level and alternate level, if any
 - Parking position
- a. Pilot shall only request for ATC clearance provided aircraft is ready to pushback at TOBT.
- 5.5 Regardless of clearance through voice or datalink, all departing aircraft must report to Clearance Delivery when ready for push within 5 minutes of TOBT.
- 5.6 ATC will advise the pilot whether the proposed flight level or other alternate flight level is available and an ATC clearance will be issued accordingly. If pre-departure coordination with an adjacent unit or centre is required, the pilot will be instructed to standby.
- 5.7 ATC will update TSAT changes if any, during issuance of ATC clearances. Note that TSAT displayed on ADGS may not be final and can be revised due to en-route clearance restrictions, ground congestion or flow measures.
- 5.8 Pilot shall request for pushback from Ground Movement Control within 5 minutes of TSAT after obtaining ATC clearance, or as directed by ATC.
- a. ATC may swap pushback sequence based on real-time readiness of aircrafts to maximise apron and runway capacity and reduce the overall delay to traffic as and when required.
 - b. At the end of pushback, the departing aircraft must have all engines started and be ready to taxi immediately, unless otherwise instructed by ATC.

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

- 5.9 If a flight is unable to pushback by TSAT + 5 minutes due to the aircraft being unready, ATC clearance and TSAT will be cancelled. Pilot must notify the AO / GHA to update the TOBT for a new TSAT before requesting for a new ATC clearance. This also applies to aircraft returning back to blocks after pushback.
- a. ATC will inform the aircraft when a clearance is cancelled using the phraseology; "(Callsign of aircraft) your ATC clearance and TSAT is cancelled (reason). Update TOBT before requesting for new clearance".
 - b. Flight may also have its ATC clearance cancelled if it develops a technical problem after pushback and is unable to taxi for prolonged duration.
- 5.10 Non-compliance of initial TSAT may result in an aircraft losing its existing position in the pre- departure sequence. Delay can be expected as a result of re-sequencing based on new TOBT input.
- 5.11 If delay in pushback is due to ground traffic movement or ATC clearance restrictions, the ATC clearance and TSAT will remain valid even if it exceeds TSAT + 5 minutes. TOBT need not be updated for such situations.
- 5.12 In the event that A-CDM mode of operations need to be cancelled due to any reason, the termination will be communicated to relevant parties through email by the airport operator and a NOTAM will be issued by ATC. Pilot shall follow the non-CDM procedures detailed in para 13.
- 5.13 Quick overview of WSSS start-up for pilots

Definitions of commonly used terms

- **Target Off-Block Time (TOBT)** - The time that an AO or GHA estimates that an aircraft will be ready, all doors closed, boarding bridge removed, pushback vehicle available and ready to start-up / pushback immediately upon receipt of ATC clearance.
- **Target Start-up Approval Time (TSAT)** - The time provided by ATC that an aircraft can expect start-up / pushback approval.

TOBT and TSAT requirements

- Irrespective of the TSAT, the aircraft must be ready for departure at the TOBT +/- 5 minutes as the TSAT may be revised forward at short notice.
- Any time the TOBT or TSAT cannot be met, or an earlier departure is required, the TOBT must be updated expeditiously by the aircraft operator or ground handler.

ATC Clearance

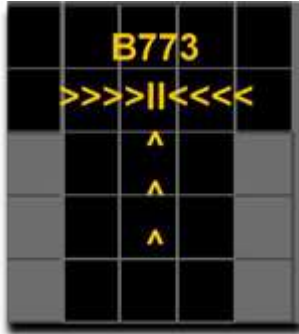



- ATC Clearance on selected ATS routes can be requested via Data Link Departure Clearance (DCL) at TOBT- 20 minutes.
- If DCL is not available, ATC Clearance should be requested via Clearance Delivery at TOBT +/-5 minutes.







Start-up / Pushback Clearance

- Pilots must be ready for start-up / pushback at TOBT +/- 5 minutes.
- Pilots should request start-up / pushback clearance at TSAT +/- 5 minutes.

6 A-CDM INFORMATION VIA AIRCRAFT DOCKING GUIDANCE SYSTEM (ADGS)

6.1 All contact stands in Singapore Changi Airport will have ADGS. The fundamental operation and usage of ADGS still remain the same for flight crew. Additional information which includes TOBT, TSAT and TOBT count-down timer will be displayed in local times as part of the improvements to support A-CDM operations.

| Aircraft Docking Guidance System (ADGS) | |
|---|---|
| Description | Display on ADGS |
| <p>Aircraft arrival to stand</p> <ul style="list-style-type: none"> No change in existing functionality and display |  |
| <p>40 minutes prior to TOBT</p> <ul style="list-style-type: none"> ADGS will display TOBT submitted by AO / GHA and a count down timer (2 digits) to TOBT in minutes As ADGS can only display up to 7 characters per line, the displayed message will be scrolling. Timings displayed will be in Local Time (LT) TOBT timings will change instantly if there is an update done by AO / GHA | <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Snapshot 1</p>  </div> <div style="text-align: center;"> <p>Snapshot 2</p>  </div> </div> <div style="text-align: center; margin-top: 20px;"> <p>Snapshot 3</p>  </div> |

| Aircraft Docking Guidance System (ADGS) | | |
|---|---|---|
| Description | Display on ADGS | |
| <p>25 minutes prior to TOBT</p> <ul style="list-style-type: none"> ADGS will display TSAT derived by PDS As ADGS can only display up to 7 characters per line, the displayed message will be scrolling. TSAT timings may change as the PDS is continuously optimising push back times based on real time traffic conditions | <p>Snapshot 1</p>  <p>Snapshot 2</p>  <p>Snapshot 3</p>  | |
| | <p>Aircraft departure from stand</p> <ul style="list-style-type: none"> ADGS will display the actual off-block time (AOBT) As ADGS can only display up to 7 characters per line, the displayed message will be scrolling TOBT, TSAT and TOBT countdown timer will be removed AOBT display will be removed 3 minutes after AOBT | <p>Snapshot 1</p>  <p>Snapshot 2</p>  <p>Snapshot 3</p>  |

7 CONTACT AND INFORMATION

- 7.1 Please contact the airport operator, Changi Airport Group (CAG), at a-cdm@changiairport.com for application of AOCs A-CDM and GMID account or if you have any queries.
- 7.2 Aircraft operators may also contact their ground handling agent directly on queries regarding TOBT submission.

8 DEPARTURE CLEARANCE (DCL) VIA DATALINK PROCEDURES

- 8.1 Aircraft need to be equipped with Aircraft Communications Addressing and Reporting System (ACARS) to support DCL application and be compliant with the European Organisation for Civil Aviation Equipment (EUROCAE) ED-85A (Data Link Application System Document (DLASD) for the DCL datalink service) and ARINC Specification 623-3.
- 8.2 Singapore application of DCL is in accordance with ED-85A.
- 8.3 The logon ID of the ground system for the provision of DCL service is WSSS.

- 8.4 DCL service is only applicable for flights departing from WSSS to the following routes / destinations:
- Destinations in Peninsular Malaysia via ATS Routes A457 and B466
 - Destinations in Thailand via ATS Routes B466 and B469 / M751
 - Destinations in Indonesia via ATS Route A457, R469 and B470
 - Destinations in Australia and New Zealand via ATS Route B470
 - Flights with allocated Calculated Take-Off Time (CTOT) under Bay of Bengal Cooperative Air Traffic Flow Management (BOBCAT)
- 8.5 Pilot utilising the DCL service on selected routes shall request for ATC clearance through RCD message no earlier than 20 minutes before TOBT.
- For flights with allocated CTOT under BOBCAT, to input "CTOT HHMMz" under the free text field in RCD message.
 - For flights routed via ANITO B470, to input "ANITO FLxxx"(ANITO crossing level) under the free text field in RCD message.
 - Pilot shall contact Clearance Delivery or the next assigned frequency in 'Departure Clearance Uplink' (CLD) message within 5 minutes of TOBT using the following phraseology:
 - <"Callsign"...With P-D-C, fully ready>
 - Provide requested flight level if it differs from PFL filed in flight plan
 - Provide CTOT or ANITO crossing if not previously given in RCD message
- 8.6 DCL message format does not include the requested cruising level and final cruising level.
- The planned flight level (PFL) filed in flight plan field 15b will be used as requested level unless otherwise specified by pilot.
 - Final cruising level will be assigned by Singapore ATC after airborne and it is subjected to traffic disposition. No on-ground level negotiations or reservations are allowed.
- 8.7 DCL service does not provide clearance revision. Any revision to the clearance issued via datalink will be made by ATC through voice communications.
- 8.8 Clearance request through VHF using the existing voice procedures is still available for applicable flights under the DCL service.
- 8.9 ATC will reject the DCL request and send a "revert to voice procedures" message to the pilot if one of the following occurs:
- Flight's routes / destinations not stated in paragraph 8.4
 - RCD message does not comply with ED-85A or have inaccurate flight data, e.g. different Callsign / ADES from flight plan
 - Invalid TOBT
 - When required by ATC due to flow restriction
- 8.10 Upon receipt of any "revert to voice procedures" message, pilot shall cancel any clearance received previously (if any) and follow the existing voice procedures for clearance request, i.e. contact Clearance Delivery within 5 minutes of TOBT.
- 8.11 Pilot shall monitor the clearance delivery frequency once the DCL process is initiated. In the event of any issues encountered, ATC will revert to voice procedures.
- 8.12 ATC will revert with CLD message within 5 minutes of receipt of the RCD message. If no CLD message is received, pilot is to call on delivery frequency to verify request.
- 8.13 Pilot shall respond with 'Departure Clearance Readback Downlink' (CDA) message within 5 minutes of receipt of CLD message. Failure to comply may result in a "revert to voice procedures" message being sent.
- Note: The DCL process is only complete and clearance confirmed when CDA message is received and processed successfully.
A "CDA received – clearance confirmed" message will be sent to the pilot.
- 8.14 Aircraft operator / ground handling agent shall continue to update TOBT to reflect any changes in readiness time in accordance to A-CDM startup procedures stated in AIP Singapore section WSSS AD 2.22 paragraph 5.

8.15 ATC will check for TOBT compliance and update pilot of any revisions in departure clearance and flow restrictions before handing the flight over to Ground frequency for start-up and pushback.

8.16 ATC will cancel the clearance issued and send a "revert to voice procedures" message if pilot does not report ready for push within 5 minutes of TSAT.

9 ASSIGNMENT OF FLIGHT LEVELS TO AIRCRAFT DEPARTING FROM SINGAPORE CHANGI AIRPORT

9.1 Assignment of flight levels to departing aircraft is made on a best-planned-best-served basis (with reference to TOBT for ATC clearance request detailed in para 5.4). Aircraft will normally be assigned the level requested unless an alternate level is offered after coordination with the adjacent ATC centres.

9.2 Departing flights from Singapore requesting FL280 or FL320 on L759, M770, N571, N571/N877 or P628 will be cleared as follows:

- a. Aircraft departing Singapore will be cleared to FL280;
- b. Succeeding aircraft on the same route will be cleared to FL280 with 10min longitudinal separation provided there is no closing speed with the preceding aircraft;
- c. Additional longitudinal separation as appropriate shall be imposed by ATC when the succeeding aircraft is faster than the preceding aircraft on the same route;
- d. The first aircraft from either Singapore or Kuala Lumpur to be over GUNIP on N571 or N571/N877, the Kuala Lumpur/Bangkok FIR boundary on M770 or L759 and VPL on P628 can expect its requested flight level

10 DELAY IN PUSHBACK AND/OR TAXIING DUE TO OTHER AIRCRAFT

10.1 Delays may be expected for the second aircraft to pushback and to taxi when two or more aircraft are parked either adjacent to one another or close together. However, it will retain its ATC clearance even if the 5 minutes grace period allowed for under para 5.9 is exceeded.

Note: The TSAT may not be able to predict delays arising from apron congestion as traffic movement on ground is dynamic and situations may change on a real time basis depending on aircraft readiness. ATC will facilitate pushback as soon as possible when traffic permits.

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

11.1 The ATC clearance may require an aircraft to arrive at a reporting point at a specified time and level or to depart a number of minutes behind a preceding traffic to establish the appropriate longitudinal separation. Such delay will not deprive a departing aircraft of its ATC clearance even though the 5 minutes grace period allowed for under para 5.9 is exceeded.

12 DELAY DUE TO OVERFLIGHTS

12.1 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

- b. ATC will revert to the gate hold procedures stated in para 14 and issue estimated pushback times accordingly.

14 GATE HOLD PROCEDURES FOR DEPARTING AIRCRAFT (DURING NON-CDM MODE OF OPERATIONS)

- 14.1 Whenever there are about five to seven departing aircraft at the runway holding point, subsequent pushback of departures will be regulated such that the Ground Movement Planner (GMP) on VHF frequency 121.65MHz will start to issue pilots with Expected Pushback Time (EPT) as TSAT used in A-CDM operations is not available. The determination of EPT will take into account an aircraft's parking stand as well as taxi time to the runway-in-use holding point.
- 14.2 When an EPT is issued, pilots will be instructed to either remain on GMP frequency or to monitor Singapore Ground Control (frequencies 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz or 125.65MHz). It should be noted that when instructed to monitor the Singapore Ground frequencies, pilots shall not establish contact with the Singapore Ground Control, rather, pilots shall maintain listening watch on the assigned Singapore Ground Control frequency and wait for pushback instruction. This is to prevent unnecessary frequency congestion.
- 14.3 A flight issued with an EPT but chooses to commence pushback before the assigned time will be allowed to do so subject to traffic. However, the flight should not expect an earlier departure time as the planned pre-departure sequence will be maintained.
- 14.4 In a situation when a departing aircraft is occupying a gate that has been assigned to an arriving aircraft, the departing aircraft will be instructed by GMP to contact Singapore Ground Movement Control for pushback for the purpose of better gate utilisation.
- 14.5 To maximise runway utilisation, departure sequence will be planned on the basis of increasing runway throughput so as to enhance overall efficiency.

15 GROUND MOVEMENT PLANNER ON VHF 121.65MHZ

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

16 GROUND MOVEMENT CONTROL ON VHF 121.725MHZ, 121.85MHZ, 122.55MHZ, 124.3MHZ, 125.65MHZ AND 127.275MHZ

- 16.1 This frequency shall be used for aircraft start-up/push-back clearance.
- 16.2 Unless otherwise instructed by ATC, the pilot-in-command shall prior to starting engines listen out on the Ground Movement Control frequency on 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz or 125.65MHz.
- 16.3 The pilot-in-command shall:
 - a. Request and obtain taxi instructions prior to taxiing;
Note: ATC clearance, including the assigned SSR code will normally be issued prior to push back. Pilot shall squawk the SSR code immediately when airborne.
 - b. Change from Ground Movement Control frequency to the Runway Control frequency when instructed (118.6MHz, 118.25MHz or 131.4MHz). It should be noted that when instructed to monitor Singapore Tower frequencies, pilots shall not establish contact with Singapore Tower; rather, pilots shall maintain a listening watch on the assigned Singapore Tower frequency and wait for instruction. This is to prevent unnecessary frequency congestion.
- 16.4 Departing aircraft will be instructed when to change from 118.6MHz, 118.25MHz or 131.4MHz to Singapore Departure frequency 120.3MHz.
- 16.5 In the case of the aircraft having landed, the pilot-in-command shall change from 118.6MHz, 118.25MHz or 131.4MHz to 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz, 125.65MHz or 127.275MHz immediately upon instructed by ATC after clearing the runway. He shall maintain watch on 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz, 125.65MHz or 127.275MHz for taxiing and parking instructions until he arrives at his aircraft stand.

17 TAXIING

- 17.1 Taxi clearance given by Singapore Ground Movement Control will relate to movement on the manoeuvring area, but excluding the marshalling area.
- 17.2 Aircraft taxiing on the manoeuvring area will be regulated by ATC to avoid or reduce possible conflict and will be provided with traffic information and alerting service. ATC shall apply taxiing clearance limits whenever necessary.

- 17.3 The taxiway routes to be used by aircraft after landing or when taxiing for departure will be specified by ATC. The issuance by ATC of a taxi route to an aircraft does not relieve the pilot-in-command of the responsibility to maintain separation with other aircraft on the manoeuvring area or to comply with ATC directions intended to regulate aircraft on the manoeuvring area. **Pilots are also advised of the possibility of misjudging the clearance between the aircraft wing tips and other obstacles, especially in areas of hot-spots or during low-light / poor visibility conditions.**
- 17.4 Pilots are reminded to always use minimum power when starting engines, when manoeuvring within the apron area or when manoeuvring from apron taxiways to other parts of the aerodrome. It is especially critical when commencing to taxi that break-away thrusts are kept to an absolute minimum and then be reduced to idle thrusts as soon as possible.

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 T11 or T12
- RWY 02L - TWY W8, W9 or W10
- RWY 20L – TWY A1, A2 or A3
- RWY 20C - TWY T2, T3
- 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 |

| 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 |
| Y513 | AROSO | Flight planning permitted for flights departing from or overflying Singapore to destinations north of Kuala Lumpur and Subang Airports. For flights operating at FL220 and below, to flight plan on A457. |

19.4 VERTICAL AND SPEED RESTRICTIONS

19.4.1 Pilots shall comply with an ATC assigned level. Pilots shall also adhere to the vertical and speed restrictions depicted on the SIDs and STARs. ATC clearance will take precedence when the ATC clearance does not allow the pilots to adhere to the vertical and speed restrictions depicted on the SIDs and STARs.

19.5 OPERATORS' PROCEDURES

- 19.5.1 The operator shall ensure that in-flight procedures, crew manuals and training programmes are established in accordance with RNAV-1 (GNSS) navigation requirements.
- 19.5.2 Pilots shall inform ATC when on-board equipment does not meet the RNAV-1 (GNSS) navigation requirements. Pilots can then expect radar vector from ATC.

20 COORDINATES OF SID/STAR WAYPOINTS (WGS84 DATUM)

| Name | Latitude | Longitude | Radius/Distance from VTK | Radius/Distance from SJ |
|-------------|----------|-----------|--------------------------|-------------------------|
| ABVIP | 010008N | 1035032E | VTK R-203.5/ D27.0 | SJ R-183.5/ D13.2 |
| 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 |

| 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) | 011321N | 1035115E | - | - |
| 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.

- 21.6 Phraseologies for variations to the lateral profile of the SID / STAR are:
- i. PROCEED DIRECT (waypoint), or
 - ii. VECTORING
- 21.7 These phraseologies mean that speed and level restrictions associated with the bypassed waypoints are cancelled.
- 21.8 Phraseology to clear aircraft to return to SID / STAR is: REJOIN SID / STAR
- 21.9 This phraseology means that speed and level restrictions associated with the waypoint where the rejoin occurs, as well as those associated with all subsequent waypoints must be complied with.
- 21.10 The term 'VIA' will no longer be used when issuing lateral routing clearances.

22 LIGHT AIRCRAFT OPERATIONS

- 22.1 Light aircraft operations into and out of Singapore Changi Airport may be approved subject to the following conditions:
- a. Prior permission has been granted;
 - b. Aircraft is suitably equipped;
 - c. Pilot is appropriately rated;
 - d. Subject to ATC.
- 22.2 Flight notification shall be given by filing a flight plan.
- 22.3 All such operations will be regulated in accordance with IFR procedures.

23 SIMULTANEOUS INDEPENDENT PARALLEL APPROACHES

23.1 Introduction

- 23.1.1 Simultaneous independent parallel approaches will be implemented daily between 0000UTC and 1500UTC to optimize runway utilization and enhance air traffic efficiency.

23.2 Procedures for simultaneous independent parallel approaches

- 23.2.1 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.
- 23.2.2 ATC will vector arriving flights into Singapore Changi Airport from the final waypoint of the respective STARs to the respective NOZs.
- 23.2.3 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.
- 23.2.4 ATC is not required to provide separation between aircraft on adjacent ILS Localizers and will monitor aircraft for deviation from the approach path.
- 23.2.5 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.
- 23.2.6 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)"

or
 - b. to intercept ILS

“TURN LEFT (RIGHT) HEADING (three digits) MAINTAIN (altitude) CLEARED FOR ILS APPROACH RUNWAY (number) LEFT (CENTRE / RIGHT)”

23.2.7 Aircraft can expect to maintain speed 180kt at base turn or earlier till 8NM from touchdown.

23.3 Break-out manoeuvre

23.3.1 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”

23.3.2 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)”

23.4 Pilot notification and conditions for operations

23.4.1 Simultaneous approaches to parallel runways operation will be broadcasted on ATIS during the active period.

23.4.2 Simultaneous approaches to the parallel runways will be suspended in the event of adverse weather or any other conditions that may affect the safe conduct of such approaches to the parallel runways.

WSSS AD 2.23 ADDITIONAL INFORMATION

1 BIRD CONCENTRATION IN THE VICINITY OF THE AIRPORT

1.1 A number of varieties of birds are found in Singapore throughout the year. The larger birds commonly found in Singapore Changi Airport include the following:

- cattle egrets (weighing approximately 400g each)
- intermediate egrets (weighing approximately 500g each)
- brahminy kites (weighing approximately 600g each)
- grey herons (weighing approximately 1500g each)
- white-bellied sea eagle (weighing approximately 2900g each)

1.2 There could be an increase in bird activities during the migratory months of September to March. During this period, migratory birds may use the airport as their feeding ground.

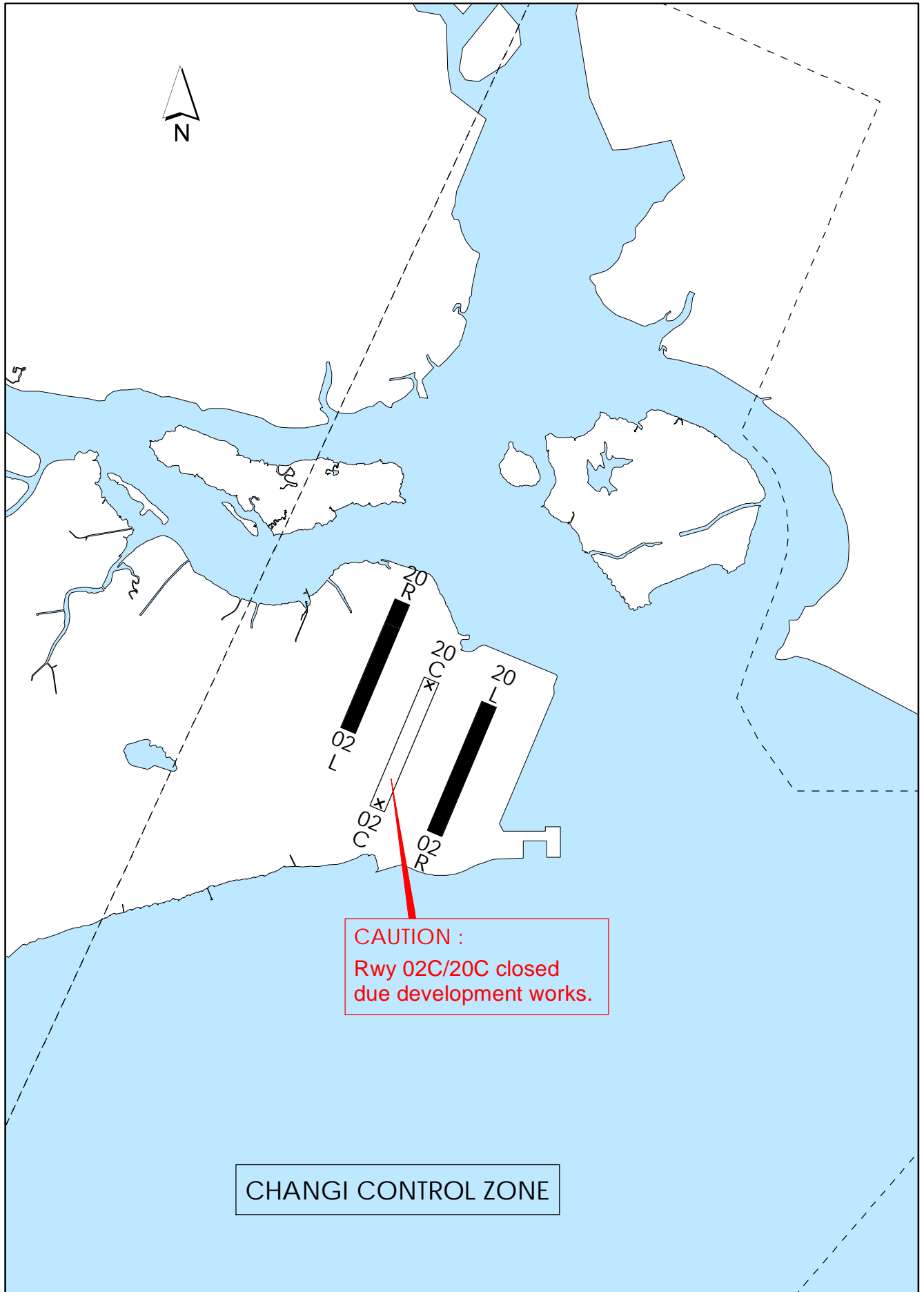
1.3 Various active dispersal devices generating light, sound or cracking effects are used for bird dispersal to mitigate wildlife hazards where necessary within Singapore Changi Airport (such as handheld laser device, long range acoustic device, scarecrow, stock-whip, pyrotechnic, etc.).

WSSS AD 2.24 CHARTS RELATED TO AN AERODROME

| | |
|--|---|
| Location of RWY 02R/20L in relation to RWY 02L/20R and RWY 02C/20C | AD-2-WSSS-ADC-1 |
| Aerodrome Chart - ICAO | AD-2-WSSS-ADC-2 |
| Aerodrome Advisory Chart - ICAO | AD-2-WSSS-ADC-3 |
| Aerodrome Obstacle Chart - ICAO - TYPE A - RWY 02L/20R | AD-2-WSSS-AOC-1 |
| Aerodrome Obstacle Chart - ICAO - TYPE A - RWY 02C/20C | AD-2-WSSS-AOC-2 |
| Aerodrome Obstacle Chart - ICAO - TYPE B | AD-2-WSSS-AOC-3 |
| Aerodrome Obstacle Chart - ICAO - TYPE A - RWY 02R/20L | AD-2-WSSS-AOC-4 |
| Precision Approach Terrain Chart - ICAO - RWY 02L | AD-2-WSSS-PATC-1 |
| Precision Approach Terrain Chart - ICAO - RWY 20C | AD-2-WSSS-PATC-2 |
| Precision Approach Terrain Chart - ICAO - RWY 02R | AD-2-WSSS-PATC-3 |
| Precision Approach Terrain Chart - ICAO - RWY 20L | AD-2-WSSS-PATC-4 |
| RNAV_(GNSS) SIDs and STARs - Introduction | |
| RNAV _(GNSS) SID - RWY 02L/20R - ANITO 6E/ANITO 7F | AD-2-WSSS-SID-1 to 1.1 |
| RNAV _(GNSS) SID - RWY 02C/20C - ANITO 6A / ANITO 7B | AD-2-WSSS-SID-2 to 2.1 |
| RNAV _(GNSS) SID - RWY 02L/20R - ADMIM 1E / ADMIM 3F | AD-2-WSSS-SID-3 to 3.1 |
| RNAV _(GNSS) SID - RWY 02C/20C - ADMIM 1A / ADMIM 3B | AD-2-WSSS-SID-4 to 4.1 |
| RNAV _(GNSS) SID - RWY 02L/20R - TOMAN 2E / TOMAN 4F | AD-2-WSSS-SID-5 to 5.1 |
| RNAV _(GNSS) SID - RWY 02C/20C - TOMAN 2A / TOMAN 4B | AD-2-WSSS-SID-6 to 6.1 |
| RNAV _(GNSS) SID - RWY 02L/20R - BAVUS 1E / BAVUS 3F | AD-2-WSSS-SID-7 to 7.1 |
| RNAV _(GNSS) SID - RWY 02C/20C - BAVUS 1A / BAVUS 3B | AD-2-WSSS-SID-8 to 8.1 |
| RNAV _(GNSS) SID - RWY 02L/20R - AROSO 2E / AROSO 4F | AD-2-WSSS-SID-9 to 9.1 |
| RNAV _(GNSS) SID - RWY 02L/20R - MASBO 2E / MASBO 4F | AD-2-WSSS-SID-10 to 10.1 |
| RNAV _(GNSS) SID - RWY 02C/20C - AROSO 2A / AROSO 4B | AD-2-WSSS-SID-11 to 11.1 |
| RNAV _(GNSS) SID - RWY 02C/20C - MASBO 2A / MASBO 4B | AD-2-WSSS-SID-12 to 12.1 |
| RNAV _(GNSS) SID - RWY 02L/20R - MERSING 5E / MERSING 8F | AD-2-WSSS-SID-13 to 13.1 |
| RNAV _(GNSS) SID - RWY 02C/20C - MERSING 5A / MERSING 8B | AD-2-WSSS-SID-14 to 14.1 |
| RNAV _(GNSS) SID - RWY 02C/20C - VENIX 1A / VENIX 3B | AD-2-WSSS-SID-15 to 15.1 |
| RNAV _(GNSS) SID - RWY 02L/20R - VENIX 1E / VENIX 3F | AD-2-WSSS-SID-16 to 16.1 |
| RNAV _(GNSS) SID - RWY 02C/20C - KADAR 1A / KADAR 3B | AD-2-WSSS-SID-17 to 17.1 |
| RNAV _(GNSS) SID - RWY 02L/20R - KADAR 1E / KADAR 3F | AD-2-WSSS-SID-18 to 18.1 |
| RNAV _(GNSS) SID - RWY 02R/20L - CHA 1C / CHA 1D | AD-2-WSSS-SID-19 to 19.1 |
| RNAV _(GNSS) STAR - RWY 02L/02C/02R - ARAMA 1A | AD-2-WSSS-STAR-1 to 1.1 |
| RNAV _(GNSS) STAR - RWY 02L/02C/02R - ASUNA 1A | AD-2-WSSS-STAR-2 to 2.1 |
| RNAV _(GNSS) STAR - RWY 20R/20C/20L - ARAMA 1B | AD-2-WSSS-STAR-3 to 3.1 |
| RNAV _(GNSS) STAR - RWY 20R/20C/20L - ASUNA 1B | AD-2-WSSS-STAR-4 to 4.1 |
| RNAV _(GNSS) STAR - RWY 02L/02C/02R - KARTO 1A | AD-2-WSSS-STAR-5 to 5.1 |
| RNAV _(GNSS) STAR - RWY 02L/02C/02R - OBDOS 1A | AD-2-WSSS-STAR-6 to 6.1 |
| RNAV _(GNSS) STAR - RWY 20R/20C/20L - KARTO 1B | AD-2-WSSS-STAR-7 to 7.1 |
| RNAV _(GNSS) STAR - RWY 20R/20C/20L - OBDOS 1B | AD-2-WSSS-STAR-8 to 8.1 |
| RNAV _(GNSS) STAR - RWY 20R/20C/20L - LELIB 3B | AD-2-WSSS-STAR-9 to 9.1 |
| RNAV _(GNSS) STAR - RWY 02L/02C/02R - MABAL 2A | AD-2-WSSS-STAR-11 to 11.1 |
| RNAV _(GNSS) STAR - RWY 20R/20C/20L - MABAL 2B | AD-2-WSSS-STAR-13 to 13.1 |
| RNAV _(GNSS) STAR - RWY 02L/02C/02R - LEBAR 2A | AD-2-WSSS-STAR-14 to 14.1 |
| RNAV _(GNSS) STAR - RWY 20R/20C/20L - LEBAR 2B | AD-2-WSSS-STAR-15 to 15.1 |
| RNAV _(GNSS) STAR - RWY 02L/02C/02R - REPOV 1A | AD-2-WSSS-STAR-16 to 16.1 |
| RNAV _(GNSS) STAR - RWY 02L/02C/02R - SURGA 1A | AD-2-WSSS-STAR-17 to 17.1 |
| RNAV _(GNSS) STAR - RWY 20R/20C/20L - REPOV 1B | AD-2-WSSS-STAR-18 to 18.1 |
| RNAV _(GNSS) STAR - RWY 20R/20C/20L - SURGA 1B | AD-2-WSSS-STAR-19 to 19.1 |
| RNAV _(GNSS) STAR - RWY 02L/02C/02R - ELALO 1A | AD-2-WSSS-STAR-20 to 20.1 |
| RNAV _(GNSS) STAR - RWY 20R/20C/20L - ELALO 1B | AD-2-WSSS-STAR-21 to 21.1 |
| Instrument Approach Chart - ICAO - RWY 02L - ICW ILS/DME | AD-2-WSSS-IAC-1 |
| Instrument Approach Chart - ICAO - RWY 02C - ICE ILS/DME | AD-2-WSSS-IAC-2 |
| Instrument Approach Chart - ICAO - RWY 20R - ICH ILS/DME | AD-2-WSSS-IAC-5 |
| Instrument Approach Chart - ICAO - RWY 20C - ICC ILS/DME | AD-2-WSSS-IAC-6 |
| Instrument Approach Chart - ICAO - RWY 20C - VTK DVOR/DME | AD-2-WSSS-IAC-7 |
| Instrument Approach Chart - ICAO - RWY 02L - RNP | AD-2-WSSS-IAC-9 to 9.1 |
| Instrument Approach Chart - ICAO - RWY 02C - RNP | AD-2-WSSS-IAC-10 to 10.1 |
| Instrument Approach Chart - ICAO - RWY 20R - RNP | AD-2-WSSS-IAC-11 to 11.1 |
| Instrument Approach Chart - ICAO - RWY 20C - RNP | AD-2-WSSS-IAC-12 to 12.1 |

| | |
|--|--|
| Instrument Approach Chart - ICAO - RWY 02R - RNP | AD-2-WSSS-IAC-13 to 13.1 |
| Instrument Approach Chart - ICAO - RWY 20L - RNP | AD-2-WSSS-IAC-14 to 14.1 |
| Visual Approach Chart - ICAO | AD-2-WSSS-VAC-1 |

LOCATION OF RUNWAY 02R/20L IN RELATION TO RUNWAY 02L/20R AND RUNWAY 02C/20C



PAGE INTENTIONALLY LEFT BLANK

AERODROME CHART - ICAO

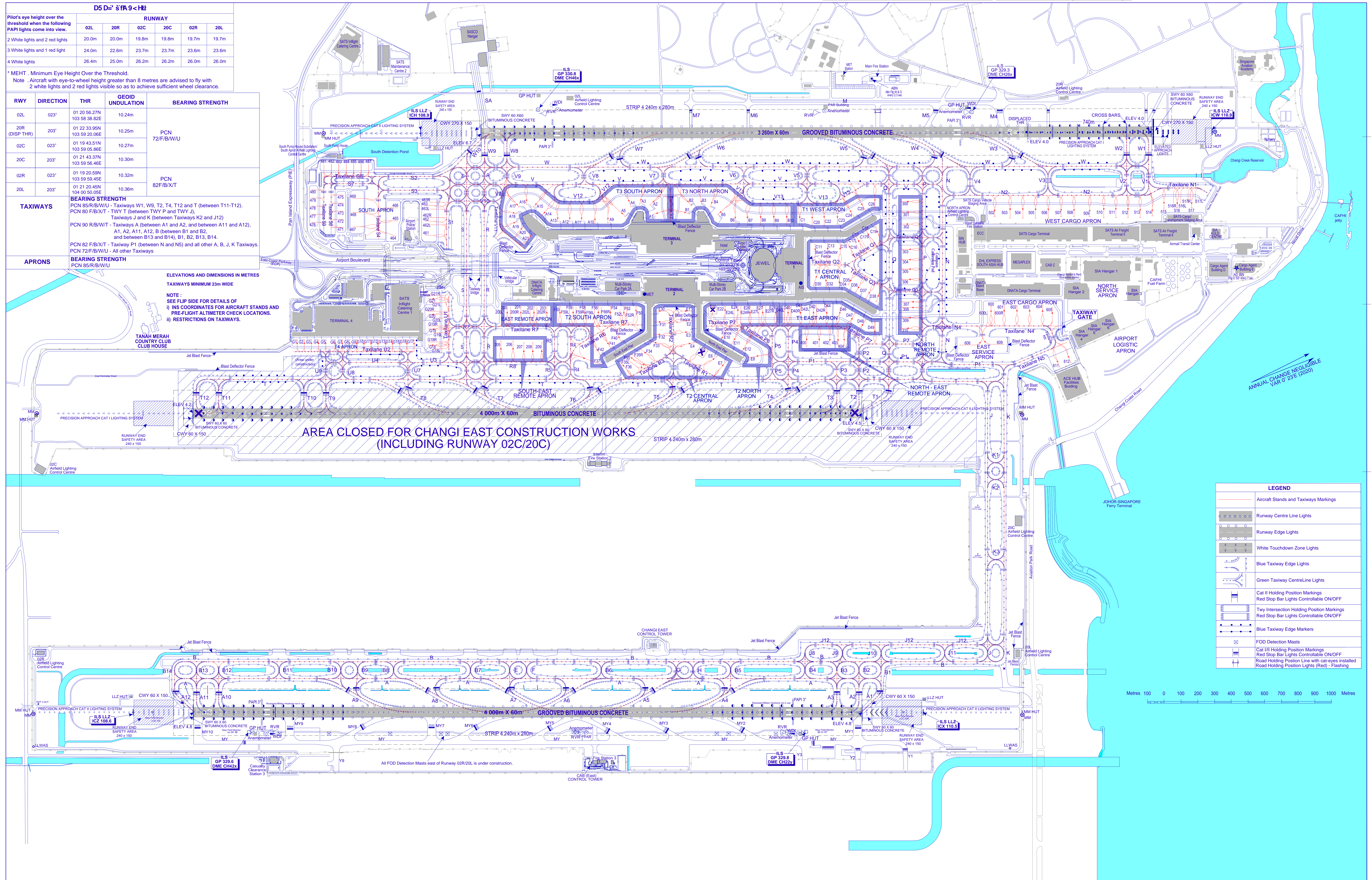
01° 21' 33"N
103° 59' 22"E

AERODROME ELEVATION 6.66m

TWR 118.6 / 118.25 / 131.4
GND 124.3 / 121.85 / 121.725 / 127.275
DELIVERY 121.65 / 119.6

RAMP TWR 122.55 (GMC 4 EAST)
GND 125.65 (GMC 4 WEST)

SINGAPORE/SINGAPORE CHANGI



D5 D=2' S'FA 9<H

| 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 | GEOD UNDULATION | BEARING STRENGTH |
|----------------|-----------|-------------------------------|-----------------|------------------|
| 02L | 023° | 01 20 56.27N 103 58 38.82E | 10.24m | PCN 72F/B/WU |
| 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 | PCN 82F/B/X/T |
| 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/WU - Taxiways W1, W9, T2, T4, T12 and T (between T11-T12).
PCN 80 F/B/X/T - TWY T (between TWY P and TWY J).
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/WU - All other Taxiways

APRONS
BEARING STRENGTH
PCN 85/R/B/WU

ELEVATIONS AND DIMENSIONS IN METRES
TAXIWAYS MINIMUM 23m WIDE
NOTE:
i) SEE FLIP SIDE FOR DETAILS OF INS COORDINATES FOR AIRCRAFT STANDS AND PRE-FLIGHT ALTIMETER CHECK LOCATIONS.
ii) RESTRICTIONS ON TAXIWAYS.

LEGEND

- Aircraft Stands and Taxiway 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
- Two Intersection Holding Position Markings
Red Stop Bar Lights Controllable ON/OFF
- Blue Taxiway Edge Markers
- FOD Detection Masts
- Cat III Holding Position Markings
Red Stop Bar Lights Controllable ON/OFF
- Road Holding Position Line with cat-eyes installed
- Road Holding Position Lights (Red) - Flashing

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 | 5.13m (16.83ft) | |
| B9 | | 01 21 42.19 | 103 59 16.16 | 5.13m (16.83ft) | |
| B10 | | 01 21 44.47 | 103 59 17.12 | 5.15m (16.90ft) | |
| T1 WEST APRON | C1 | 01 21 46.75 | 103 59 18.08 | 5.09m (16.70ft) | |
| | C20 | 01 21 48.83 | 103 59 19.23 | 5.08m (16.67ft) | |
| | C22 | 01 21 51.00 | 103 59 20.13 | 5.15m (16.90ft) | |
| | C23 | 01 21 53.56 | 103 59 20.77 | 5.08m (16.67ft) | |
| | C24 | 01 21 56.54 | 103 59 20.97 | 4.89m (16.04ft) | |
| | C25 | 01 21 59.12 | 103 59 20.59 | 4.99m (16.37ft) | |
| | C26 | 01 22 01.48 | 103 59 20.76 | 5.01m (16.44ft) | |
| | T1 CENTRAL APRON | C11 | 01 21 47.42 | 103 59 23.82 | 5.09m (16.70ft) |
| | | C13 | 01 21 49.63 | 103 59 24.75 | 5.03m (16.50ft) |
| | | C15 | 01 21 51.89 | 103 59 25.70 | 5.06m (16.60ft) |
| C16 | | 01 21 53.47 | 103 59 26.62 | 4.86m (15.94ft) | |
| C17 | | 01 21 55.50 | 103 59 26.20 | 5.01m (16.44ft) | |
| C17L | | 01 21 54.75 | 103 59 26.22 | 4.96m (16.27ft) | |
| C17R | | 01 21 56.01 | 103 59 25.68 | 5.12m (16.80ft) | |
| C18 | | 01 21 57.86 | 103 59 25.75 | 4.99m (16.37ft) | |
| C19 | | 01 21 59.79 | 103 59 25.63 | 4.95m (16.24ft) | |
| D30 | | 01 21 44.54 | 103 59 30.14 | 5.08m (16.67ft) | |
| D32 | | 01 21 46.75 | 103 59 31.08 | 5.08m (16.67ft) | |
| D34 | | 01 21 49.03 | 103 59 32.04 | 5.07m (16.63ft) | |
| D35 | | 01 21 50.87 | 103 59 32.82 | 5.02m (16.47ft) | |
| D36 | | 01 21 51.98 | 103 59 34.52 | 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) | | |

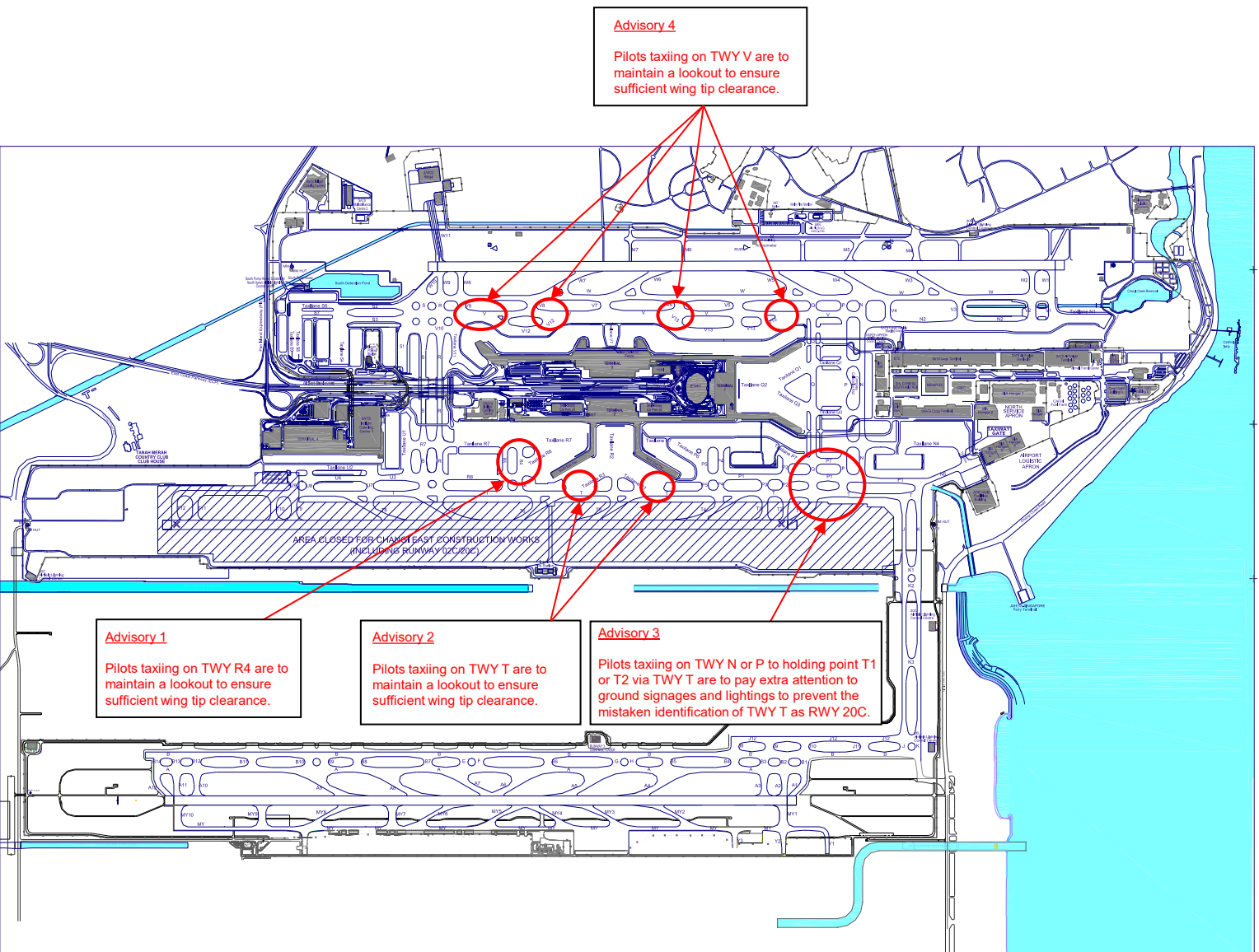
INS COORDINATES FOR AIRCRAFT STANDS AND PRE-FLIGHT ALTIMETER CHECK LOCATIONS

| 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 04.59 | 103 59 19.70 | 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 54.34 | 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 33.06 | 5.35m (17.55ft) | |
| | 305 | 01 22 02.14 | 103 59 34.71 | 5.30m (17.39ft) | |
| | 306 | 01 22 01.41 | 103 59 36.42 | 5.16m (16.93ft) | |
| | 307 | 01 21 59.39 | 103 59 40.36 | 5.16m (16.93ft) | |
| | 308 | 01 21 58.96 | 103 59 41.35 | 5.10m (16.73ft) | |
| | 309 | 01 21 58.52 | 103 59 43.17 | 5.06m (16.60ft) | |
| | 310 | 01 21 57.42 | 103 59 44.96 | 4.74m (15.55ft) | |
| | 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 | | |

AERODROME ADVISORY CHART

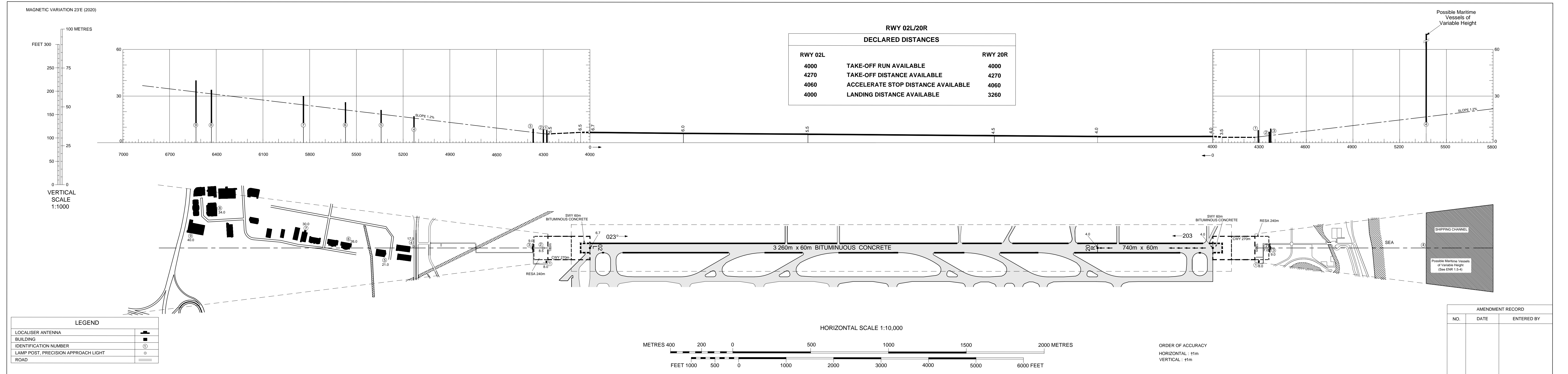


PAGE INTENTIONALLY LEFT BLANK

DIMENSIONS AND ELEVATIONS IN METRES

**AERODROME OBSTACLE CHART - ICAO
TYPE A (OPERATING LIMITATIONS)**

SINGAPORE/Singapore Changi

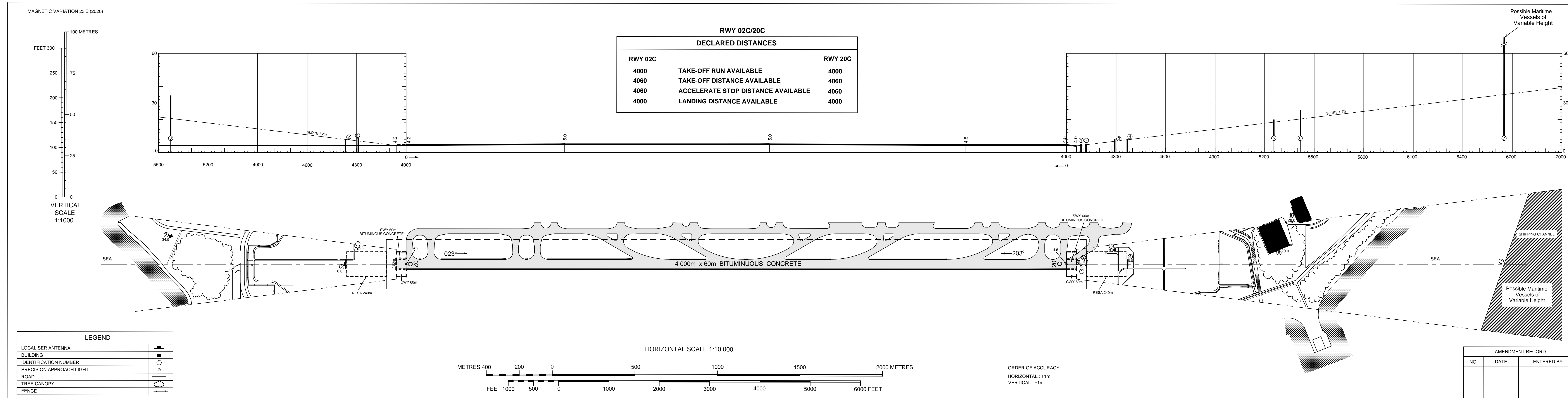


PAGE INTENTIONALLY LEFT BLANK

DIMENSIONS AND ELEVATIONS IN METRES

**AERODROME OBSTACLE CHART - ICAO
TYPE A (OPERATING LIMITATIONS)**

SINGAPORE/Singapore Changi



PAGE INTENTIONALLY LEFT BLANK

AERODROME OBSTACLE CHART - ICAO TYPE B

SINGAPORE / Singapore Changi



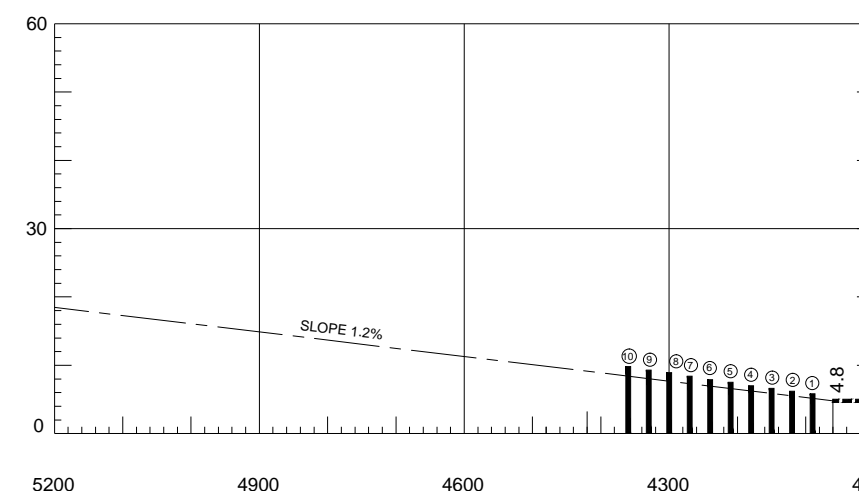
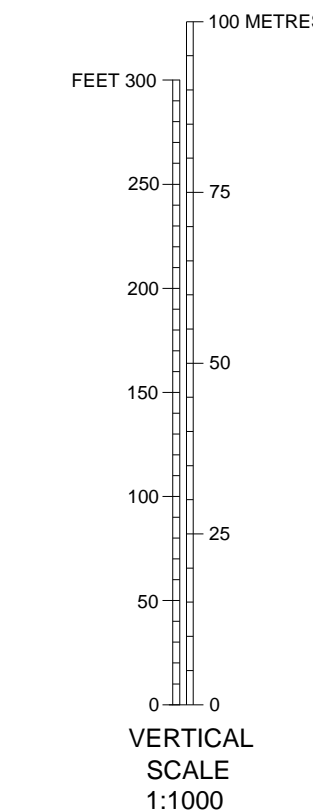
PAGE INTENTIONALLY LEFT BLANK

DIMENSIONS AND ELEVATIONS IN METRES

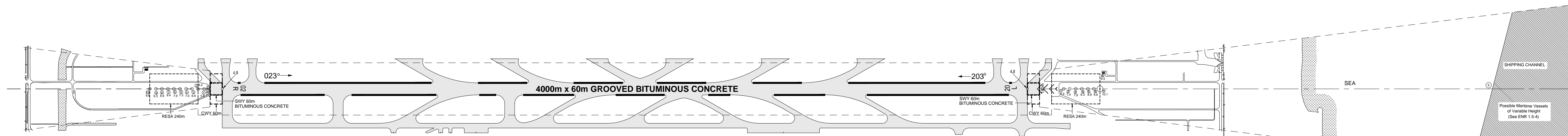
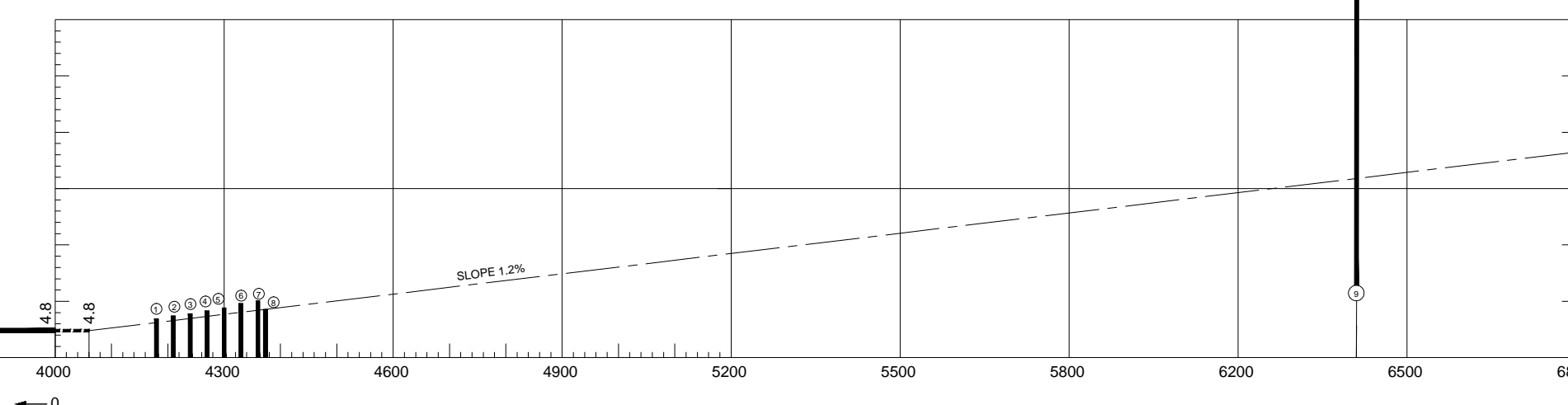
**AERODROME OBSTACLE CHART - ICAO
TYPE A (OPERATING LIMITATIONS)**

SINGAPORE/Singapore Changi

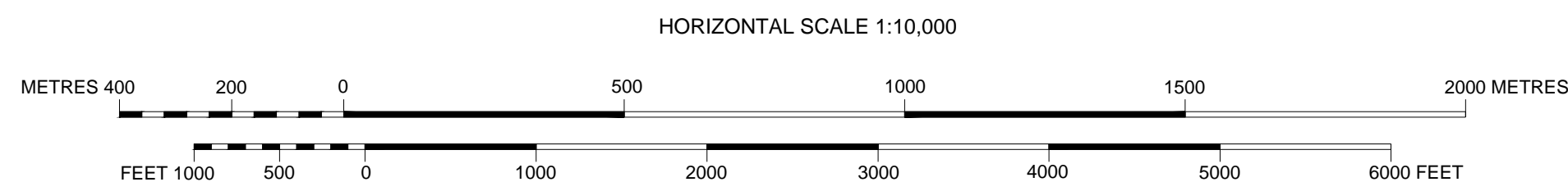
MAGNETIC VARIATION 0°23'E (2020)



| 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 |



| LEGEND | |
|--------------------------|-----|
| IDENTIFICATION NUMBER | ① |
| PRECISION APPROACH LIGHT | ⊙ |
| ANTENNA | ⊖ |
| ROAD | — |
| FENCE | —+— |
| DRAIN | ▨ |
| BUILDING | ■ |



ORDER OF ACCURACY
HORIZONTAL : ±1m
VERTICAL : ±1m

| AMENDMENT RECORD | | |
|------------------|------|------------|
| NO. | DATE | ENTERED BY |
| | | |

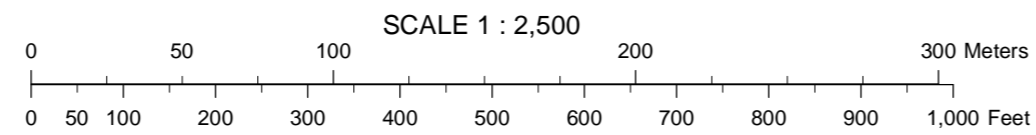
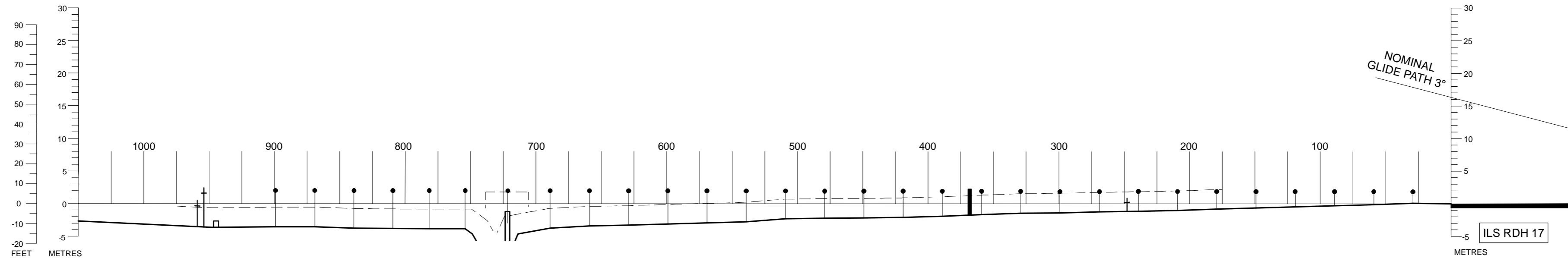
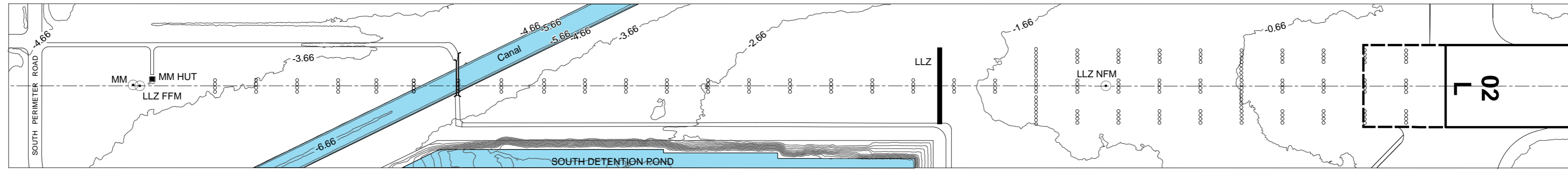
PAGE INTENTIONALLY LEFT BLANK

PRECISION APPROACH TERRAIN CHART - ICAO

SINGAPORE/Singapore Changi

DISTANCES AND HEIGHTS IN METRES

RWY 02L



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 |
| | | |

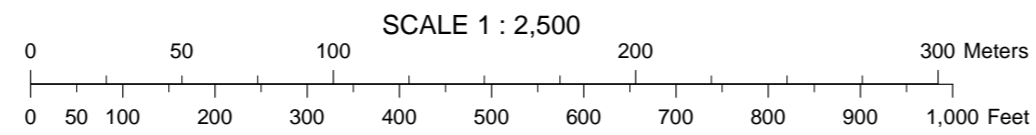
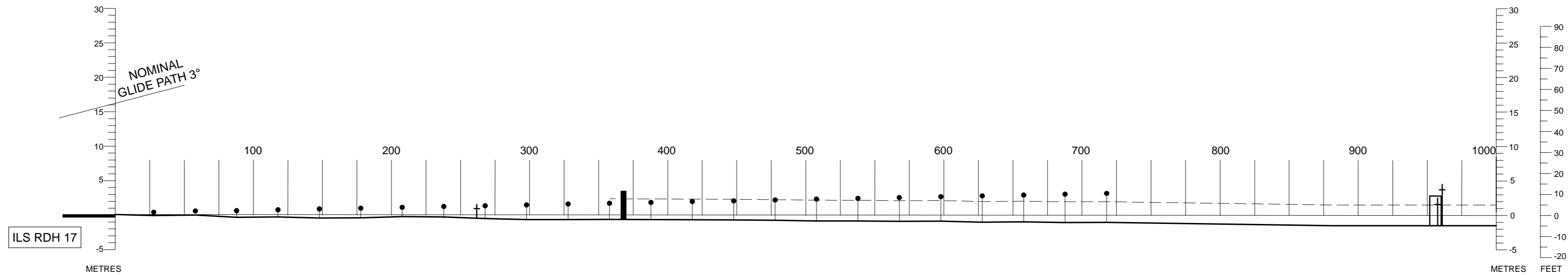
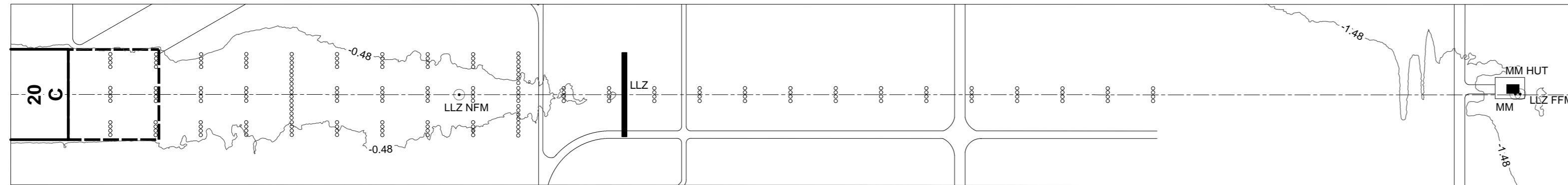
PAGE INTENTIONALLY LEFT BLANK

PRECISION APPROACH TERRAIN CHART - ICAO

SINGAPORE/Singapore Changi

DISTANCES AND HEIGHTS IN METRES

RWY 20C



HORIZONTAL SCALE 1 : 2,500
VERTICAL SCALE 1 : 500
CONTOUR AND HEIGHTS ARE RELATED TO ELEVATION OF RWY THR

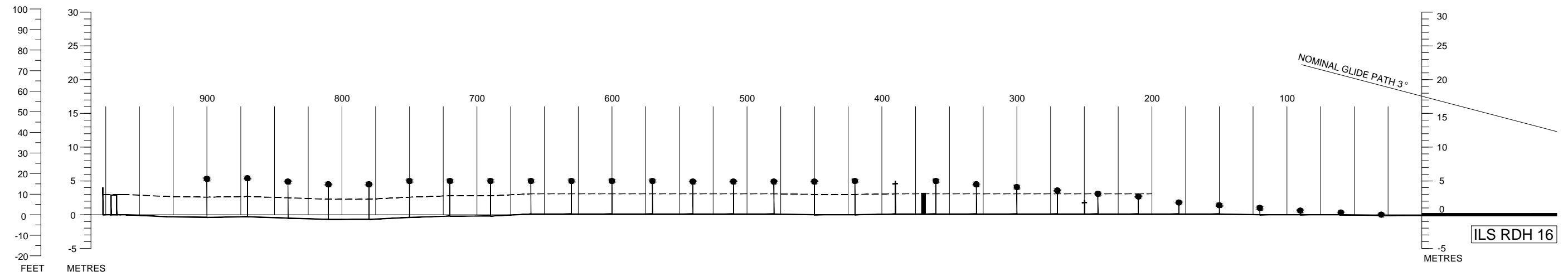
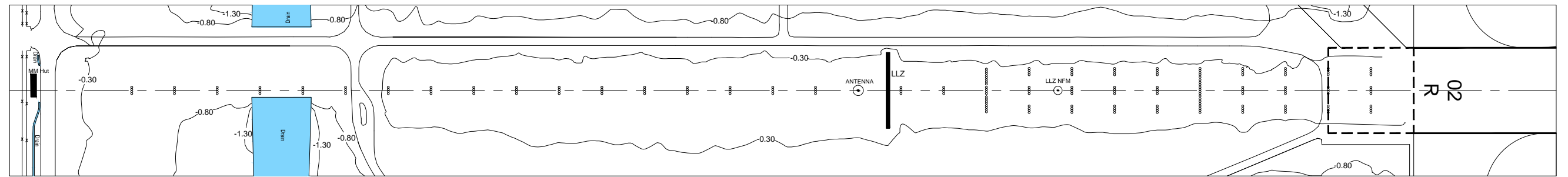
| LEGEND | | |
|---|------|------------|
| BUILDING | | |
| ROAD | | |
| CONTOUR | | |
| ANTENNA | | |
| LOCALISER | | |
| APPROACH LIGHTS | | |
| CENTRE-LINE PROFILE | | |
| DEVIATION AT LEAST +/- 3m FROM CENTERLINE PROFILE | | |
| AMENDMENT RECORD | | |
| NO. | DATE | ENTERED BY |
| | | |

PAGE INTENTIONALLY LEFT BLANK

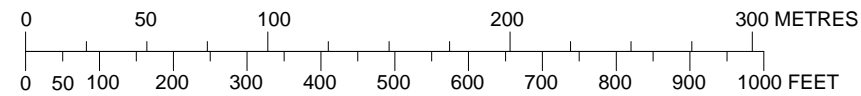
DISTANCES AND HEIGHTS IN METRES

PRECISION APPROACH TERRAIN CHART - ICAO

SINGAPORE/Singapore Changi
RWY 02R



SCALE 1: 2500



HORIZONTAL SCALE 1 : 2500
VERTICAL SCALE 1 : 500
CONTOUR AND HEIGHTS ARE RELATED TO ELEVATION OF RWY THR

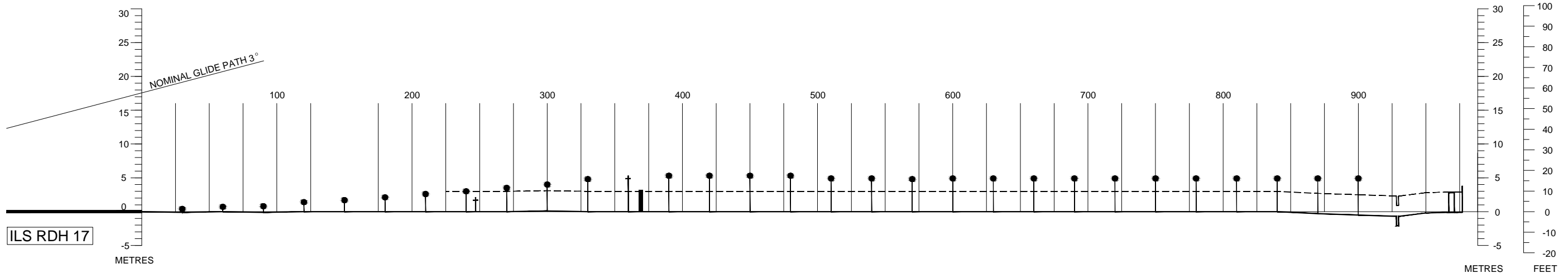
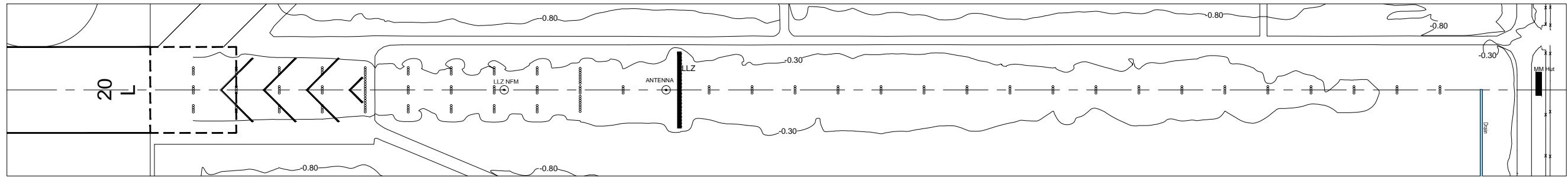
| LEGEND | | |
|--|------|---|
| ANTENNA | | ⊕ ↑ |
| LOCALISER | | LLZ |
| DRAIN | | |
| FENCE | | -x-x- |
| CONTOUR | | ~1.30~ |
| PRECISION APPROACH LIGHT | | ○ ● |
| ROAD | | == |
| BUILDING | | ■ |
| CENTRE-LINE PROFILE | | — |
| DEVIATION AT LEAST +/- 3M FROM CENTRE-LINE PROFILE | | - - - - |
| AMENDMENT RECORD | | |
| NO. | DATE | ENTERED BY |
| | | |

PAGE INTENTIONALLY LEFT BLANK

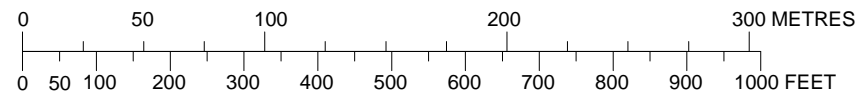
DISTANCES AND HEIGHTS IN METRES

PRECISION APPROACH TERRAIN CHART - ICAO

SINGAPORE/Singapore Changi
RWY 20L



SCALE 1: 2500



HORIZONTAL SCALE 1 : 2500
VERTICAL SCALE 1 : 500
CONTOUR AND HEIGHTS ARE RELATED TO ELEVATION OF RWY THR

| LEGEND | | |
|--|------|------------|
| ANTENNA | | |
| LOCALISER | | |
| BUILDING | | |
| DRAIN | | |
| FENCE | | |
| CONTOUR | | |
| APPROACH LIGHT | | |
| ROAD | | |
| CENTRE-LINE PROFILE | | |
| DEVIATION AT LEAST +/- 3M FROM CENTRE-LINE PROFILE | | |
| AMENDMENT RECORD | | |
| NO. | DATE | ENTERED BY |
| | | |

PAGE INTENTIONALLY LEFT BLANK

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6
APP 120.3
124.05
ACC 134.4

TRANSITION ALTITUDE
11 000ft

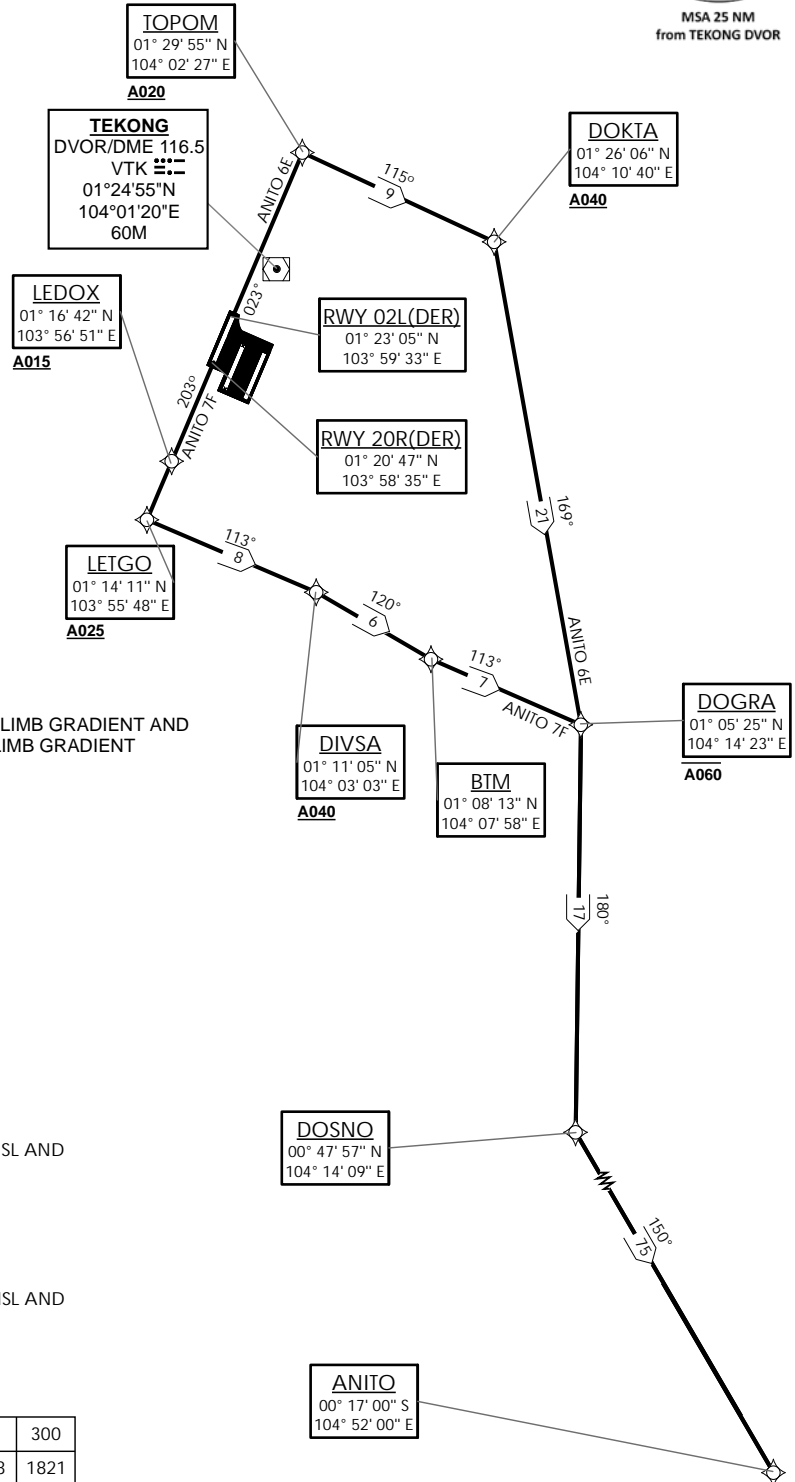
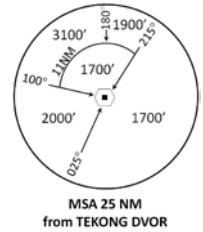
D-ATIS AP ID-WSSS
128.6

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 VECTURING, 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

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] - | 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 | 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+] - | 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 |
| | ANITO | 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 | ANITO | - | 150(150.4) | -0.4 | - | - | - | RNAV1 |

RADIO COMMUNICATIONS FAILURE PROCEDURE

| | |
|---|---|
| 1 | SET TRANSPONDER TO MODE A/C CODE 7600 |
| 2 | <p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:</p> <p>RWY 02L - PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p> <p>RWY 20R - PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p> |

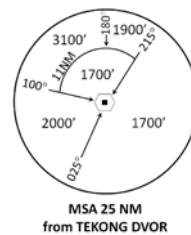
STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

| | |
|--|---------------------------------|
| TWR 118.6 / 118.25 APP 120.3 124.05 ACC 134.4 | 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 VECTORED, IF NECESSARY
- NOTE:** WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT 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.

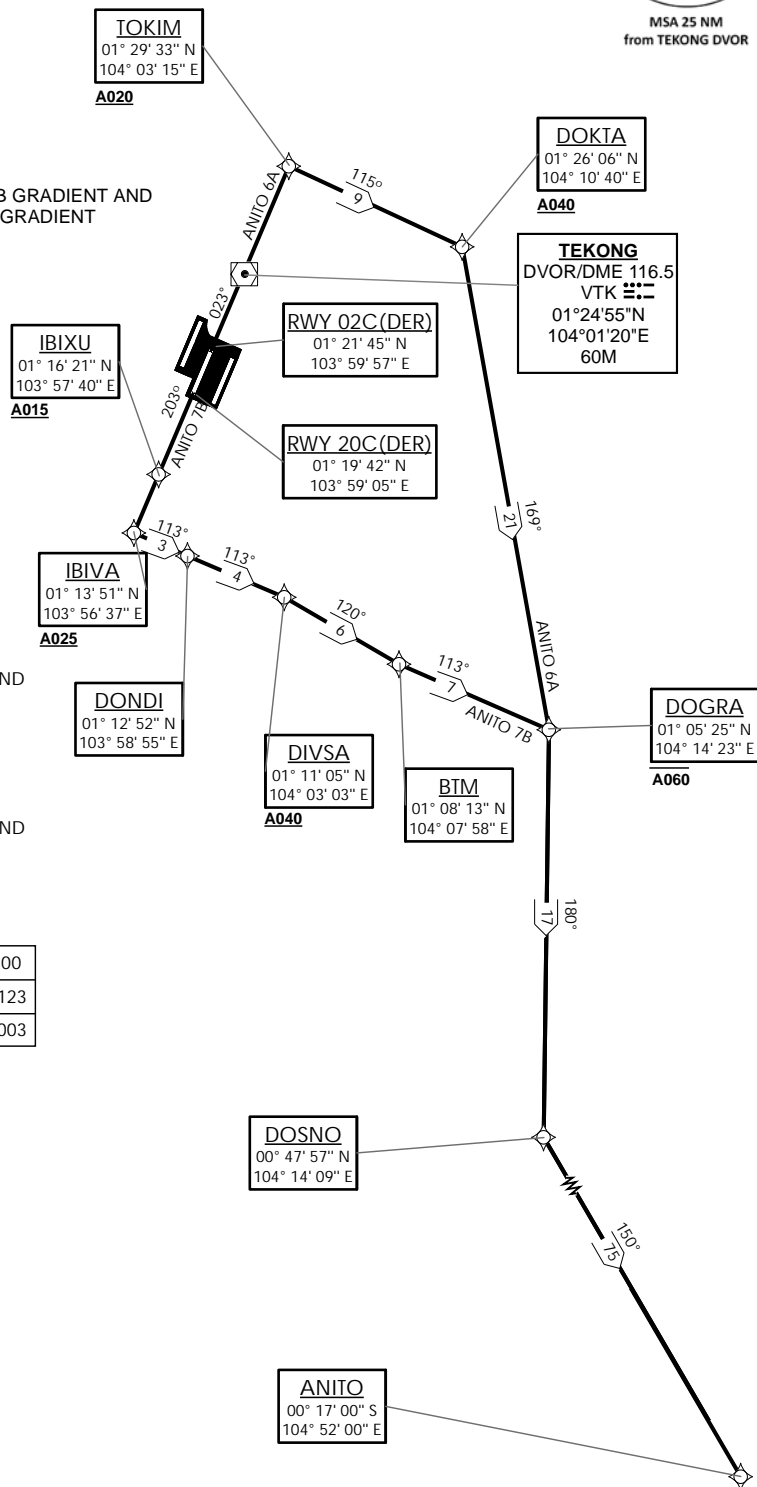
RWY 02C

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 |



NOT TO SCALE

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. |

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

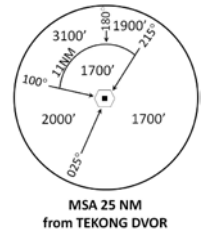
NOTE: RADAR REQUIRED

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 VECTURING,
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.

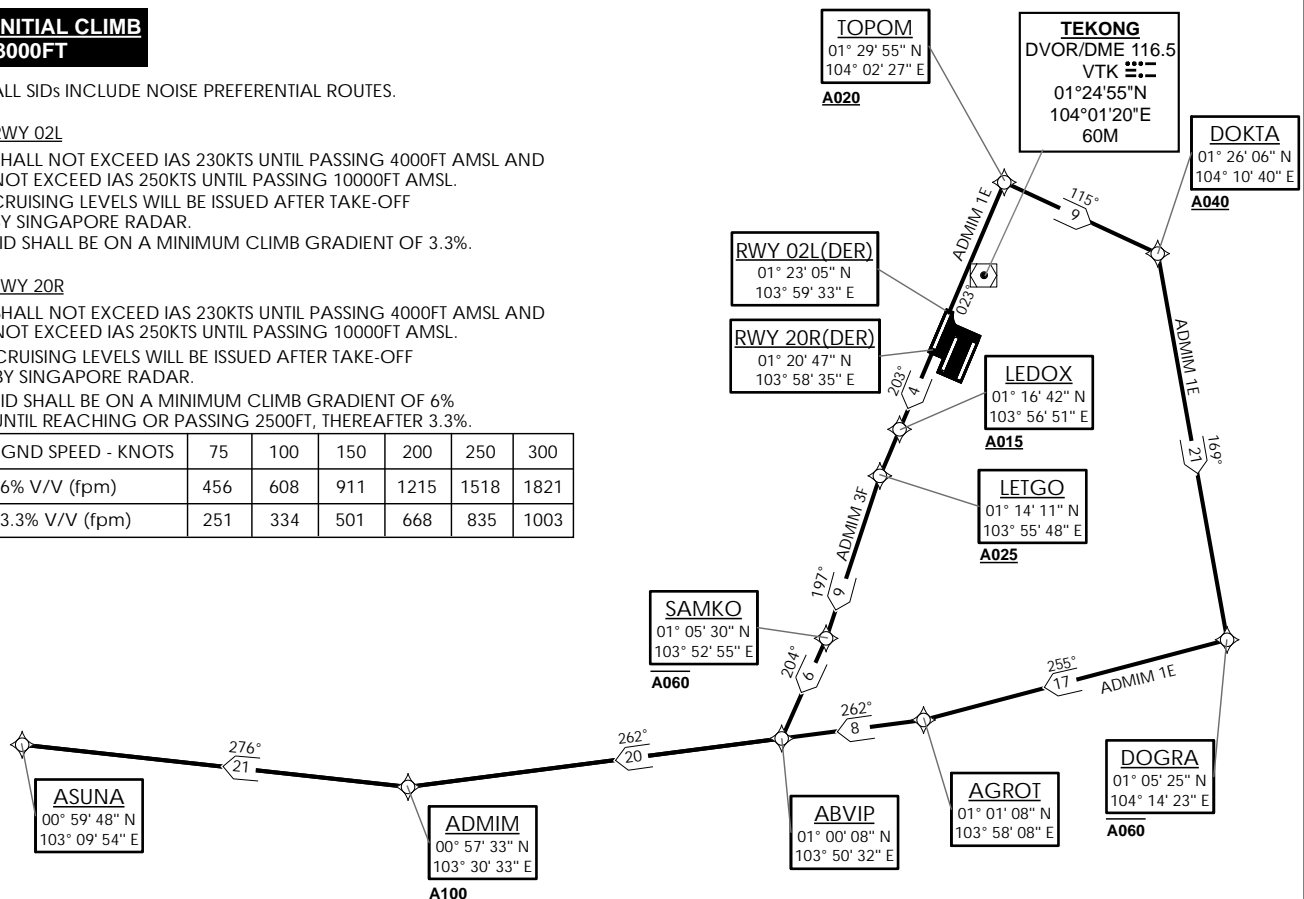
RWY 02L

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

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] - | CF | N |
| | DOKTA [A040+; R] - | TF | N |
| | DOGRA [A060-; R] - | TF | N |
| | AGROT [R] - | TF | N |
| | ABVIP - | TF | N |
| | ADMIM [A100+; R] - | TF | N |
| | ASUNA | 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 | 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+] - | CF | N |
| | LETGO [A025+; L] - | TF | N |
| | SAMKO [A060-; R] - | TF | N |
| | ABVIP [R] - | TF | N |
| | ADMIM [A100+; R] - | TF | N |
| | ASUNA | 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 | 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 | <p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:</p> <p>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.</p> <p>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.</p> |

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C/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 VECTORED,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT 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.

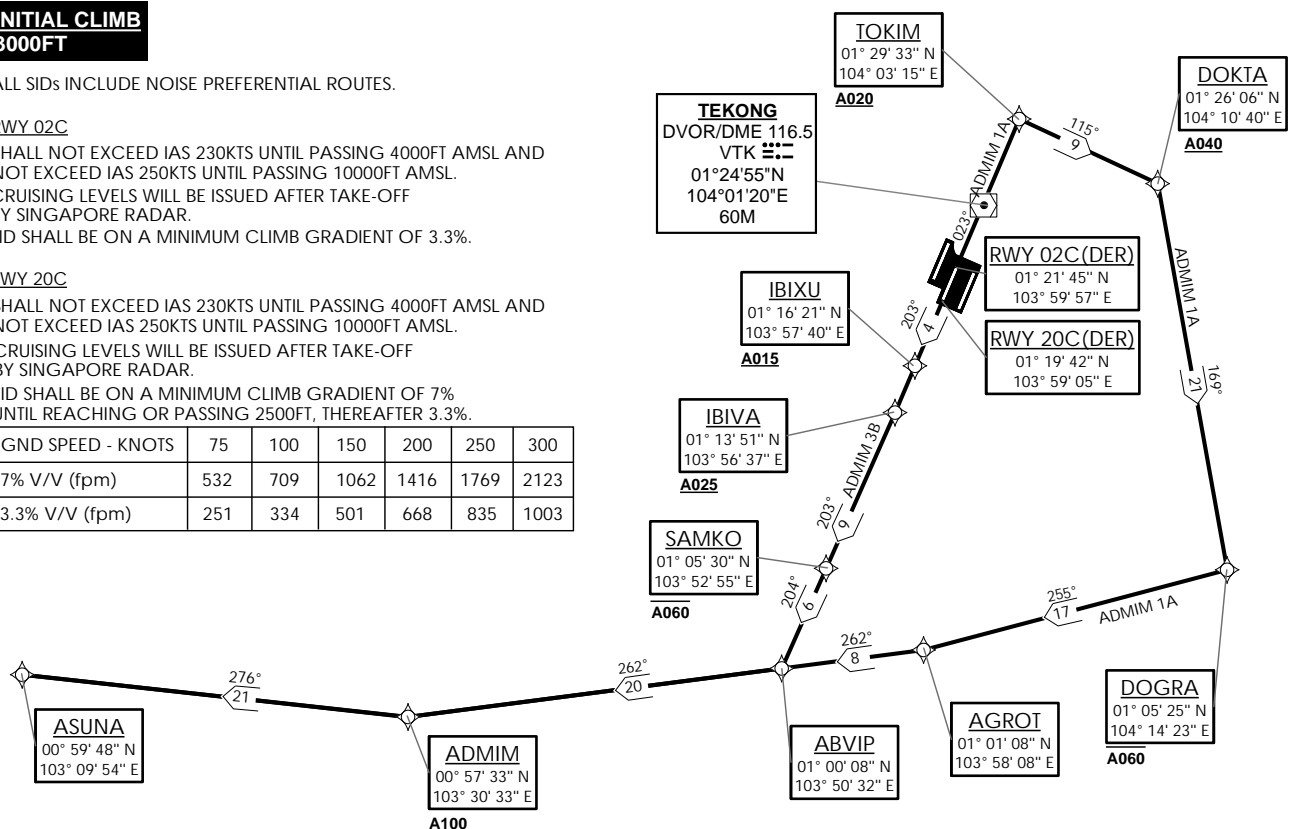
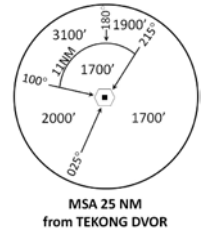
RWY 02C

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

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] - | CF | N |
| | DOKTA [A040+; R] - | TF | N |
| | DOGRA [A060-; R] - | TF | N |
| | AGROT [R] - | TF | N |
| | ABVIP - | TF | N |
| | ADMIM [A100+; R] - | TF | N |
| | ASUNA | 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 | 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+] - | CF | N |
| | IBIVA [A025+] - | TF | N |
| | SAMKO [A060-; R] - | TF | N |
| | ABVIP [R] - | TF | N |
| | ADMIM [A100+; R] - | TF | N |
| | ASUNA | 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 | - | 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 | <p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:</p> <p>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.</p> <p>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.</p> |

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 23°E (2020)

DISTANCES IN NM

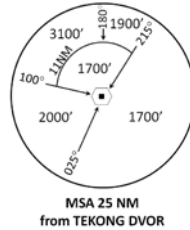
NOTE: RADAR REQUIRED

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 VECTORED,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.2 [A] - FOR RWY 02L MINIMUM CLIMB GRADIENT 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.

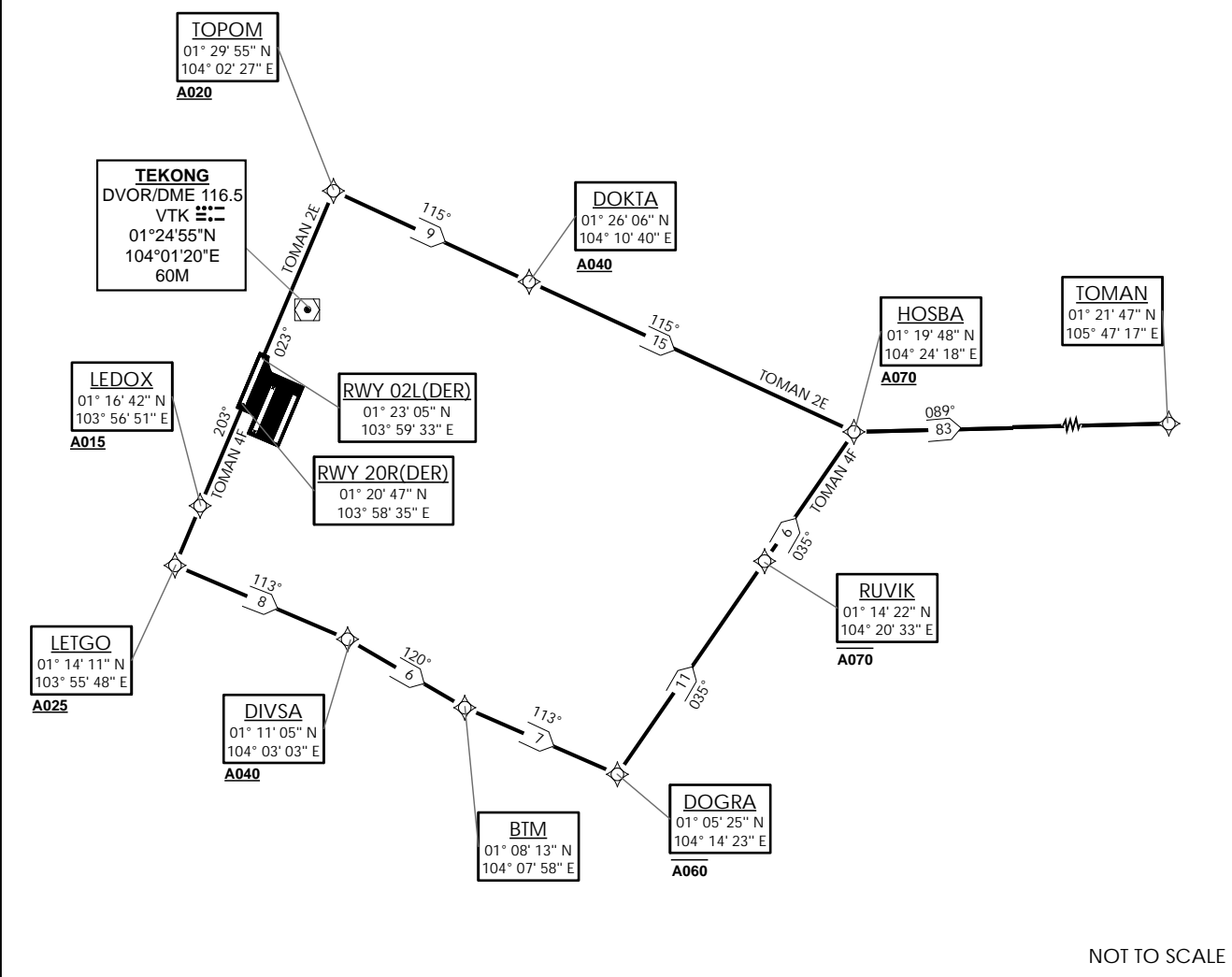
RWY 02L

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

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] - | CF | N |
| | DOKTA [A040+] - | TF | N |
| | HOSBA [A070+; L] - | TF | N |
| | TOMAN | 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 | - | 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+] - | CF | N |
| | LETGO [A025+; L] - | TF | N |
| | DIVSA [A040+; R] - | TF | N |
| | BTM [L] - | TF | N |
| | DOGRA [A060-; L] - | TF | N |
| | RUVIK [A070-] - | TF | N |
| | HOSBA [A070+; R] - | TF | N |
| | TOMAN | 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 | 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 | <p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:</p> <p>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.</p> <p>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.</p> |

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 134.2

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C/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

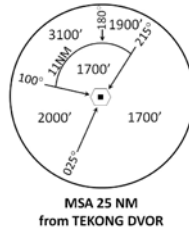
NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

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 VECTURING,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT 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.

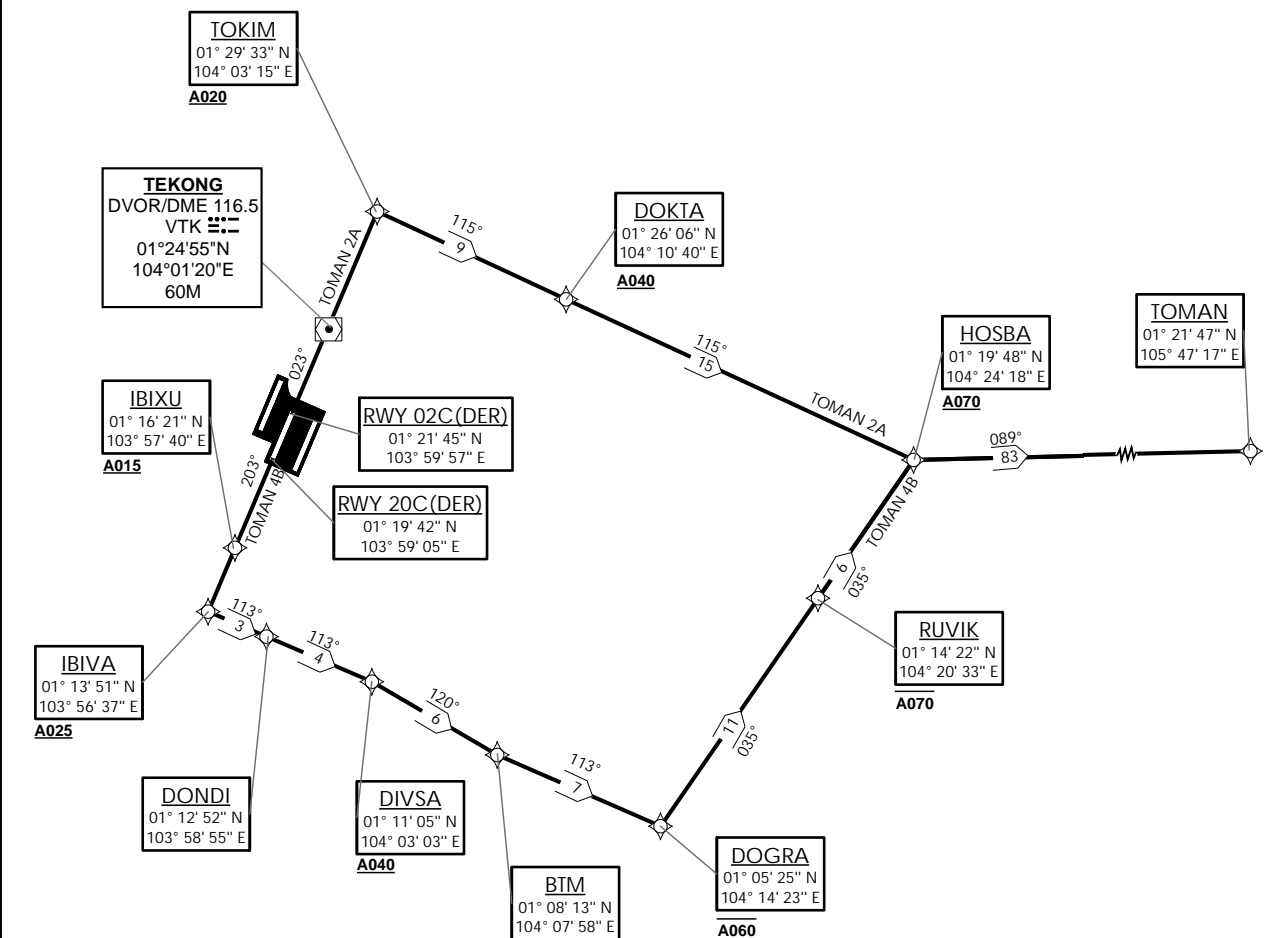
RWY 02C

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

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] - | CF | N |
| | DOKTA [A040+] - | TF | N |
| | HOSBA [A070+; L] - | TF | N |
| | TOMAN | 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 | - | 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+] - | CF | N |
| | IBIVA [A025+; L] - | TF | N |
| | DONDI - | TF | N |
| | DIVSA [A040+; R] - | TF | N |
| | BTM [L] - | TF | N |
| | DOGRA [A060-; L] - | TF | N |
| | RUVIK [A070-] - | TF | N |
| | HOSBA [A070+; R] - | TF | N |
| TOMAN | 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 | 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. |

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

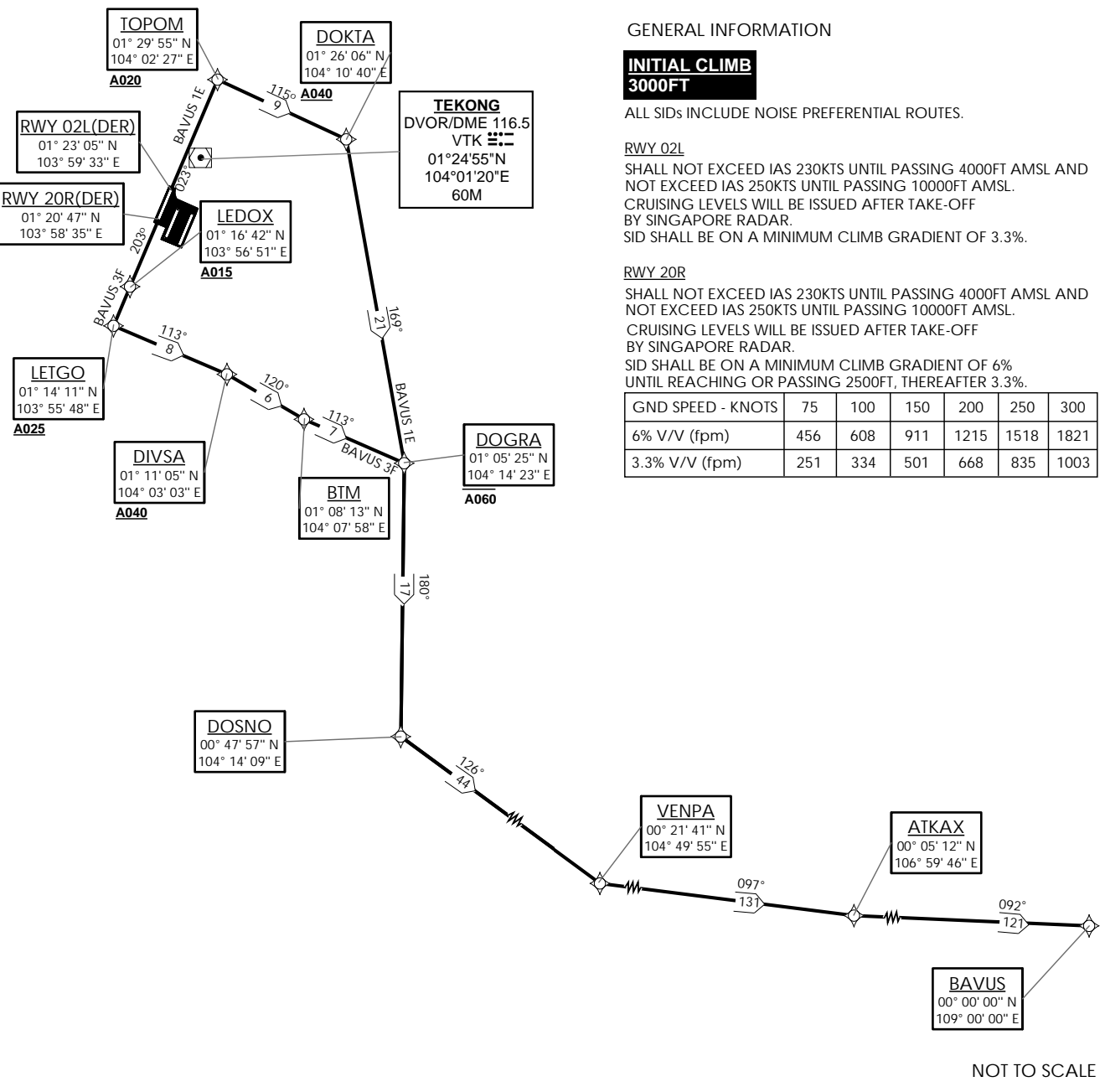
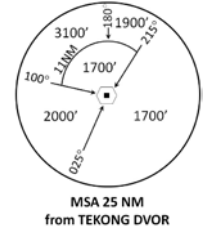
NOTE: RADAR REQUIRED

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 VECTURING,
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 |

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. |

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

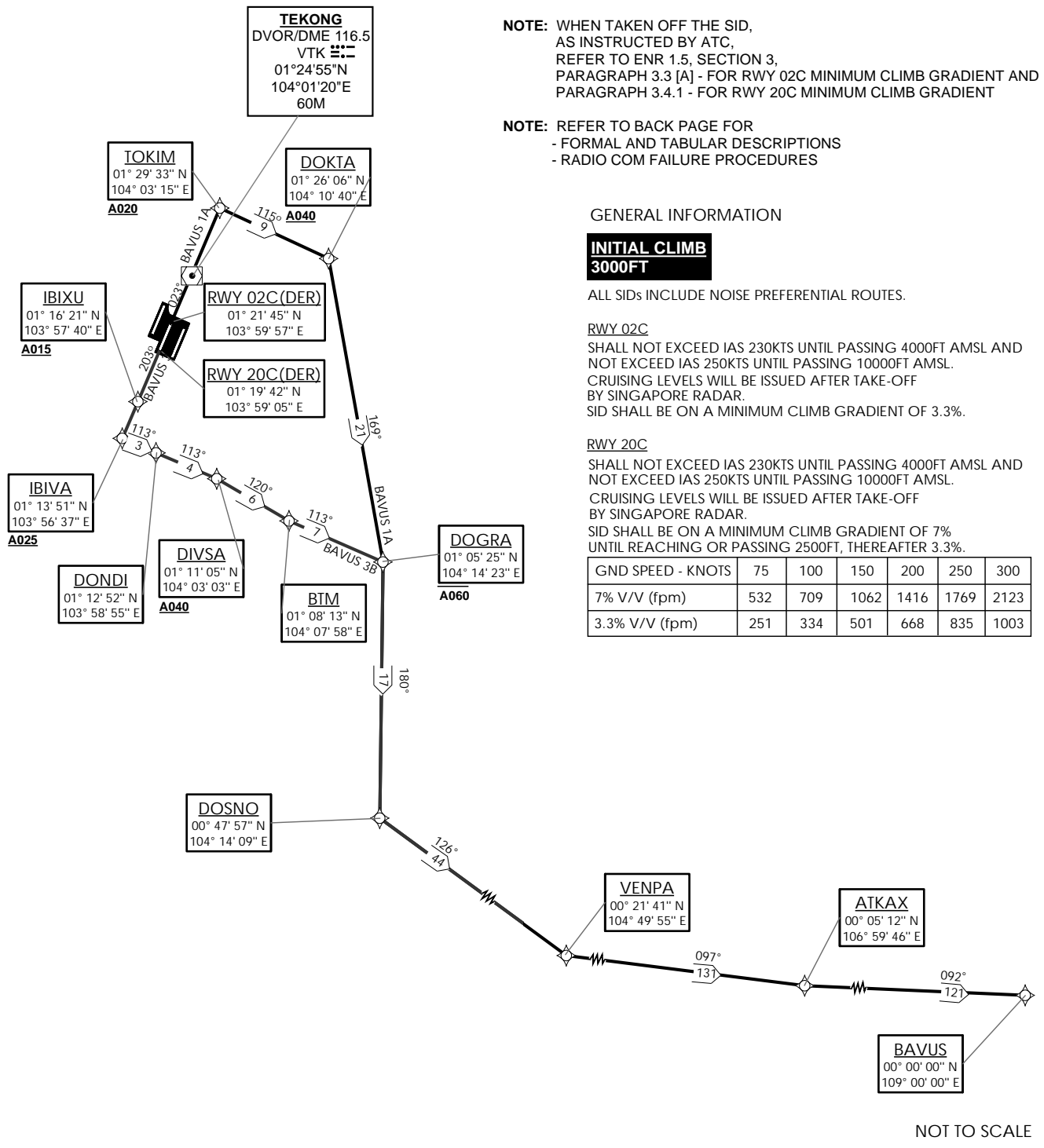
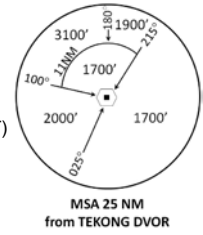
NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

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 VECTORED,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT 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 |

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. |

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6
APP 120.3
124.05
ACC 133.25

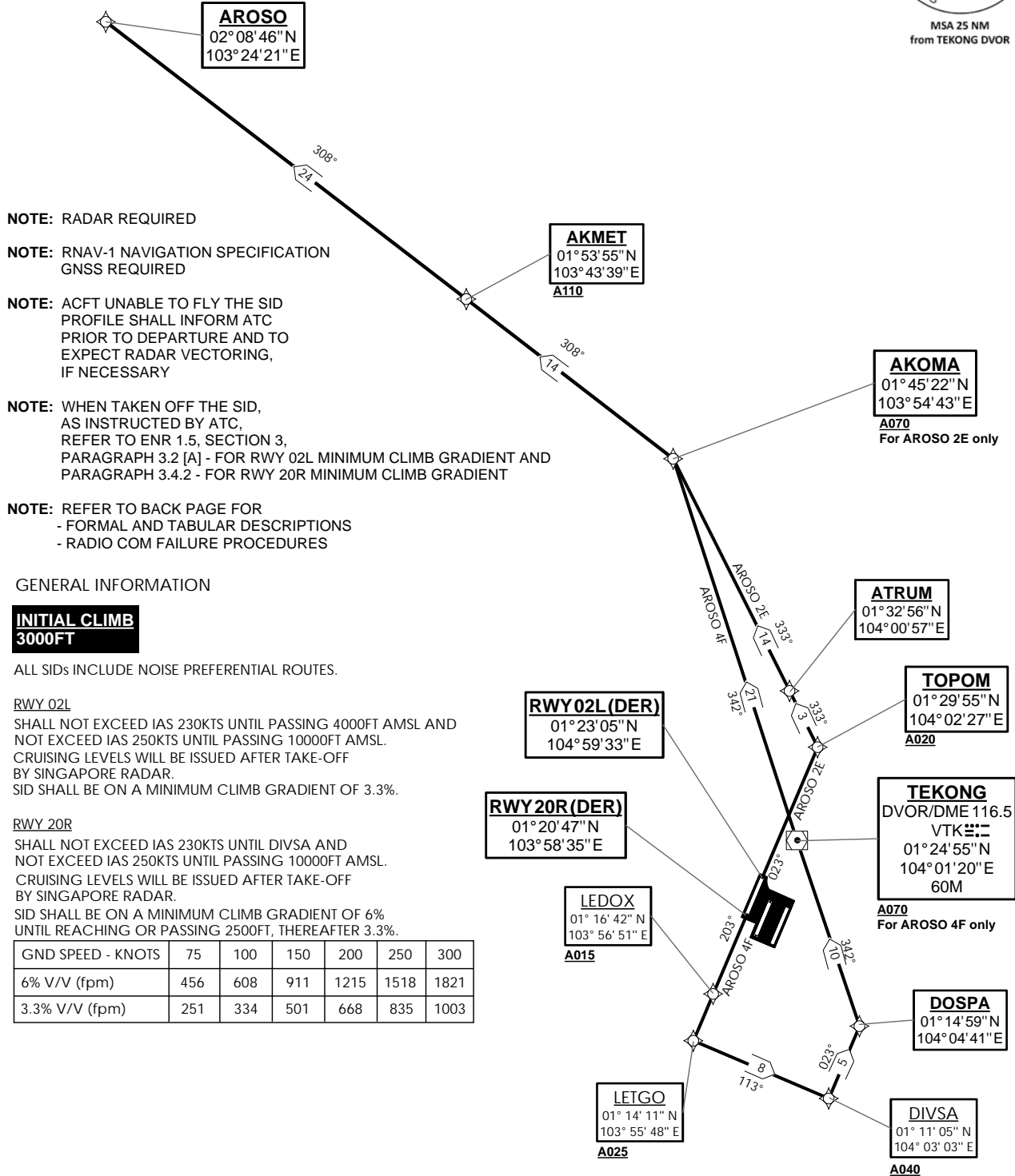
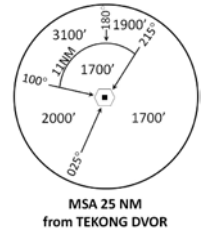
TRANSITION ALTITUDE
11 000ft

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 VECTURING, 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

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] - | CF | N |
| | ATRUM - | TF | N |
| | AKOMA [A070+; L] - | TF | N |
| | AKMET [A110+] - | TF | N |
| | AROSO | 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 | 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+] - | 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 |
| | AKMET [A110+] - | TF | N |
| | AROSO | 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 | 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 | <p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:</p> <p>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.</p> <p>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.</p> |

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

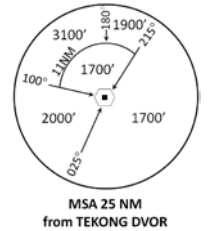
NOTE: RADAR REQUIRED

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 VECTURING,
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



MASBO
02° 02' 48" N
102° 52' 51" E

SABKA
01° 50' 51" N
103° 17' 13" E

AGVAR
01° 47' 19" N
103° 41' 45" E
A110

AKOMA
01° 45' 22" N
103° 54' 43" E
A070
For MASBO 2E only

ATRUM
01° 32' 56" N
104° 00' 57" E

TOPOM
01° 29' 55" N
104° 02' 27" E
A020

RWY 02L (DER)
01° 23' 05" N
103° 59' 33" E

RWY 20R (DER)
01° 20' 47" N
103° 58' 35" E

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55" N
104° 01' 20" E
60M
A070
For MASBO 4F only

LEDOX
01° 16' 42" N
103° 56' 51" E
A015

DOSPA
01° 14' 59" N
104° 04' 41" E

LETGO
01° 14' 11" N
103° 55' 48" E
A025

DIVSA
01° 11' 05" N
104° 03' 03" E
A040

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

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 | <p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:</p> <p>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.</p> <p>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.</p> |

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

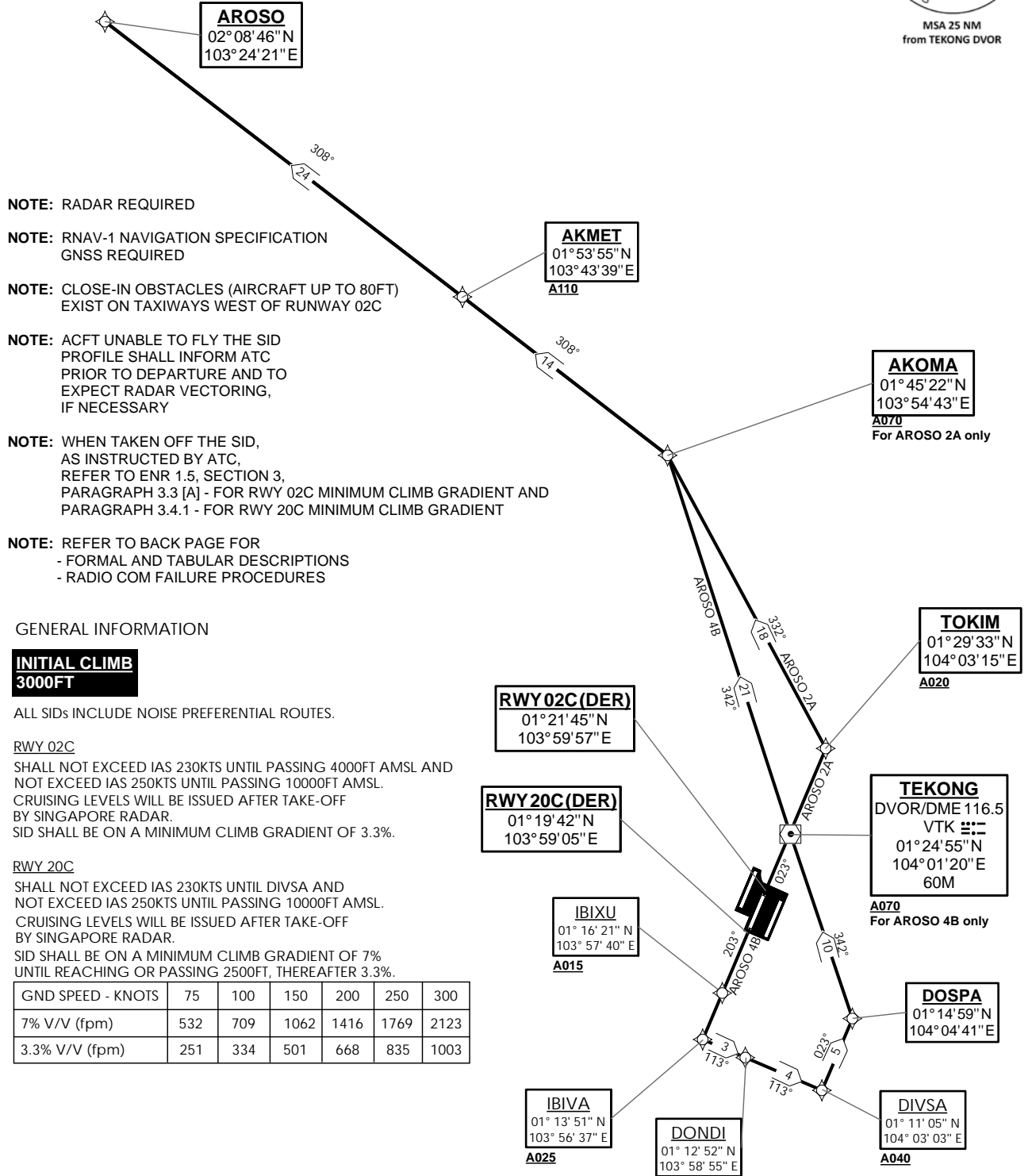
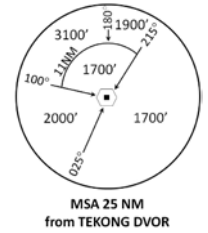
TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C/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 VECTORIZING, IF NECESSARY
- NOTE:** WHEN TAKEN OFF THE SID, AS INSTRUCTED BY ATC, REFER TO ENR 1.5, SECTION 3, PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT 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

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] - | CF | N |
| | AKOMA [A070+; L] - | TF | N |
| | AKMET [A110+] - | TF | N |
| | AROSO | 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 | 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+] - | 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 |
| | AKMET [A110+] - | TF | N |
| | AROSO | 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 | 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 | <p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:</p> <p>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.</p> <p>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.</p> |

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
124.05
ACC 133.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C/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

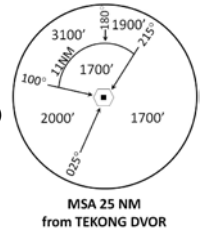
NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

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 VECTURING,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT 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



MASBO
02° 02' 48" N
102° 52' 51" E

SABKA
01° 50' 51" N
103° 17' 13" E

AGVAR
01° 47' 19" N
103° 41' 45" E
A110

AKOMA
01° 45' 22" N
103° 54' 43" E
A070
For MASBO 2A only

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 MASBO 4B only

IBIXU
01° 16' 21" N
103° 57' 40" E
A015

DOSPA
01° 14' 59" N
104° 04' 41" E

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 |

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

NOT TO SCALE

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 | <p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:</p> <p>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.</p> <p>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.</p> |

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

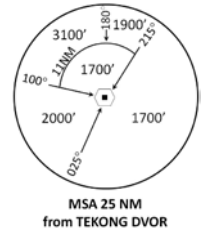
NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

NOTE: ACFT UNABLE TO FLY THE SID
PROFILE SHALL INFORM ATC
PRIOR TO DEPARTURE AND TO
EXPECT RADAR VECTORED,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.2 [A] - FOR RWY 02L MINIMUM CLIMB GRADIENT 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

VMR
02° 23' 18" N
103° 52' 18" E



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 |

RWY02L(DER)
01° 23' 05" N
103° 59' 33" E

RWY20R(DER)
01° 20' 47" N
103° 58' 35" E

LEDOX
01° 16' 42" N
103° 56' 51" E
A015

LETGO
01° 14' 11" N
103° 55' 48" E
A025

AKOMA
01° 45' 22" N
103° 54' 43" E
A070
For VMR 5E only

ATRUM
01° 32' 56" N
104° 00' 57" E

TOPOM
01° 29' 55" N
104° 02' 27" E
A020

TEKONG
DVOR/DME 116.5
VTK
01° 24' 55" N
104° 01' 20" E
60M
A070
For VMR 8F only

DOSPA
01° 14' 59" N
104° 04' 41" E

DIVSA
01° 11' 05" N
104° 03' 03" E
A040

NOT TO SCALE

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] - | CF | N |
| | ATRUM - | TF | N |
| | AKOMA [A070+; R] - | TF | N |
| | VMR | 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 | 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+] - | CF | N |
| | LETGO [A025+; L] - | TF | N |
| | DIVSA [A040+; K230; L] - | TF | N |
| | DOSPA [L] - | TF | N |
| | VTK [A070+] - | TF | N |
| | AKOMA [R] - | TF | N |
| | VMR | 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 | R | - | - | RNAV1 |
| TF | VMR | - | 356(356.4) | -0.4 | - | - | - | RNAV1 |

RADIO COMMUNICATIONS FAILURE PROCEDURE

| | |
|---|---|
| 1 | SET TRANSPONDER TO MODE A/C CODE 7600 |
| 2 | <p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:</p> <p>RWY 02L - PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p> <p>RWY 20R - PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p> |

STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

| | |
|--|---------------------------------|
| TWR 118.6 / 118.25 APP 120.3 124.05 ACC 133.8 | 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 VECTORED,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT 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

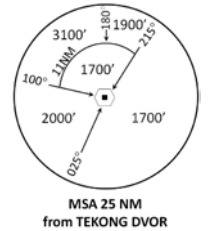
SHALL NOT EXCEED IAS 230KTS UNTIL PASSING 4000FT AMSL AND
NOT EXCEED IAS 250KTS UNTIL PASSING 10000FT AMSL.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.
SID SHALL BE ON A MINIMUM CLIMB GRADIENT OF 3.3%.

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 |

VMR
02° 23' 18" N
103° 52' 18" E



AKOMA
01° 45' 22" N
103° 54' 43" E
A070
For VMR 5A only

TOKIM
01° 29' 33" N
104° 03' 15" E
A020

RWY02C(DER)
01° 21' 45" N
103° 59' 57" E

RWY20C(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 VMR 8B only

DOSPA
01° 14' 59" N
104° 04' 41" E

IBIXU
01° 16' 21" N
103° 57' 40" E
A015

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
NOT TO SCALE

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] - | CF | N |
| | AKOMA [A070+; R] - | TF | N |
| | VMR | 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 | 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+] - | 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 [R] - | TF | N |
| | VMR | 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 | 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. |

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

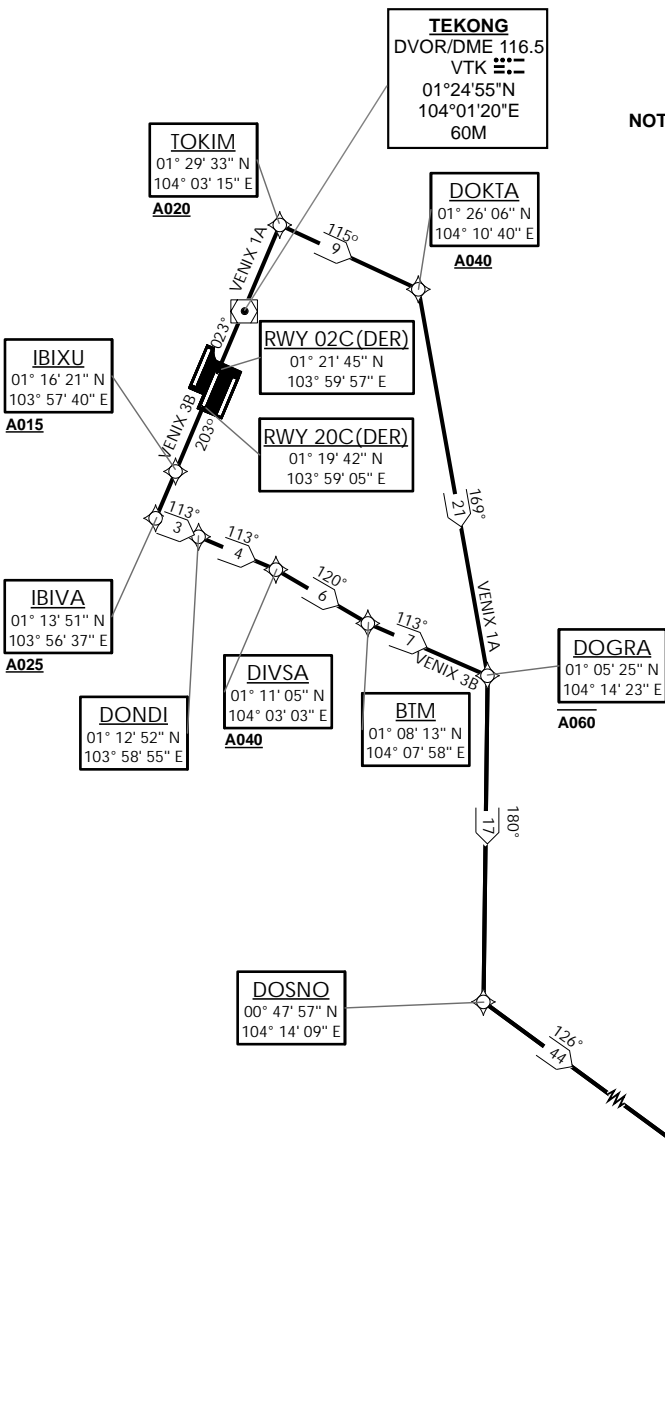
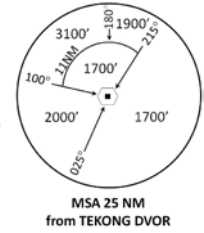
NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

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 VECTORED,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT 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

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 | <p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:</p> <p>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.</p> <p>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.</p> |

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

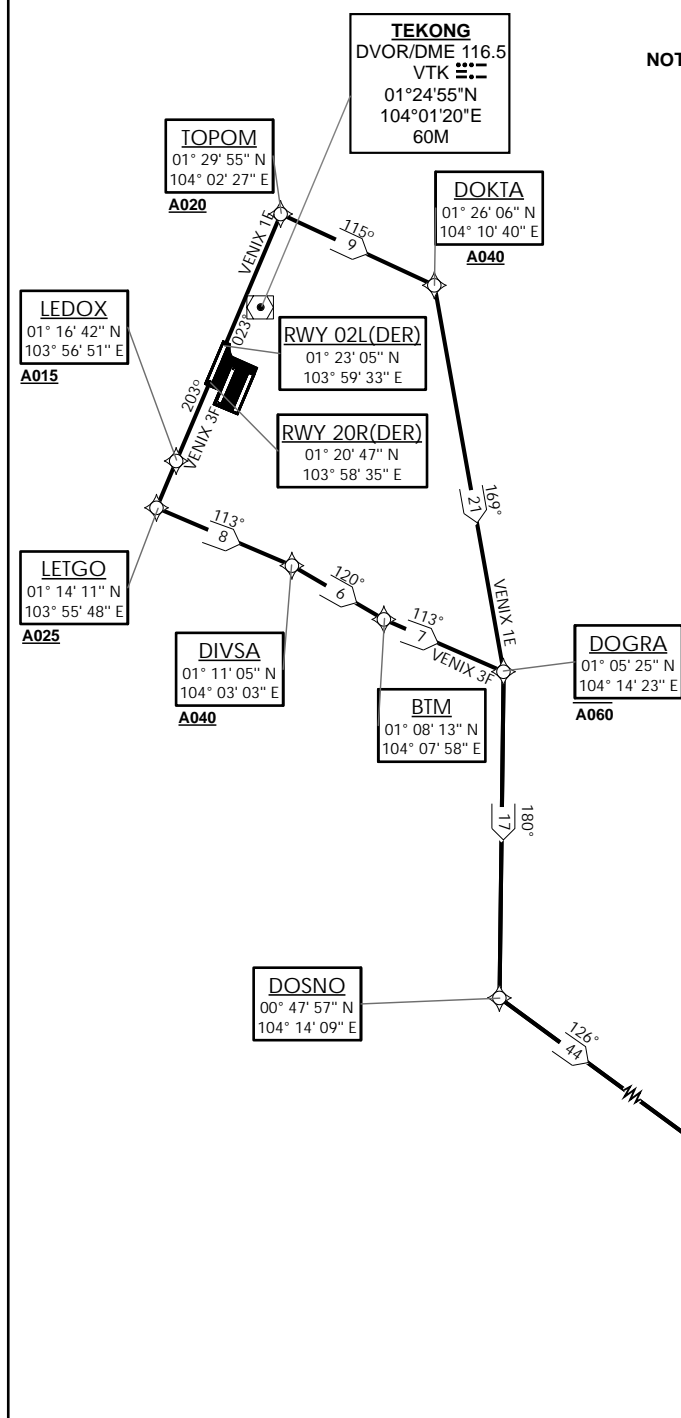
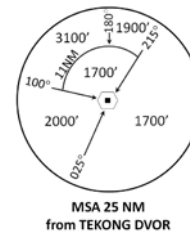
NOTE: RADAR REQUIRED

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



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

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. |

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

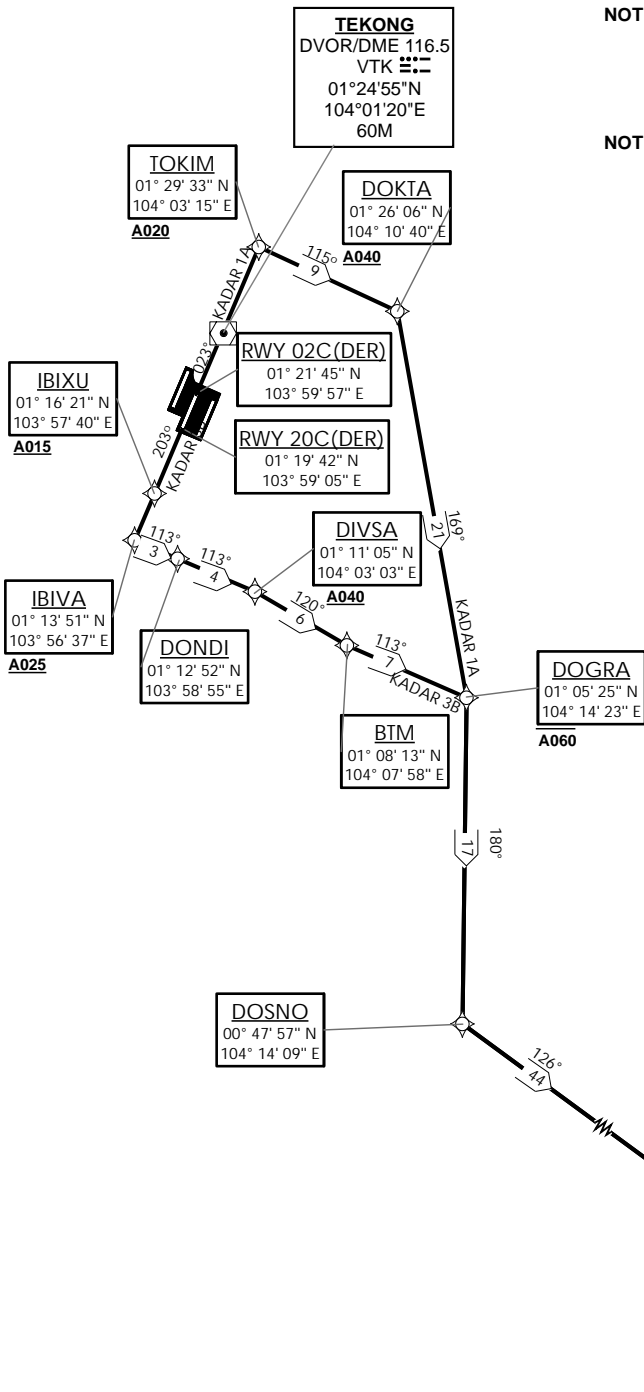
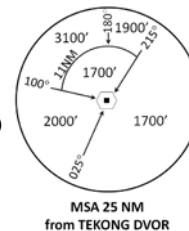
NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED

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 VECTURING,
IF NECESSARY

NOTE: WHEN TAKEN OFF THE SID,
AS INSTRUCTED BY ATC,
REFER TO ENR 1.5, SECTION 3,
PARAGRAPH 3.3 [A] - FOR RWY 02C MINIMUM CLIMB GRADIENT 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

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 | <p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:</p> <p>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.</p> <p>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.</p> |

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

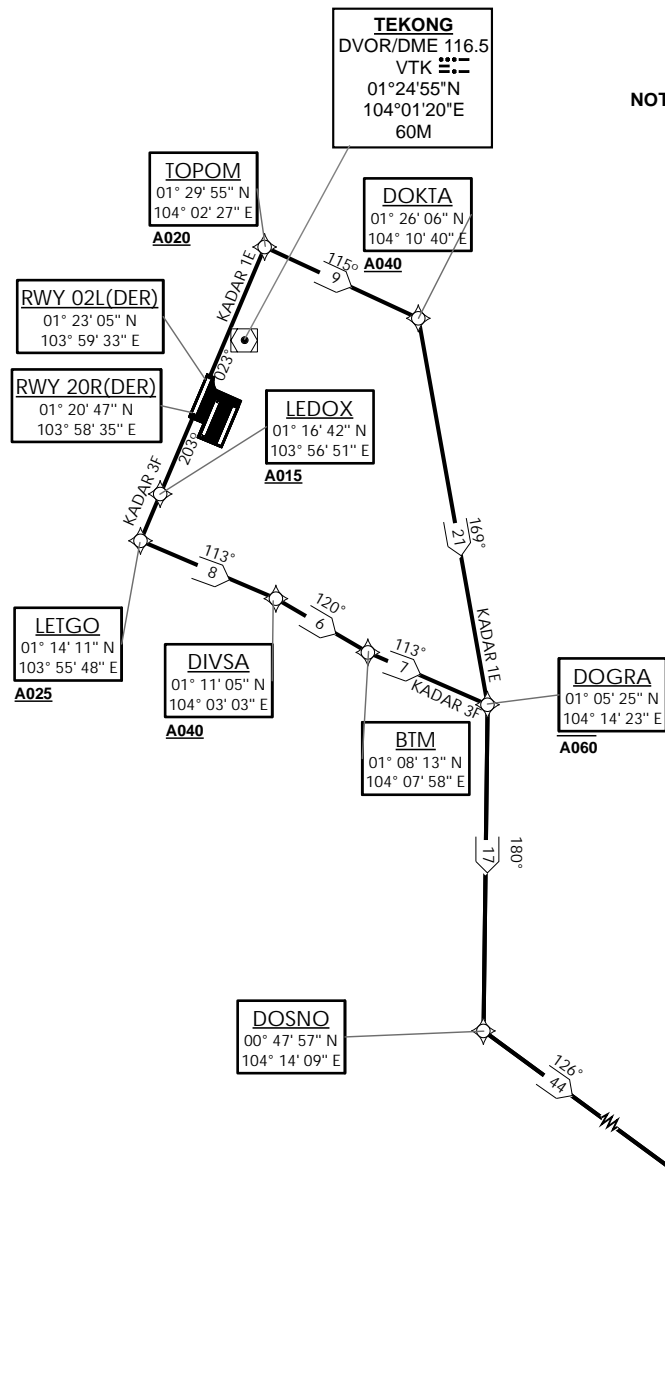
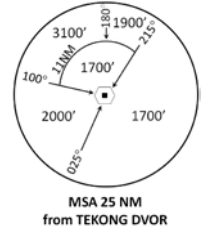
NOTE: RADAR REQUIRED

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 VECTURING,
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

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. |

STANDARD INSTRUMENT
DEPARTURES (SID)
CHART

| | |
|-----|--------------------|
| TWR | 131.4 |
| APP | 120.3 |
| ACC | 133.8/134.4/133.25 |

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02R/20L
CHANGI DEPARTURE (RADAR)
CHA 1C (R02R)
CHA 1D (R20L)

ELEV, ALT IN FEET

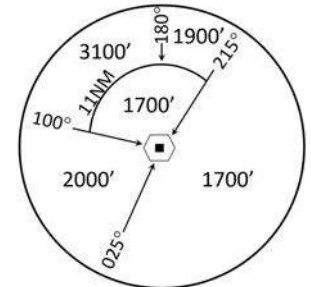
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: ACFT UNABLE TO COMPLY WITH CLIMB GRADIENT
RESTRICTION SHALL INFORM ATC DURING THE TIME
ACFT COMMENCES TAXIING TO HOLDING POINT FOR
DEPARTURE

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



**MSA 25 NM
from TEKONG DVOR**

GENERAL INFORMATION

**INITIAL CLIMB
3000FT**

ACFT ON DEPARTURE SHALL NOT EXCEED IAS 230KTS
UNTIL PASSING 4000FT AMSL AND NOT EXCEED IAS 250KTS
UNTIL PASSING 10000FT AMSL.

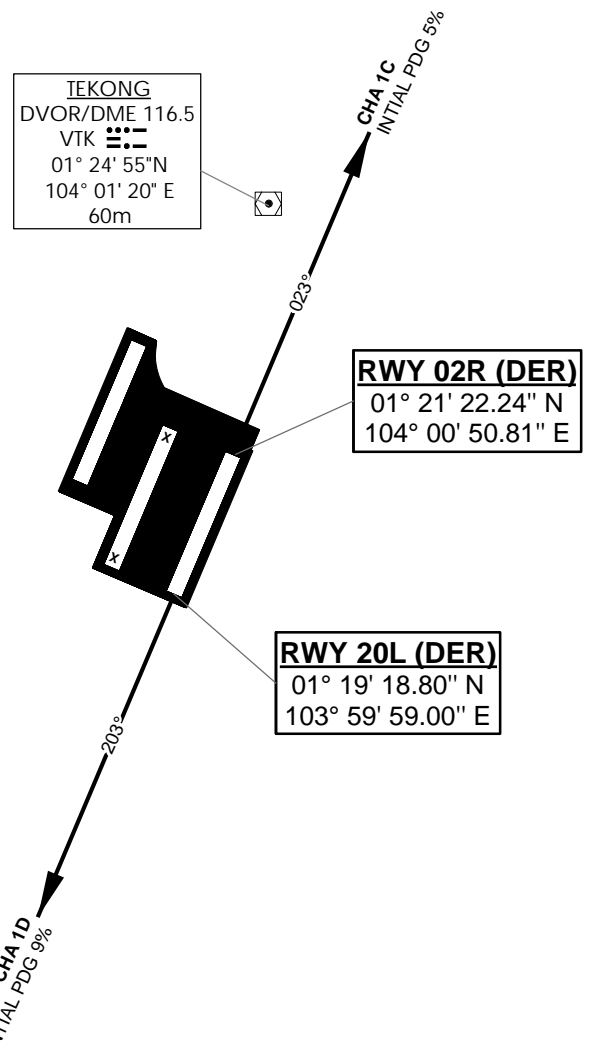
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

ACFT ON DEPARTURE 02R SHALL BE ON A MINIMUM CLIMB GRADIENT
OF 5% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

| | | | | | | |
|-------------------|-----|-----|-----|------|------|------|
| GND SPEED - KNOTS | 75 | 100 | 150 | 200 | 250 | 300 |
| 5% V/V (fpm) | 380 | 506 | 760 | 1013 | 1266 | 1519 |
| 3.3% V/V (fpm) | 251 | 334 | 501 | 668 | 835 | 1003 |

ACFT ON DEPARTURE 20L SHALL BE ON A MINIMUM CLIMB GRADIENT
OF 9% UNTIL REACHING OR PASSING 2500FT, THEREAFTER 3.3%.

| | | | | | | |
|-------------------|-----|-----|------|------|------|------|
| GND SPEED - KNOTS | 75 | 100 | 150 | 200 | 250 | 300 |
| 9% V/V (fpm) | 684 | 911 | 1367 | 1823 | 2279 | 2734 |
| 3.3% V/V (fpm) | 251 | 334 | 501 | 668 | 835 | 1003 |



NOT TO SCALE

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 |
| Y513 | AKOMA DCT AKMET DCT AROSO |

RADIO COMMUNICATIONS FAILURE PROCEDURE

| | |
|---|---|
| 1 | SET TRANSPONDER TO MODE A/C CODE 7600 |
| 2 | <p>COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:</p> <p>RWY 02R - PROCEED DIRECT TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p> <p>RWY 20L - PROCEED DIRECT TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.</p> |

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 133.25
APP 124.05
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**

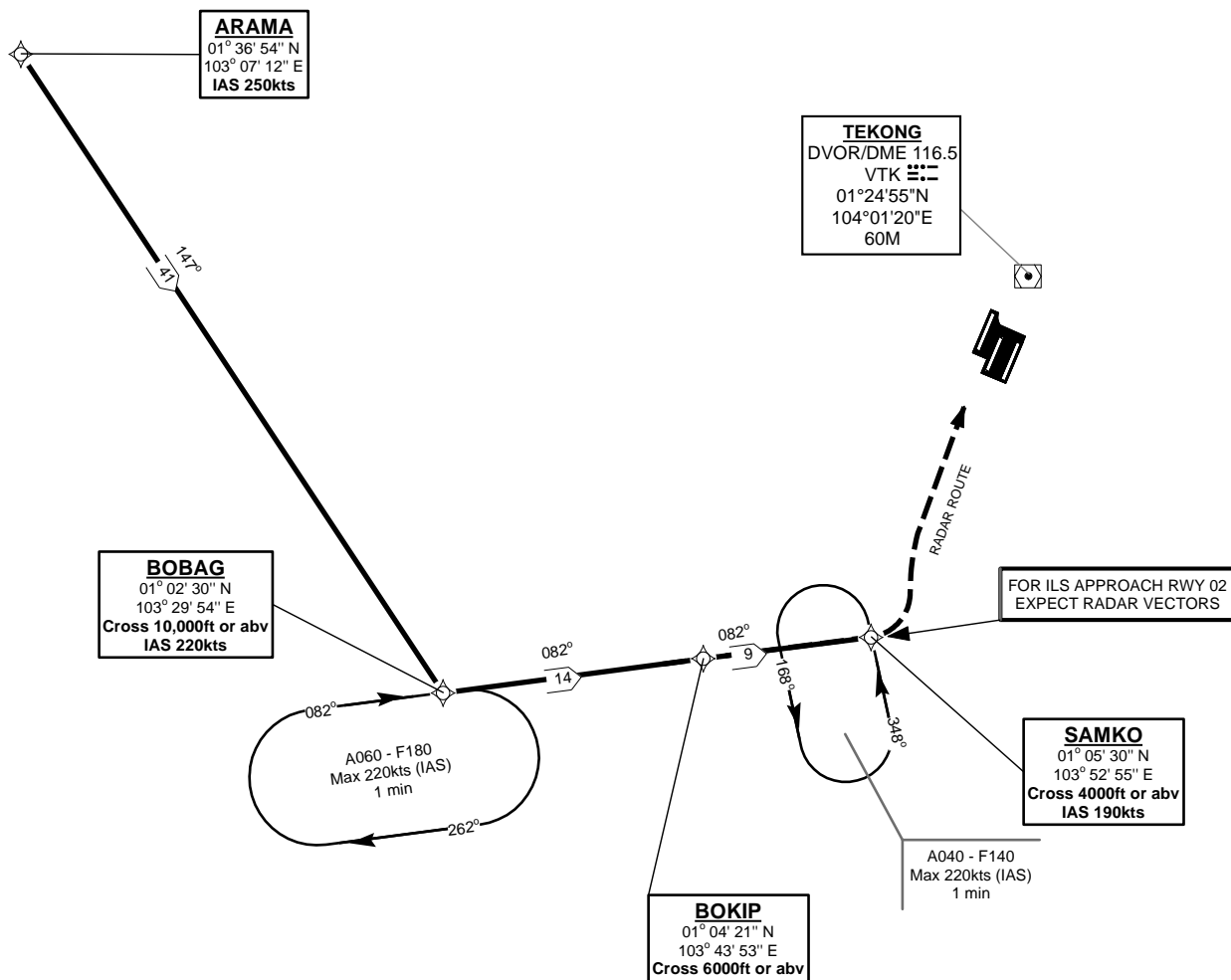
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

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

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] - | IF | N |
| | BOBAG [A100+; K220; L] - | TF | N |
| | BOKIP [A060+] - | TF | N |
| | SAMKO [A040+; K190] | TF | 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 | <p>When cleared via ARAMA 1A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on ARAMA 1A to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 133.25
APP 124.05
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**

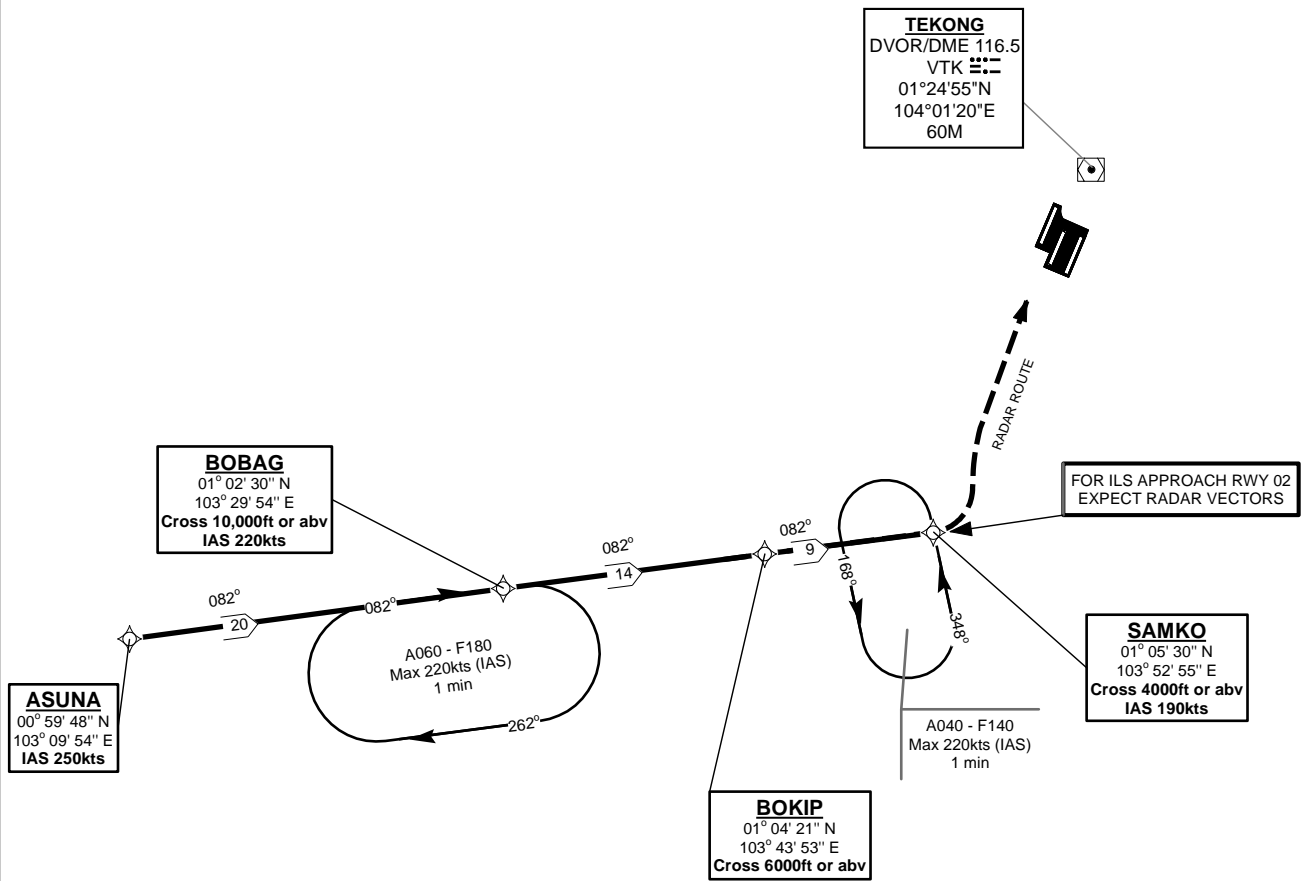
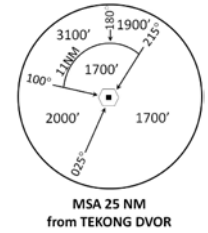
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

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

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] - | IF | N |
| | BOBAG [A100+; K220] - | TF | N |
| | BOKIP [A060+] - | TF | N |
| | SAMKO [A040+; K190] | TF | 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 | <p>When cleared via ASUNA 1A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on ASUNA 1A to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 133.25
APP 124.05
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

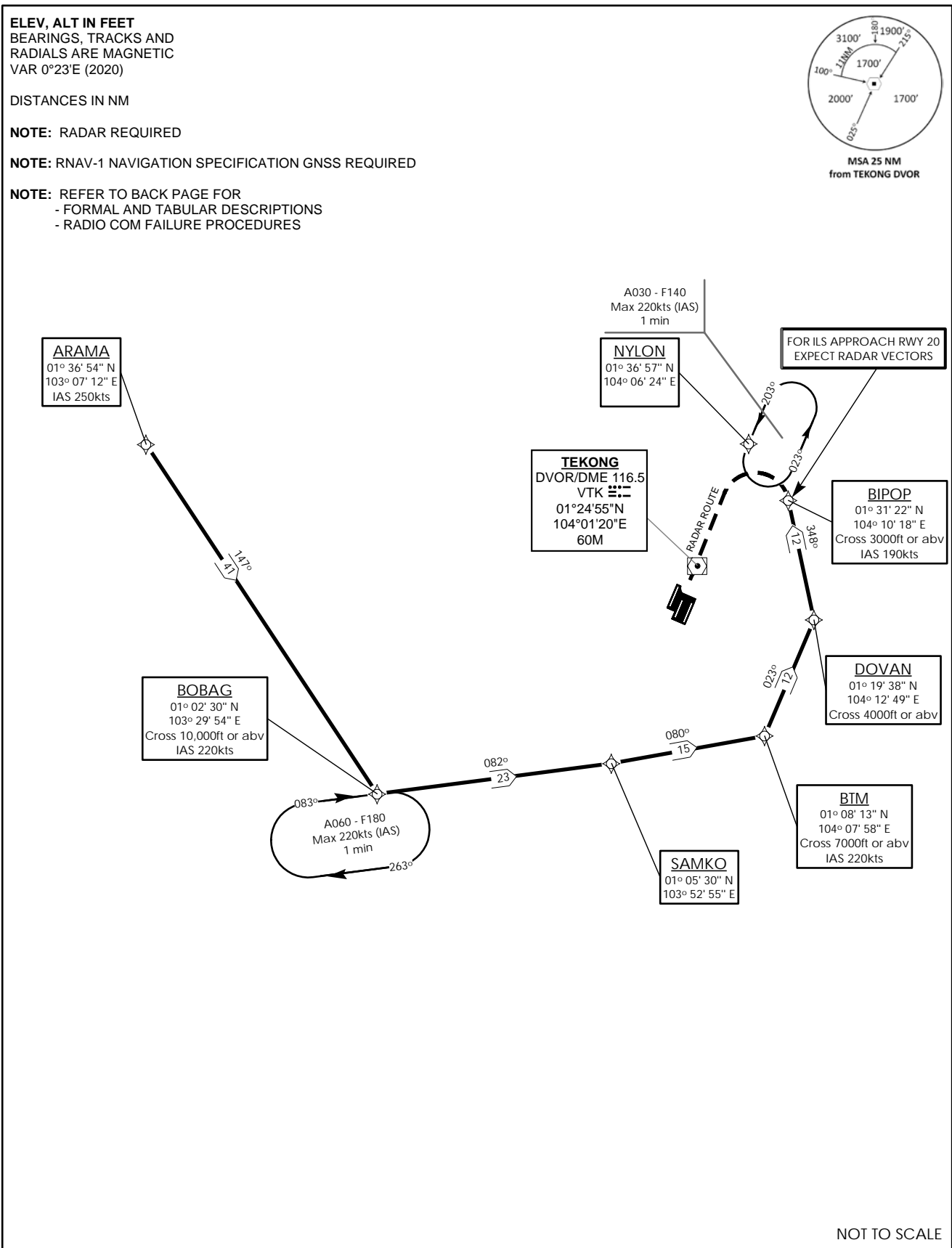
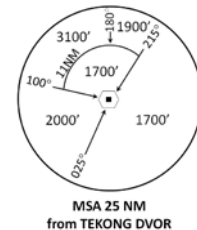
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

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



NOT TO SCALE

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] - | IF | N |
| | BOBAG [A100+; K220; L] - | TF | N |
| | SAMKO [L] - | TF | N |
| | BTM [A070+; K220; L] - | TF | N |
| | DOVAN [A040+; L] - | TF | N |
| | BIPOP [A030+; K190] | TF | 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 | <p>When cleared via ARAMA 1B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on ARAMA 1B to BIPOP, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 133.25
APP 124.05
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

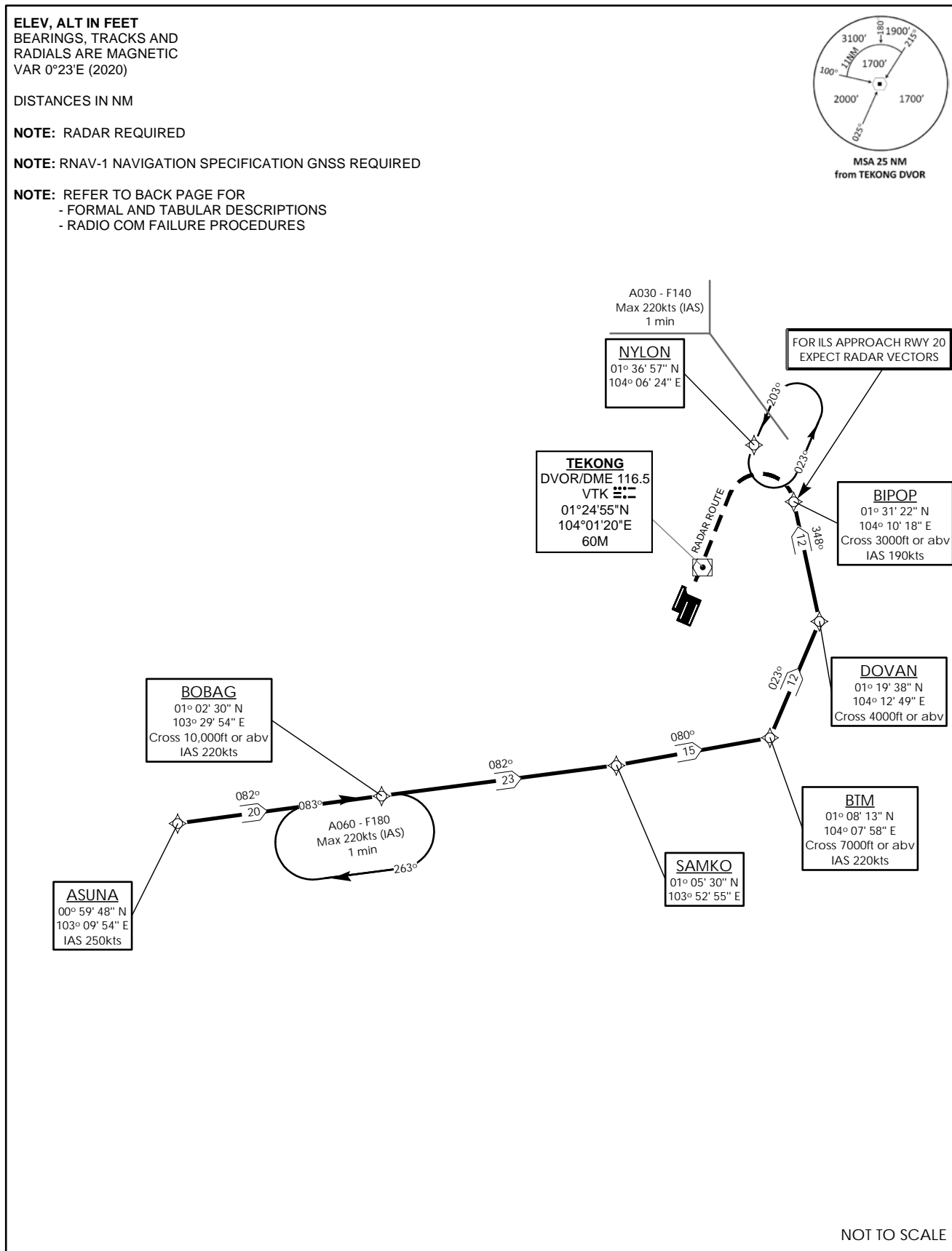
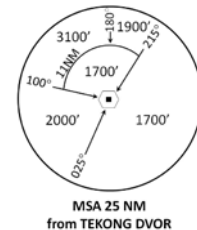
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

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



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] - | IF | N |
| | BOBAG [A100+; K220] - | TF | N |
| | SAMKO [L] - | TF | N |
| | BTM [A070+; K220; L] - | TF | N |
| | DOVAN [A040+; L] - | TF | N |
| | BIPOP [A030+; K190] | TF | 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 | <p>When cleared via ASUNA 1B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on ASUNA 1B to BIPOP, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 134.2
APP 124.05
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

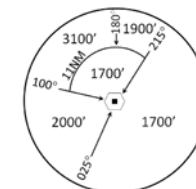
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

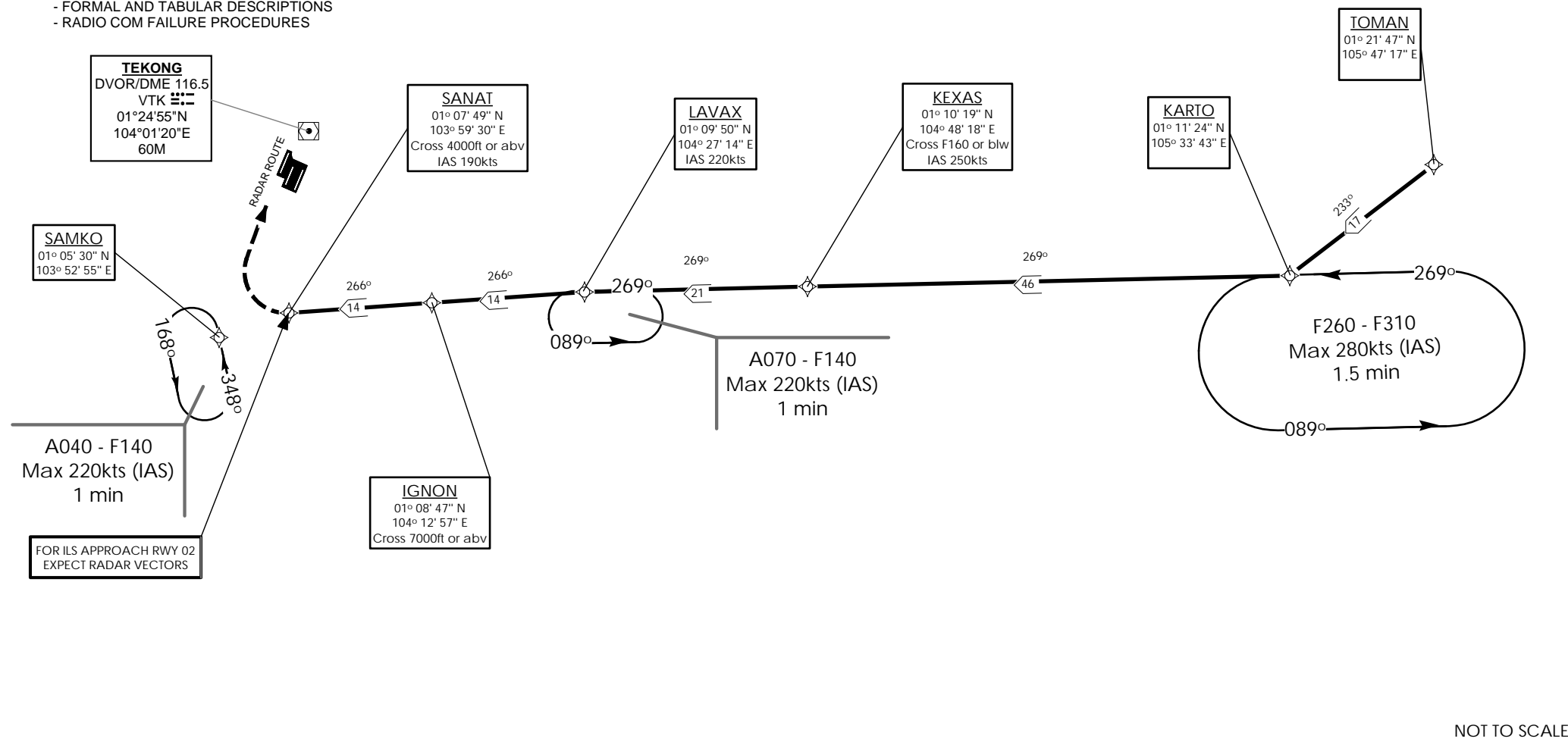
NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



MSA 25 NM
from TEKONG DVOR



NOT TO SCALE

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 - | IF | N |
| | KARTO [R] - | TF | N |
| | KEXAS [FL160-; K250] - | TF | N |
| | LAVAX [K220; L] - | TF | N |
| | IGNON [A070+] - | TF | N |
| | SANAT [A040+; K190] | TF | 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 | <p>When cleared via KARTO 1A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on KARTO 1A to SANAT, then direct to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 134.4
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

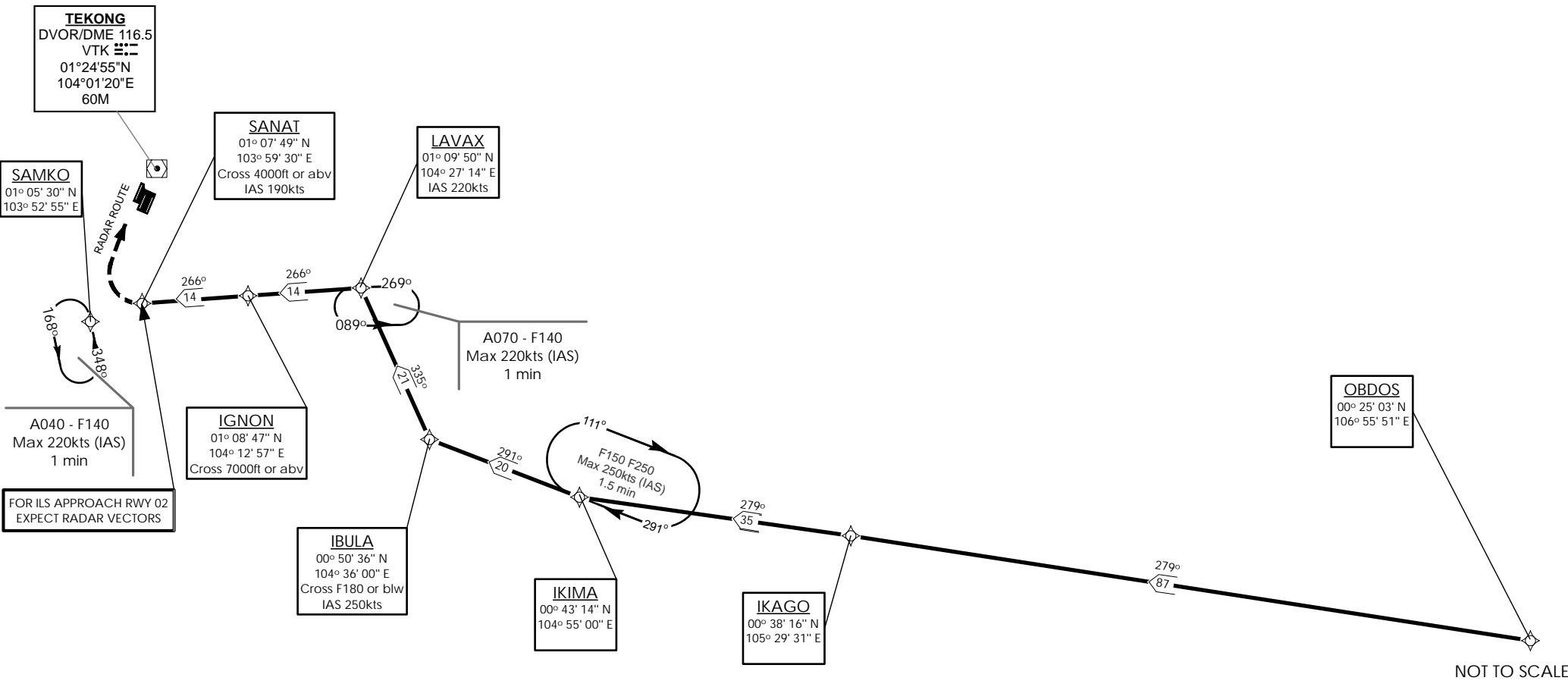
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

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



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 - | IF | N |
| | IKAGO - | TF | N |
| | IKIMA [R] - | TF | N |
| | IBULA [FL180-; K250; R] - | TF | N |
| | LAVAX [K220; L] - | TF | N |
| | IGNON [A070+] - | TF | N |
| | SANAT [A040+; K190] | TF | 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 | <p>When cleared via OBDOS 1A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on OBDOS 1A to SANAT, then direct to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 134.2
APP 124.05
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

SINGAPORE/Singapore Changi
RWY 20R/C/L
KARTO ONE BRAVO ARRIVAL
KARTO 1B

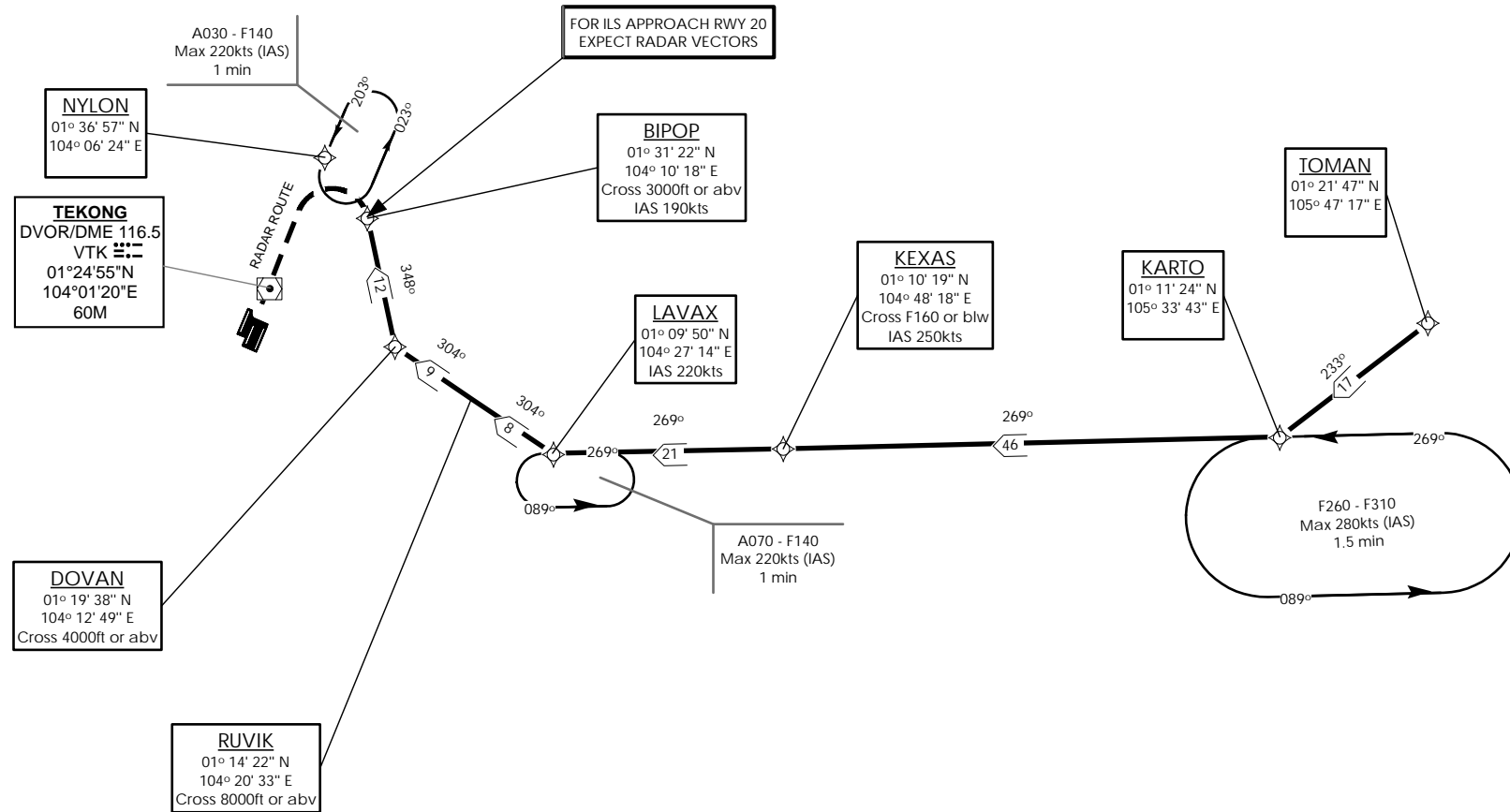
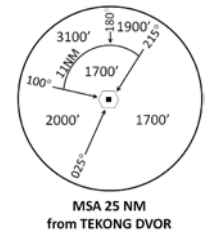
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

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

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 - | IF | N |
| | KARTO [R] - | TF | N |
| | KEXAS [FL160-; K250] - | TF | N |
| | LAVAX [K220; R] - | TF | N |
| | RUVIK [A080+] - | TF | N |
| | DOVAN [A040+; R] - | TF | N |
| | BIPOP [A030+; K190] | TF | 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 | <p>When cleared via KARTO 1B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on KARTO 1B to BIPOP, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 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

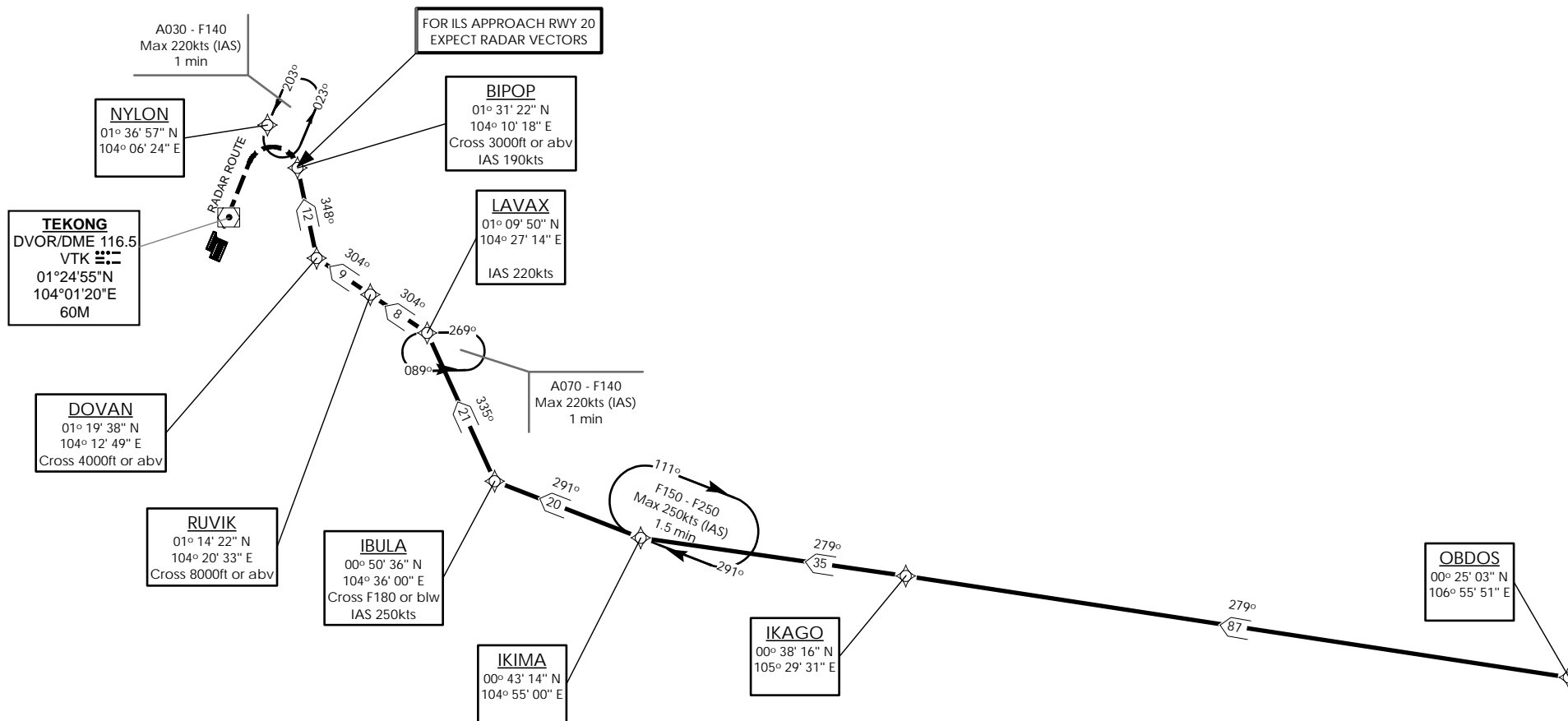
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

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

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 - | IF | N |
| | IKAGO - | TF | N |
| | IKIMA [R] - | TF | N |
| | IBULA [FL180-; K250; R] - | TF | N |
| | LAVAX [K220; L] - | TF | N |
| | RUVIK [A080+] - | TF | N |
| | DOVAN [A040+; R] - | TF | N |
| | BIPOP [A030+; K190] | TF | 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 | <p>When cleared via OBDOS 1B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on OBDOS 1B to BIPOP, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 133.25
APP 124.05
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

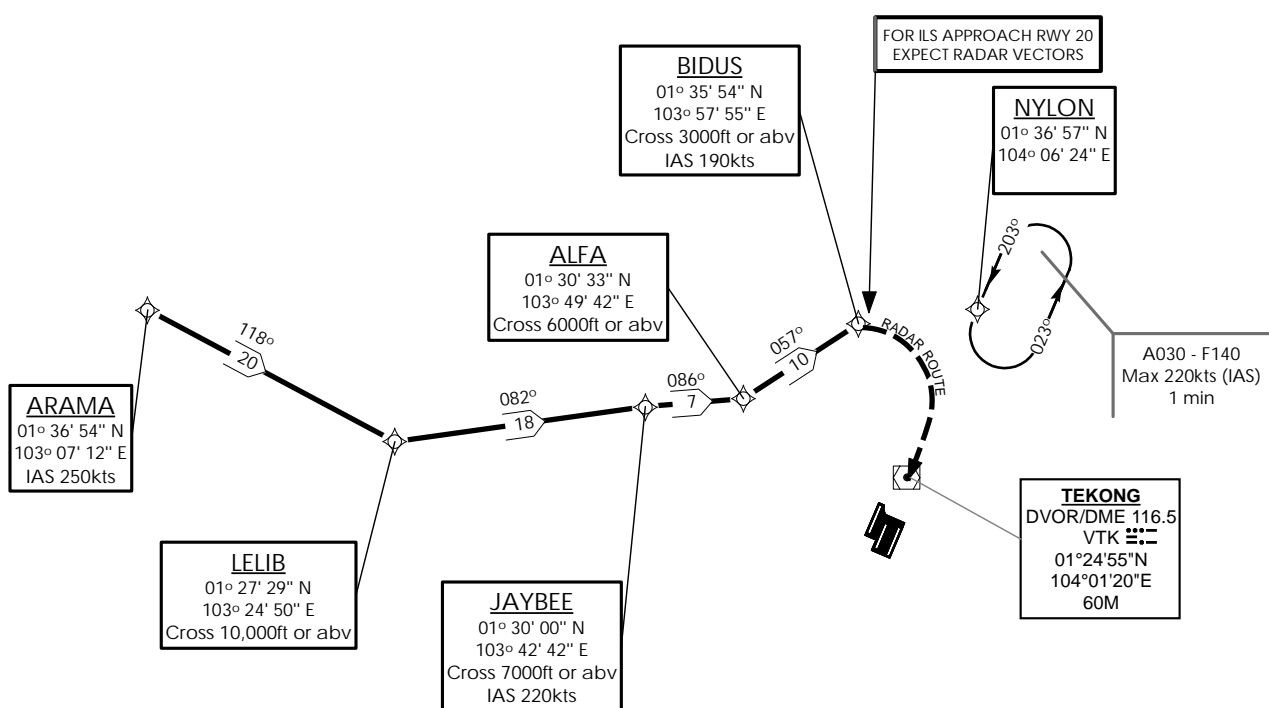
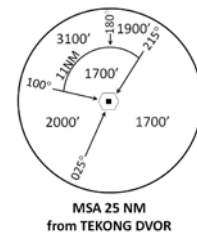
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

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

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] - | IF | N |
| | LELIB [A100+; L] - | TF | N |
| | JAYBEE [A070+; K220; R] - | TF | N |
| | ALFA [A060+; L] - | TF | N |
| | BIDUS [A030+; K190] | TF | 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 PROCEDURE AIP Singapore

| | |
|----------|--|
| 1 | SET TRANSPONDER TO MODE A/C CODE 7600 |
| 2 | <p>When cleared via LELIB 3B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on LELIB 3B to BIDUS, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 133.8
APP 124.05
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

SINGAPORE/Singapore Changi
RWY 02L/C/R
MABAL TWO ALPHA ARRIVAL
MABAL 2A

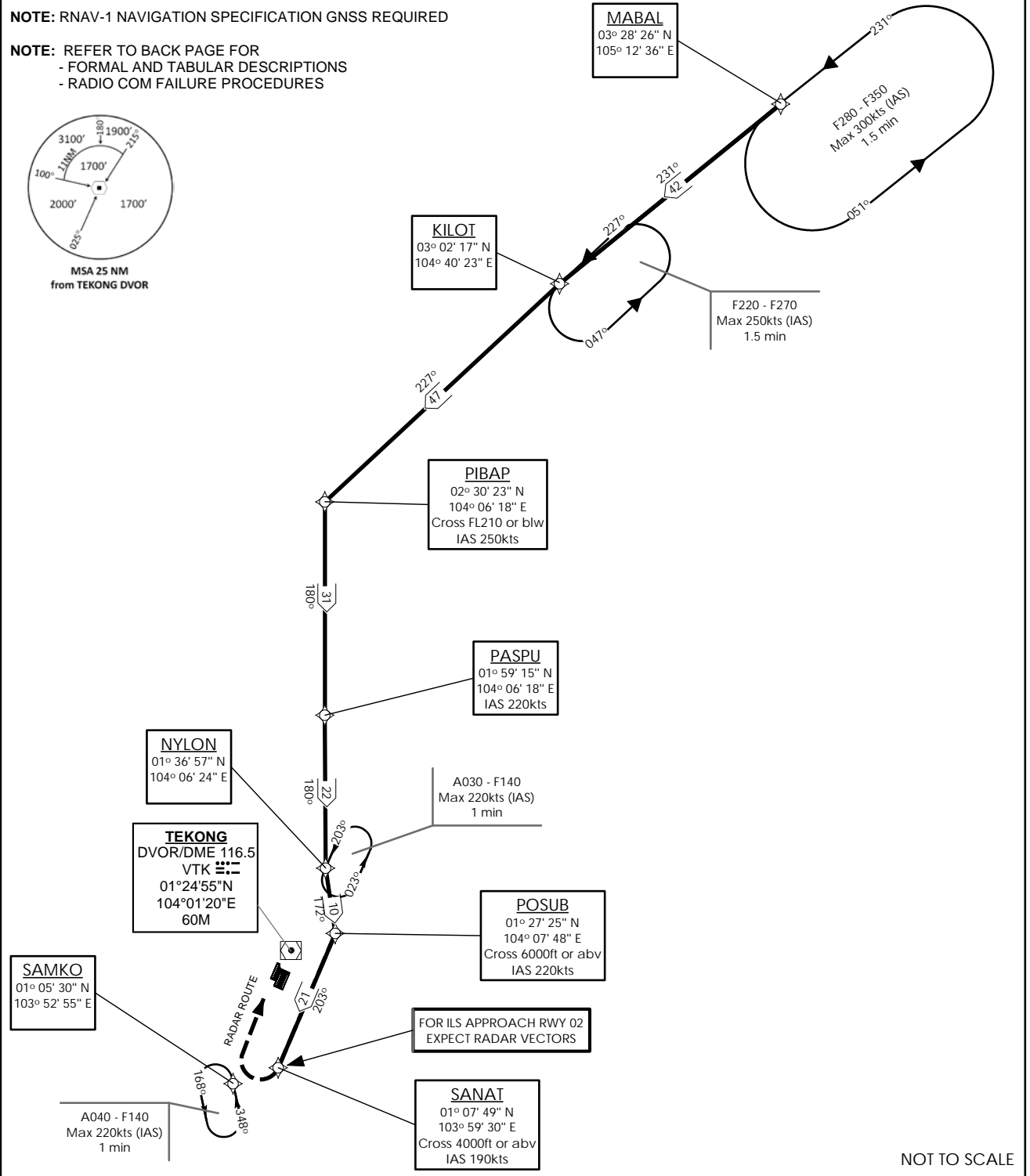
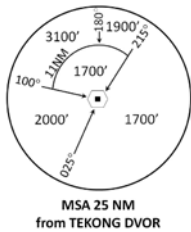
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

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

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 - | IF | N |
| | KILOT [L] - | TF | N |
| | PIBAP [FL210-; K250; L] - | TF | N |
| | PASPU [K220] - | TF | N |
| | NYLON [L] - | TF | N |
| | POSUB [A060+; K220; R] - SANAT [A040+; K190] | TF | 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 | <p>When cleared via MABAL 2A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on MABAL 2A to SANAT, then direct to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 133.8
APP 124.05
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

SINGAPORE/Singapore Changi
RWY 20R/C/L
MABAL TWO BRAVO ARRIVAL
MABAL 2B

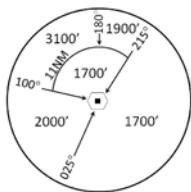
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

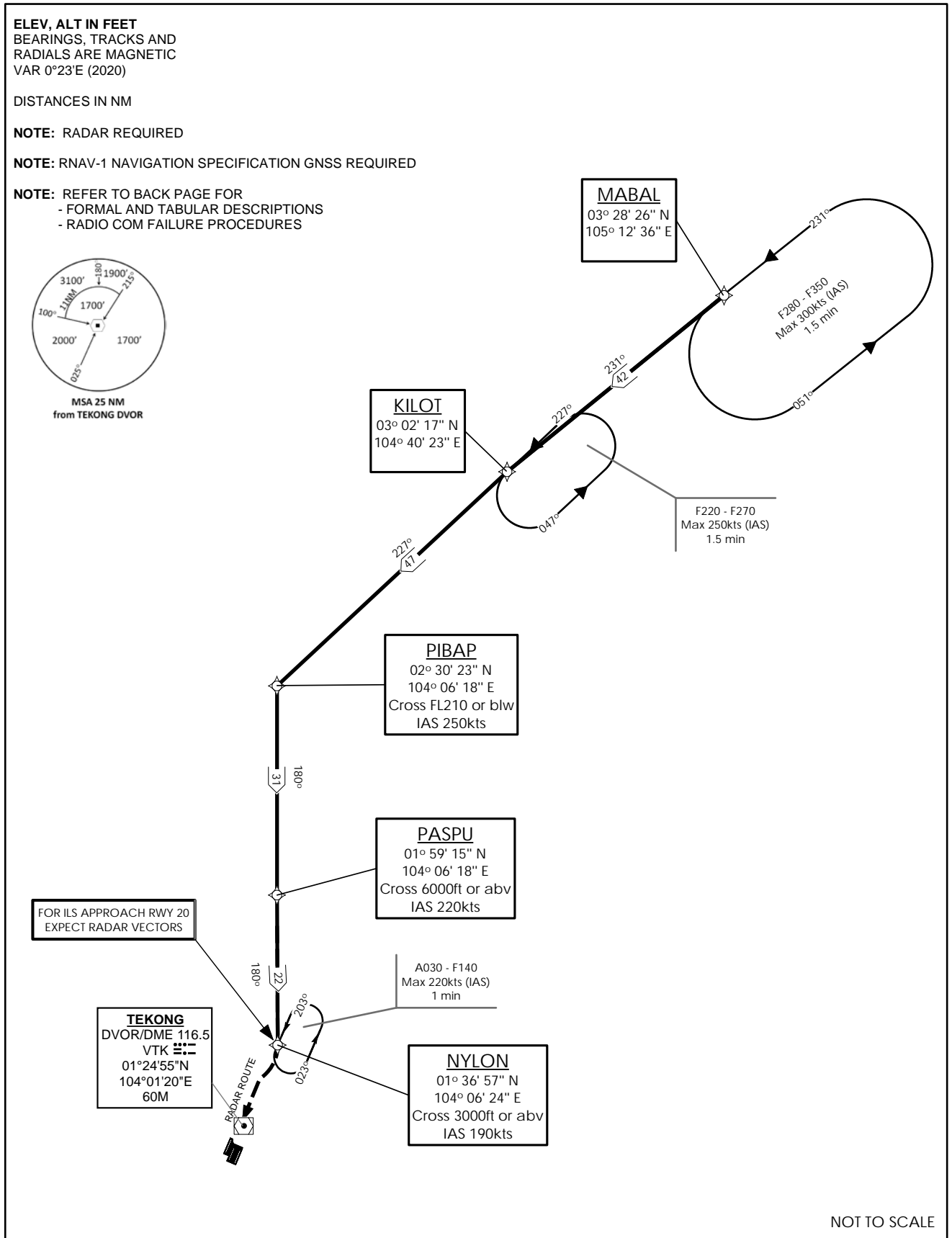
NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



MSA 25 NM
from TEKONG DVOR



MABAL 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 | <p>When cleared via MABAL 2B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on MABAL 2B to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 133.8
APP 124.05
119.3
TWR 118.6

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

**SINGAPORE/Singapore Changi
RWY 02L/C/R
LEBAR TWO ALPHA ARRIVAL
LEBAR 2A**

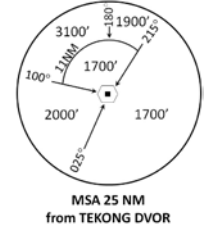
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



PASPU
01° 59' 15" N
104° 06' 18" E
IAS 220kts

PAPA UNIFORM
DVOR/DME 115.1
PU :---
01° 25' 24" N
103° 56' 00" E
60M
Cross 7,000ft or abv

TEKONG
DVOR/DME 116.5
VTK :---
01° 24' 55" N
104° 01' 20" E
60M

DEVIATION IS NOT PERMITTED
BETWEEN SJ AND PU

WSR38
10,000ft ALT
GND

SINJON
DVOR/DME 113.5
SJ :---
01° 13' 21.34" N
103° 51' 15.22" E
60M
Cross 7,000ft or abv

PALGA
01° 10' 59" N
103° 47' 59" E
IAS 220kts

PAMSI
01° 04' 59" N
103° 48' 45" E

SAMKO
01° 05' 30" N
103° 52' 55" E
Cross 4,000ft or abv
IAS 190kts

FOR ILS APPROACH RWY 02
EXPECT RADAR VECTORS

NOT TO SCALE

LEBAR 2A (STAR) RNAV GNSS RWY 02L/02C/02R - DESCRIPTIONS

Formal & Abbreviated Descriptions

| Formal Description | Abbreviated Description | Path Terminator | Fly-Over required |
|--|-------------------------|-----------------|-------------------|
| From PASPU, speed 220kts. 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] - | IF | N |
| | PU [A070+; R] - | TF | N |
| | SJ [A070+; R] - | TF | N |
| | PALGA [K220; L] - | TF | N |
| | PAMSI [L] - | TF | N |
| | SAMKO [A040+; K190] | TF | 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 | <p>When cleared via LEBAR 2A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on LEBAR 2A to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02L as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

**STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)**

ACC 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**

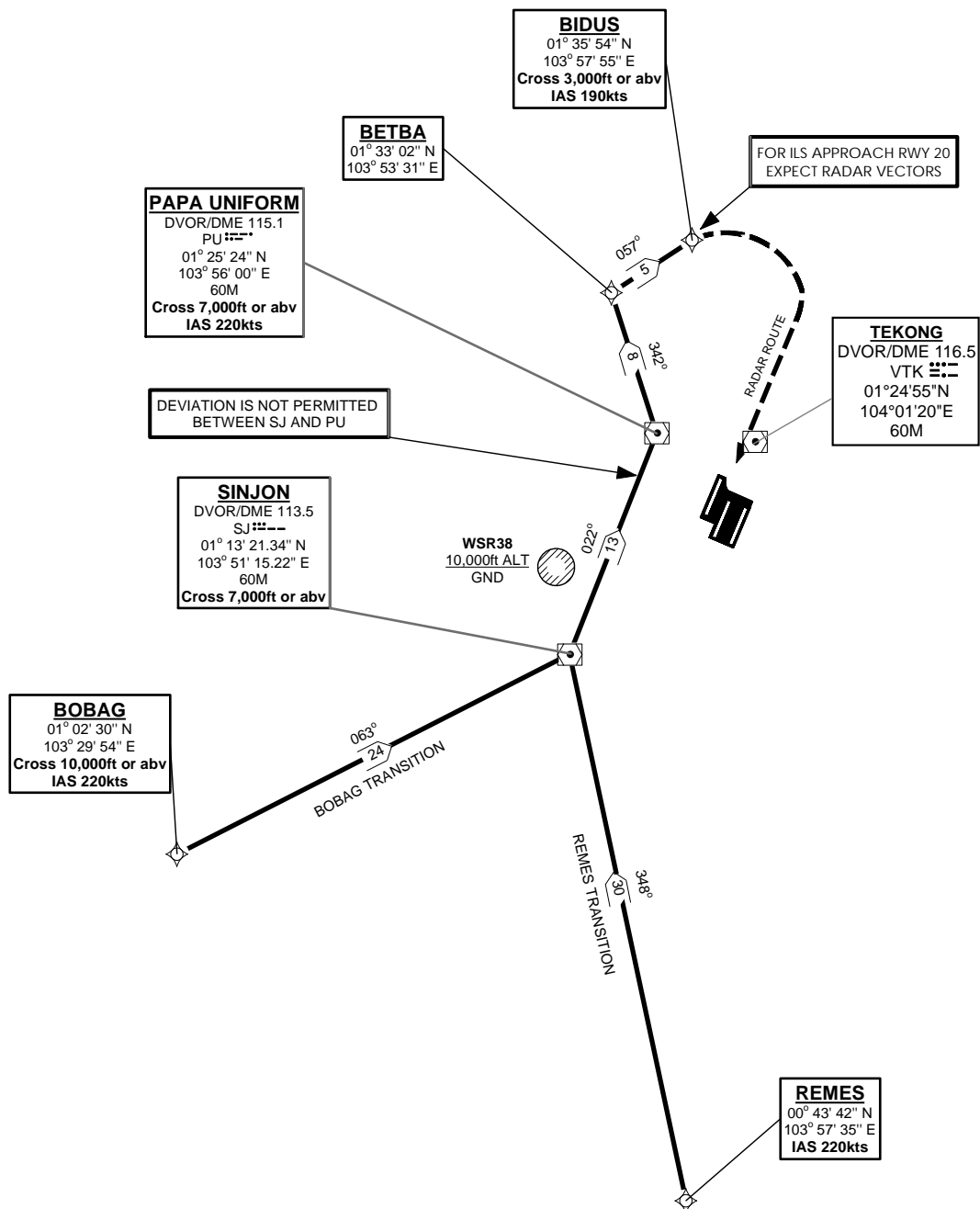
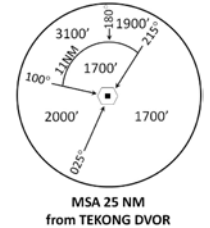
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

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



NOT TO SCALE

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] - | IF | N |
| | SJ [A070+; L] - | TF | N |
| | PU [A070+; K220; L] - | TF | N |
| | BETBA [R] - | TF | N |
| | BIDUS [A030+; K190] | TF | 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] - | IF | N |
| | SJ [A070+; R] - | TF | N |
| | PU [A070+; K220; L] - | TF | N |
| | BETBA [R] - | TF | N |
| | BIDUS [A030+; K190] | TF | 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 | <p>When cleared via LEBAR 2B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on LEBAR 2B to BIDUS, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20R as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 134.4
APP 124.05
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)

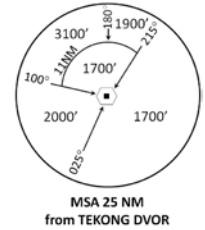
DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

TEKONG
DVOR/DME 116.5
VTK 
01°24'55"N
104°01'20"E
60M



FOR ILS APPROACH RWY 02
EXPECT RADAR VECTORS

A040 - F140
Max 220kts (IAS)
1 min

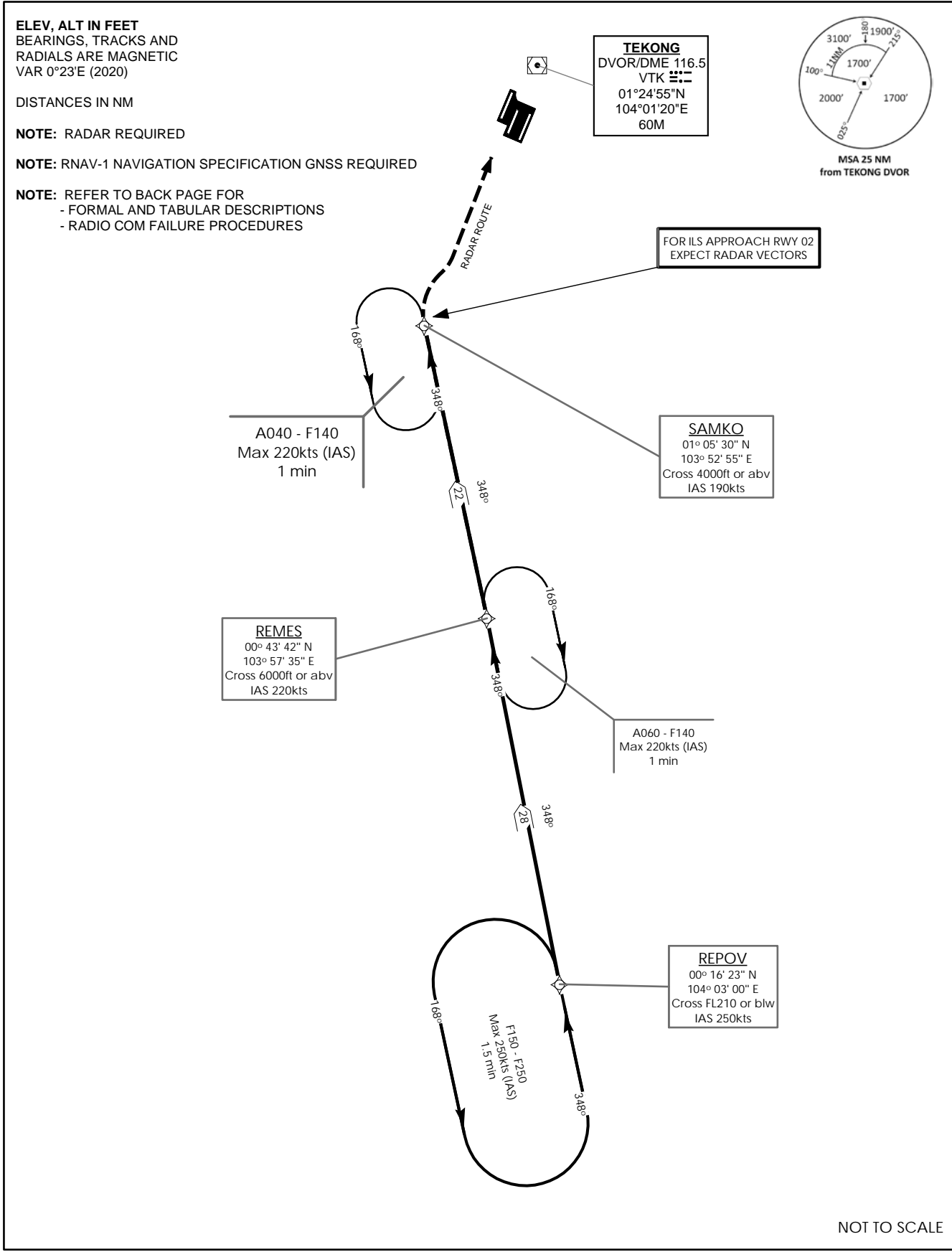
SAMKO
01° 05' 30" N
103° 52' 55" E
Cross 4000ft or abv
IAS 190kts

REMES
00° 43' 42" N
103° 57' 35" E
Cross 6000ft or abv
IAS 220kts

A060 - F140
Max 220kts (IAS)
1 min

REPOV
00° 16' 23" N
104° 03' 00" E
Cross FL210 or blw
IAS 250kts

F150 - F250
Max 250kts (IAS)
1.5 min



NOT TO SCALE

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 | <p>When cleared via REPOV 1A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on REPOV 1A to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 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

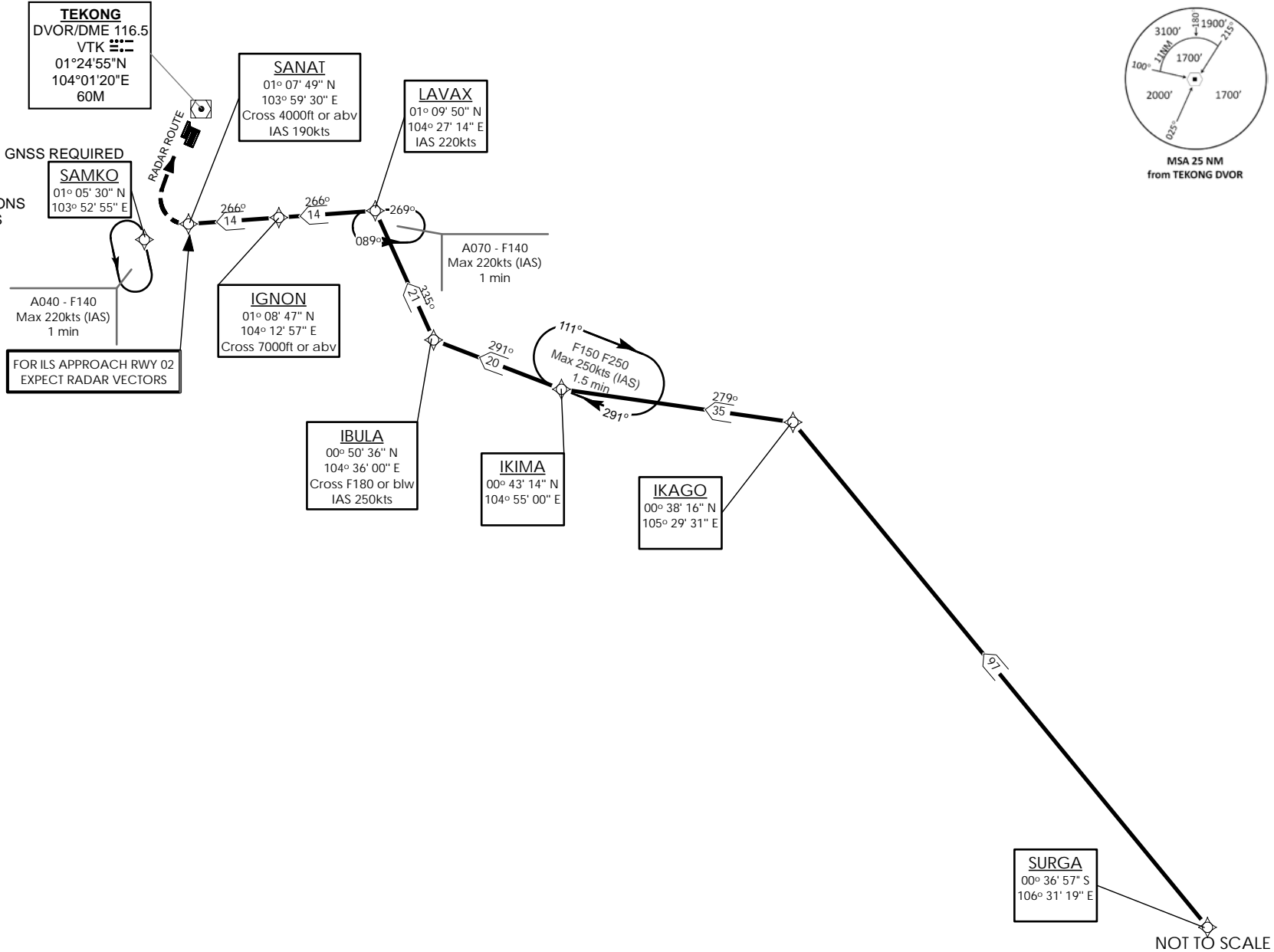
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

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



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 - | IF | N |
| | IKAGO [L] - | TF | N |
| | IKIMA [R] - | TF | N |
| | IBULA [FL180-; K250; R] - | TF | N |
| | LAVAX [K220; L] - | TF | N |
| | IGNON [A070+] - | TF | N |
| | SANAT [A040+; K190] | TF | 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 | <p>When cleared via SURGA 1A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on SURGA 1A to SANAT, then direct to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 134.4
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

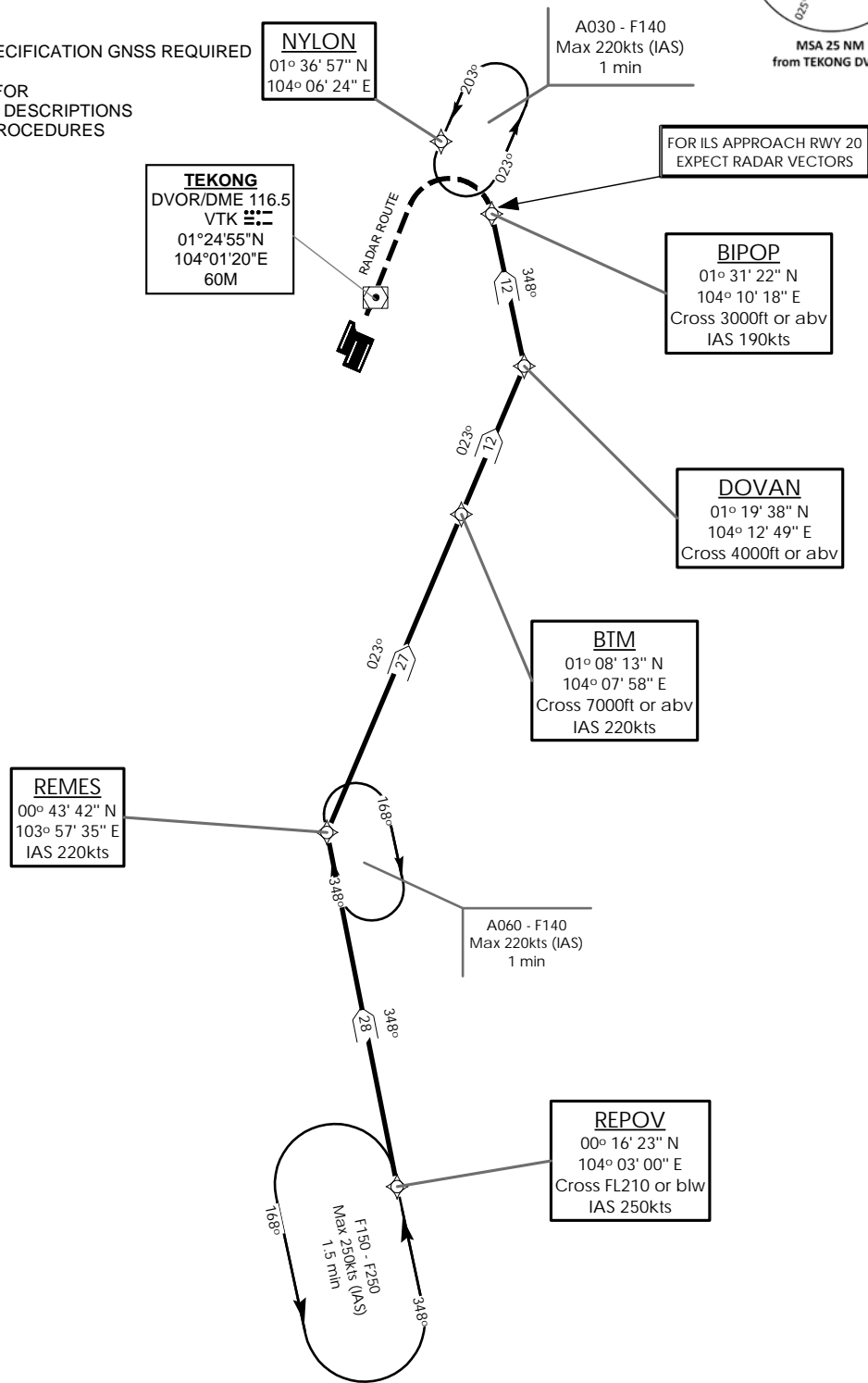
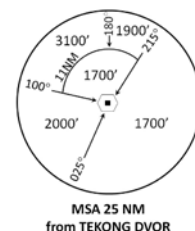
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

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

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 | <p>When cleared via REPOV 1B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on REPOV 1B to BIPOP, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 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

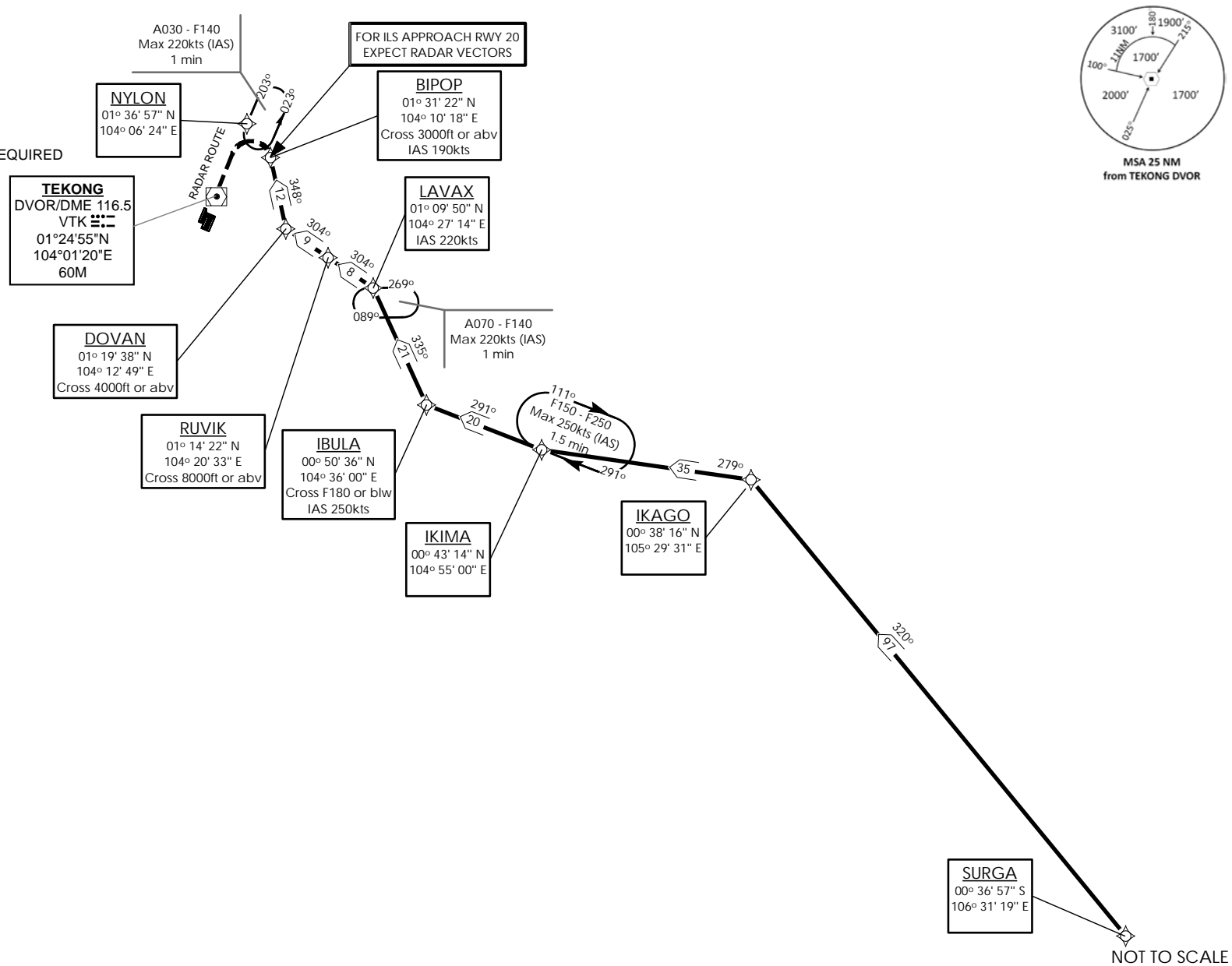
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

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



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 | <p>When cleared via SURGA 1B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on SURGA 1B to BIPOP, then direct to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 133.8
APP 124.05
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.025

SINGAPORE/Singapore Changi
RWY 02L/C/R
ELALO ONE ALPHA ARRIVAL
ELALO 1A

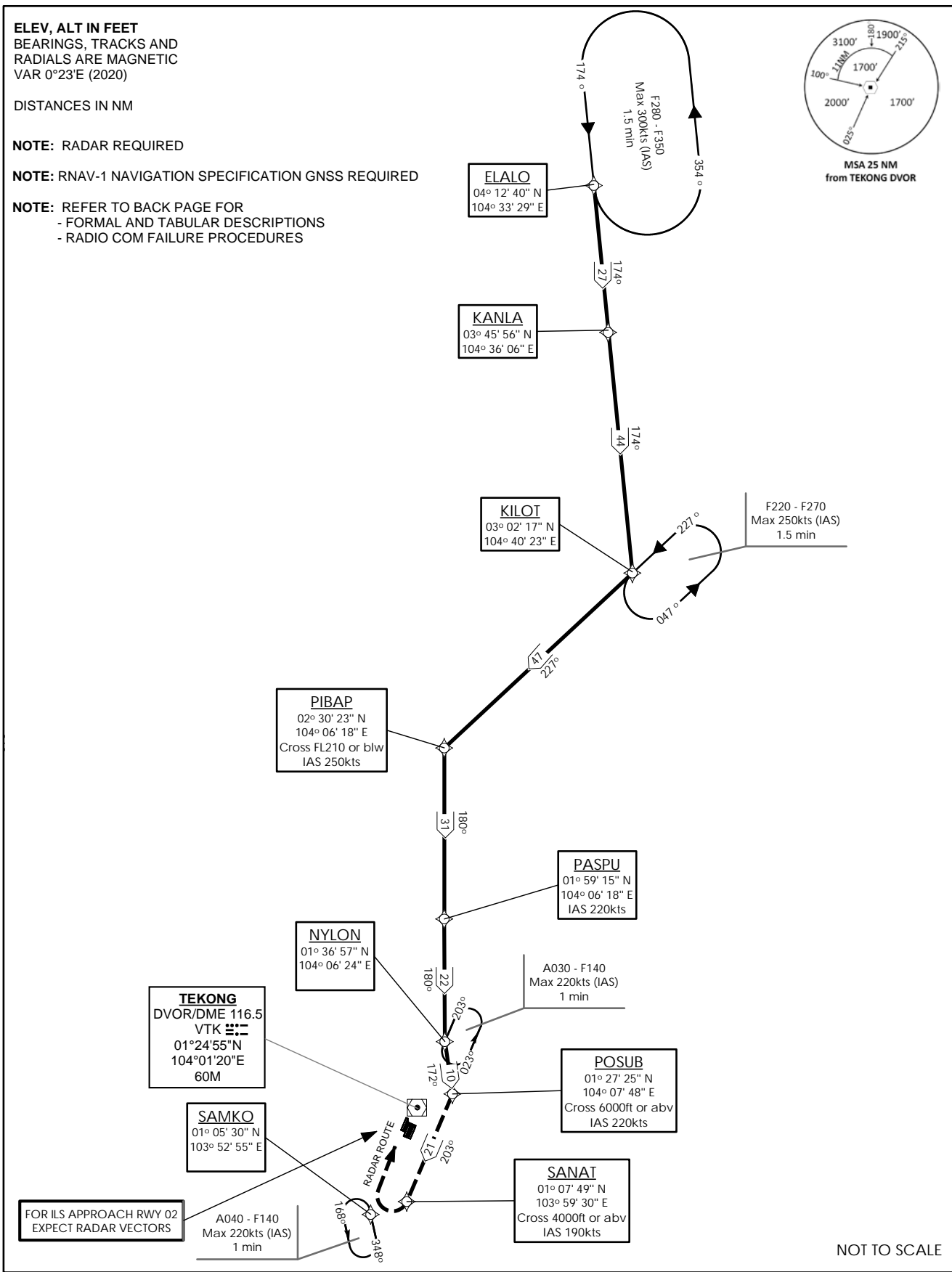
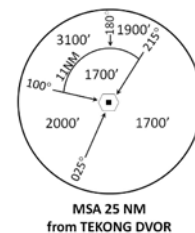
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



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 - | IF | N |
| | KANLA - | TF | N |
| | KILOT [R] - | TF | N |
| | PIBAP [FL210-; K250; L] - | TF | N |
| | PASPU [K220] - | TF | N |
| | NYLON [L] - | TF | N |
| | POSUB [A060+; K220; R] - SANAT [A040+; K190] | TF TF | 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 | <p>When cleared via ELALO 1A by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on ELALO 1A to SANAT, then direct to SAMKO</p> <p>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

ACC 133.8
APP 124.05
119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft
D-ATIS AP ID-WSSS
128.025

SINGAPORE/Singapore Changi
RWY 20R/C/L
ELALO ONE BRAVO ARRIVAL
ELALO 1B

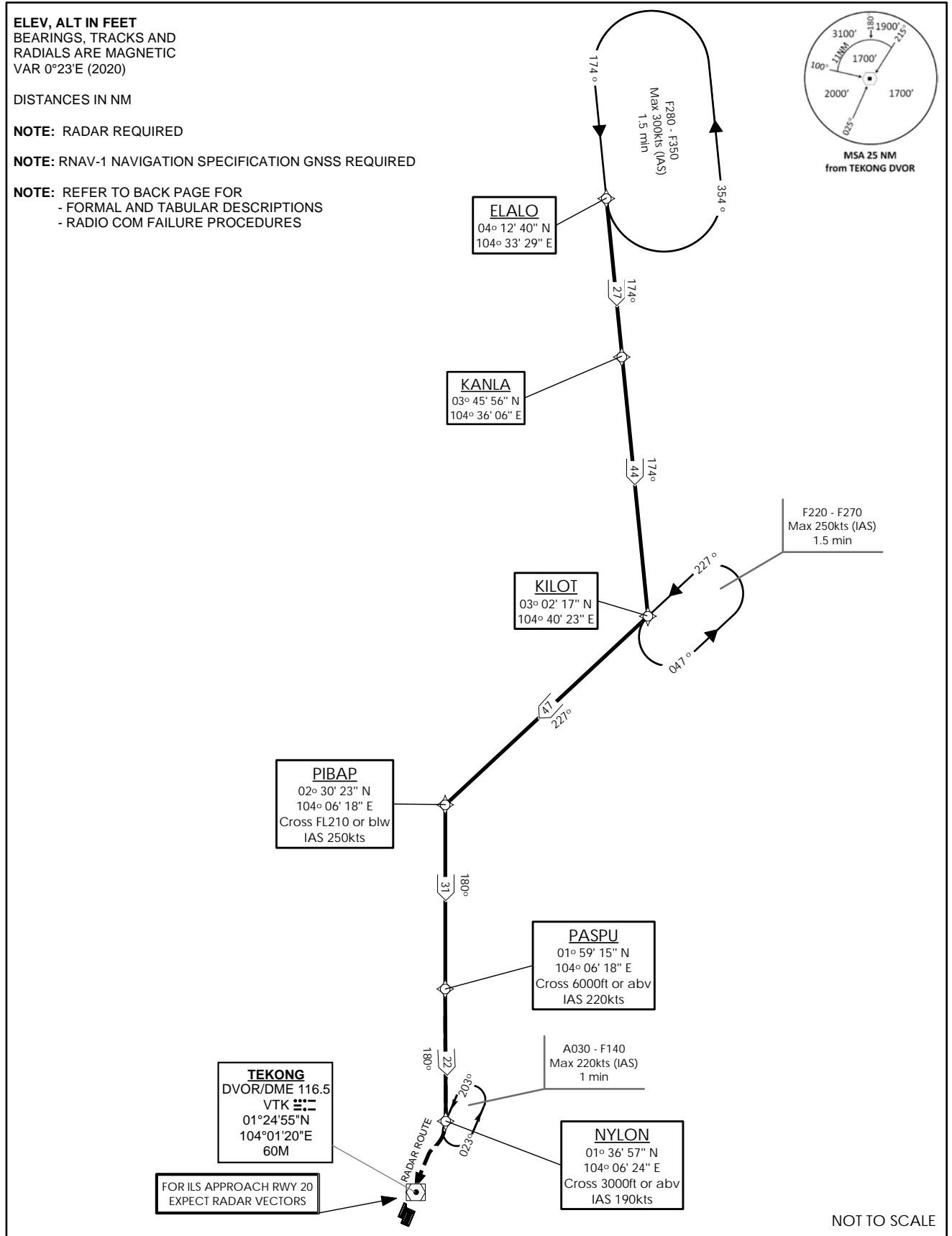
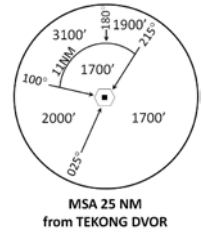
ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 0°23'E (2020)

DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES



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 - | IF | N |
| | KANLA - | TF | N |
| | KILOT [R] - | TF | N |
| | PIBAP [FL210-; K250; L] - | TF | N |
| | PASPU [A060+; K220] - | TF | N |
| | NYLON [A030+; K190] | TF | N |

Tabular Descriptions

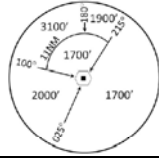
| Path Term | Waypoint Name | Fly-Over | Course °M(°T) | Magnetic Variation | Turn Direction | Altitude | Speed Limit | Navigation Spec |
|-----------|---------------|----------|---------------|--------------------|----------------|----------|-------------|-----------------|
| IF | ELALO | - | - | - | - | - | - | 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 | <p>When cleared via ELALO 1B by Singapore ATC</p> <p>(a) Maintain last assigned flight level or altitude and proceed on ELALO 1B to NYLON</p> <p>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</p> <p>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</p> |
| 3 | <p>No clearance or instruction received from Singapore ATC</p> <p>- Refer to Singapore AIP for radio communications failure procedure</p> |

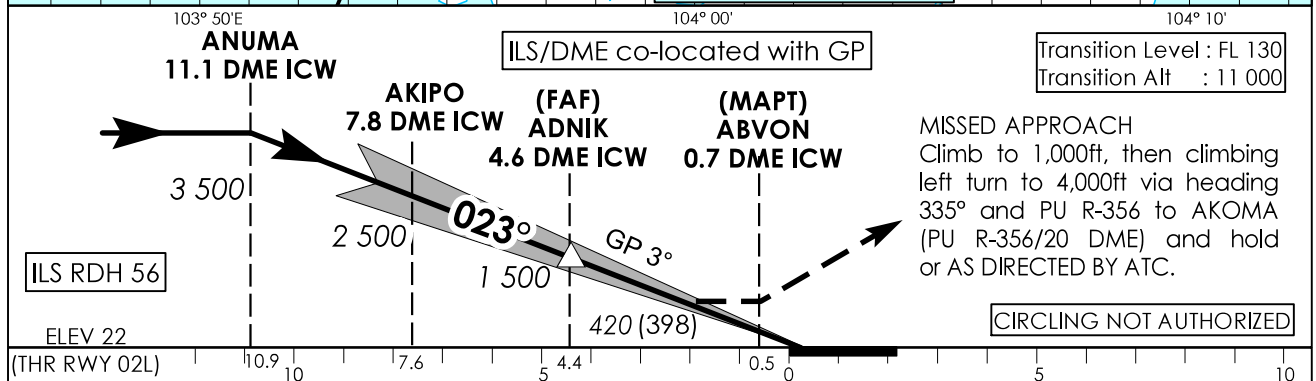
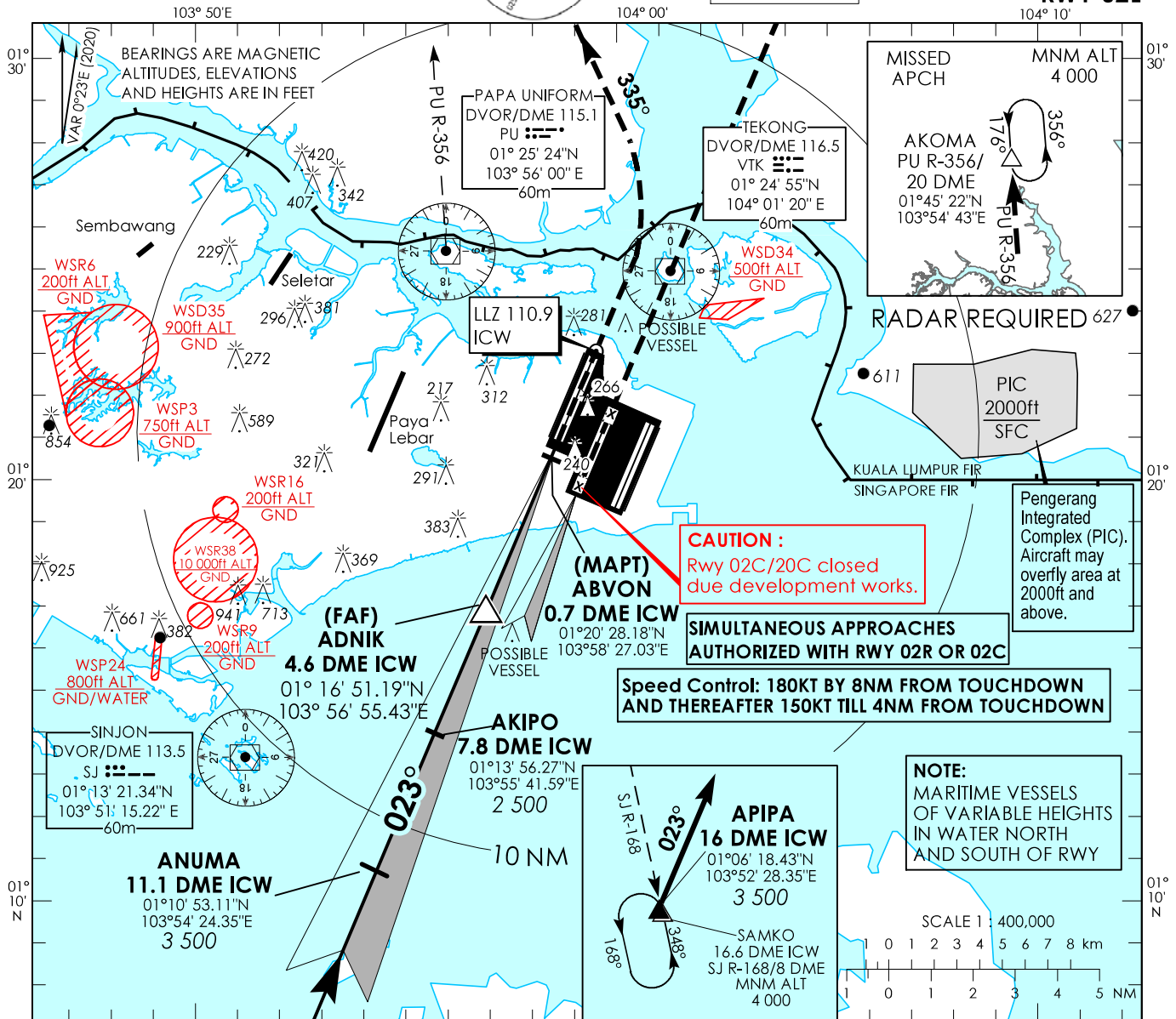
INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO THR RWY 02L - ELEV 22ft



| | |
|--------|------------|
| D-ATIS | AP ID WSSS |
| APP | 128.025 |
| TWR | 124.05 |
| | 119.3 |
| | 118.6 |
| | 118.25 |

SINGAPORE/ SINGAPORE CHANGI ICW ILS/DME RWY 02L



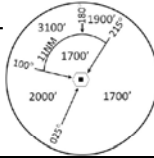
* TIMING NOT AUTHORIZED WHEN GP INOP

| Category of Aircraft | OCA (OCH) | | | | | |
|----------------------|-------------|-----------|-----------|-----------|----------------|-----------|
| | 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 | |

PAGE INTENTIONALLY LEFT BLANK

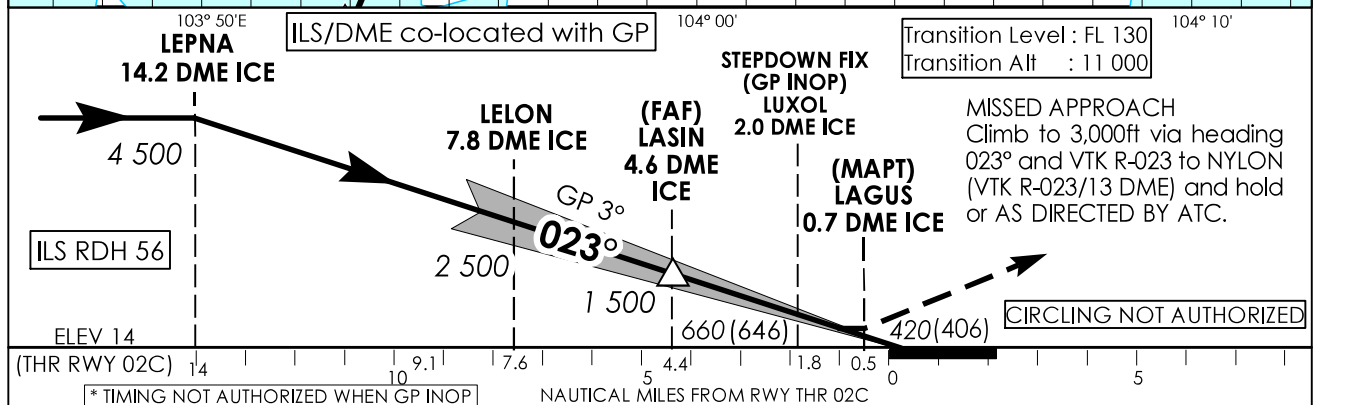
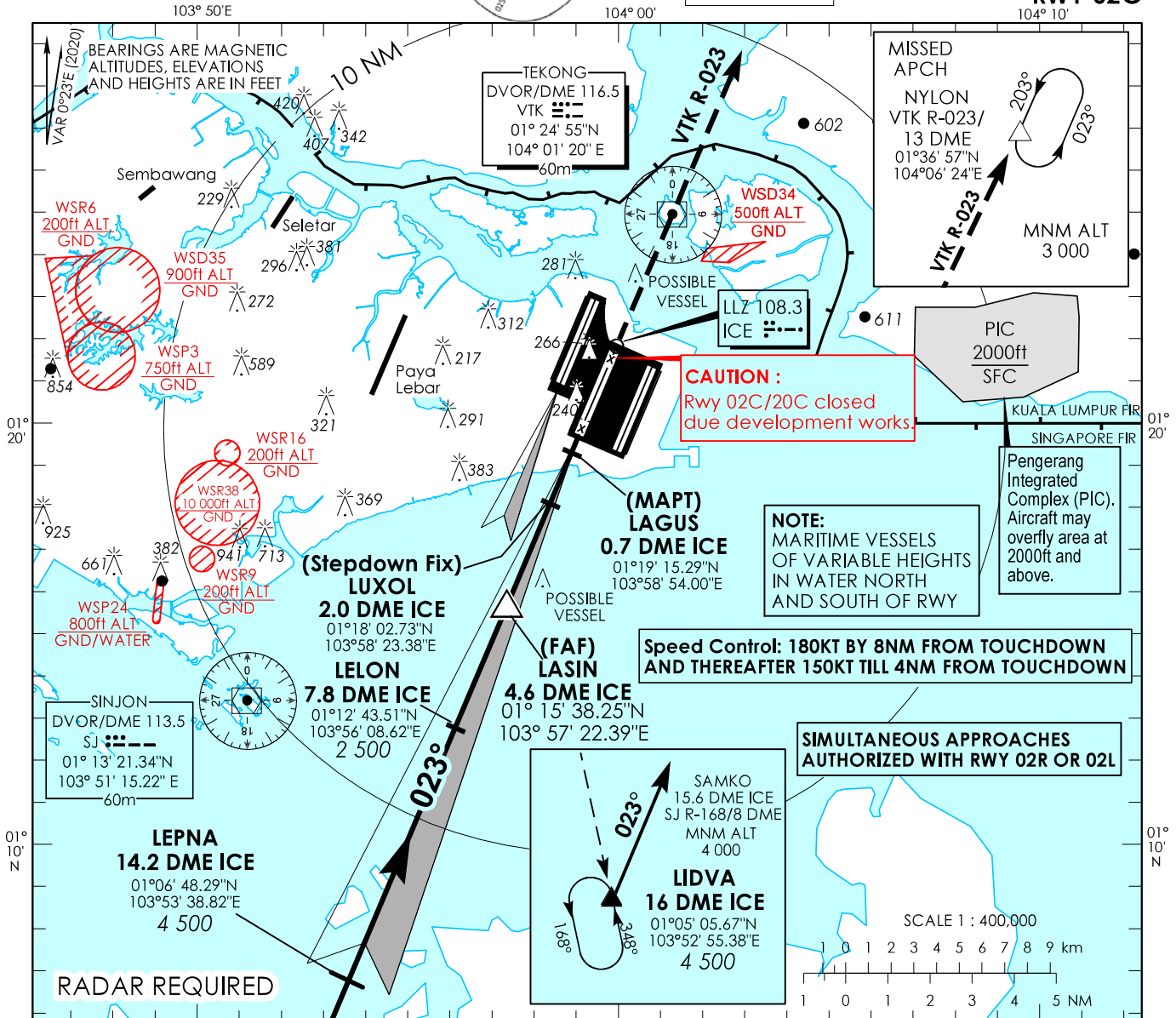
INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 02C - ELEV 14ft



| | | |
|--------|---------|------|
| D-ATIS | AP ID | WSSS |
| | 128.025 | |
| APP | 124.05 | |
| TWR | 119.3 | |
| | 118.6 | |
| | 118.25 | |

SINGAPORE/ SINGAPORE CHANGI ICE ILS/DME RWY 02C

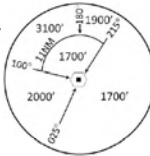


| OCA (OCH) | | | | | | |
|----------------------|--------------------------------|-----------|-----------|-----------|----------------|-----------|
| Category of Aircraft | A | B | C | D | D _L | |
| Straight-in | CAT I ILS | 170 (156) | 180 (166) | 196 (182) | 209 (195) | 212 (198) |
| | GP INOP (with 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 | |

PAGE INTENTIONALLY LEFT BLANK

INSTRUMENT APPROACH CHART - ICAO

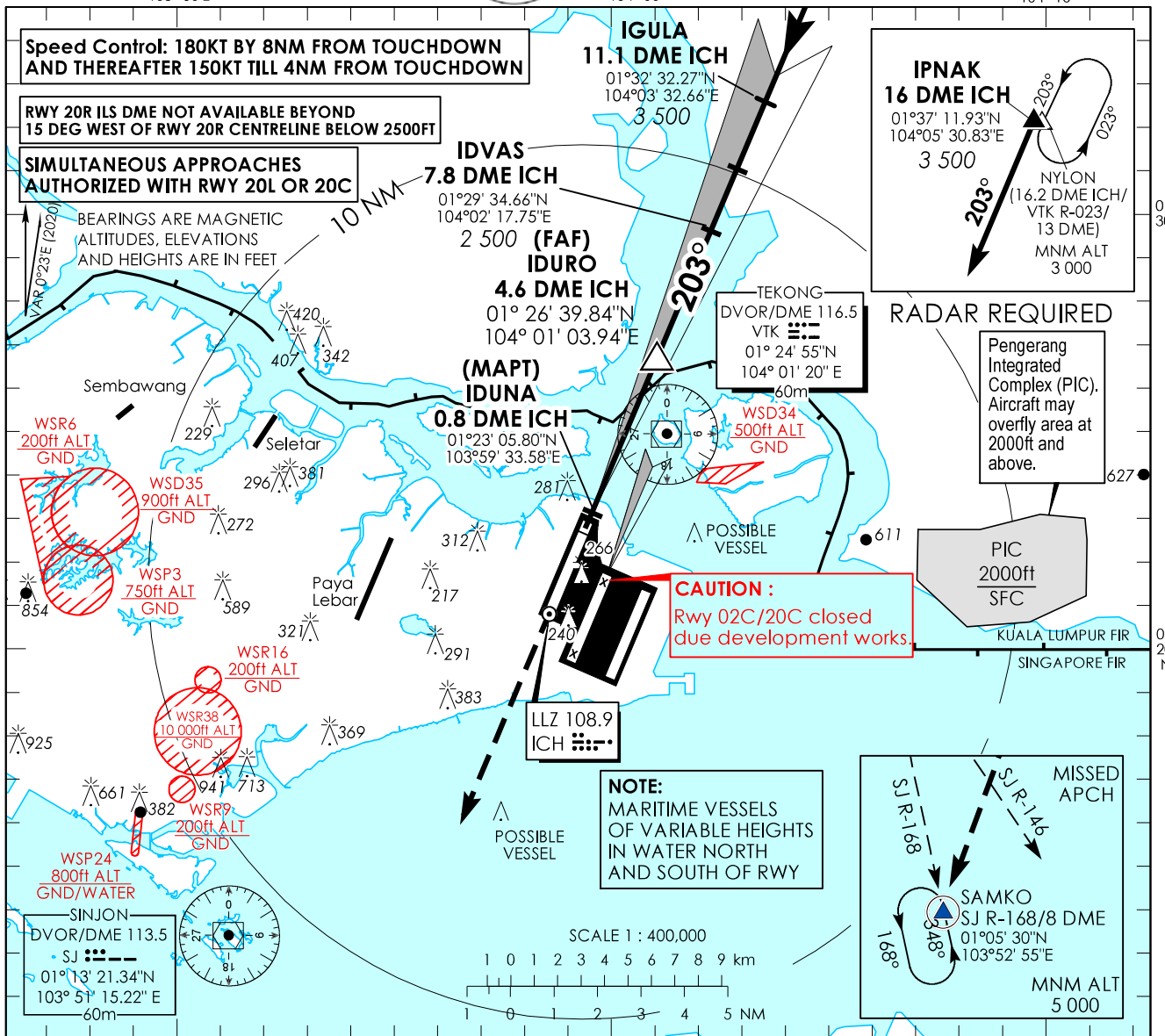
AERODROME ELEV **22ft**
HEIGHT RELATED TO
DTHR RWY 20R - ELEV **13ft**



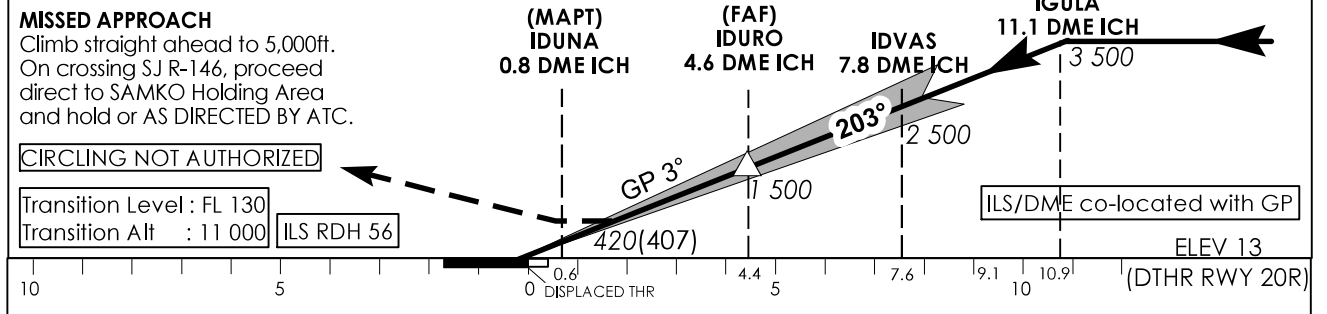
MSA 25 NM from TEKONG DVOR

| | |
|-------------------|---------|
| D-ATIS AP ID WSSS | 128.025 |
| APP | 124.05 |
| TWR | 119.3 |
| | 118.6 |
| | 118.25 |

SINGAPORE/ SINGAPORE CHANGI ICH ILS/DME RWY 20R



This procedure requires a missed approach climb gradient of 3.7% (225 ft/NM) until passing 2,500ft.
For aircraft which can only achieve a 2.5% (152 ft/NM) climb gradient, the CAT I OCA (OCH) is 693ft (680ft).



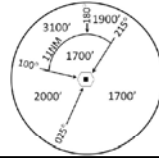
* TIMING NOT AUTHORIZED WHEN GP INOP

| | | 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 |

PAGE INTENTIONALLY LEFT BLANK

INSTRUMENT APPROACH CHART - ICAO

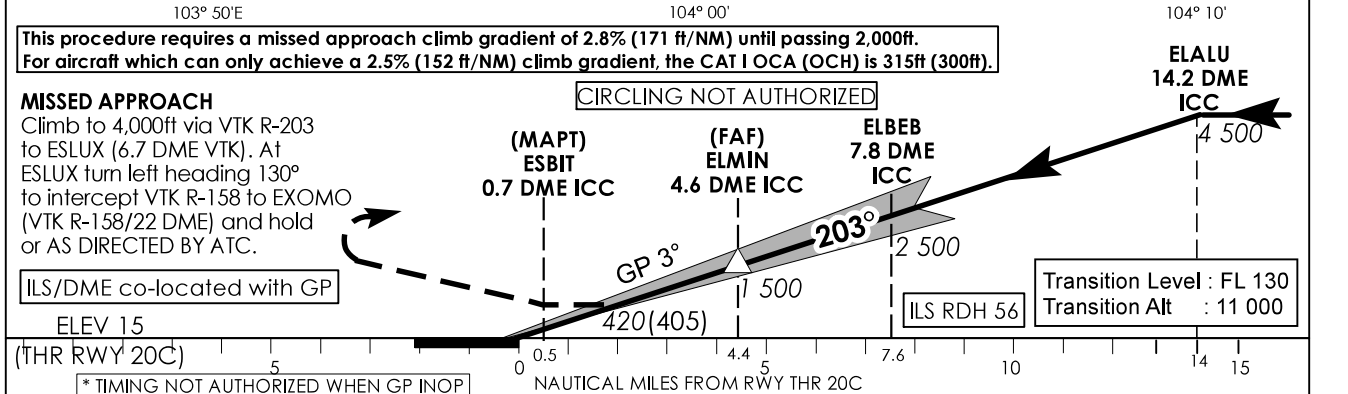
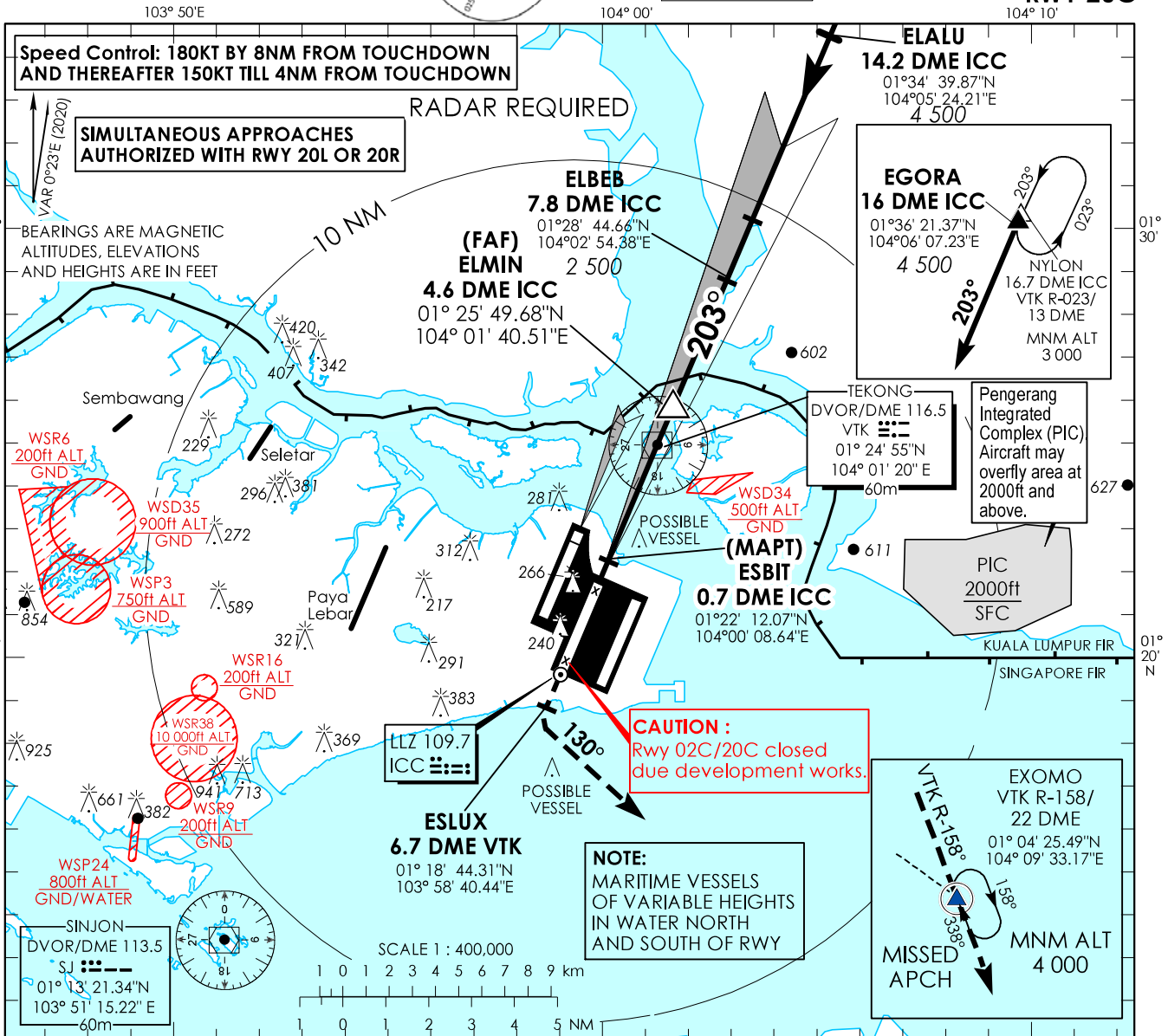
AERODROME ELEV 22ft
HEIGHT RELATED TO THR RWY 20C - ELEV 15ft



MSA 25 NM from TEKONG DVOR

| | |
|--------|------------|
| D-ATIS | AP ID WSSS |
| APP | 128.025 |
| TWR | 124.05 |
| | 119.3 |
| | 118.6 |
| | 118.25 |

SINGAPORE/ SINGAPORE CHANGI ICC ILS/DME RWY 20C

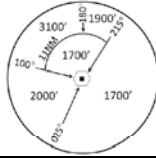


| | | OCA (OCH) | | | | |
|----------------------|-------------|-----------|-----------|-----------|-----------|----------------|
| Category of Aircraft | | A | B | C | D | D _L |
| Straight-in | CAT I ILS | 166 (151) | 180 (165) | 196 (181) | 209 (194) | 212 (197) |
| | CAT II ILS | 71 (56) | 78 (63) | 91 (76) | 101 (86) | 107 (92) |
| | GP INOP | 420 (405) | | | | |
| Distance | 4 DME | 3 DME | | 2 DME | | |
| Altitude (Height) | 1290 (1275) | 980 (965) | | 660 (645) | | |
| Speed | knots | 70 | 120 | 150 | 185 | |
| FAF - MAPT 3.9nm | min : s * | 3 : 21 | 1 : 57 | 1 : 34 | 1 : 16 | |
| Rate of descent/GS | ft/min | 370 | 635 | 795 | 980 | |

PAGE INTENTIONALLY LEFT BLANK

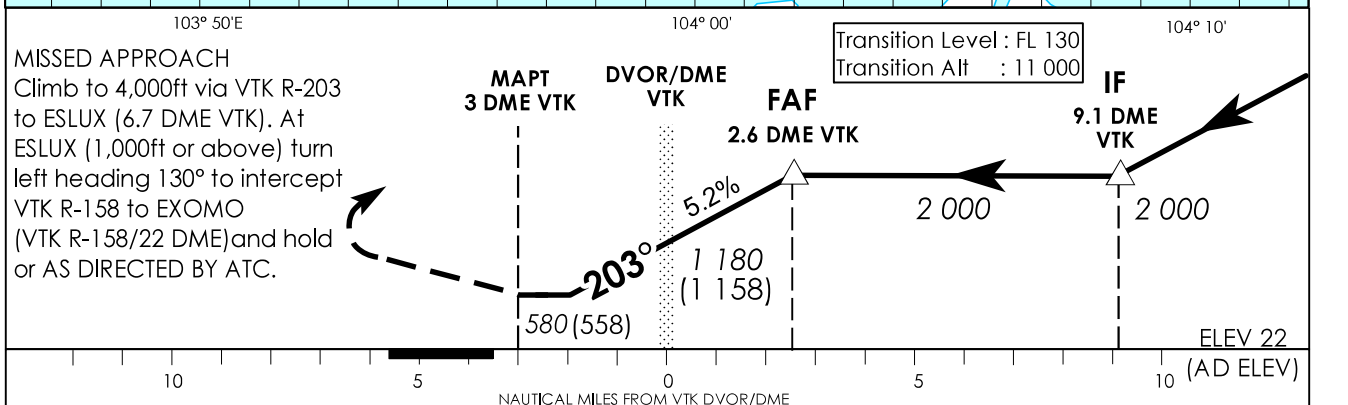
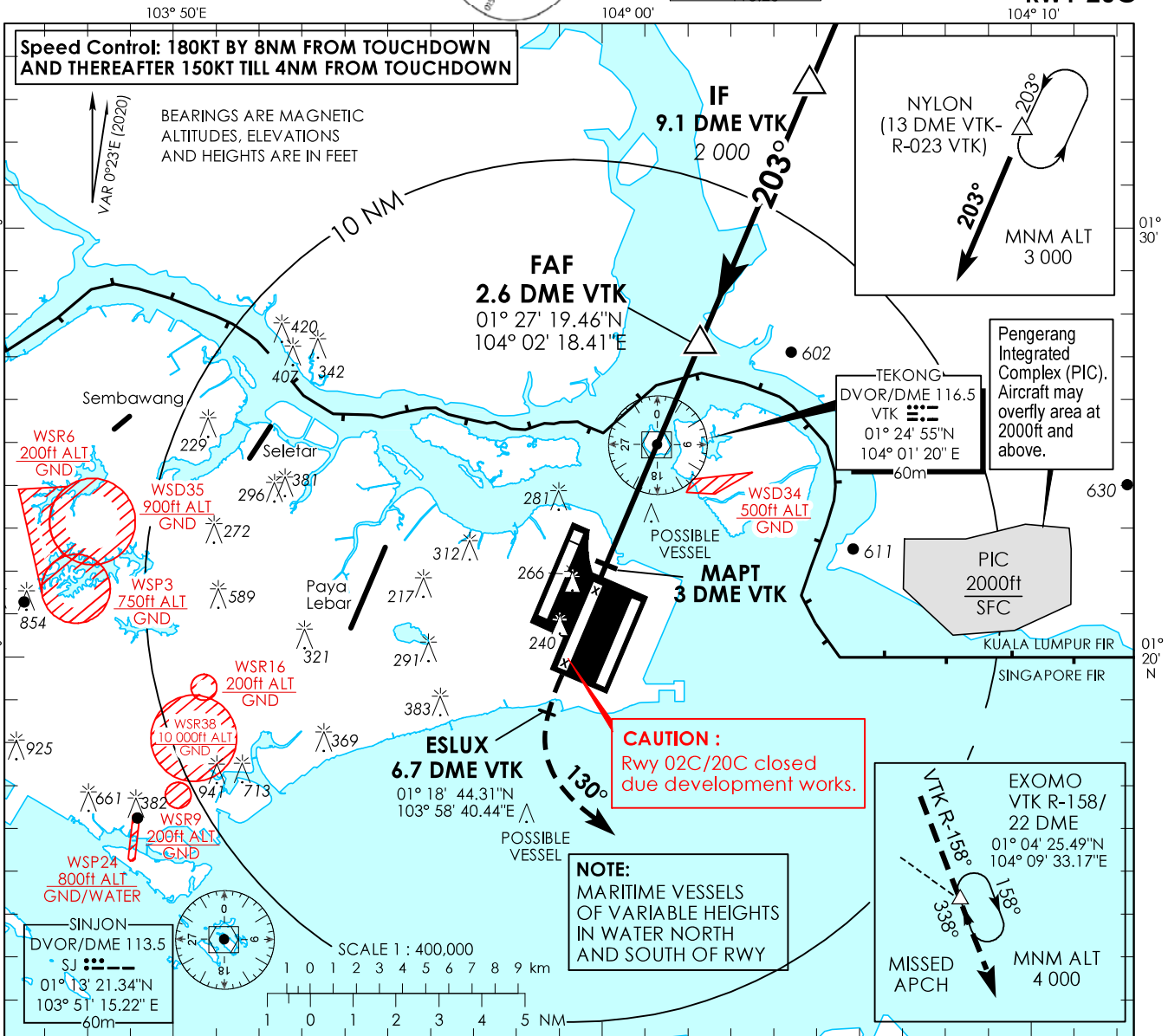
INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV **22ft**
HEIGHT RELATED TO
AD ELEV



| | | |
|--------|---------|------|
| D-ATIS | AP ID | WSSS |
| | 128.025 | |
| APP | 124.05 | |
| TWR | 119.3 | |
| | 118.6 | |
| | 118.25 | |

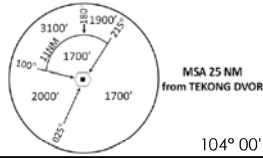
SINGAPORE/ SINGAPORE CHANGI VTK DVOR/DME RWY 20C



| OCA (OCH) | | | | |
|----------------------|-------------|-------------|-------------|-----------|
| Category of Aircraft | A | B | C | D |
| Straight-in | 580 (558) | | | |
| Distance | 2 DME | 1 DME | VTK | 1 DME |
| Altitude (Height) | 1820 (1798) | 1500 (1478) | 1180 (1158) | 860 (838) |
| Speed | knots | 70 | 120 | 150 |
| FAF - MAPT 5.6nm | min : s | 4 : 48 | 2 : 48 | 2 : 15 |
| Rate of descent/GS | ft/min | 370 | 635 | 795 |

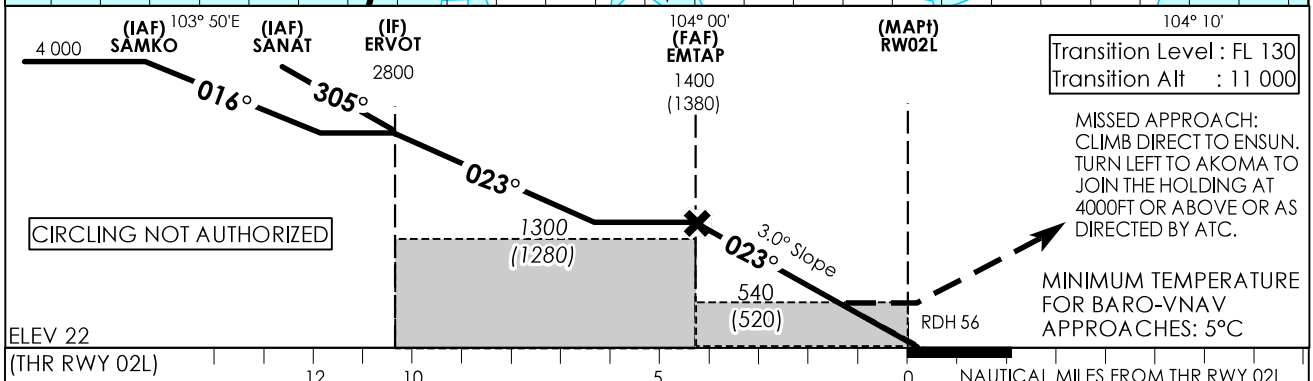
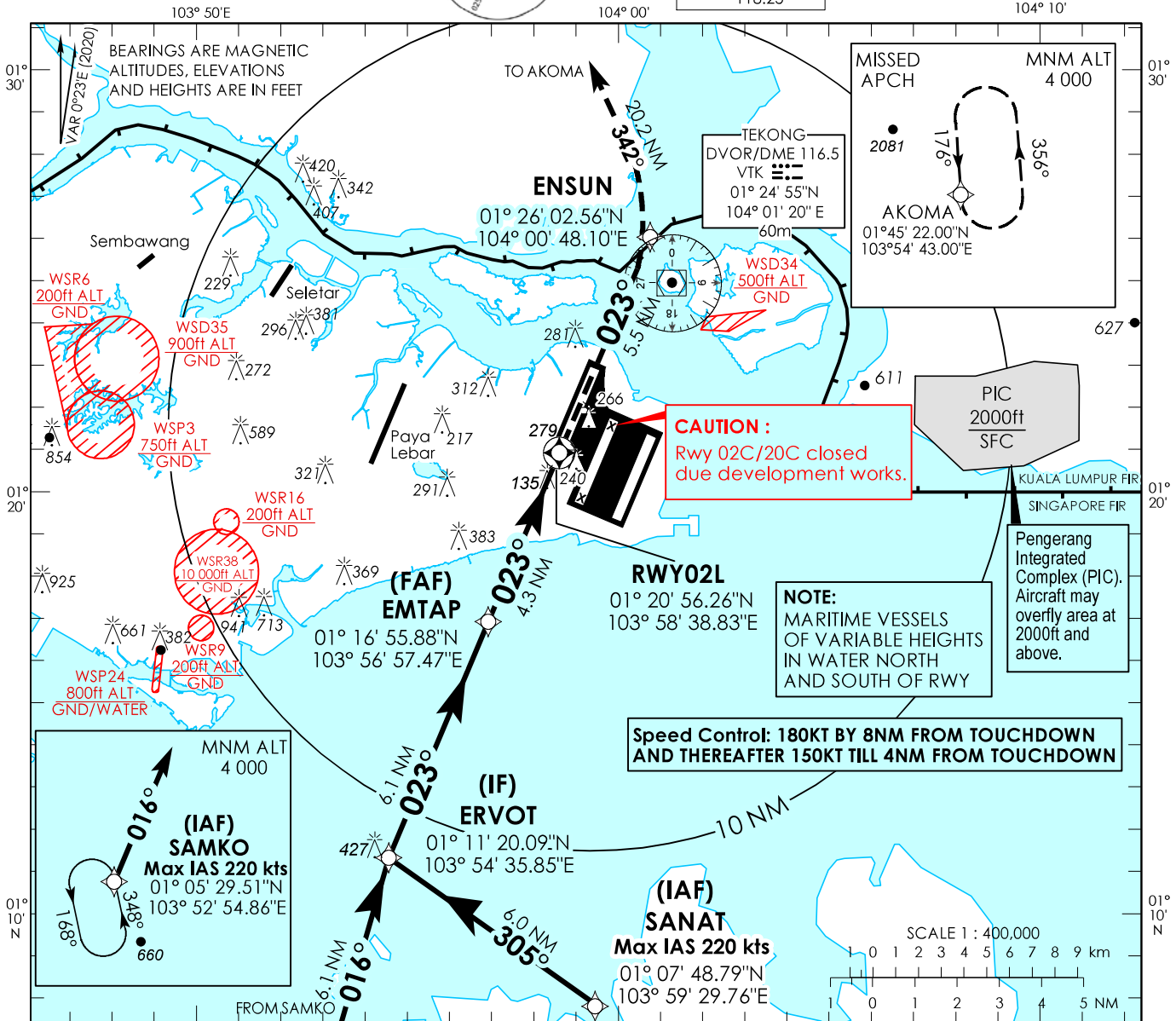
PAGE INTENTIONALLY LEFT BLANK

INSTRUMENT APPROACH CHART - ICAO
AERODROME ELEV 22ft
HEIGHT RELATED TO THR RWY 02L - ELEV 22ft



| | |
|-------------------|---------|
| D-ATIS AP ID WSSS | 128.025 |
| APP | 124.05 |
| TWR | 119.3 |
| | 118.6 |
| | 118.25 |

SINGAPORE/ SINGAPORE CHANGI
RNP RWY 02L



| | | OCA (OCH) | | | | | | |
|----------------------|---------------|-------------|-------------|-------------|-------------|-----------|-----------|-------------|
| Category of Aircraft | | A | B | C | D | | | |
| LNAV/VNAV | 2.5% | 450 (430) | | | | | | |
| LNAV | 2.5% | 540 (520) | | | | | | |
| Fix | | SAMKO | SANAT | ERVOT | EMTAP | RW02L | ENSUN | AKOMA |
| Altitude (Height) | | 4000 (3978) | 4000 (3978) | 2800 (2778) | 1400 (1378) | 540 (518) | 880 (858) | 4000 (3978) |
| Speed | knots | 80 | 100 | 120 | 140 | 140 | 160 | 180 |
| FAF - MAPt | 4.3nm min : s | 3 : 14 | 2 : 35 | 2 : 09 | 1 : 51 | 1 : 37 | 1 : 26 | |
| Rate of descent/GS | ft/min | 424 | 530 | 637 | 743 | 849 | 955 | |

SINGAPORE CHANGI RNP-APCH RWY 02L – Approach from SAMKO

| Path Terminator | Waypoint | Fly-Over | Course °M (°T) | Magnetic Variation | Distance (NM) | Turn Direction | Altitude (FT) | Speed Limit (KT) | VPA/TCH(FT) | Navigation Specification |
|-----------------|----------|----------|----------------|--------------------|---------------|----------------|---------------|------------------|-------------|--------------------------|
| IF | SAMKO | - | - | -0.4 | - | - | A040+ | 220 | - | RNP APCH |
| TF | ERVOT | - | 016 (016.4) | -0.4 | 6.1 | R | A028+ | - | - | RNP APCH |
| TF | EMTAP | - | 023 (023.4) | -0.4 | 6.1 | - | A014+ | - | - | RNP APCH |
| TF | RW02L | Y | 023 (023.4) | -0.4 | 4.3 | - | - | - | -3.0° / 50 | RNP APCH |
| DF | ENSUN | - | - | -0.4 | - | L | - | - | - | RNP APCH |
| TF | AKOMA | - | 342 (342.4) | -0.4 | 20.2 | - | A040+ | - | - | RNP APCH |

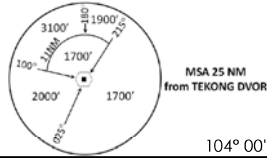
SINGAPORE CHANGI RNP-APCH RWY 02L – Approach from SANAT

| Path Terminator | Waypoint | Fly-Over | Course °M (°T) | Magnetic Variation | Distance (NM) | Turn Direction | Altitude (FT) | Speed Limit (KT) | VPA/TCH(FT) | Navigation Specification |
|-----------------|----------|----------|----------------|--------------------|---------------|----------------|---------------|------------------|-------------|--------------------------|
| IF | SANAT | - | - | -0.4 | - | - | A040+ | 220 | - | RNP APCH |
| TF | ERVOT | - | 305 (305.4) | -0.4 | 6.0 | R | A028+ | - | - | RNP APCH |
| TF | EMTAP | - | 023 (023.4) | -0.4 | 6.1 | - | A014+ | - | - | RNP APCH |
| TF | RW02L | Y | 023 (023.4) | -0.4 | 4.3 | - | - | - | -3.0° / 50 | RNP APCH |
| DF | ENSUN | - | - | -0.4 | - | L | - | - | - | RNP APCH |
| TF | AKOMA | - | 342 (342.4) | -0.4 | 20.2 | - | A040+ | - | - | RNP APCH |

Waypoint Coordinates

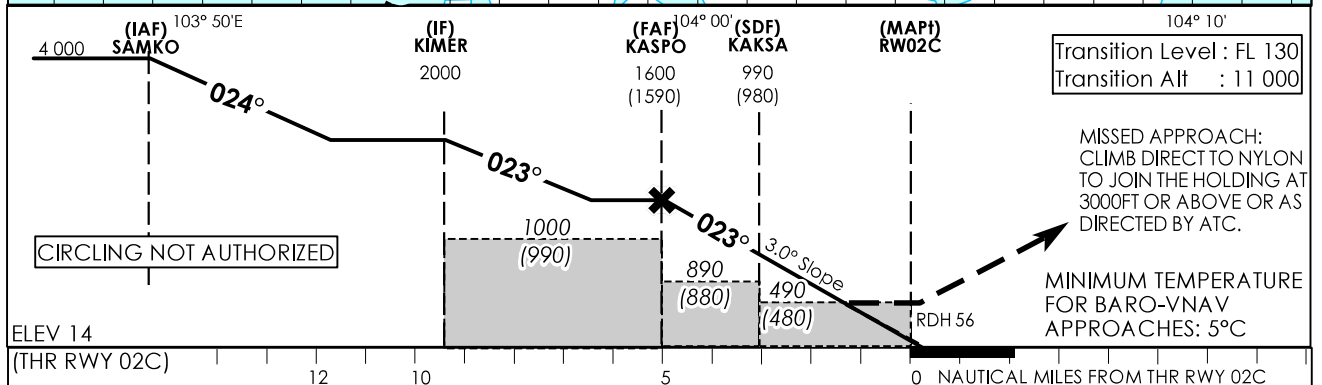
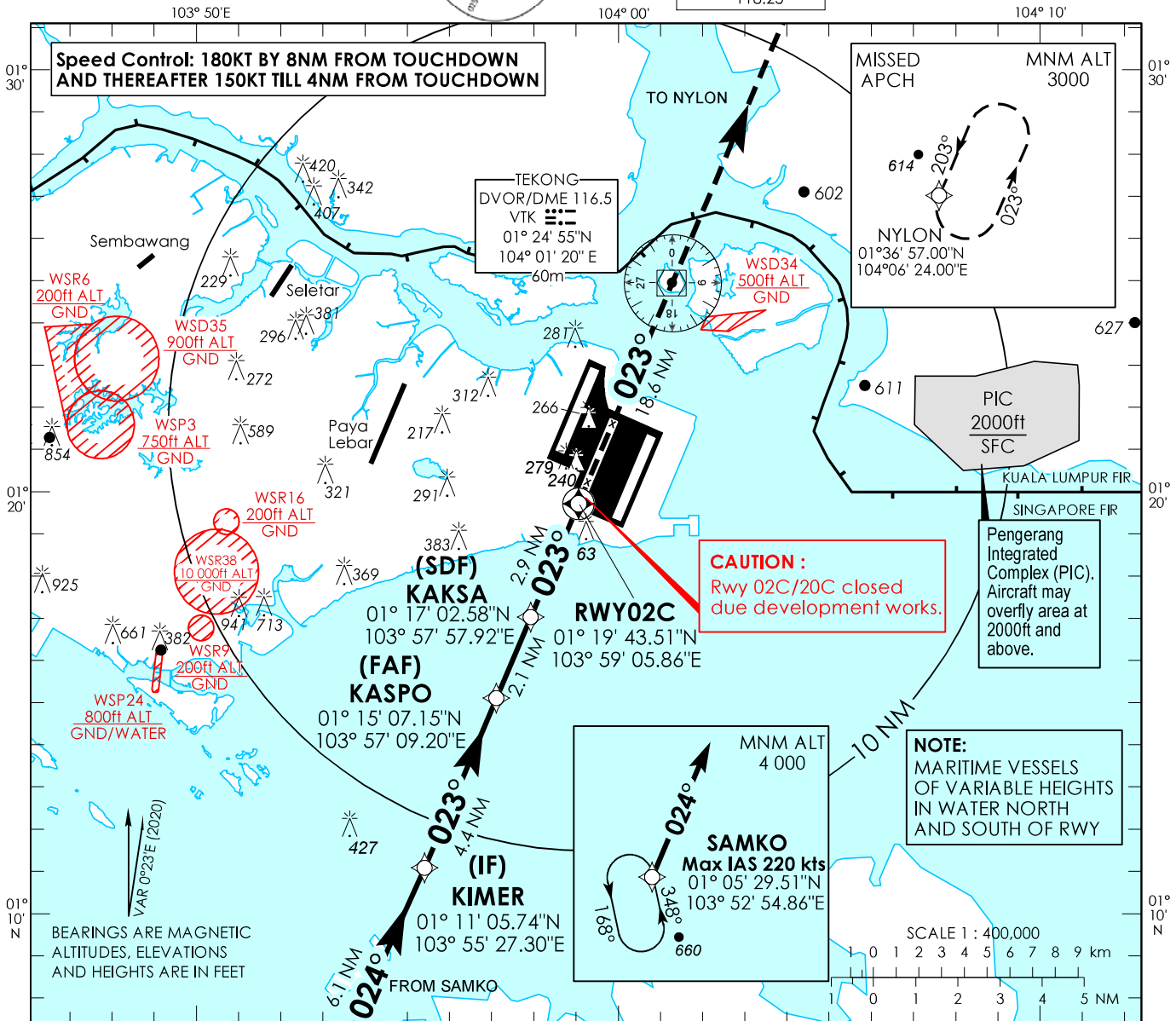
| Name | Latitude | Longitude |
|-------------|------------------|-------------------|
| SAMKO (IAF) | 01° 05' 29.51" N | 103° 52' 54.86" E |
| SANAT (IAF) | 01° 07' 48.79" N | 103° 59' 29.76" E |
| ERVOT (IF) | 01° 11' 20.09" N | 103° 54' 35.85" E |
| EMTAP (FAF) | 01° 16' 55.88" N | 103° 56' 57.47" 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 |

INSTRUMENT APPROACH CHART - ICAO AERODROME ELEV 22ft
HEIGHT RELATED TO THR RWY 02C - ELEV 14ft



| | |
|-------------------|---------|
| D-ATIS AP ID WSSS | 128.025 |
| APP | 124.05 |
| | 119.3 |
| TWR | 118.6 |
| | 118.25 |

SINGAPORE/ SINGAPORE CHANGI RNP RWY 02C



| | | 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 |

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 |

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

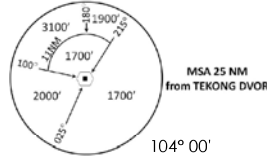
| Path Terminator | Waypoint | Fly-Over | Course °M (°T) | Magnetic Variation | Distance (NM) | Turn Direction | Altitude (FT) | Speed Limit (KT) | VPA/TCH(FT) | Navigation Specification |
|-----------------|----------|----------|----------------|--------------------|---------------|----------------|---------------|------------------|-------------|--------------------------|
| 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 |

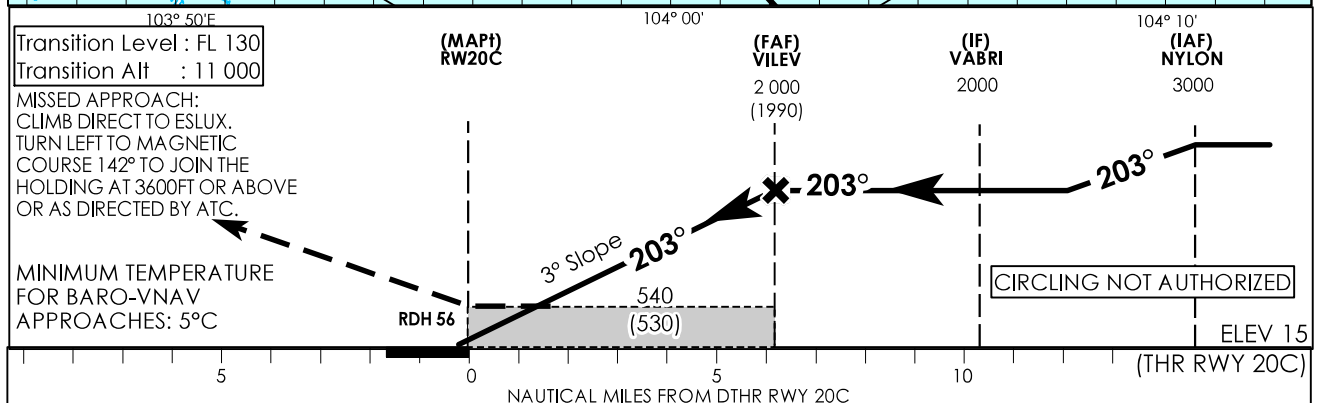
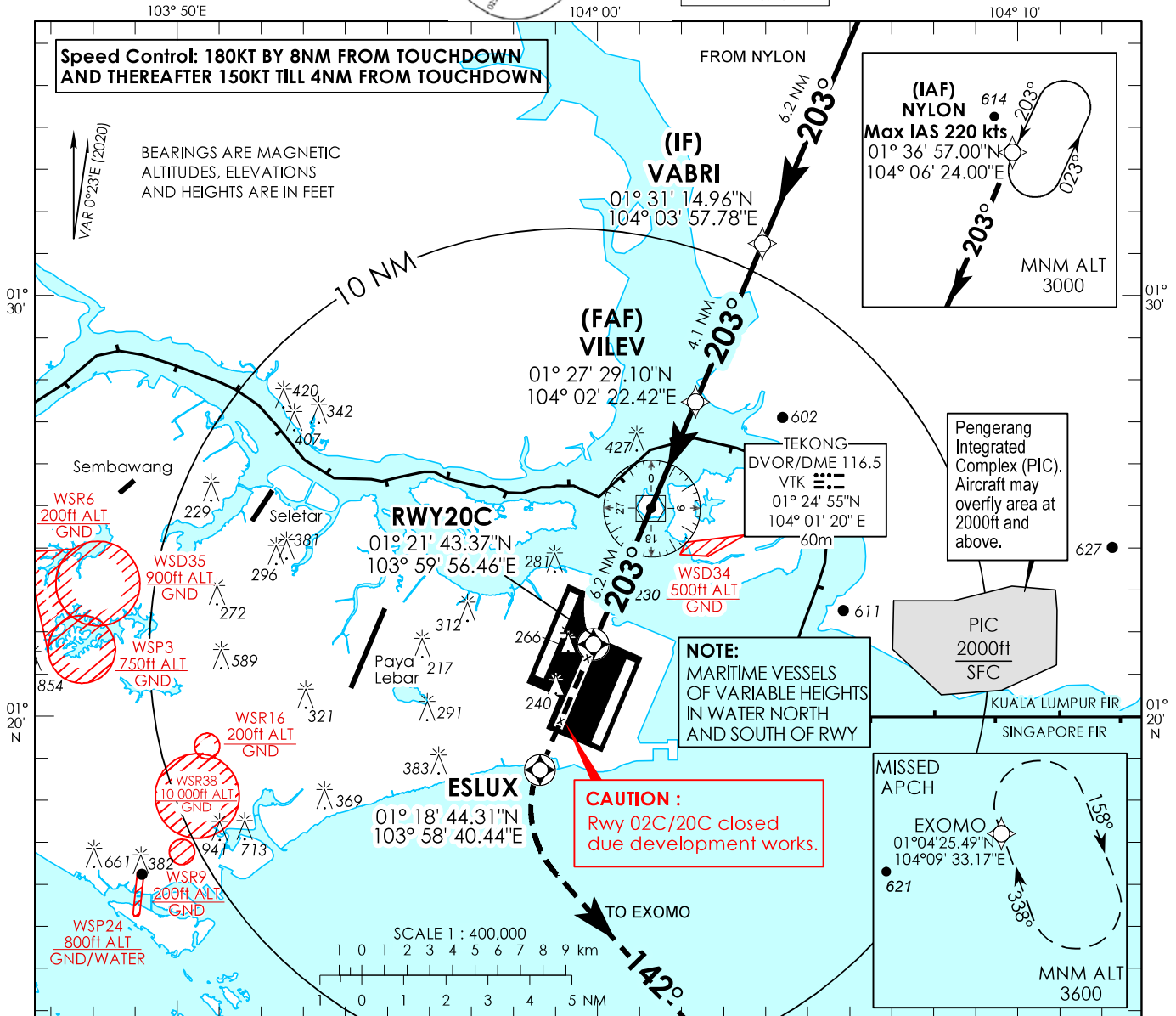
INSTRUMENT APPROACH CHART - ICAO

AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 20C - ELEV 15ft



| | |
|--------|------------|
| D-ATIS | AP ID WSSS |
| APP | 128.025 |
| APP | 124.05 |
| TWR | 119.3 |
| TWR | 118.6 |
| TWR | 118.25 |

SINGAPORE/SINGAPORE CHANGI RNP RWY 20C



| | | OCA (OCH) | | | | | |
|----------------------|---------|-------------|-------------|-------------|-----------|-----------|-------------|
| | | A | B | C | D | | |
| Category of Aircraft | | | | | | | |
| LNAV/VNAV | 2.5% | 490 (480) | | | | | |
| LNAV | 2.5% | 540 (530) | | | | | |
| Fix | | NYLON | VABRI | VILEV | RW20C | ESLUX | EXOMO |
| Altitude (Height) | | 3000 (2985) | 2000 (1985) | 2000 (1985) | 540 (525) | 540 (525) | 3600 (3585) |
| Speed | knots | 80 | 100 | 120 | 140 | 160 | 180 |
| FAF - MAPt 6.2 nm | min : s | 4 : 39 | 3 : 44 | 3 : 06 | 2 : 40 | 2 : 20 | 2 : 04 |
| Rate of descent/GS | ft/min | 425 | 531 | 637 | 743 | 849 | 955 |

SINGAPORE CHANGI RNP-APCH RWY 20C – Approach from NYLON

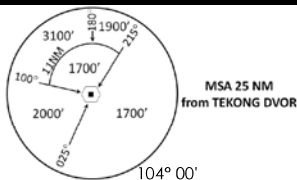
| Path Terminator | Waypoint | Fly-Over | Course °M (°T) | Magnetic Variation | Distance (NM) | Turn Direction | Altitude (FT) | Speed Limit (KT) | VPA/TCH(FT) | Navigation Specification |
|-----------------|----------|----------|----------------|--------------------|---------------|----------------|---------------|------------------|-------------|--------------------------|
| IF | NYLON | - | - | -0.4 | - | - | A030+ | 220 | - | RNP APCH |
| TF | VABRI | - | 203 (203.4) | -0.4 | 6.2 | - | A020+ | - | - | RNP APCH |
| TF | VILEV | - | 203 (203.4) | -0.4 | 4.1 | - | A020+ | - | - | RNP APCH |
| TF | RW20C | Y | 203 (203.4) | -0.4 | 6.2 | - | - | - | -3.0° / 50 | RNP APCH |
| DF | ESLUX | Y | - | -0.4 | - | L | - | - | - | RNP APCH |
| TF | EXOMO | - | 142(142.4) | -0.4 | - | - | A036+ | - | - | RNP APCH |

Waypoint Coordinates

| Name | Latitude | Longitude |
|-------------|------------------|-------------------|
| NYLON (IAF) | 01° 36' 57.00" 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 |

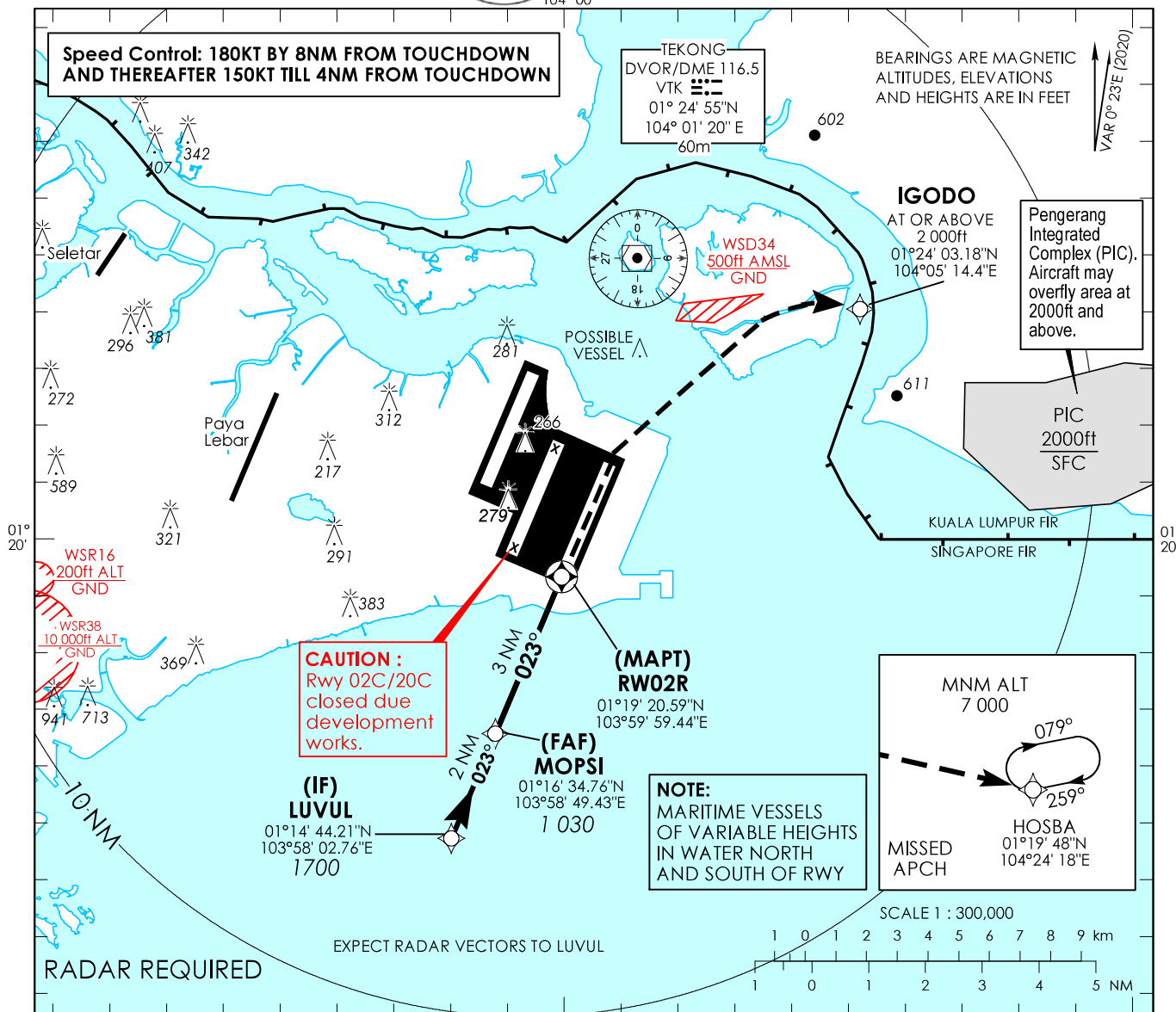
**INSTRUMENT
APPROACH
CHART**

AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 02R - ELEV 16ft

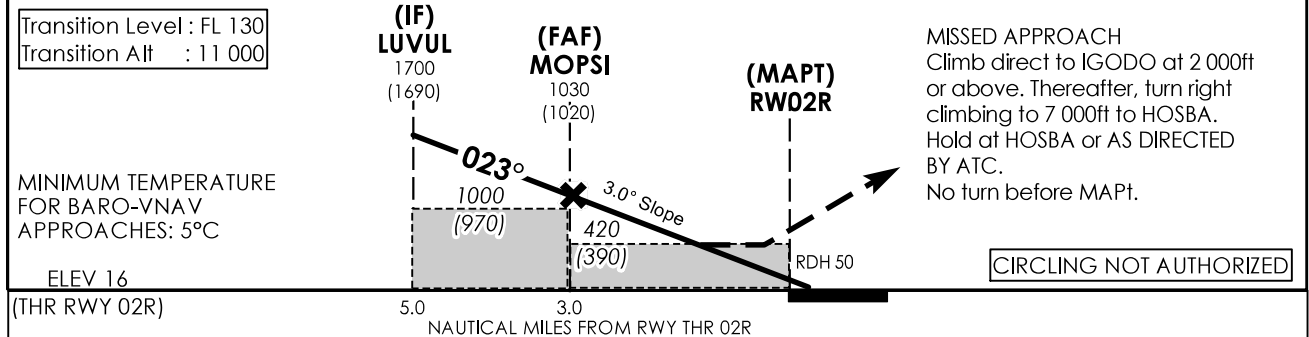


| | | |
|--------|---------|------|
| D-ATIS | AP ID | WSSS |
| APP | 128.025 | |
| TWR | 124.05 | |
| | 124.6 | |
| | 131.4 | |

**SINGAPORE/
SINGAPORE CHANGI
RNP RWY 02R**



- This procedure requires a missed approach climb gradient of 5% (304 ft/NM) until passing 2,000ft. MAX IAS 185kts during turning missed approach.
- For aircraft which can only achieve a 2.5% (152 ft/NM) climb gradient, the CAT I OCA (OCH) is 820ft (800ft) and aircraft shall climb straight to 1200ft before commencing right turn climbing to 7000ft to HOSBA.



| | | 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 |

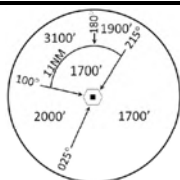
SINGAPORE CHANGI RNP-APCH RWY 02R – Approach from LUVUL

| Path Terminator | Waypoint | Fly-Over | Course °M (°T) | Magnetic Variation | Distance (NM) | Turn Direction | Altitude (FT) | Speed Limit (KT) | VPA/TCH(FT) | Navigation Specification |
|-----------------|----------|----------|----------------|--------------------|---------------|----------------|---------------|------------------|-------------|--------------------------|
| IF | LUVUL | - | 023 (023.4) | -0.4 | - | - | 1700+ | 180 | - | RNP APCH |
| TF | MOPSI | - | 023 (023.4) | -0.4 | 2.0 | - | 1030+ | 150 | - | RNP APCH |
| TF | RW02R | Y | 023 (023.4) | -0.4 | 3.0 | R | - | - | -3.0° / 50 | RNP APCH |
| DF | IGODO | - | - | -0.4 | - | R | 2000+ | 185 | - | RNP APCH |
| TF | HOSBA | - | 023 (023.4) | -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 |

INSTRUMENT APPROACH CHART AERODROME ELEV 22ft
HEIGHT RELATED TO
THR RWY 20L - ELEV 16ft

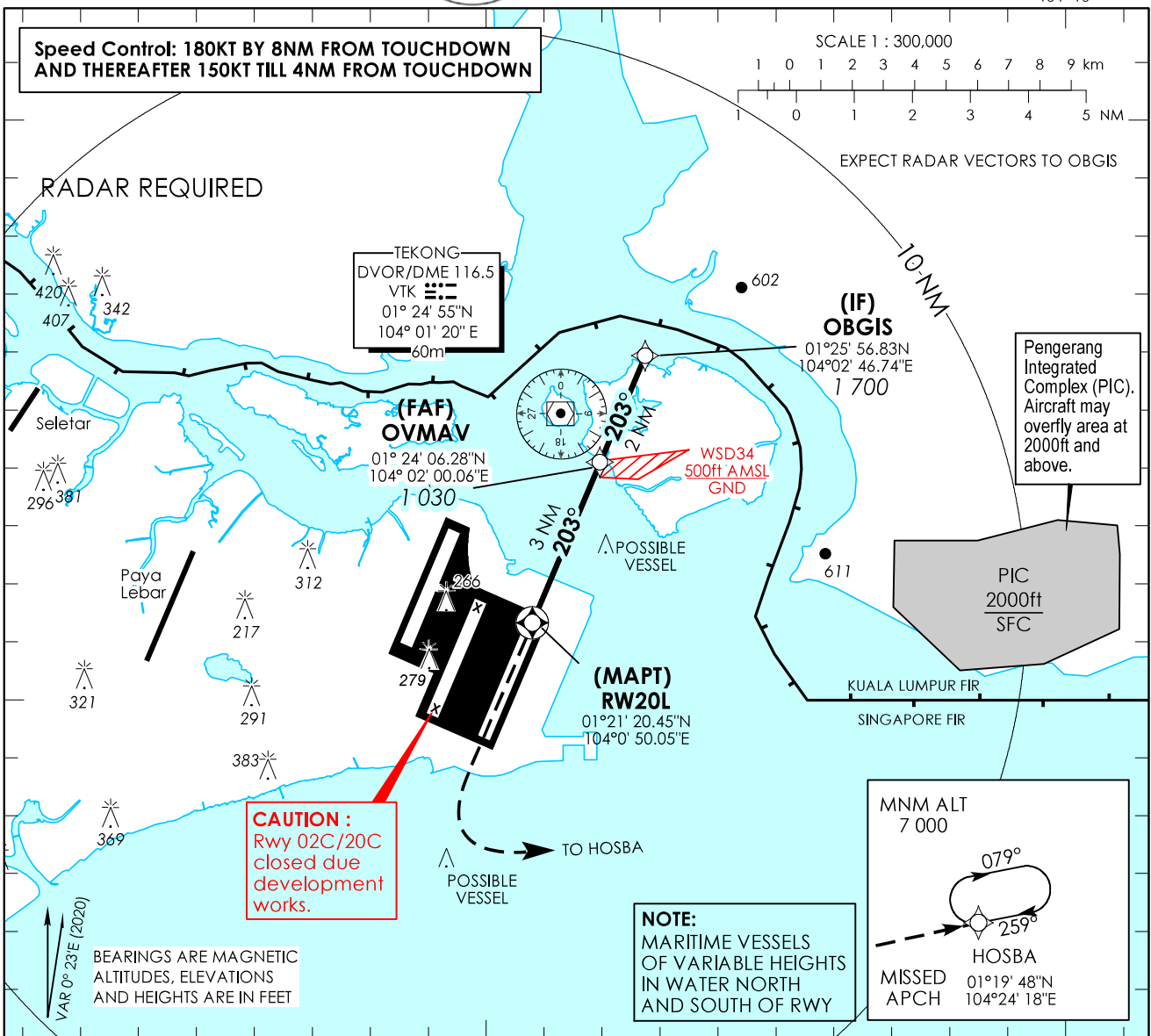


MSA 25 NM
from TEKONG DVOR

| | |
|--------|------------|
| D-ATIS | AP ID WSSS |
| APP | 128.6 |
| TWR | 124.05 |
| | 124.6 |
| | 131.4 |

**SINGAPORE/
SINGAPORE CHANGI**
RNP RWY 20L

104° 10'

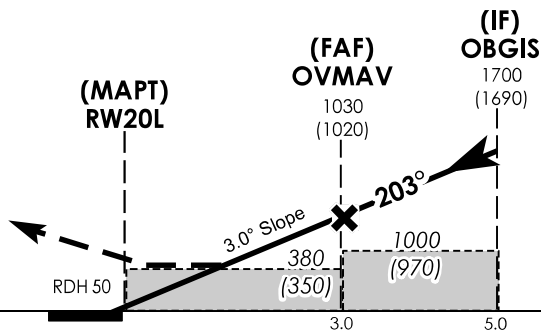


This procedure requires a missed approach climb gradient of 5% (304 ft/NM) until passing 3,000ft.
For aircraft which can only achieve a 2.5% (152 ft/NM) climb gradient, the CAT I OCA (OCH) is 1080ft (1050ft).

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

| | | OCA (OCH) | | | |
|----------------------|----|-----------|---|---|---|
| Category of Aircraft | | A | B | C | D |
| LNAV/VNAV | 5% | 280 (260) | | | |
| LNAV | 5% | 380 (350) | | | |

| | | OBGIS | | OVMAV | |
|--------------------|-----------|-------------|--------|-------------|--------|
| Distance | | 1700 (1690) | | 1030 (1020) | |
| Altitude (Height) | | 1700 (1690) | | 1030 (1020) | |
| Speed | knots | 70 | 120 | 150 | 185 |
| FAF - MAPT 3.0nm | min : s * | 2 : 34 | 1 : 30 | 1 : 12 | 0 : 58 |
| Rate of descent/GS | ft/min | 370 | 635 | 795 | 980 |

SINGAPORE CHANGI RNP-APCH RWY 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 | OVMAN | - | 203 (203.4) | -0.4 | 2.0 | - | 1030+ | 150 | - | RNP APCH |
| TF | RW20L | Y | 203 (203.4) | -0.4 | 3.0 | - | - | - | -3.0° / 50 | RNP APCH |
| CA | - | - | 203 (203.4) | -0.4 | - | L | 1500+ | - | - | RNP APCH |
| DF | HOSBA | - | - | - | - | - | 7000+ | - | - | RNP APCH |

Waypoint Coordinates

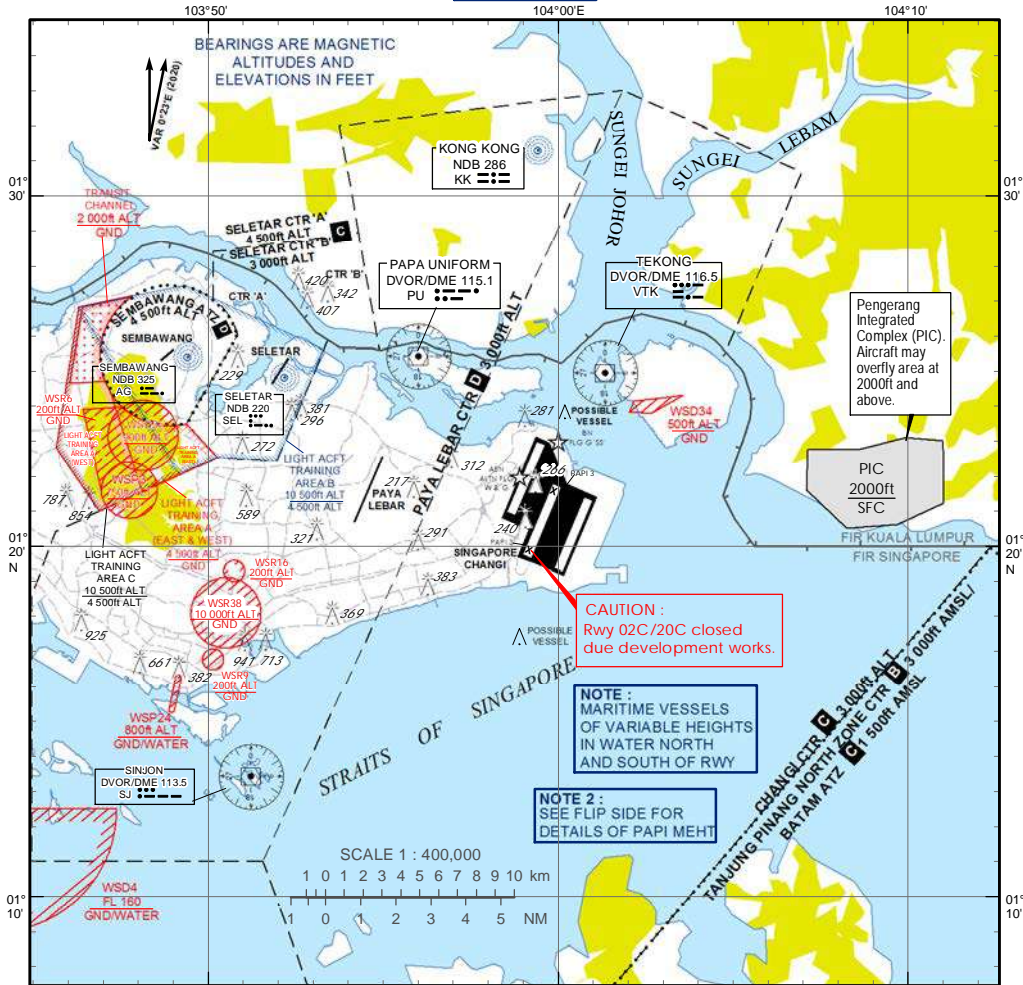
| Name | Latitude | Longitude |
|-------------|------------------|-------------------|
| OBGIS (IF) | 01° 25' 56.83" N | 104° 02' 46.74" E |
| OVMAN (FAF) | 01° 24' 06.28" N | 104° 02' 00.06" E |
| RW20L | 01° 21' 20.45" N | 104° 00' 50.05" E |
| HOSBA | 01° 19' 48.00" N | 104° 24' 18.00" E |

**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

- An IFR flight operating into Singapore Changi Airport may be cleared for a visual approach subject to the following conditions :-
 - The pilot has the aerodrome in sight and can conduct his approach with visual reference to terrain;
 - The flight will not cause delay to other traffic;
 - There is no conflicting tall vessel movement;
 - The cloud ceiling at the aerodrome is 4,000ft or more for landing on RWY 20C/L/R and 3,000ft or more for on RWY 02C/L/R ; and
 - The visibility at the aerodrome is 5km or more.
- 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.
- Pilots may expect radar vectoring for separation and sequencing with other traffic prior to being cleared for a visual approach.

| PAPI 3° (MEHT)* | | | | | | |
|--|---------------|-------|-------|-------|-------|-------|
| Pilot's eye height over the threshold when the following PAPI lights come in view. | RUNWAY | | | | | |
| | 02L | 20R | 02C | 20C | 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 |
| <p>*MEHT : Minimum Eye Height Over the Threshold.</p> <p>Note : Aircraft with eye-to-wheel height greater than 8 metres are advised to fly with 2 white lights and 2 red lights visible so as to achieve sufficient wheel clearance.</p> | | | | | | |

WSSL — SINGAPORE / SELETAR**WSSL AD 2.1 AERODROME LOCATION INDICATOR AND NAME**

WSSL — SINGAPORE / SELETAR

WSSL AD 2.2 AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA

| | | |
|---|--|--|
| 1 | <i>ARP Coordinates and Site at AD</i> | 012501.04N 1035203.52E |
| 2 | <i>Direction and distance from (city)</i> | 006°, 14.6km from city centre (The Fullerton Hotel, Singapore) |
| 3 | <i>Elevation/Reference Temperature</i> | 14 M (46ft) / 33.7°C |
| 4 | <i>Geoid Undulation</i> | 9.78 M |
| 5 | MAG VAR | 0°23' E (2020) |
| 6 | <i>AD Administration, Address, Telephone, Telefax, AFS</i> | <p>Address: CHANGI AIRPORT GROUP (S) PTE LTD SELETAR AIRPORT 21 Seletar Aerospace Road 1 Singapore 797405</p> <p>TEL: (65)64812909, Fax: (65)64833044 (AIS) TEL: (65)64812893, Fax: (65)64831656 (Control Tower) TEL: (65)64815077, 97533361 FAX: (65)64831754 (Airside Operations)</p> <p>AFS: WSSLYDYX</p> |
| 7 | <i>Types of Traffic Permitted</i> | IFR and VFR |
| 8 | <i>Remarks</i> | <p>a. Scheduled Closure Periods for RWY 03/21: see AIP section WSSL AD 2.12 item 14 i).</p> <p>b. Night flight restriction for noise abatement purpose (see AIP section WSSL AD 2.21).</p> <p>c. PPR for aircraft not equipped with RTF.</p> <p>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.</p> <p>e. Direct transit area. Overnight transit in Singapore city.</p> <p>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</p> <p>g. For non-scheduled flights, all passengers and crews are required to clear Customs and Immigration at Seletar Business Aviation Centre (SBAC)</p> |

WSSL AD 2.3 OPERATIONAL HOURS

| | | | | | |
|---|---------------------------------|-----|---|-----------------------------|-----|
| 1 | <i>Aerodrome Administration</i> | H24 | 5 | <i>ATS Reporting Office</i> | H24 |
| 2 | <i>Customs and Immigration</i> | H24 | 6 | <i>MET Briefing Office</i> | H24 |
| 3 | <i>Health and Sanitation</i> | H24 | 7 | <i>Air Traffic Services</i> | H24 |
| 4 | <i>AIS Self-Briefing Office</i> | H24 | 8 | <i>Apron Control Office</i> | H24 |

WSSL AD 2.4 HANDLING SERVICES AND FACILITIES

| | | |
|---|--|---|
| 1 | <i>Cargo Handling Facilities</i> | Provided by handling agent. |
| 2 | <i>Fuel / Oil Types</i> | AVGAS 100LL, JET A1 |
| 3 | <i>Fuelling Facilities / Capacity</i> | 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 | <i>Hangar space for visiting aircraft</i> | By arrangement with handling agent. |
| 5 | <i>Repair facilities for visiting aircraft</i> | By arrangement with handling agent. |
| 6 | <i>Remarks</i> | NIL |

WSSL AD 2.5 PASSENGER FACILITIES

| | | |
|---|-----------------------------|---|
| 1 | <i>Hotels</i> | NIL |
| 2 | <i>Restaurants</i> | Public area of terminal building |
| 3 | <i>Transportation</i> | 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 | <i>Medical Facilities</i> | NIL |
| 5 | <i>Bank and Post Office</i> | NIL |
| 6 | <i>Tourist Office</i> | NIL |
| 7 | <i>Remarks</i> | Internet address : http://www.seletarairport.com/ / for airport and flight information, facilities and services. |

WSSL AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

| | | |
|---|--|---|
| 1 | <i>AD category for fire fighting</i> | CAT7 (No facilities for foaming of runways). |
| 2 | <i>Rescue equipment</i> | Adequately provided as recommended by ICAO. |
| 3 | <i>Capability for removal of disabled aircraft</i> | Up to B757-200. Contact Seletar Airside Operations at: +65 64815077 or +65 97533361 |
| 4 | <i>Remarks</i> | All Airport Emergency Service personnel are trained in rescue and fire-fighting as well as medical first-aid. |

WSSL AD 2.7 SEASONAL AVAILABILITY - CLEARING

The aerodrome is available throughout the year

WSSL AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

| | | |
|---|--|---|
| 1 | <i>Apron surface and strength</i> | 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 | <i>Taxiway width, surface and strength</i> | 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 | <i>Remarks : NIL</i> | |

WSSL AD 2.9 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS

| SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS | | |
|--|---|--|
| 1 | <i>Use of aircraft stand ID signs, TWY guidelines and visual docking/parking guidance system of aircraft stands</i> | Taxiing guidance signs at all intersections with TWY and RWY at all holding positions. Guidelines at apron. Nose-in guidance at aircraft stands. |
| 2 | <i>RWY and TWY markings and LGT</i> | <p><u>RWY LGT:</u> refer to page WSSL AD 2-5 for details. RWY Turn Pad LGT / Markings: Only AVBL at THR RWY 03. Yellow turnpad centreline.</p> <p><u>TWY LGT:</u> 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.</p> <p>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.</p> <p>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.</p> <p><u>MARKING AIDS:</u> Threshold, touchdown zone, centreline stripes and RWY designation. RWY width outline from bituminous concrete surface by white lines.</p> <p><u>AIMING POINT MARKINGS:</u> RWY 03: coincident with PAPI origin located 423.542m from THR respectively. RWY 21: coincident with PAPI origin located 271.279m from THR respectively.</p> |
| 3 | <i>Stop Bars</i> | <p>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.</p> <p>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.</p> <p>Pilots and drivers shall enter / cross the runway only when both the following conditions are met: The crew have</p> <ol style="list-style-type: none"> a) received positive ATC clearance to enter / cross the runway or taxiway, and b) observed that the red stop bar lights are turned off. <p>Crash Alarm Stop Bars: Red LGT across junctions of EP, EC4 and EH2 TWY, flushed with TWY surface.</p> <p>(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.)</p> |

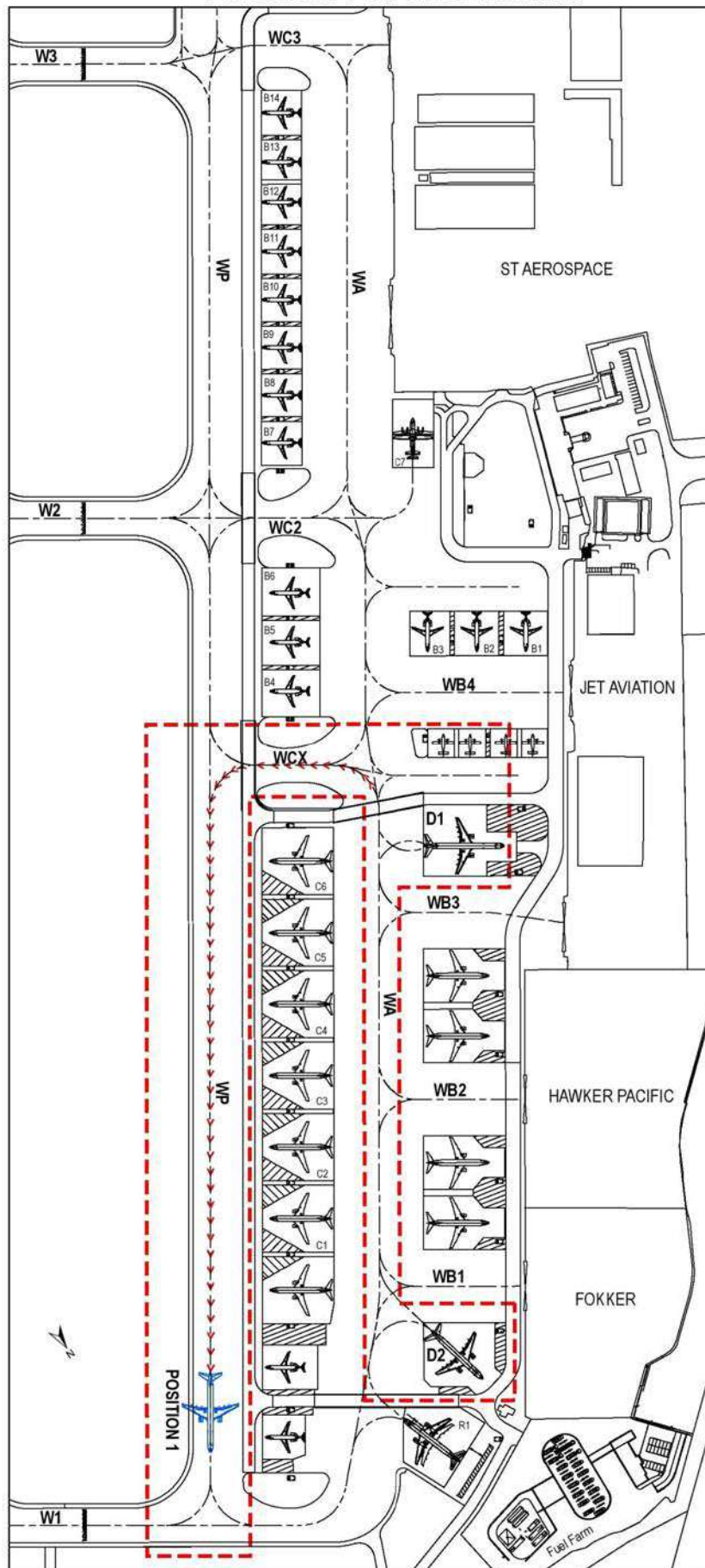
| SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS | | |
|--|---------|--|
| 4 | Remarks | <p>a. Aircraft operators/ground handlers shall be responsible for the safe and smooth operations of aircraft at the aircraft stands.</p> <p>b. A ground handler shall be at the aircraft stand when the aircraft 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.</p> <p>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.</p> <p>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.</p> <p>e. Only Code A aircraft, Code B aircraft, aircraft type Global Express (GLEX), Global 5000 (GL5T), Global 6000 (GL6T), Global Express XRS (GLEX), Global 7500 (GL7T), Fokker 50 (F50), Fokker 70 (F70), Fokker 100 (F100), Gulfstream 500 (GLF5), Gulfstream 550 (GLF5), Gulfstream 650 (GLF6), ATR 42 (AT45 & AT46), ATR 72 (AT75 & AT76), DASH 7 (DNC7), Falcon 7X (FA7X) and Falcon 8X (FA8X) are allowed to taxi out from aircraft stands C1, C2, C3, C4, C5 and C6 subjected to (g), (h) or (i).</p> <p>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.</p> <p>g. Aircraft departing stand C1 shall taxi out towards the north only.</p> <p>h. Aircraft departing stand C6 shall taxi out towards the south only.</p> <p>i. Aircraft departing stands C2, C3, C4 and C5 are allowed to taxi out towards the south or the north.</p> <p>j. Aircraft parking stand C7 is unable to accommodate aircraft with wingspan larger than 28.35m.</p> <p>k. No Refuelling is permitted for aircraft parked at aircraft stand C7.</p> <p>l. Aircraft types up to B757-200 (no winglets) can taxi into aircraft stands D50, D51, D52, D53, D54, D55 and D56.</p> <p>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 (DNC 7), Embraer 190STD (E190), Embraer ERJ 135 (E135), Falcon 7X (FA7X), Falcon 8X (FA8X), Fokker 50 (F50), Fokker 70 - all, Fokker 100 - all, Global Express (GLEX), Global 5000 (GL5T), Global 6000 (GL6T), Global Express XRS (GLEX), Global 7500 (GL7T), Gulfstream 500 (GLF5), Gulfstream 550 (GLF5), Gulfstream 650 (GLF6) and Q400 (DH8) are allowed to taxi out from aircraft stands D50, D51, D52, D53, D54, D55 and D56.</p> <p>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.</p> <p>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.</p> |

| 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 | <p>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.</p> <p>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.</p> | <p>Pushback approved, to face North (or South)</p> <p>Tow forward approved, to face North (or South)</p> |
| C7 | <p>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.</p> | <p>Pushback approved, to face North (or South)</p> |
| C50, C51, C52 | <p>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.</p> | <p>Pushback approved, to face North (or South)</p> |
| C60, C61 | <p>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.</p> <p>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.</p> | <p>Pushback approved, to face North.</p> <p>Pushback approved, to face East.</p> |
| C62 | <p>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.</p> <p>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.</p> | <p>Pushback approved, to face North.</p> <p>Pushback approved, to face South.</p> |

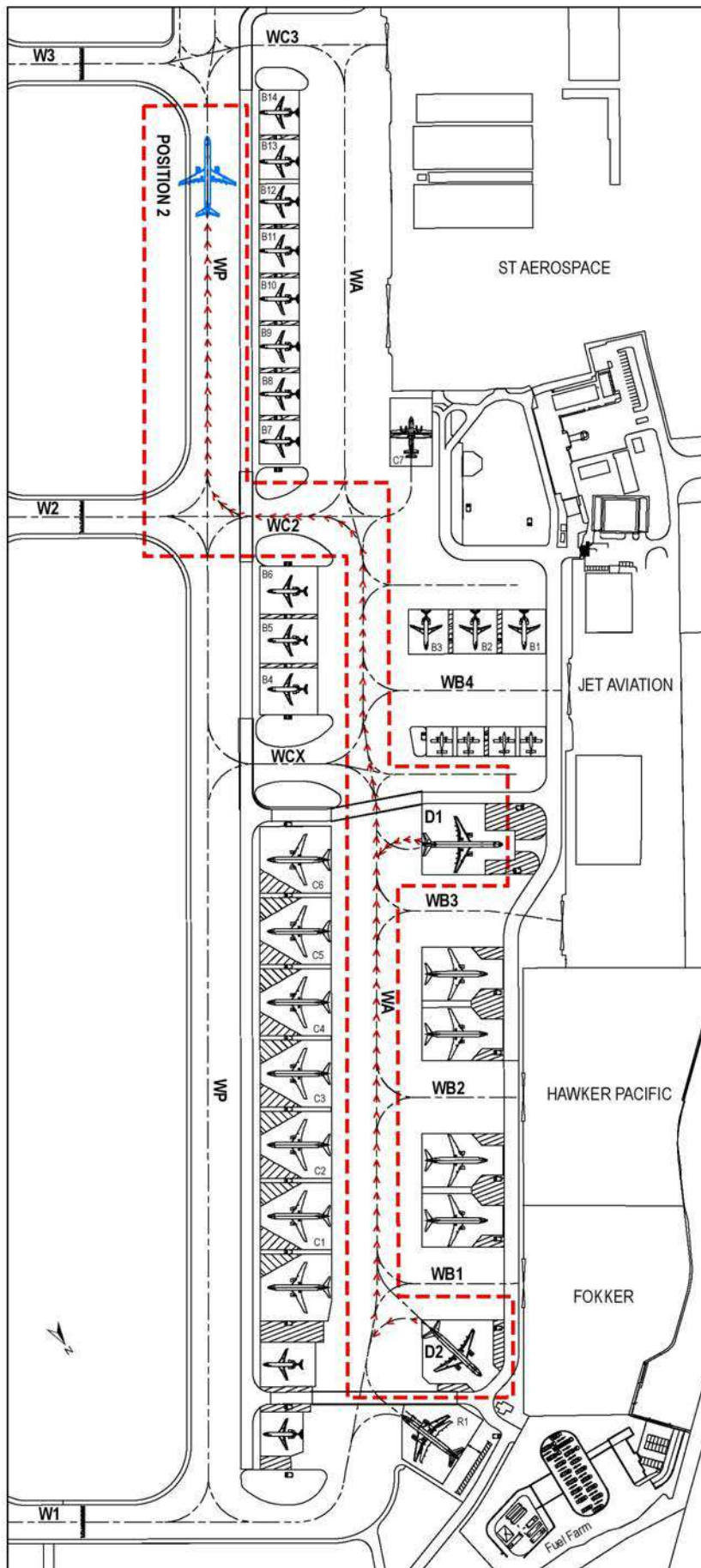
| Aircraft Stands | Pushback / Tow Forward Procedures | Phraseology Used By SELETAR GROUND |
|--------------------------------------|--|---|
| D1, D2 (for B757-200 and C130) | <p>PUSHBACK AND TOW FORWARD TO TWY WP The tow-crew shall request from Seletar Ground (vehicular) on 122.9MHz for departure pushback 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.</p> <p>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.</p> <p>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.</p> <p>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.</p> | <p>1) Tow approved to intermediate holding position on TWY WP short of TWY W1 to face North; or</p> <p>2) Tow approved to intermediate holding position on TWY WP short of TWY W3 to face South</p> <p>Not applicable</p> <p>Not applicable</p> <p>Not applicable</p> |
| D50 | <p>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.</p> <p>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.</p> <p>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.</p> | <p>Pushback approved, to face North.</p> <p>Pushback approved, to face South.</p> <p>Tow forward approved, to face North (or South)</p> |
| D51, D52, D53, D54, D55 | <p>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.</p> <p>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.</p> | <p>Pushback approved, to face North (or South).</p> <p>Tow forward approved, to face North (or South)</p> |

| Aircraft Stands | Pushback / Tow Forward Procedures | Phraseology Used By SELETAR GROUND |
|-----------------|---|---|
| D56 | <p>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.</p> <p>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.</p> <p>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.</p> | <p>Pushback approved, to face North.</p> <p>Pushback approved, to face South.</p> <p>Tow forward approved, to face North (or South)</p> |

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



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 | <i>Associated MET Office</i> | Seletar |
| 2 | <i>Hours of service</i> | H24 |
| 3 | <i>Office responsible for TAF preparation, Periods of validity</i> | Singapore Changi, 30 hours |
| 4 | <i>Type of landing forecast, Interval of issuance</i> | METAR, SPECI and AD warning of adverse weather (H24). TREND NIL. |
| 5 | <i>Briefing/consultation provided</i> | NIL |
| 6 | <i>Flight documentation, Language(s) used</i> | Tabular forms, English |
| 7 | <i>Charts/other information available for briefing or consultation</i> | NIL |
| 8 | <i>Supplementary equipment available for providing information</i> | 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 | <i>ATS units provided with information</i> | NIL |
| 10 | <i>Additional information</i> | TEL: 64815978 (MET Office) |

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 | <p>i) Scheduled closure period for RWY 03/21</p> <p>a. BTN 1600-2300 on first and third FRI of every month or the following FRI if the first or third FRI is a public holiday. RWY CLSD to all TFC except medevac and EMERG flights. Advance notice of 30 minutes is required for EMERG reopening of RWY.</p> <p>b. BTN 0500-0515, 1030-1045, 1600-1615 and 2300-2315 daily for RWY inspection. Aircraft to expect delay.</p> <p>ii) A lighted RWY turn pad with centreline marking is provided at the threshold of RWY 03 which is able to serve aircraft up to B757-200.</p> <p>iii) Orange frangible posts are positioned along the boundary 90m on either sides of the RWY centreline demarcating the boundary for grass cutting and other maintenance works.</p> <p>iv) Wind Direction Indicators (WDIs) are located at both northern and southern ends of the RWY.</p> |

WSSL AD 2.13 DECLARED DISTANCES

| RWY Designator | TORA (m) | TODA (m) | ASDA (m) | LDA (m) | Remarks |
|----------------|-------------|-------------|-------------|------------|---------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 03 | 1836 | 1896 | 1836 | 1836 | NIL |
| 21 | 1836 | 1896 | 1836 | 1836 | NIL |

WSSL AD 2.14 APPROACH AND RUNWAY LIGHTING

| RWY Designator | APCH LGT type LEN INTST | THR LGT Colour WBAR | VASIS (MEHT) PAPI | TDZ LGT LEN | RWY CL LGT,LEN, spacing, colour, INTST | RWY edge LGT LEN, spacing colour, INTST | RWY End LGT Colour WBAR | SWY LGT LEN Colour |
|---|---|---------------------------|--|-------------------|--|---|-------------------------------------|-----------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 03 | Simple APCH LGT: 4 rows of barettes of 3 LGT each and 1 crossbar of 13 LGT. White, elevated, uni-directional APCH LGT and white, omni-directional CGL on top of elevated APCH LGT. Simple TDZ LGT: 2 pairs white, inset, uni-directional LGT. | Green with THR IDENT LGT | PAPI 3.2° (both sides of RWY) 2 white 2 red LGT (21.24m) 3 white 1 red LGT (22.27m) 4 white LGT (24.75m). ACFT with eye-to-wheel HGT greater than 6.3m are ADZ to fly with 2 white 2 red LGT visible so as to achieve sufficient wheel CLR. | NIL | NIL | White with yellow on last 600m of either end. Elevated, omni-directional and brilliancy controlled. | Red | NIL |
| 21 | APCH LGT: 1 row of inset APCH LGT of 4 LGT and 4 rows of barettes of 4 LGT each. White inset uni-directional APCH LGT and white omni-directional CGL on top of white, elevated uni-directional APCH LGT. Simple TDZ LGT: 2 pairs white, inset, uni-directional LGT. | Green with THR IDENT LGT | PAPI 3.5° (both sides of RWY) 2 white 2 red LGT (17.720m) 3 white 1 red LGT (19.286m) 4 white LGT (20.871m). ACFT with eye-to-wheel HGT greater than 6.3m are ADZ to fly with 2 white 2 red LGT visible so as to achieve sufficient wheel CLR. | NIL | NIL | White with yellow on last 600m of either end. Elevated, omni-directional and brilliancy controlled. | Red | NIL |
| RWY 21 THR and RWY END LGT symmetrically disposed in 2 groups with a gap between the groups. RWY 21 THR and RWY END LGT reinstated to inset fitting. | | | | | | | | |

WSSL AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

| | | |
|---|---|--|
| 1 | <i>ABN/IBN location, characteristics and hours of operation</i> | ABN: 012448.00N 1035207.96E (on top of Control Tower) ALTN FLG W G EV 2.5 SEC. HN and IMC IBN: 012509.94N 1035152.14E (on top of West Substation) FLG G 'SL' EV 7 SEC. HN and IMC |
| 2 | <i>LD and LGTI location Ultrasonic wind sensor location and LGT</i> | Ultrasonic wind sensors and windsocks at ends of RWY. |
| 3 | <i>TWY edge and centreline lighting</i> | TWY Edge LGT: Blue, elevated and omni-directional. TWY Centreline LGT: Green, fixed. Intermediate holding position LGT: Yellow, fixed, unidirectional. |
| 4 | <i>Secondary power supply/switch-over time</i> | Automatic standby generator power supply available for airfield lighting. |
| 5 | <i>Remarks</i> | Vehicles painted yellow or displaying checkered red/white or orange/white flag at highest point of vehicle. WDI lighted. |

WSSL AD 2.16 HELICOPTER LANDING AREA

| | | | |
|---|---|--|--|
| 1 | Coordinates of THR of FATO Geoid undulation | H03 012437.963N 1035152.072E | H21 012446.046N 1035157.344E |
| 2 | FATO elevation M/FT | H03- 10.45m/34.3ft; H21 - 9.36m/30.7ft | |
| 3 | FATO area dimensions, surface, strength, marking | Rectangle 297m x 21.5m, compacted turf, helicopter landing area designations, outline by concrete kerbs painted white. | |
| 4 | True BRG of FATO | 033.33/213.33° Direction of TKOF zones: 034° GEO / 214° GEO | |
| 5 | Declared distance available | TODAH RTODAH LDAH H03 297m 297m 297m H21 297m 297m 297m | |
| 6 | Approach and FATO lighting | Nil | |
| 7 | Remarks | Slope of helicopter landing area (transverse/longitudinal) H03 - 1.19%/0.44% ; H21 - 0.96%/0.44% | |

WSSL AD 2.17 ATS AIRSPACE

| | | |
|---|---|---|
| 1 | <i>Designation and Lateral Limits</i> | <p>SELETAR CTR 012703N 1035009E 012825N 1035009E 012900N 1035425E 012534N 1035454E thence along international boundary to 012556N 1035326E 012227N 1035158E 012232N 1035016E 012327N 1034922E 012607N 1035053E and thence an arc of 2NM radius (centred at position 012527N 1034856E) joining 012607N 1035053E and 012703N 1035009E</p> <p>SELETAR CONTROL ZONE A Portion of Seletar CTR within Singapore FIR is known as Seletar CTR 'A'.</p> <p>SELETAR CONTROL ZONE 'B' The part in the Kuala Lumpur FIR is known as Seletar CTR 'B' and is bounded by 012825N 1035009E, 012900N 1035425E, 012534N 1035454E thence along the Peninsular Malaysia/Singapore international boundary to 012808N 1035010E to 012825N 1035009E from GND/sea level to 3,000ft. It will be activated only with prior approval of Johor Bahru ATC. (see chart AD-2-WSSL-VFR-1).</p> |
| 2 | <i>Vertical Limits</i> | <p>SELETAR CONTROL ZONE A SFC to 4 500ft ALT Maximum Usable ALT 4 000ft</p> <p>SELETAR CONTROL ZONE B SFC to 3 000ft ALT</p> |
| 3 | <i>Airspace Classification</i> | C |
| 4 | <i>ATS Unit Call sign Language(s)</i> | SELETAR TOWER English |
| 5 | <i>Transition Altitude</i> | 11000 FT (3,350m) |
| 6 | <i>Remarks</i> | NIL |

WSSL AD 2.18 ATS COMMUNICATION FACILITIES

| Service designation | Call sign | Frequency P-Pri S-Sec | Hours of operation | Remarks |
|---------------------|-----------------------------|--|--------------------|---|
| TWR | Seletar Tower | P118.45 MHz S130.2 MHz 270.4 MHz | H24 | NIL |
| | Seletar Ground | 121.6 MHz * 122.9 MHz | H24 | * for vehicular movements |
| ACC | Singapore Radar | P123.7 MHz S127.3 MHz 133.8 MHz | H24 0000-1430 | for ATS Routes B469, G219, G334, R208, L625, L629, L635, L642, L644, M751, M753, M758, M761, M763, M771, N875, N884, N891, N892 and Y514. |
| | | 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, L762, M630 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), 045224N 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 |

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.

- 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.

3.3 AERODROME CHARACTERISTICS OF SELETAR AND SEMBAWANG AERODROMES

| Aeronautical Service | Seletar AD | Sembawang AD | Significant Differences and Remarks |
|-----------------------------|--|--|--|
| RWY Designation | 03/21 | 05/23 | Exercise caution due to almost similar RWY alignment |
| Location | Adjacent to the Straits of Johor on the eastern bank of Seletar River. Seletar AD is situated APRX 3NM NW of Paya Lebar AP. | APRX 3NM west of Seletar AD and 3NM inland from the Straits of Johor | Seletar RWY commences almost from the edge of the shore. Also note that Sembawang AD is inland and not next to the sea. Pilots operating in either AD are to keep clear of the other AD ATZ/CTR at all times. |
| RWY LGT | White/Amber RWY edge LGT | NIL | Sembawang AD has no RWY LGT |
| Approach LGT | Simple approach LGT available for RWY 03 approach, consisting of 4 rows of barettes and 1 crossbar (5th row). RWY 03 - white, elevated, uni-directional approach LGT and white, omni-directional CGL on top of elevated approach LGT. Approach LGT available for RWY 21 approach, consisting of 1 row of inset approach LGT (1st row) and 4 rows of barettes. RWY 21 - white, inset and elevated, uni-directional approach LGT and white, omni-directional CGL on top of elevated approach LGT. Simple touchdown zone LGT for both RWY 03 and RWY 21 approach consisting of 2 pairs of white, inset, uni-directional LGT | NIL | No visual approach slope indicator at Sembawang AD |
| IBN | FLG G 'SL' EV 7 SEC | FLG R 'AG' EV 20 SEC HN and IMC | NIL |
| ABN | ALTN FLG W G EV 2.5 SEC | NIL | Sembawang AD has no ABN |
| Parking Apron | Relatively large aircraft parking apron to the west of RWY, connected to the RWY by three taxiways | Small aircraft parking apron | Differences in size and location of the parking apron |

WSSL AD 2.21 NOISE ABATEMENT PROCEDURES

- 1.1 To alleviate the problem of noise, no flights are permitted between 1400-2300, other than MEDEVAC and emergency flights.
- 1.2 All aircraft on AWY G579 between SINJON (SJ) and 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 |

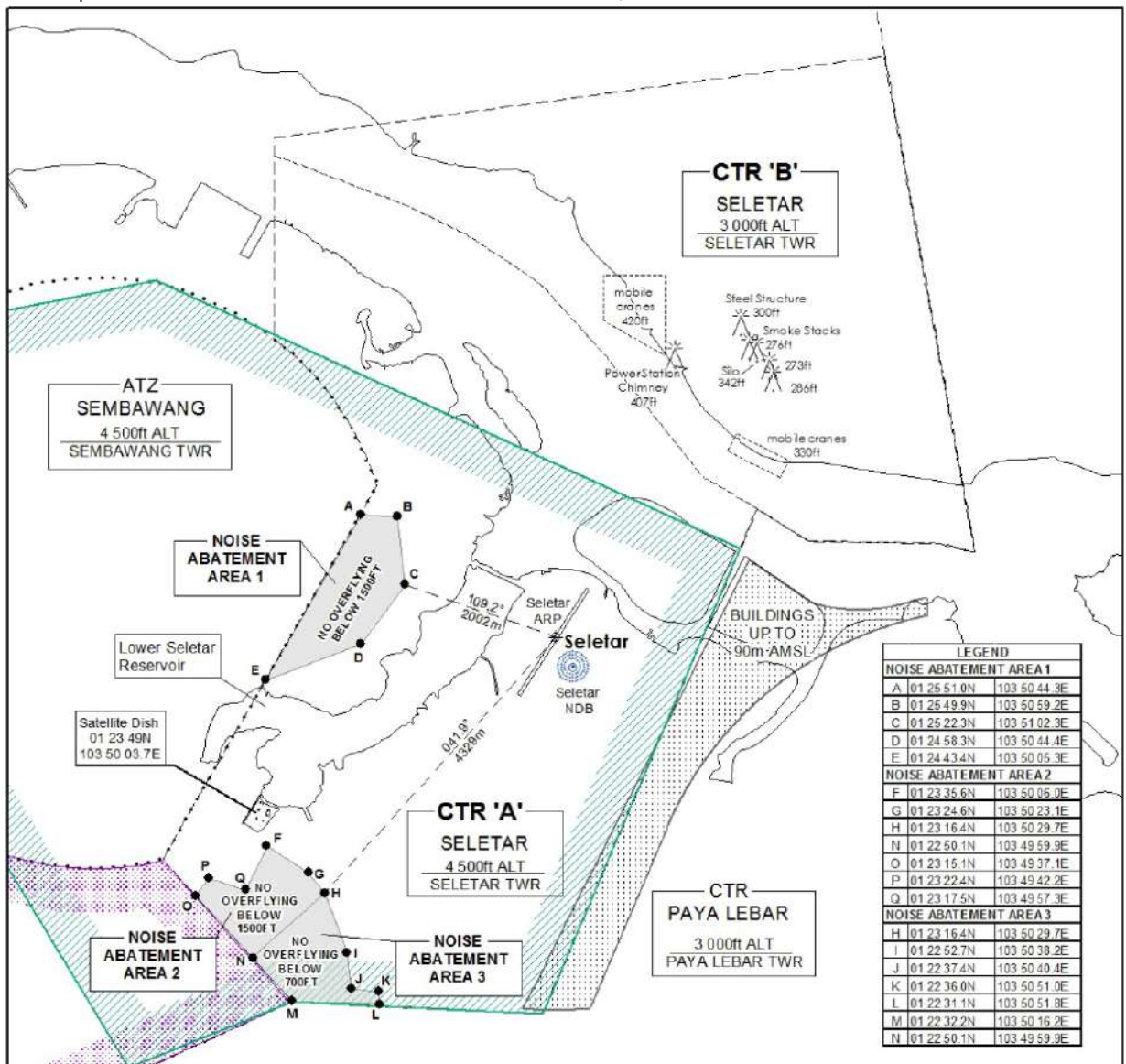
- 1.5 Noise Abatement Area 2 is bounded by the following points, and aircraft are to maintain a minimum altitude of 1,500ft when overflying the area.

| 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 |

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.

- 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.

- 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.

- 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).

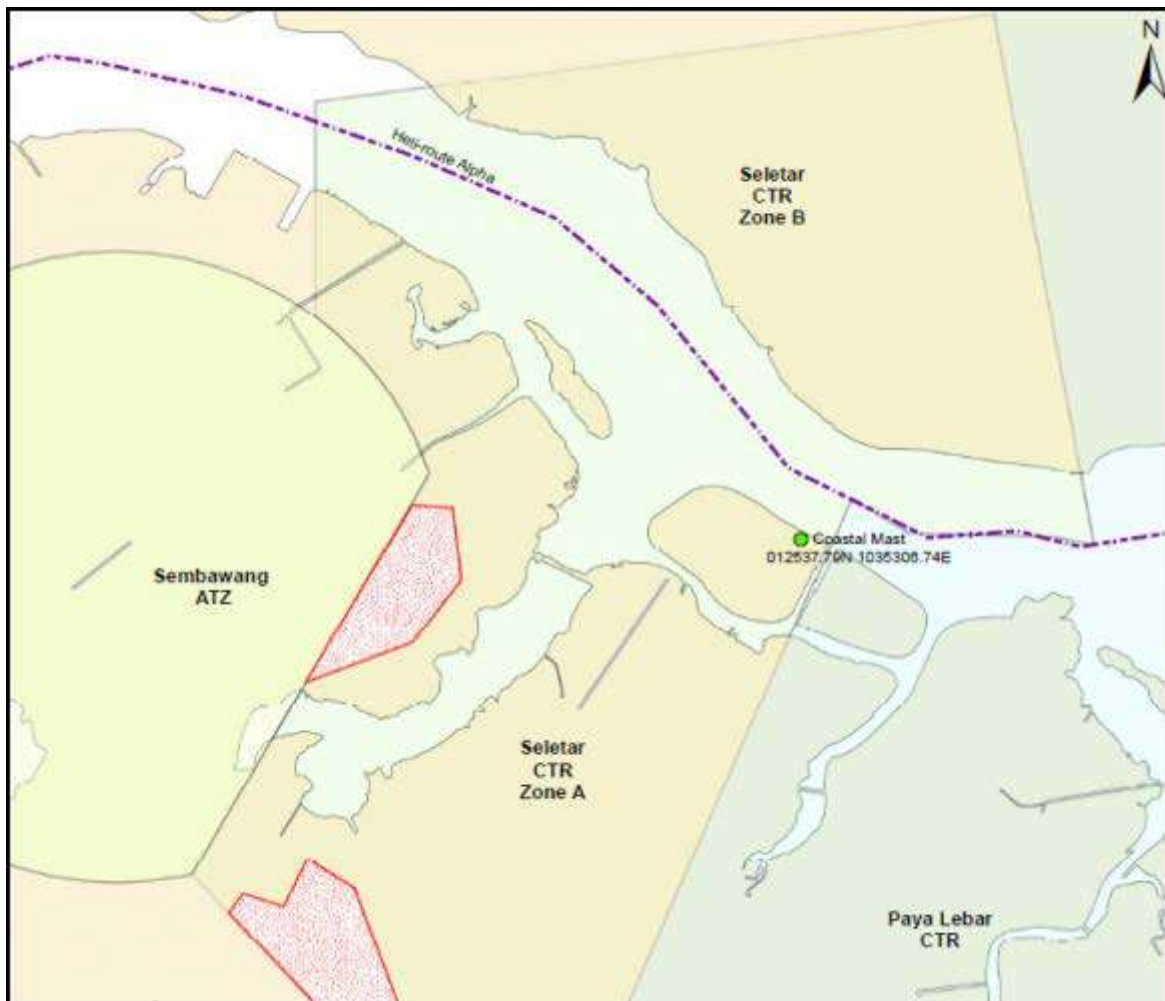
WSSL AD 2.23 ADDITIONAL INFORMATION

1 BIRD CONCENTRATION IN THE VICINITY OF THE AIRPORT

- 1.1 A number of varieties of birds are found in Singapore throughout the year. The larger birds commonly found in Seletar Airport includes the following:
- Cattle egrets (weighing approximately 300g each)
 - Brahminy kites (weighing approximately 600g each)
- 1.2 There could be an increase in bird activities during the usual migratory months of September to April. During this period, migratory birds may use the airport as their feeding ground.
- 1.3 Handheld laser device, long range acoustic device and alternating amplified bird cries of distress are used for bird dispersal within Seletar Airport.

2 HELICOPTER CROSSING SELETAR NORTHERN EXTENDED CENTRELINE

- 2.1 Due to flying activities in Seletar Control Zone, all helicopters flying on Heli-route Alpha and intending to cross the northern extended centreline of Seletar Aerodrome shall obtain a positive clearance from Seletar Tower on 118.45MHz prior to crossing (see chart below).
- 2.2 For eastbound crossing, all helicopters are to hold over the western tip of Seletar Island until a clearance has been issued by Seletar Tower.
- 2.3 For westbound crossing, all helicopters are to hold on Heli-route Alpha abeam the coastal mast until a clearance has been issued by Seletar Tower.
- 2.4 The holding altitude is 200 feet or otherwise instructed by ATC.



WSSL AD 2.24 CHARTS RELATED TO SELETAR AIRPORT

| | |
|---|--|
| Aerodrome Chart - ICAO | AD-2-WSSL-ADC-1 |
| Layout of Significant Aerodrome Buildings and Apron Facilities | AD-2-WSSL-ADC-2 |
| Aerodrome Hotspots | AD-2-WSSL-ADC-3 |
| Aerodrome Obstacle Chart (AOC) - ICAO - TYPE A - RWY 03/21 | AD-2-WSSL-AOC-1 |
| Aerodrome Obstacle Chart (AOC) - ICAO - TYPE B - RWY 03/21 | AD-2-WSSL-AOC-2 |
| Visual Approach Chart (VAC) - ICAO - RWY 03 | AD-2-WSSL-VAC-1 |
| Visual Approach Chart (VAC) - ICAO - RWY 21 | AD-2-WSSL-VAC-2 |
| Visual Approach Chart (VAC) - ICAO - Advisory Joining Procedures - RWY 03 | AD-2-WSSL-VAC-3 |
| Visual Approach Chart (VAC) - ICAO - Advisory Joining Procedures - RWY 21 | AD-2-WSSL-VAC-4 |
| Visual Departure Chart - RWY 03 | AD-2-WSSL-VDC-1 |
| Visual Departure Chart - RWY 21 | AD-2-WSSL-VDC-2 to 2.1 |
| Joining Procedures - VFR Flights from JB | AD-2-WSSL-VFR-1 |
| Joining procedures - IFR Flights from JB, KK and SJ - RWY 03 | AD-2-WSSL-IFR-1 |
| Joining procedures - IFR Flights from JB, KK and SJ - RWY 21 | AD-2-WSSL-IFR-2 |

PAGE INTENTIONALLY LEFT BLANK

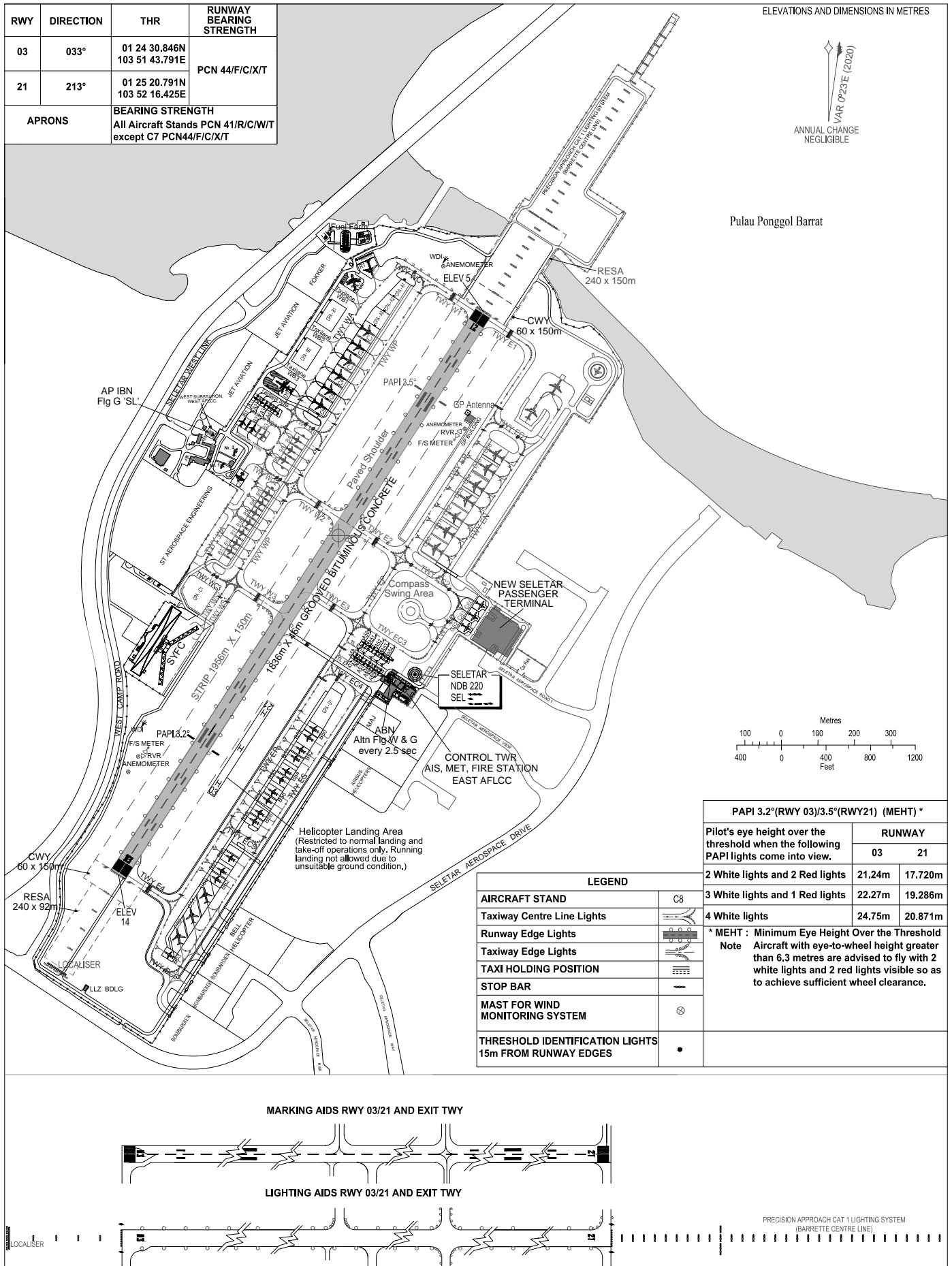
AERODROME CHART - ICAO

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 | |

| 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 |

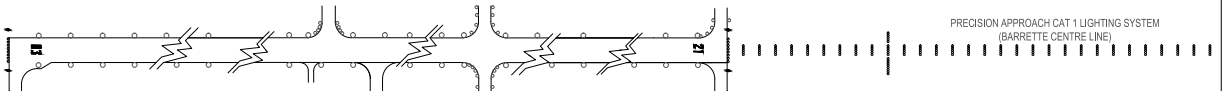
* MEHT : Minimum Eye Height Over the Threshold
Note : Aircraft with eye-to-wheel height greater than 6.3 metres are advised to fly with 2 white lights and 2 red lights visible so as to achieve sufficient wheel clearance.

| LEGEND | |
|---|----------|
| AIRCRAFT STAND | C8 |
| Taxiway Centre Line Lights | [Symbol] |
| Runway Edge Lights | [Symbol] |
| Taxiway Edge Lights | [Symbol] |
| TAXI HOLDING POSITION | [Symbol] |
| STOP BAR | [Symbol] |
| MAST FOR WIND MONITORING SYSTEM | [Symbol] |
| THRESHOLD IDENTIFICATION LIGHTS 15m FROM RUNWAY EDGES | [Symbol] |

MARKING AIDS RWY 03/21 AND EXIT TWY



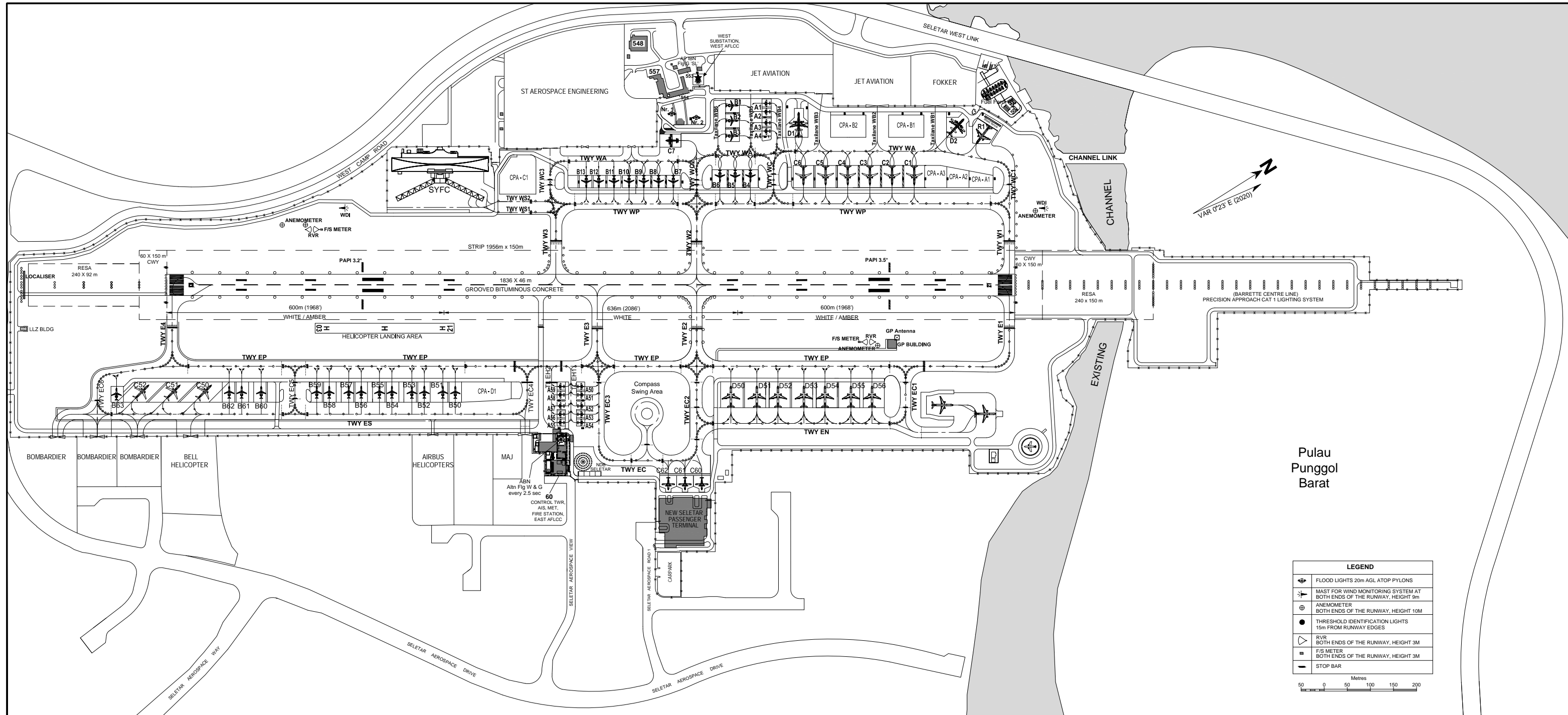
LIGHTING AIDS RWY 03/21 AND EXIT TWY



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



LEGEND

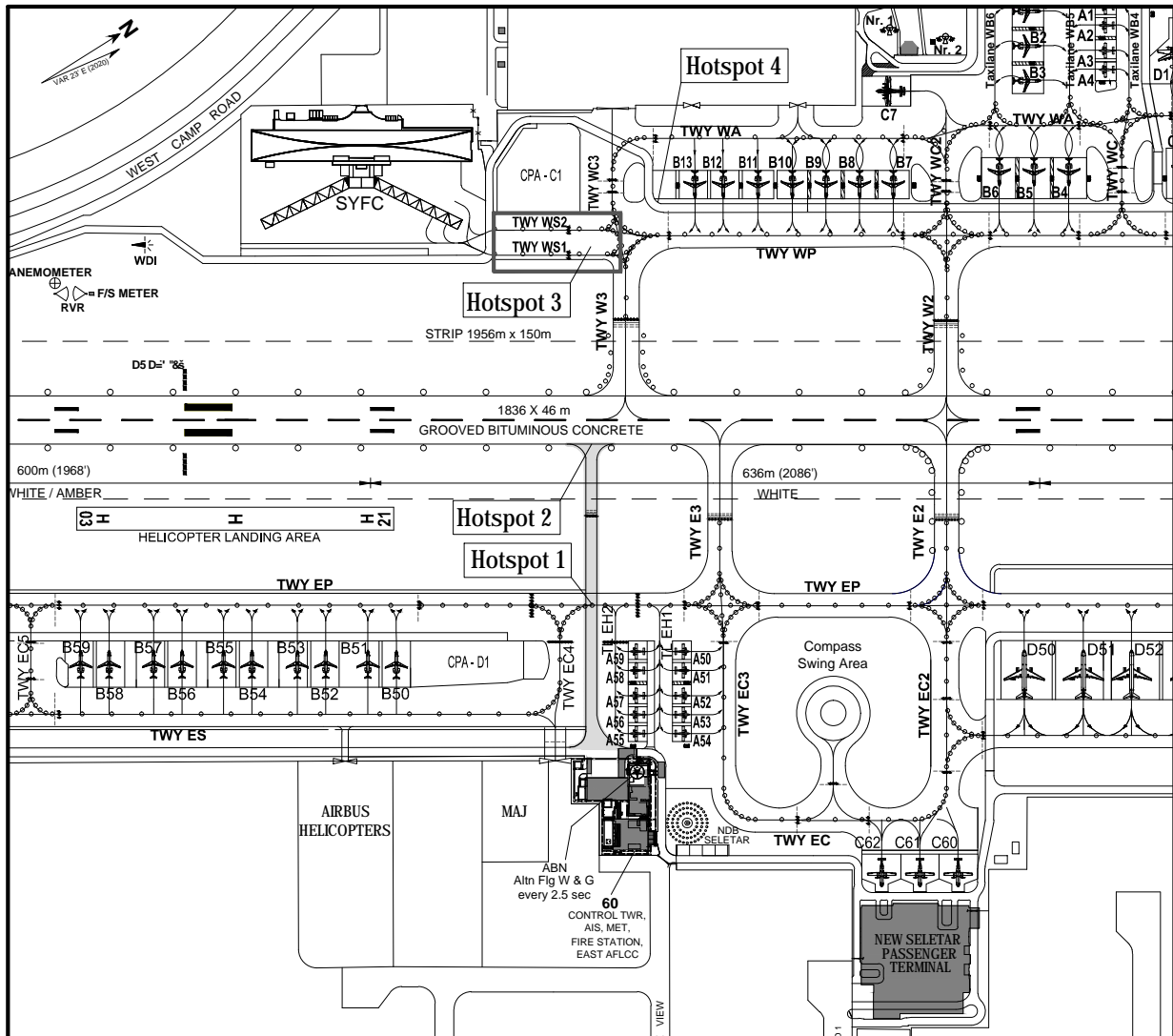
| | |
|--|---|
| | FLOOD LIGHTS 20m AGL ATOP PYLONS |
| | MAST FOR WIND MONITORING SYSTEM AT BOTH ENDS OF THE RUNWAY, HEIGHT 9m |
| | ANEMOMETER BOTH ENDS OF THE RUNWAY, HEIGHT 10M |
| | THRESHOLD IDENTIFICATION LIGHTS 15m FROM RUNWAY EDGES |
| | RVR BOTH ENDS OF THE RUNWAY, HEIGHT 3M |
| | F/S METER BOTH ENDS OF THE RUNWAY, HEIGHT 3M |
| | STOP BAR |

Metres
0 50 100 150 200

CHANGES : Runway emergency access road at Runway south end added.
Taxiway connections to 2 new Bombardier hangars along TWY ES added.

PAGE INTENTIONALLY LEFT BLANK

AERODROME HOTSPOTS



Hotspots

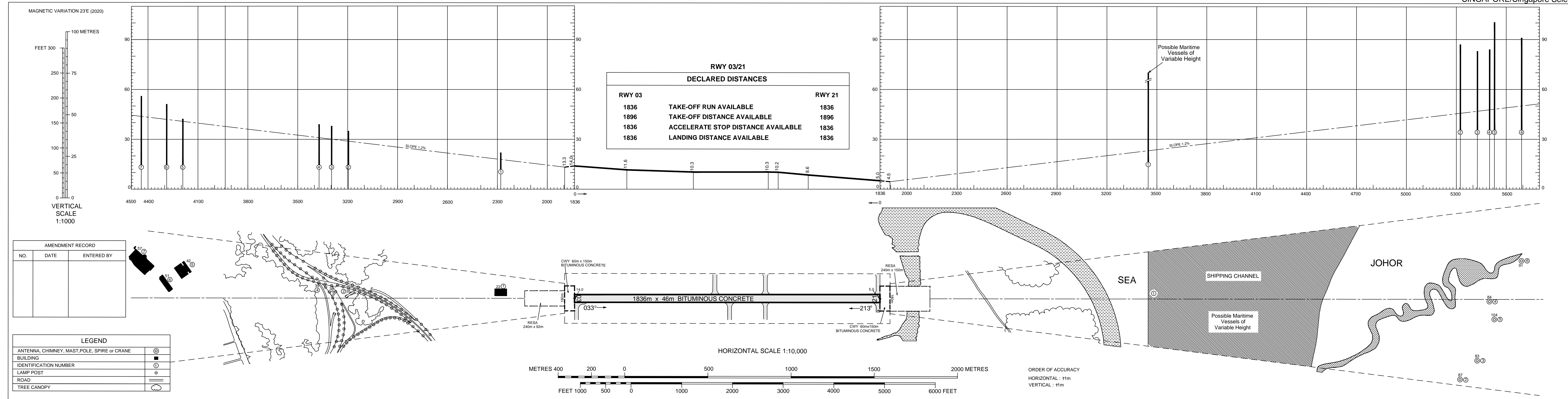
- 1) Emergency access road crossing TWY EP parallel to TWY EC4.
Pilots and tow tug drivers to exercise caution. Stop Bar on both sides of emergency road will be lighted during emergency.
- 2) Emergency roadway South of TWY E3.
Pilots on RWY to exercise caution and observe NO ENTRY marking. This is not 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.

PAGE INTENTIONALLY LEFT BLANK

DIMENSIONS AND ELEVATIONS IN METRES

**AERODROME OBSTACLE CHART - ICAO
TYPE A (OPERATING LIMITATIONS)**

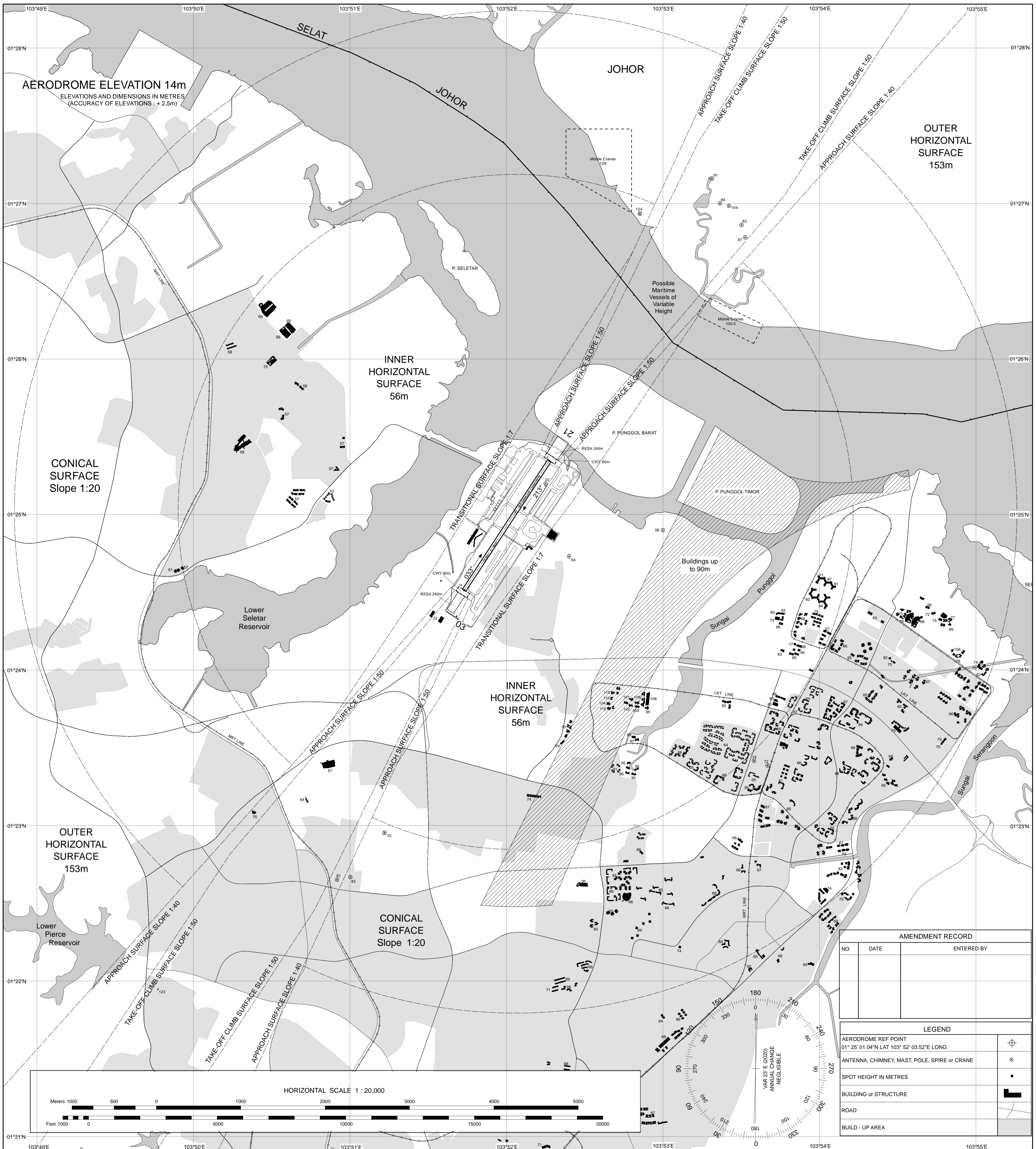
SINGAPORE/Singapore Seletar



PAGE INTENTIONALLY LEFT BLANK

**AERODROME OBSTACLE CHART - ICAO
TYPE B**

SINGAPORE / Seletar



| 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 | |

PAGE INTENTIONALLY LEFT BLANK

VISUAL APPROACH CHART - ICAO

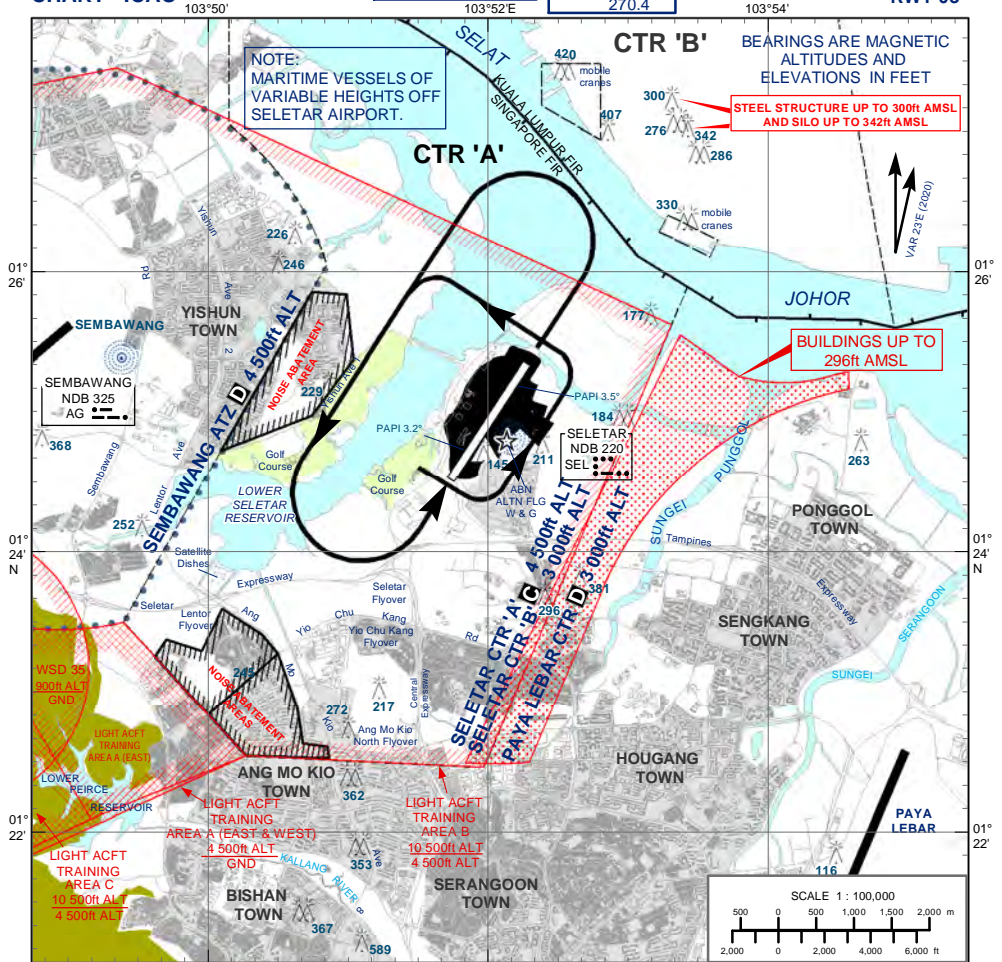
AD ELEV 46 ft

ATIS AP ID-WSSL
128.425

APP 124.05
TWR 121.625
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° | RUNWAY | |
|---|--------|---------|
| | 03 | 21 |
| Pilot's eye height over the threshold when the following PAPI lights come into view | | |
| 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.

Notes:

- 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.

PAGE INTENTIONALLY LEFT BLANK

VISUAL APPROACH CHART - ICAO

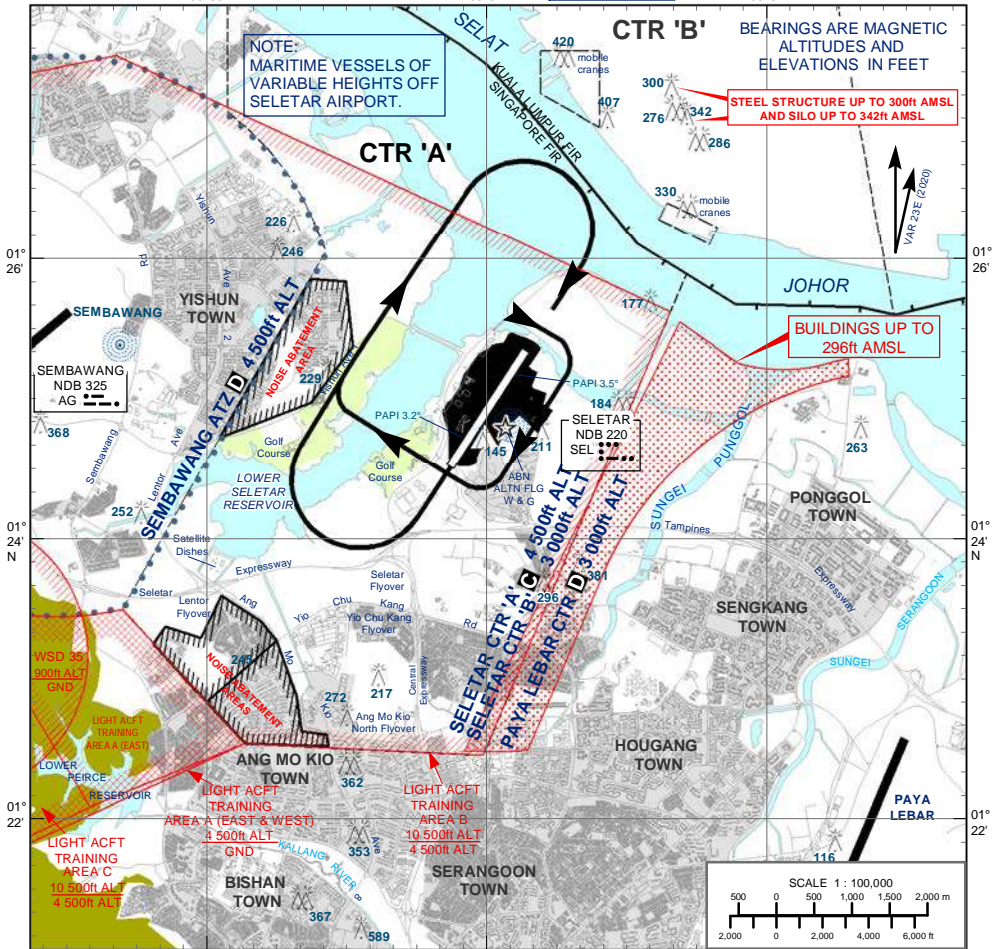
AD ELEV 46 ft

ATIS AP ID-WSSL
128.425

APP 124.05
TWR 121.625
118.45
270.4

SINGAPORE/SELTAR

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 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° | RUNWAY | |
|---|--------|---------|
| | 03 | 21 |
| Pilot's eye height over the threshold when the following PAPI lights come into view | | |
| 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.

PAGE INTENTIONALLY LEFT BLANK

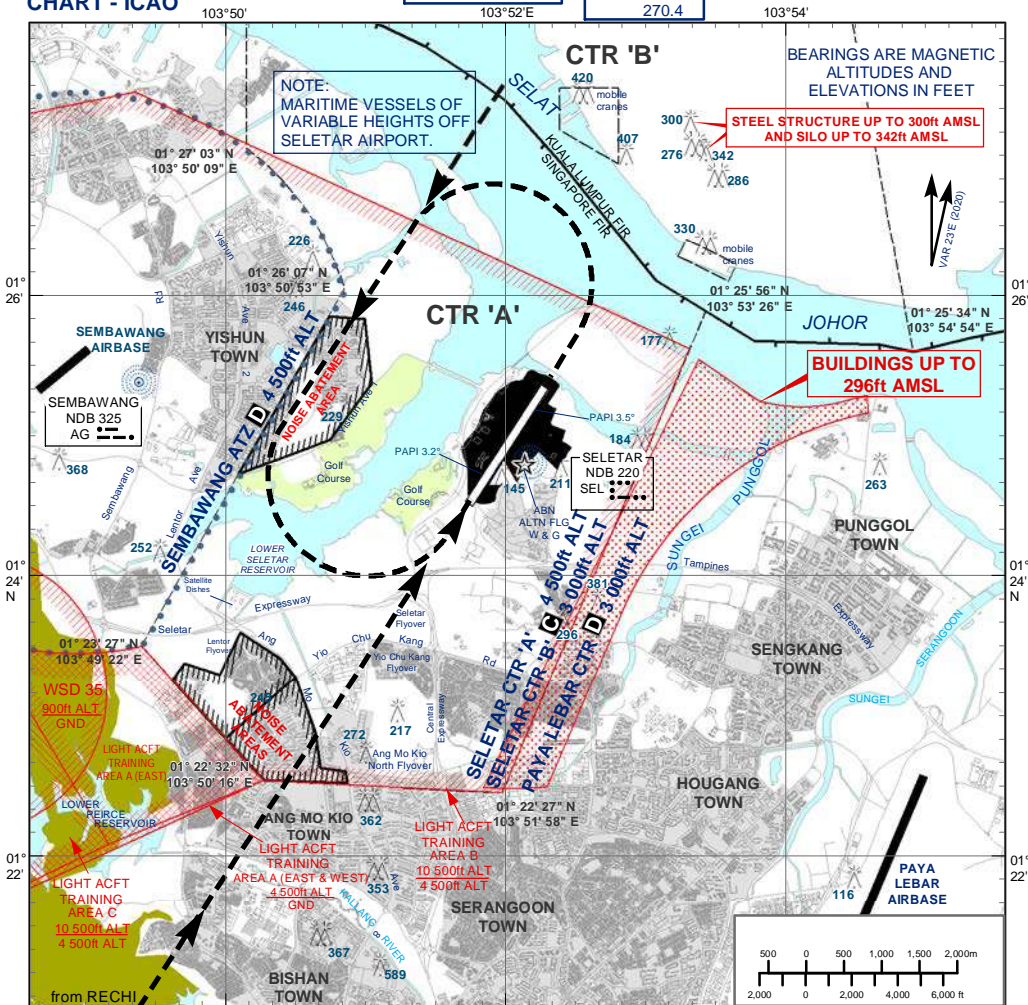
**VISUAL
APPROACH
CHART - ICAO**

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

- 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.
- 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.
- Joining aircraft shall give way to circuit traffic already on downwind.

Circling Approach

- 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.
- From SJ-PONJO-RECHI, 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 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.
- Joining aircraft shall give way to circuit traffic already on downwind.

CAUTION

- Pilots are required to keep clear of Sembawang ATZ. Turns should therefore be kept within Seletar CTR.
- 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.

- 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° | RUNWAY | |
|---|--------|---------|
| | 03 | 21 |
| Pilot's eye height over the threshold when the following PAPI lights come into view | | |
| 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.


PAGE INTENTIONALLY LEFT BLANK

PAGE INTENTIONALLY LEFT BLANK

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.

ADVISORY DEPARTURE PROCEDURES FOR RUNWAY 21

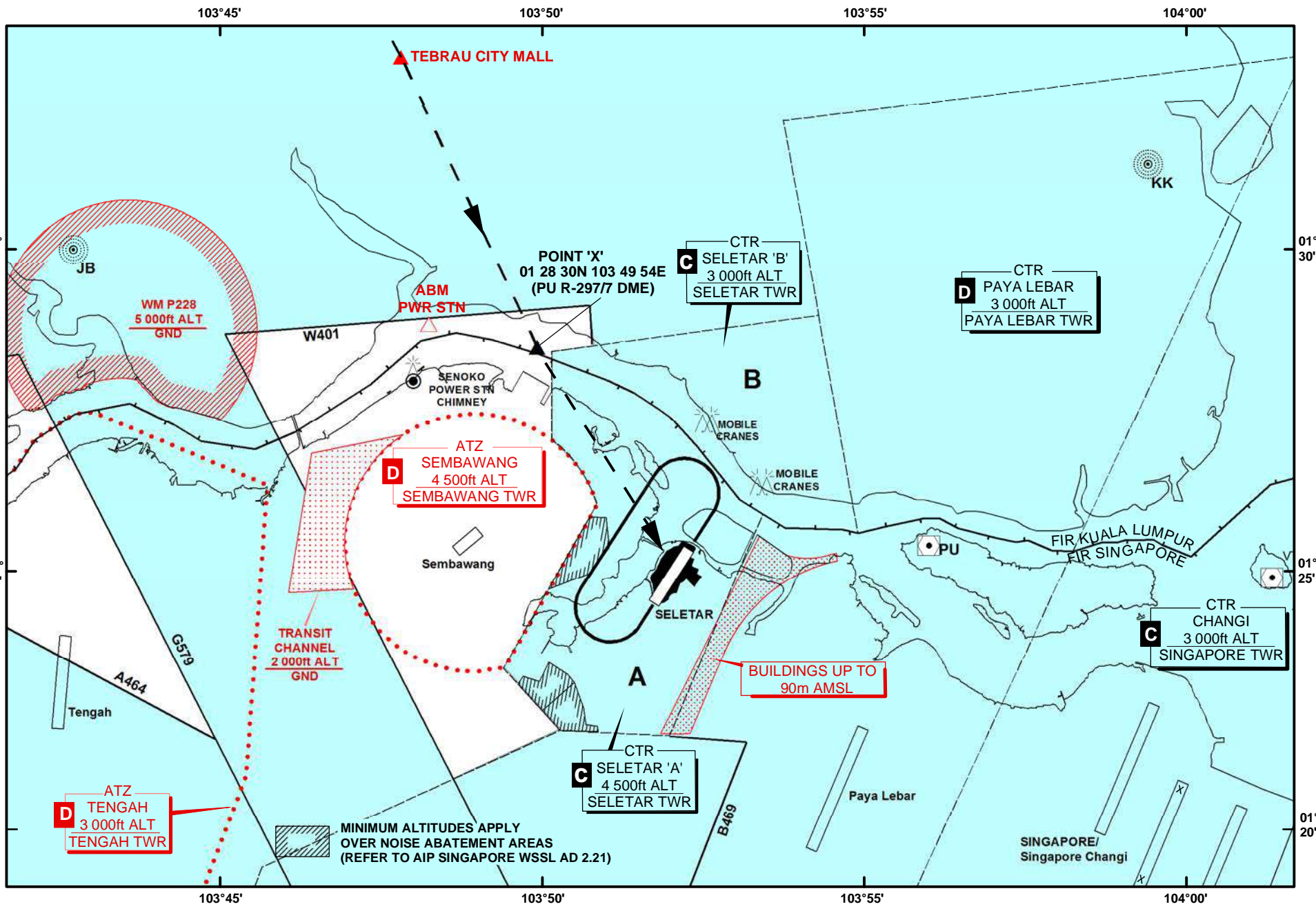
On departure, pilots can expect climb to an initial altitude cleared by ATC. Pilots of fixed-wing aircraft navigating to KK can expect to turn right to join the circuit till end of downwind and then expect a radar heading to leave Seletar CTR. Where a radar heading is not given, pilots shall navigate 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.

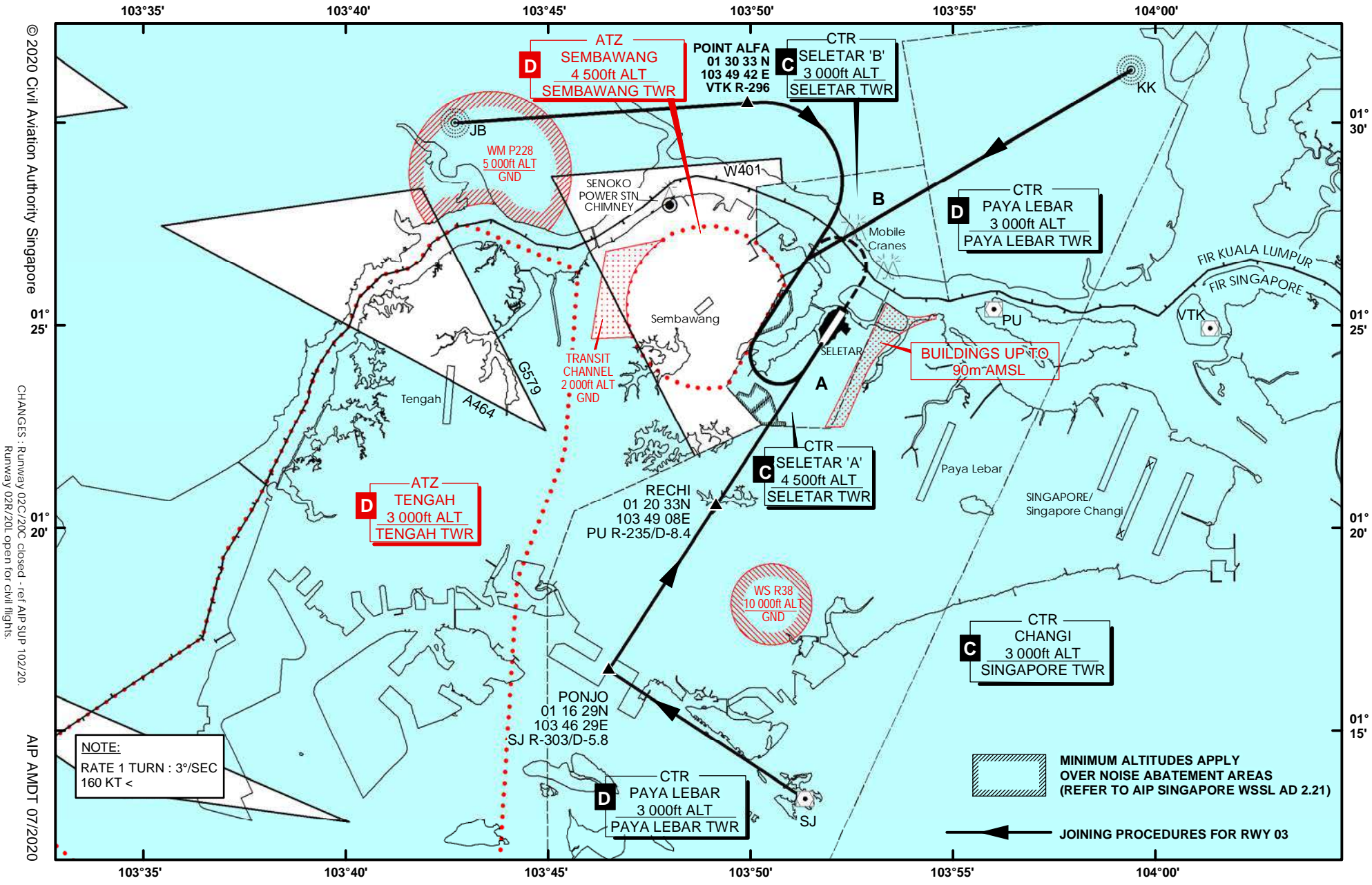
SELETAR AERODROME JOINING PROCEDURE (VFR FLIGHTS) FROM JOHOR BAHRU



MINIMUM ALTITUDES APPLY OVER NOISE ABATEMENT AREAS (REFER TO AIP SINGAPORE WSSL AD 2.21)

PAGE INTENTIONALLY LEFT BLANK

SELETAR AERODROME JOINING PROCEDURE (IFR FLIGHTS) FROM JB, KK AND SJ - RUNWAY 03



© 2020 Civil Aviation Authority Singapore

CHANGES - Runway 02C/20C closed - ref AIP SUP 102/20
Runway 02R/20L open for civil flights.

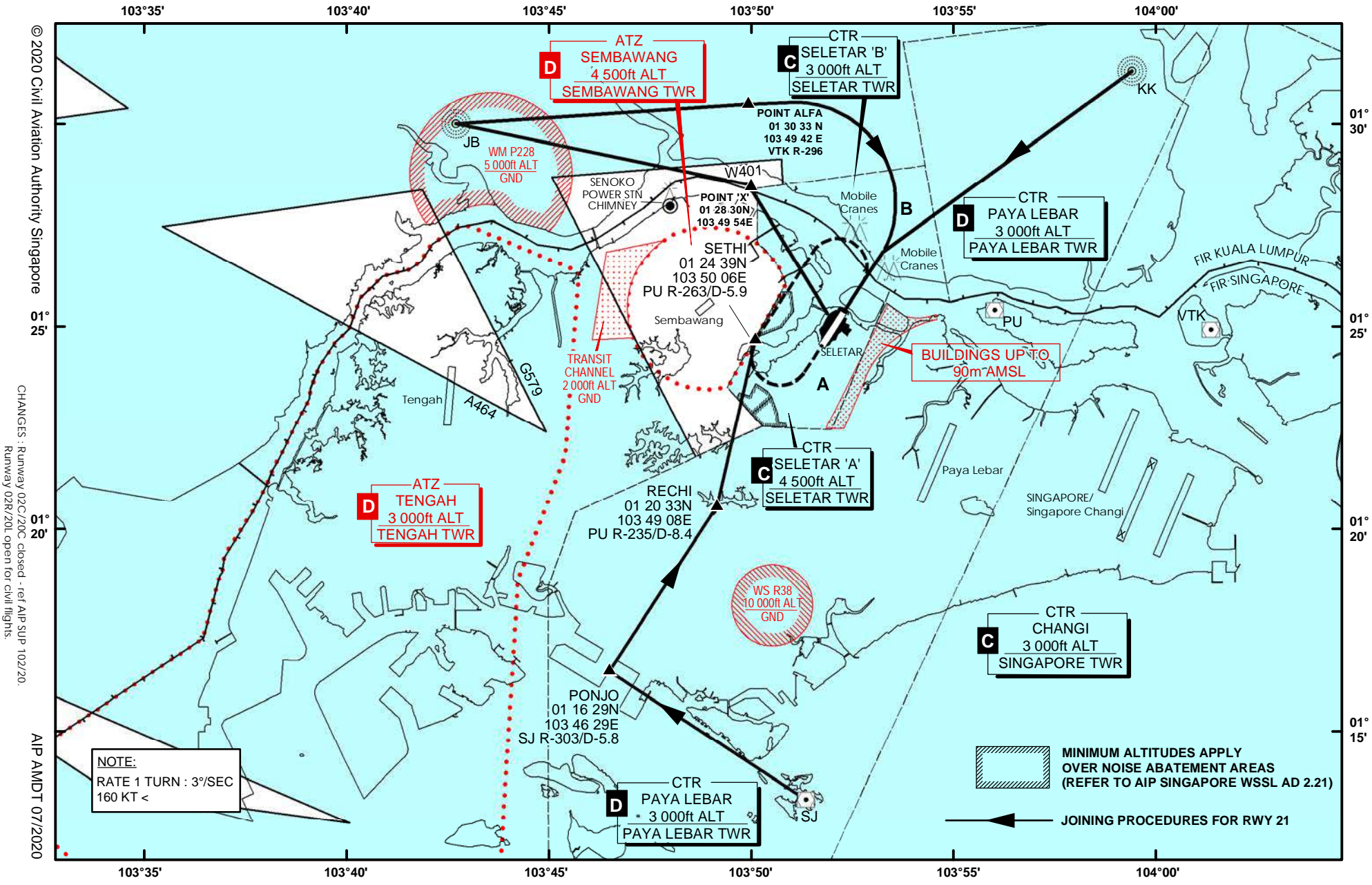
AIP AMDT 07/2020

A I P Singapore

AD-2-WSSL-IFR-1
31 DEC 2020

PAGE INTENTIONALLY LEFT BLANK

SELETAR AERODROME JOINING PROCEDURE (IFR FLIGHTS) FROM JB, KK AND SJ - RUNWAY 21



© 2020 Civil Aviation Authority Singapore
 CHANGES - Runway 02C/20C closed - ref AIP SUP 10/2/20
 Runway 02R/20L open for civil flights
 AIP AMDT 07/2020

A I P Singapore
 AD-2-WSSL-IFR-2
 31 DEC 2020

PAGE INTENTIONALLY LEFT BLANK

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 | <i>ARP coordinates and site at AD</i> | 012120.6N 1035410.0E(Paya Lebar IBN) |
| 2 | <i>Direction and distance from (city)</i> | - |
| 3 | <i>Elevation/Reference temperature</i> | 20 M (65ft) / 31.5° C |
| 4 | <i>MAG VAR</i> | 0°23' E (2020) |
| 5 | <i>AD Administration, address, telephone, telefax, telex, AFS</i> | PAYA LEBAR AIRPORT SINGAPORE 534395 Tel: 63813111 (Base Command Post) AFS: WSAPYWYX |
| 6 | <i>Types of traffic permitted</i> | IFR |
| 7 | <i>Remarks</i> | 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 | <i>Aerodrome Administration</i> | 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 | <i>Customs and immigration</i> | by prior arrangement only |
| 3 | <i>Health and sanitation</i> | by prior arrangement only |
| 4 | <i>AIS Briefing Office</i> | - |
| 5 | <i>ATS Reporting Office</i> | - |
| 6 | <i>MET Briefing Office</i> | H24 |
| 7 | <i>Air Traffic Services</i> | H24 |
| 8 | <i>Remarks</i> | AD may be closed periodically for Foreign Object Damage (FOD) walk. Actual emergency or diversion will be accepted at 30 min notification. Such closure will be published via NOTAM. |

WSAP AD 2.4 HANDLING SERVICES AND FACILITIES

| | | |
|---|--|---|
| 1 | <i>Cargo Handling Facilities</i> | - |
| 2 | <i>Fuel / Oil Types</i> | JET A1, Oil |
| 3 | <i>Fuelling Facilities / Capacity</i> | BTN 2300-1 100 SUN/MON to THU/FRI Public holidays and outside operating hours prior permission required from RSAF Headquarters via Paya Lebar Base Command Post. |
| 4 | <i>Hangar space for visiting aircraft</i> | - |
| 5 | <i>Repair facilities for visiting aircraft</i> | - |
| 6 | <i>Remarks</i> | NIL |

WSAP AD 2.5 PASSENGER FACILITIES

| | | |
|---|-------------------------------|-----|
| 1 | <i>Hotels</i> | NIL |
| 2 | <i>Restaurants</i> | NIL |
| 3 | <i>Transportation</i> | NIL |
| 4 | <i>Medical Facilities</i> | NIL |
| 5 | <i>Banks and Post Offices</i> | NIL |
| 6 | <i>Tourist Office</i> | NIL |
| 7 | <i>Remarks</i> | NIL |

WSAP AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

| | | |
|---|--|--|
| 1 | <i>AD category for fire fighting</i> | CAT9 |
| 2 | <i>Rescue equipment</i> | Adequately provided as recommended by ICAO |
| 3 | <i>Capability for removal of disabled aircraft</i> | Sufficient salvage equipment provided by Airfield Ground Services section at military bases. |
| 4 | <i>Remarks</i> | 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 | <i>Apron surface and strength</i> | 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 | <i>Taxiway width, surface and strength</i> | Strength: PCN72/F/B/W/U |
| 3 | <i>Remarks</i> | TWY between TWY W1 and TWY W2 closed to all code C and above aircraft. Pilots to exercise caution. |

WSAP AD 2.9 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS

| SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS | | |
|---|---|---|
| 1 | Aircraft Parking Restrictions | |
| | There are 4 designated parking aprons: Apron A, Apron C, Jet Apron and Jet Apron Extension: | |
| | ACFT Stand | Largest ACFT Type |
| | Apron A | A1 to A5 C17 |
| | Apron C | C1 to C7 (reserved for RSAF) C8 to C9 C10 C10A C11 C11A C130 C130 KC135 B747-400 C17 C5, AN124 |
| | Jet Apron | J1 to J3 J1A and J2A C130 B747 |
| | Jet Apron Extension | J4 and J5 C17 |
| 2 | Taxiing Procedures | |
| 2.1 | Taxiing in/out of Apron Areas | |
| | 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 | |

SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS

| | |
|-----|---|
| 4.3 | <p>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:</p> <p>a) Marshalling of VVIP / VIP aircraft b) Embarkation / disembarkation of VIP from aircraft</p> |
| 5. | <p>Ground Procedures - General</p> |
| 5.1 | <p><u>Engine Start-ups and Ground Runs</u> 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.</p> |
| 5.2 | <p><u>Aircraft to/from Apron B</u> 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.</p> |
| 5.3 | <p><u>Prohibited Activities - Smoking in the Apron Areas</u> Smoking is strictly prohibited within the Apron areas. Disciplinary action will be taken on any personnel caught contravening this restriction.</p> |

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. |

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 |

WSAP AD 2.14 APPROACH AND RUNWAY LIGHTING

| <i>RWY Designator</i> | <i>APCH LGT type LEN INTST</i> | <i>THR LGT colour WBAR</i> | <i>VASIS (MEHT) PAPI</i> | <i>TDZ LGT LEN</i> | <i>RWY Centre Line LGT LEN, spacing, colour, INTST</i> | <i>RWY edge LGT LEN, spacing colour, INTST</i> | <i>RWY END LGT colour WBAR</i> | <i>SWY LGT LEN colour</i> |
|-----------------------|--|--|----------------------------------|------------------------|--|--|--|-----------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 02/20 | Sequenced FLG LGT. Modified Calvert High INTST White LGT with brilliance control. | Green | PAPI on 3° glide slope | - | NIL | White with Amber | Red | Red |

WSAP AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

| | |
|----------------------------|---|
| <i>WDI/Taxiway/Stopway</i> | Lighted |
| IBN | 012120.6N 1035410.0E; Flashing Red 'PL'; Operating hours HN and IMC |

WSAP AD 2.17 ATS AIRSPACE

| | | |
|---|--|--|
| 1 | <i>Designation and Lateral Limits</i> | PAYA LEBAR CTR 011100N 1035134E 013300N 1040149E 013200N 1035344E 012534N 1035454E thence along international BDRY to 012544N 1035320E 012227N 1035158E 012232N 1035016E 012100N 1034654E 012025N 1034539E 011835N 1034459E thence southwards on 180° to 011100N 1034459E and eastwards to join up with 011100N 1035134E. |
| 2 | <i>Vertical Limits</i> | GND to 3000 FT ALT |
| 3 | <i>Airspace Classification</i> | D |
| 4 | <i>ATS Unit Call Sign, Language(s)</i> | PAYA LEBAR TOWER (Singapore APP outside the opr hours of PAYA LEBAR TOWER), English |
| 5 | <i>Transition Altitude</i> | 11000 FT (3,350m) |
| 6 | <i>Remarks</i> | Northern Transit Corridor: RSAF military aircraft (with the exception of trainer aircraft) using the northern transit corridor will enter the airspace over Johor at or above 5,000ft. RSAF trainer aircraft using the northern corridor will enter the airspace over Johor at or above 2,000ft. |

WSAP AD 2.18 ATS COMMUNICATION FACILITIES

| Service designation | Call sign | Frequency | Hours of operation | Remarks | |
|----------------------------|-----------------------------------|--|---|---|---|
| APP | SELETAR APPROACH | 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 | * for monitoring aircraft operating in Light Aircraft Training Areas. # for monitoring aircraft operating in Light Aircraft Training Areas and Seletar outbound/inbound traffic. | |
| TWR | PAYA LEBAR TOWER | 118.05 MHz 263.1 MHz | On SAT-SUN, public holidays and outside the above times PPR from RSAF | NIL | |
| GND | PAYA LEBAR GROUND | 130.8 MHz 296.0 MHz | | | |
| PAR | PAYA LEBAR TALKDOWN | 119.9 MHz †269.0 MHz ◆240.5 MHz | | | Headquarters via Paya Lebar Base Command Post. |
| 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, L762, M630 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), 045224N 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. | | |

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 | 011321.34N 1035115.22E | 201° MAG 14.5km from THR RWY 02 (Paya Lebar). Antenna HGT: 194ft AMSL Coverage 200NM Maint Period: BTN 0200-0600 Third THU of EV month |
| ILS LLZ RWY 02 | IPN | 109.3MHz | H24 | 012246.41N 1035503.64E | LOC 401m from THR RWY 20 along centreline of RWY. Course width 3 DEG. Maint Period: BTN 0001-0900 First SUN of EV month |
| ILS GP RWY 02 | - | 332.00MHz | H24 | 012050.42N 1035410.11E | GP angle 3 DEG. |
| ILS DME RWY 02 | IPN | CH30X | H24 | 012050.42N 1035410.11E | DME co-located with GP |
| ILS LLZ RWY 20 | IPS | 111.5MHz | H24 | 012027.24N 1035404.48E | LOC 462m from THR RWY 02 along centreline of RWY. Course width 3 deg. Maint Period: BTN 0001-0900 Second SUN of EV month |
| ILS GP RWY 20 | - | 332.90MHz | H24 | 012227.29N 1035451.29E | GP angle 3 deg. |
| ILS DME RWY 20 | IPS | CH52X | H24 | 012227.29N 1035451.29E | DME co-located with GP |

WSAP AD 2.20 LOCAL TRAFFIC REGULATIONS - DESIGNATION OF PAYA LEBAR AIRPORT AS AN ALTERNATE AD FOR SINGAPORE CHANGI AIRPORT**1 INTRODUCTION**

- 1.1 Paya Lebar Airport is designated as an alternate aerodrome to Singapore Changi Airport.
- 1.2 As Paya Lebar Airport is a joint civil/military aerodrome, its use as a planned alternate aerodrome for Singapore Changi Airport is subjected to certain restrictions and limitations. It also has limited ground, baggage and passenger handling facilities for civilian aircraft operations, such as passenger boarding bridges.

2 MANNING OF PAYA LEBAR AIRPORT

- 2.1 The airport is open from 2300-1100 on SUN-MON to THU-FRI. It is closed on Saturdays, Sundays and Public Holidays. Outside the stipulated operating hours and during airport closure, Paya Lebar Airport will be opened at 30 minutes' notice to accept diversion flights into the aerodrome.
- 2.2 Airline operators are requested to inform the Airport Manager and the Duty Tower Controller or SATCC Watch Manager at Singapore Changi Airport as soon as it is known that their service will require the use of Paya Lebar Airport. Revised ETAs and/or ETDs are to be notified as soon as known.

- 2.3 The airport will hold off all departures and arrivals when the aerodrome visibility falls below 3km, or when the aerodrome prevailing cloud base is lower than 500ft. This is a safety consideration to avoid aircraft from carrying out a missed approach under an adverse weather condition. For maintenance/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.

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 121.625 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 121.625 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 121.625 MHz or as instructed by ATC.

3 STANDARD ARRIVALS

When Paya Lebar is VMC - Expect radar vector to RWY 20 for visual straight-in approach.

When Paya Lebar is IMC - Expect radar vector to RWY 20 for ILS or PU DVOR/DME approach.

WSAP AD 2.23 ADDITIONAL INFORMATION

1 OUTDOOR LIGHT AND WATER SHOW

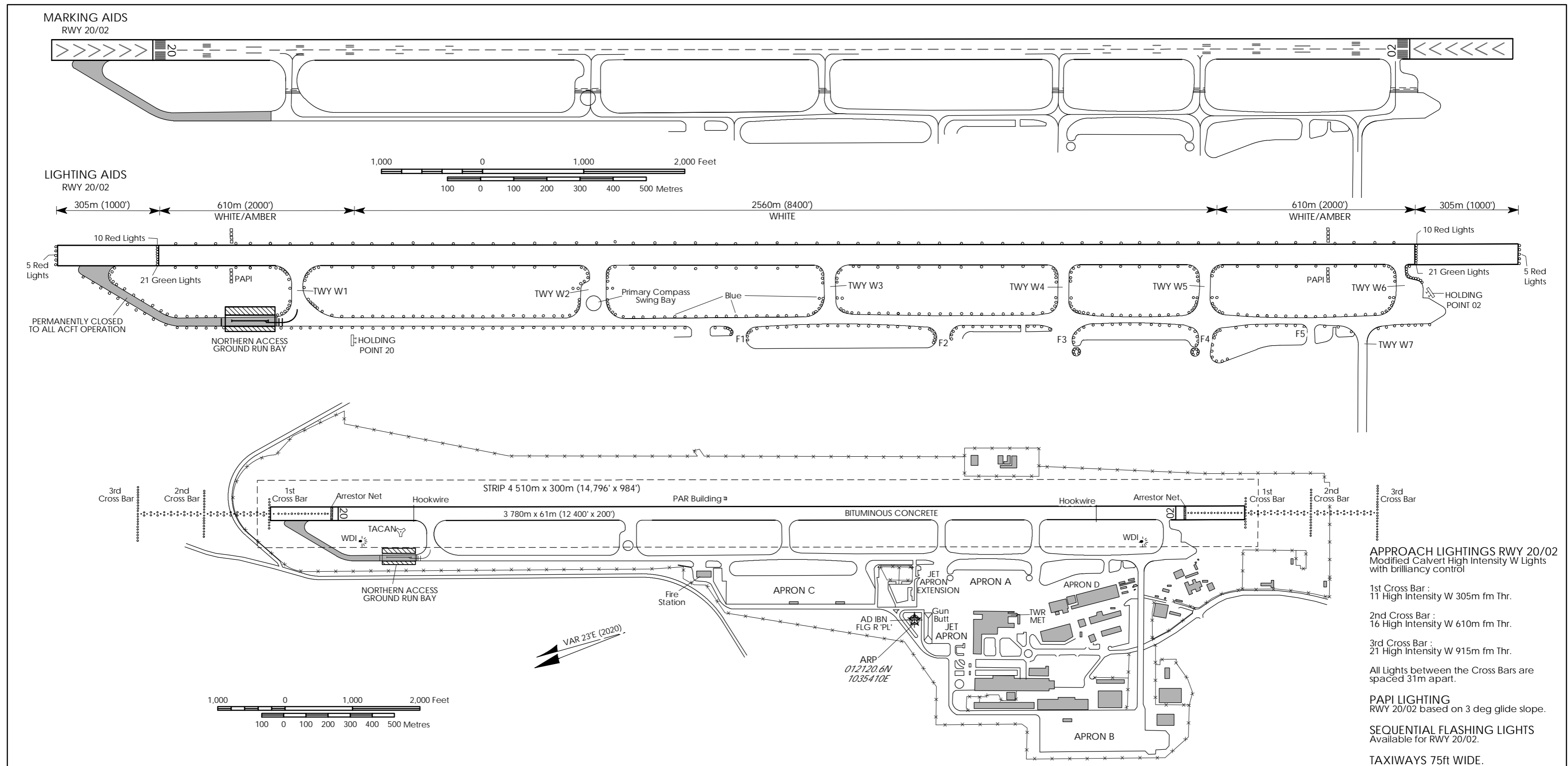
- 1.1 An outdoor light and water show will take place between 1200-1215, 1300-1315, 1400-1415 Friday to Saturday and 1200-1215, 1300-1315 Sunday to Thursday at 011704N 1035130E (within Paya Lebar Control Zone).
GND - UNL.

WSAP AD 2.24 CHARTS RELATED TO PAYA LEBAR AIRPORT

| | |
|---|---------------------------------|
| Aerodrome Chart | AD-2-WSAP-ADC-1 |
| Location of Aircraft Stands for Civil Aircraft | AD-2-WSAP-ADC-2 |
| Aerodrome Obstacle Chart - ICAO - TYPE A | AD-2-WSAP-AOC-1 |
| Instrument Approach Chart - ICAO - RWY 20 - PU DVOR/DME | AD-2-WSAP-IAC-1 |
| Instrument Approach Chart - ICAO - RWY 02 - PU DVOR/DME | AD-2-WSAP-IAC-2 |
| Instrument Approach Chart - ICAO - RWY 20 - IPS ILS/DME | AD-2-WSAP-IAC-3 |
| Instrument Approach Chart - ICAO - RWY 02 - IPN ILS DME | AD-2-WSAP-IAC-4 |
| Instrument Approach Chart - ICAO - RWY 02 - RNP | AD-2-WSAP-IAC-5 |
| Instrument Approach Chart - ICAO - RWY 20 - RNP | AD-2-WSAP-IAC-6 |

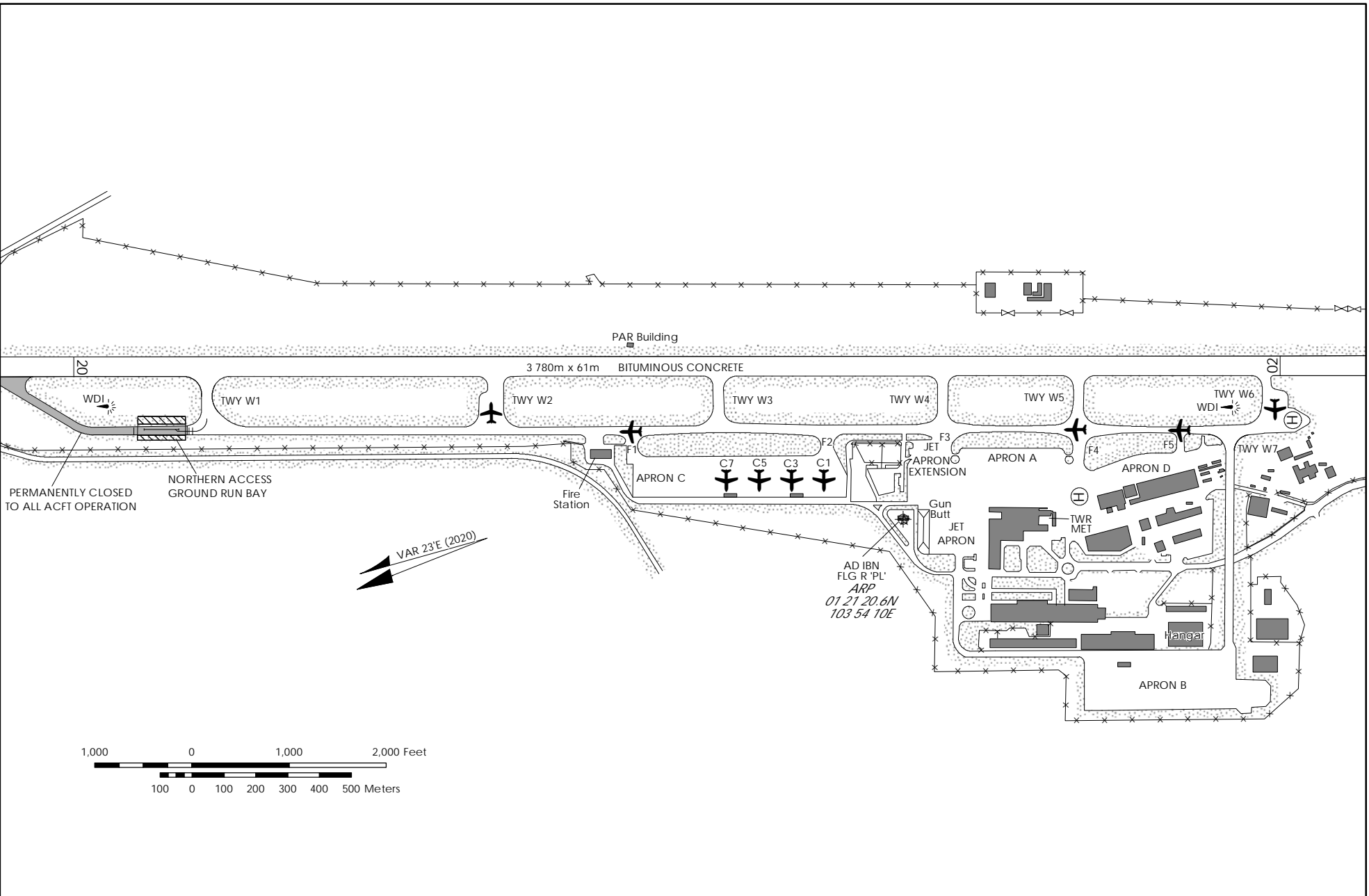
PAGE INTENTIONALLY LEFT BLANK

AERODROME CHART - PAYA LEBAR AIRPORT



PAGE INTENTIONALLY LEFT BLANK

LOCATION OF AIRCRAFT STANDS FOR CIVIL AIRCRAFT
AT PAYA LEBAR AIRPORT



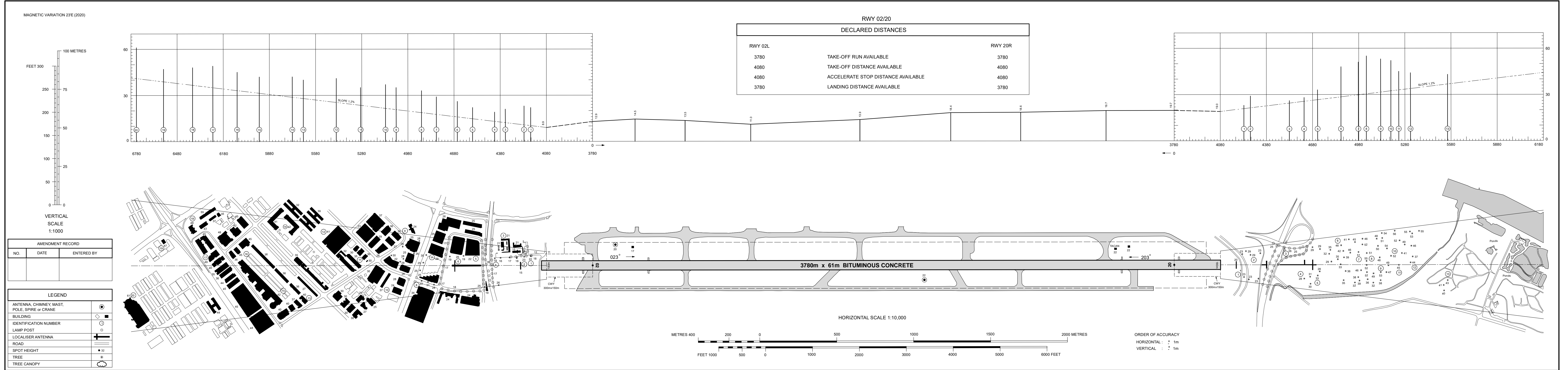
PAGE INTENTIONALLY LEFT BLANK

DIMENSIONS AND ELEVATIONS IN METRES

AERODROME OBSTACLE CHART - ICAO

TYPE A (OPERATING LIMITATIONS)

SINGAPORE/Paya Lebar Airport



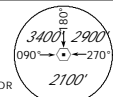
| AMENDMENT RECORD | | |
|------------------|------|------------|
| NO. | DATE | ENTERED BY |
| | | |

| LEGEND | |
|--|------|
| ANTENNA, CHIMNEY, MAST, POLE, SPIRE or CRANE | ⊙ |
| BUILDING | ■ |
| IDENTIFICATION NUMBER | ① |
| LAMP POST | ⊙ |
| LOCALISER ANTENNA | ⊕ |
| ROAD | — |
| SPOT HEIGHT | • 32 |
| TREE | * |
| TREE CANOPY | ☁ |

PAGE INTENTIONALLY LEFT BLANK

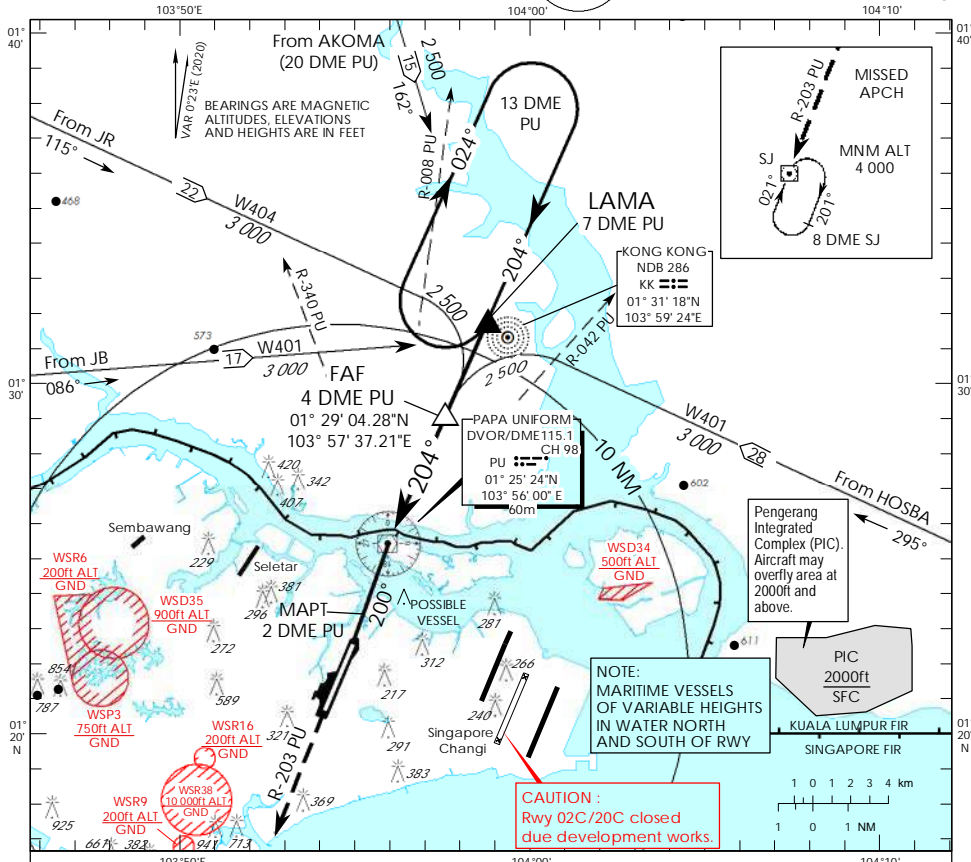
INSTRUMENT
APPROACH
CHART - ICAO

AERODROME ELEV 65ft
HEIGHT RELATED TO
AD ELEV - 65ft



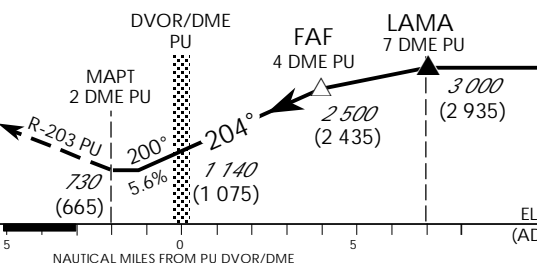
APP 124.05
119.9
121.625
TWR 118.05

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 |
| Altitude (Height) | 2160 (2095) | 1820 (1755) | 1480 (1415) | 1140 (1075) |
| Speed | knots | 70 | 120 | 150 |
| FAF - MAPT 6nm | min : s | 5 : 09 | 3 : 00 | 2 : 24 |
| Rate of descent/GS | ft/min | 370 | 635 | 795 |

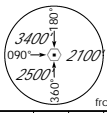
PAGE INTENTIONALLY LEFT BLANK

INSTRUMENT
APPROACH
CHART - ICAO

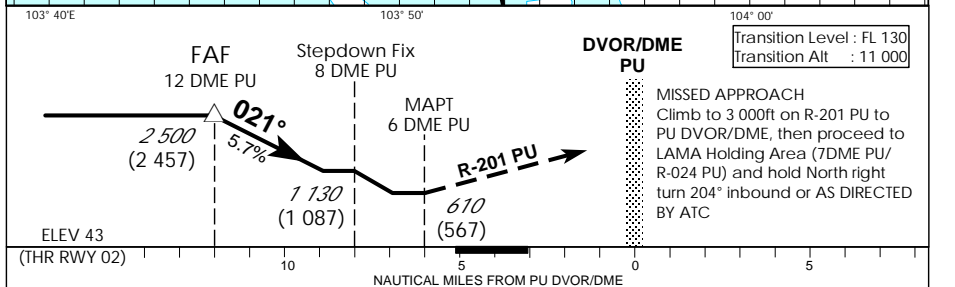
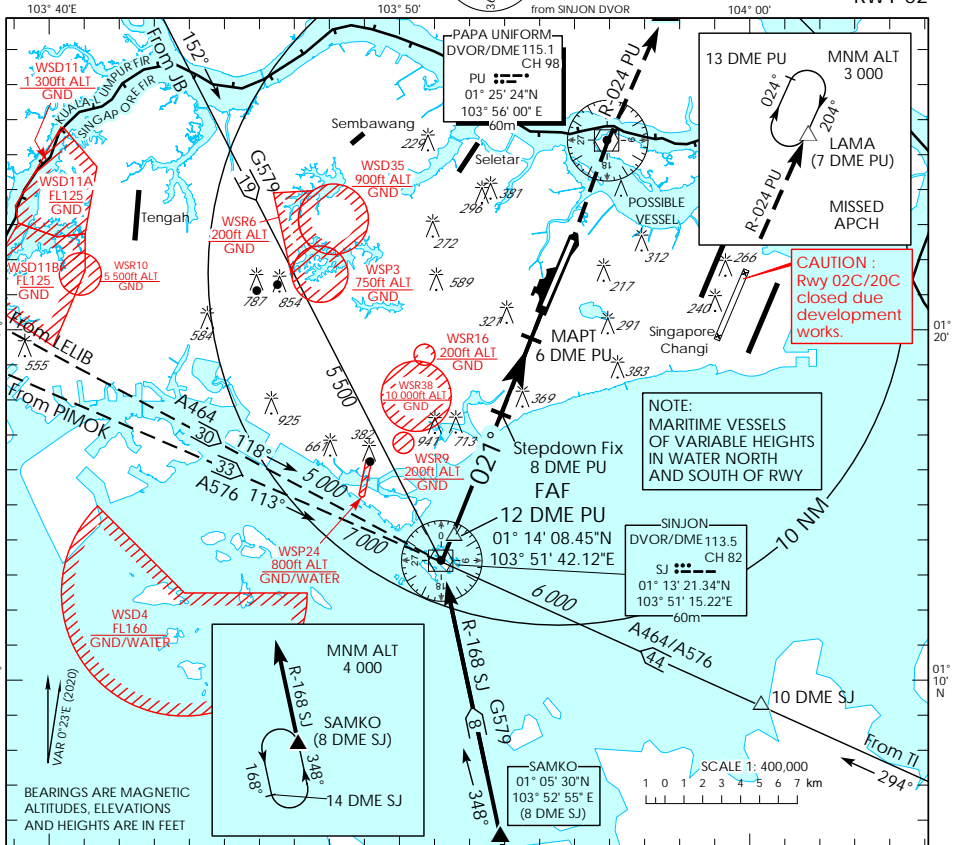
AERODROME ELEV 65ft
HEIGHT RELATED TO
THR RWY 02 - ELEV 43ft

APP 124.05
119.9
121.625
TWR 118.05

SINGAPORE/
PAYA LEBAR
PU DVOR/DME
RWY 02




MSA 25 NM
from SINJON DVOR

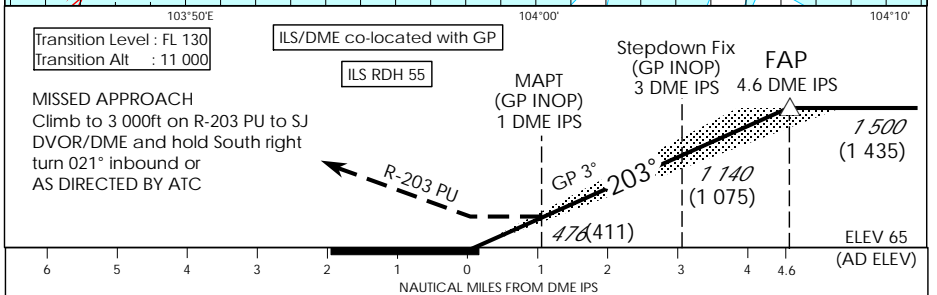
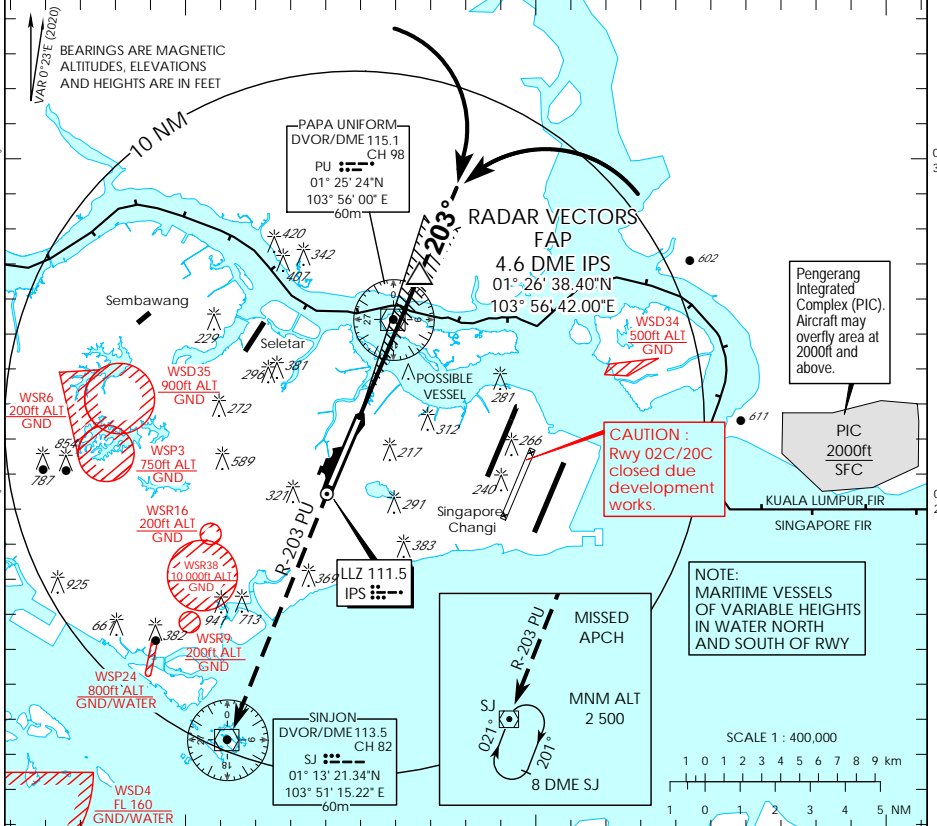


| OCA (OCH) | | | | | |
|------------------------------------|---------------|-------------|-------------|-------------|-----------|
| Category of Aircraft | A | B | C | D | |
| Straight-in (with stepdown fix) | 610 (567) | | | | |
| Straight-in (without stepdown fix) | 1 130 (1 087) | | | | |
| Distance | 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 : 09 | 2 : 24 | 1 : 57 |
| Rate of descent/GS | ft/min | 370 | 635 | 795 | 980 |

PAGE INTENTIONALLY LEFT BLANK

| | | | |
|---|---|--|---|
| INSTRUMENT APPROACH CHART - ICAO | AERODROME ELEV 65ft HEIGHT RELATED TO THR RWY 20 - 65ft | 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 IPS ILS/DME RWY 20



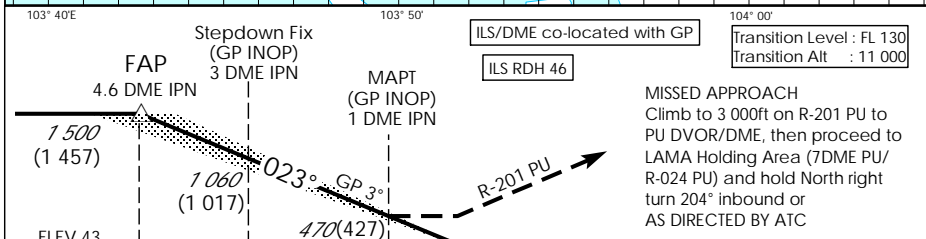
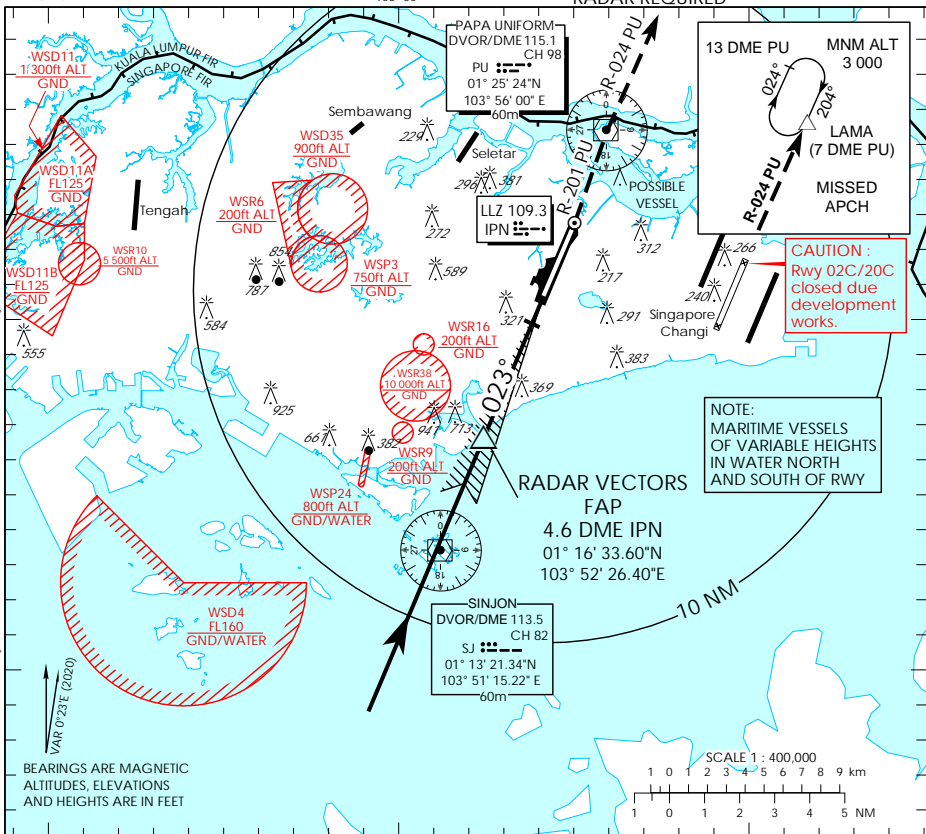
| OCA (OCH) | | | | | |
|----------------------|-------------|-------------|-----------|-----------|-----------|
| Category of Aircraft | A | B | C | D | |
| Straight-in | CAT I ILS | 194 (129) | 204 (139) | 214 (149) | 224 (159) |
| | GP INOP | 476 (411) | | | |
| Distance | 4 DME | 3 DME | 2 DME | | |
| 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 |

PAGE INTENTIONALLY LEFT BLANK

INSTRUMENT APPROACH CHART - ICAO
 AERODROME ELEV 65ft
 HEIGHT RELATED TO THR RWY 02 - ELEV 43ft
 MSA 25 NM from PAPA UNIFORM DVOR
 103° 40'E 103° 50' 104° 00'

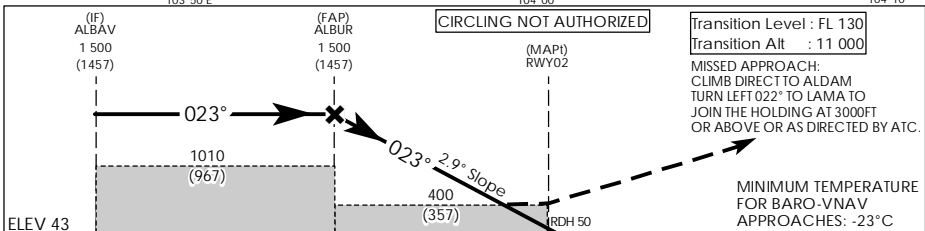
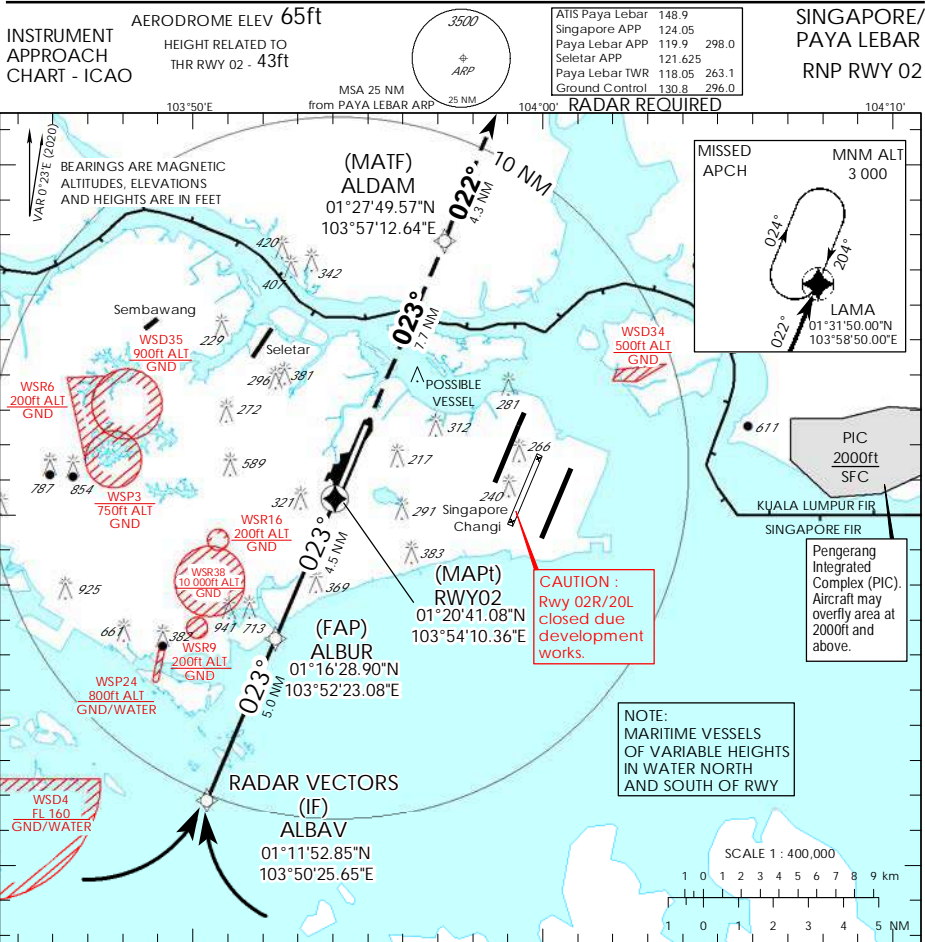
ATIS Paya Lebar 148.9
 Singapore APP 124.05
 Paya Lebar APP 119.9 298.0
 Seletar APP 121.625
 Paya Lebar TWR 118.05 263.1
 Ground Control 130.8 296.0

SINGAPORE/
 PAYA LEBAR
 IPN ILS/DME
 RWY 02



| 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 |

PAGE INTENTIONALLY LEFT BLANK



| 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 |

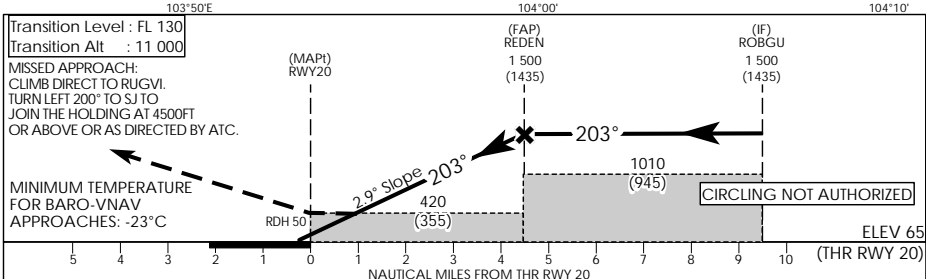
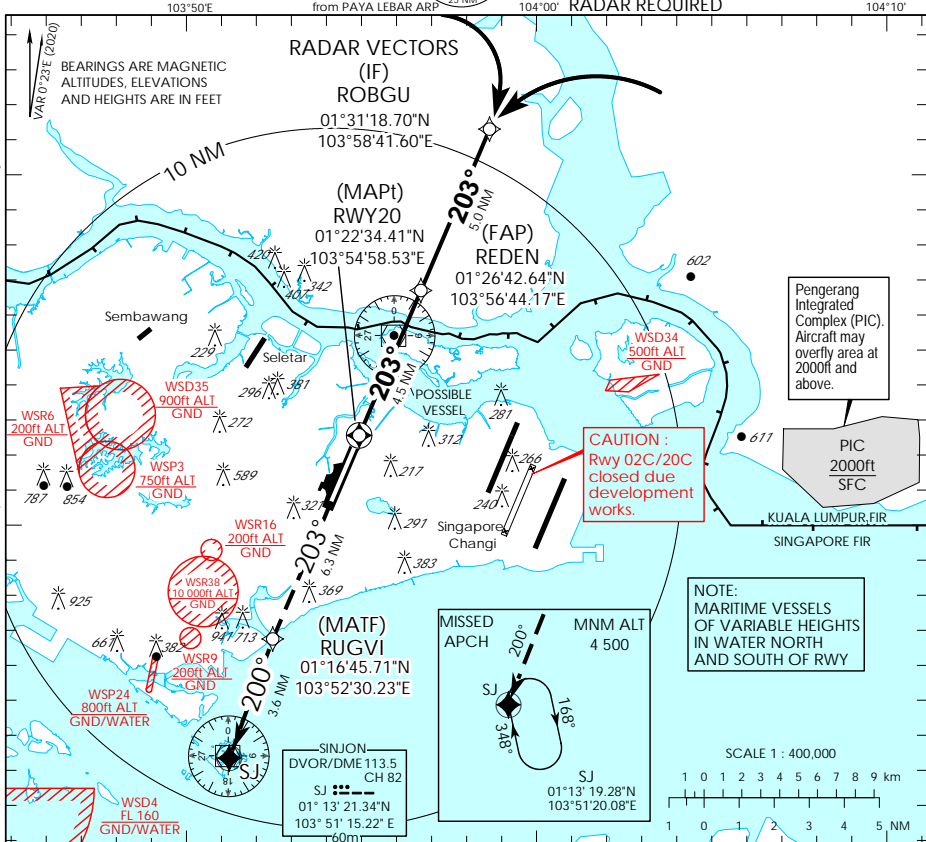
PAGE INTENTIONALLY LEFT BLANK

INSTRUMENT APPROACH CHART - ICAO
AERODROME ELEV 65ft
 HEIGHT RELATED TO
 THR RWY 20 - 65ft



| | |
|-----------------|--------------|
| ATIS Paya Lebar | 148.9 |
| Singapore APP | 124.05 |
| Paya Lebar APP | 119.9 298.0 |
| Seletar APP | 121.625 |
| Paya Lebar TWR | 118.05 263.1 |
| Ground Control | 130.8 296.0 |

**SINGAPORE/
PAYA LEBAR**
RNP RWY 20



| Category of Aircraft | OCA (OCH) | | | | |
|----------------------|----------------|-------------|-----------|------------|---------------|
| | 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 |

PAGE INTENTIONALLY LEFT BLANK

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 | <i>ARP coordinates and site at AD</i> | 012315.40N 1034229.80E |
| 2 | <i>Direction and distance from (city)</i> | - |
| 3 | <i>Elevation/Reference temperature</i> | 15.24M (50ft) / 31.5°C |
| 4 | <i>MAG VAR</i> | 0°23' E(2020) |
| 5 | <i>AD Administration, address, telephone, telefax, telex, AFS</i> | RSAF TENGAH AIRBASE CHOA CHU KANG ROAD SINGAPORE 669638 Telephone: (65)67612222 AFS : WSATYWYX |
| 6 | <i>Types of traffic permitted</i> | IFR |
| 7 | <i>Remarks</i> | Emergency Diversion Aerodrome for Singapore Changi Airport (see page WSAT AD 2-7) |

WSAT AD 2.3 OPERATIONAL HOURS

| | | |
|---|---------------------------------|---|
| 1 | <i>Aerodrome Administration</i> | 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 | <i>Customs and Immigration</i> | by prior arrangement |
| 3 | <i>Health and Sanitation</i> | by prior arrangement |
| 4 | <i>AIS Briefing Office</i> | - |
| 5 | <i>ATS Reporting Office</i> | - |
| 6 | <i>MET Briefing Office</i> | - |
| 7 | <i>Air Traffic Services</i> | - |
| 8 | <i>Remarks</i> | - |

WSAT AD 2.4 HANDLING SERVICES AND FACILITIES

| | | |
|---|--|---|
| 1 | <i>Cargo Handling Facilities</i> | - |
| 2 | <i>Fuel / Oil Types</i> | JET A1, F3 |
| 3 | <i>Fuelling Facilities / Capacity</i> | 2300-1100 SUN/MON to THU/FRI; Public holidays & outside OPR HR PPR from RSAF HQ via Tengah Operations. |
| 4 | <i>Hangar space for visiting aircraft</i> | - |
| 5 | <i>Repair facilities for visiting aircraft</i> | - |
| 6 | <i>Remarks</i> | Nil |

WSAT AD 2.5 PASSENGER FACILITIES

| | | |
|---|-----------------------------|-----|
| 1 | <i>Hotels</i> | - |
| 2 | <i>Restaurants</i> | - |
| 3 | <i>Transportation</i> | - |
| 4 | <i>Medical Facilities</i> | - |
| 5 | <i>Bank and Post Office</i> | - |
| 6 | <i>Tourist Office</i> | - |
| 7 | <i>Remarks</i> | Nil |

WSAT AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

| | | |
|---|--|--|
| 1 | <i>AD category for fire fighting</i> | CAT8 |
| 2 | <i>Rescue equipment</i> | Adequately provided as recommended by ICAO |
| 3 | <i>Capability for removal of disabled aircraft</i> | Sufficient salvage equipment provided by Airfield Ground Services section at Military bases. |
| 4 | <i>Remarks</i> | 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 | <i>Apron surface and strength</i> | - |
| 2 | <i>Taxiway width, surface and strength</i> | Strength : LCN80 (Taxiway E) Surface : Asphalt |
| 3 | <i>Remarks</i> | Nil |

WSAT AD 2.10 AERODROME OBSTACLES

| <i>In approach / TKOF areas</i> | <i>In circling area and at aerodrome</i> |
|--|--|
| <p><u>RWY 18/36 APCH / TKOF Areas</u> ILS LLZ co-located with LLZ antenna, HGT 21m AGL, 004 degrees MAG 260m from THR RWY 18</p> <p>ILS LLZ co-located with LLZ antenna, HGT 15m AGL, 184 degrees MAG 290m from THR RWY 36</p> | <p>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.</p> <p>PAR hut co-located with GP antenna mast, HGT 16m AGL, 074 degrees MAG, 100m from WSAT ARP.</p> <p>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.</p> <p>1 Monopole located at 012432N 1034035E, HGT 117.5m AMSL, 304 degrees MAG, 4255m from WSAT ARP.</p> <p>1 Lightning rod located at 012135N 1034425E, HGT 64.04m AMSL, 131 degrees MAG, 4719m from WSAT ARP.</p> <p>1 Lightning rod located at 012133N 1034426E, HGT 64.17m AMSL, 131 degrees MAG, 4783m from WSAT ARP.</p> <p>2 Lightning rod located at 012051N 1034419E, HGT 60.23m AMSL, 142 degrees MAG, 5591m from WSAT ARP.</p> |

WSAT AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

| <i>Designation RWY NR</i> | <i>TRUE & MAG BRG</i> | <i>Dimensions of RWY (m)</i> | <i>Strength (PCN) and surface of RWY and SWY</i> | <i>THR coordinates</i> | <i>THR elevation and highest elevation of TDZ of precision APCH RWY</i> |
|-------------------------------|-------------------------------|----------------------------------|--|----------------------------|---|
| 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 | <i>Remarks</i> | <ul style="list-style-type: none"> 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

| <i>RWY Designator</i> | <i>TORA (m)</i> | <i>TODA (m)</i> | <i>ASDA (m)</i> | <i>LDA (m)</i> | <i>Remarks</i> |
|---------------------------|---------------------|---------------------|---------------------|--------------------|----------------|
| 1 | 2 | 3 | 4 | 5 | 6 |
| 18 | 2743 | 3115 | 2743 | 2743 | Nil |
| 36 | 2743 | 3030 | 2743 | 2743 | Nil |

WSAT AD 2.14 APPROACH AND RUNWAY LIGHTING

| <i>RWY</i> | <i>APCH LGT Type, LEN INTST</i> | <i>THR LGT colour WBAR</i> | <i>VASIS (MEHT) PAPI</i> | <i>TDZ LGT LEN</i> | <i>RCL LGT, LEN, spacing, colour, INTST</i> | <i>RWY edge LGT, LEN, spacing, colour, INTST</i> | <i>RWY End LGT, colour WBAR</i> | <i>SWY LGT, LEN colour</i> | <i>Remarks</i> |
|------------|--|----------------------------|--|--------------------|---|--|---------------------------------|----------------------------|-------------------------------------|
| 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

| | |
|---------------------|---|
| <i>TWY Lighting</i> | blue edge lights |
| <i>IBN</i> | 012400N 1034254E, FLG R 'TN', operating hours HN and IMC. |
| <i>Remarks</i> | WDI lighted. Dispersal area floodlights |

WSAT AD 2.17 ATS AIRSPACE

| | | |
|---|---------------------------------------|--|
| 1 | <i>Designation and Lateral Limits</i> | 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 | <i>Vertical Limits</i> | SFC to 3000 FT ALT |
| 3 | <i>Airspace Classification</i> | D |
| 4 | <i>ATS Unit Callsign Language(s)</i> | TENGAH APPROACH English |
| 5 | <i>Transition altitude</i> | 11000 FT (3,350m) |
| 6 | <i>Remarks</i> | Controlling Authority: Tengah Approach During Aerodrome operating hours: Contact Tengah APP on 130.0 MHz, 263.4 MHz or 122.0 MHz Outside Aerodrome operating hours: Contact SATCC (RSAF element) on 123.4MHz or 288.2MHz |

WSAT AD 2.18 ATS COMMUNICATION FACILITIES

| <i>Service designation</i> | <i>Call sign</i> | <i>Frequency P - Primary S - Secondary</i> | <i>Hours of operation</i> | <i>Remarks</i> |
|----------------------------|-------------------|--|---|---|
| APP | TENGAH APPROACH | P130.0 MHz P263.4 MHz S122.0 MHz | BTN 2300-1100 SUN/MON to THU/FRI; and | Nil |
| TWR | TENGAH TOWER | P122.0 MHz P282.5 MHz S263.4 MHz | On SUN, Public holidays and outside the above times, PPR from RSAF HQ via Tengah Ops. | |
| | TENGAH GROUND | 122.0 MHz 337.8 MHz | | |
| | TENGAH TALKDOWN | 130.0 MHz 290.8 MHz 328.5 MHz | | |
| Flight Information Service | SINGAPORE RADAR | 119.1 MHz | H24 | Nil |
| 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, L762, M630 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), 045224N 1041442E (ENREP), 045000N 1034400E, thence north along the Singapore FIR boundary to 070000N 1080000E at or above FL290. |

| <i>Service designation</i> | <i>Call sign</i> | <i>Frequency P - Primary S - Secondary</i> | <i>Hours of operation</i> | <i>Remarks</i> |
|----------------------------|--------------------|--|---------------------------|--|
| 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 | | | | | |
|-----------------------------------|--------------|--------------------|---|---------------------------|--|
| <i>Type of Aid</i> | <i>IDENT</i> | <i>FREQ</i> | <i>OPR Hour</i> | <i>Coordinates</i> | <i>Remarks</i> |
| TACAN | TNG | CH86X | 2300-1100 from SUN/MON to THU/FRI; SUN, Public holidays and outside the above times prior permission required from RSAF HQ via Tengah Operations. | 012336.00N 1034242.00E | 043° MAG 0.55km from ARP Maint Period: 0001-0900 second SAT of EV month |
| SINJON DVOR/DME | SJ | 113.5 MHz CH82X | H24 | 011321.34N 1035115.22E | 201° MAG 14.5km from THR RWY 02 (Paya Lebar) Antenna HGT: 194ft AMSL. Coverage 200NM Maint Period: 0200-0600 third THU of EV month |
| ILS LLZ RWY 36 | ITN | 108.1 MHz | H24 | 012408.43N 1034234.34E | Located 260m from THR RWY 18 along centreline of RWY. Course width 3° |
| ILS GP RWY 36 | - | 334.7 MHz | H24 | 012240.84N 1034231.01E | GP antenna 3° |
| ILS DME RWY 36 | ITN | CH18X | H24 | 012241.02N 1034226.67E | DME co-located with GP |

WSAT AD 2.20 LOCAL TRAFFIC REGULATIONS - USE OF RSAF TENGAH AIR BASE AS AN EMERGENCY DIVERSION AERODROME FOR SINGAPORE CHANGI AIRPORT

1 INTRODUCTION

- 1.1 RSAF Tengah Air Base is nominated as the emergency diversionary aerodrome for Singapore Changi Airport. The arrangement outlined below is applicable for the handling of any civil aircraft movement that is diverted to RSAF Tengah Air Base.
- 1.2 It is emphasised that RSAF Tengah Air Base **is not an ICAO designated alternate aerodrome for Singapore Changi Airport** and therefore should not be flight planned as such. Its use by civil aircraft is permitted for emergency purposes only when Singapore Changi Airport runway is obstructed.

2 MANNING OF TENGAH AIR BASE

- 2.1 Tengah Air Base is open from 2300-1100 SUN/MON to THU/FRI. It is closed on SAT, SUN and public holidays. Outside the above stipulated operating hours, Tengah Air Base can be opened on 2 hours' prior notice. This arrangement, if necessary, will be undertaken by the Duty Tower Controller or SATCC Watch Manager of Singapore Changi Airport who will inform RSAF Headquarters via Tengah Ops.
- 2.2 Airline operators are requested to inform the Airport Manager and the Duty Tower Controller or SATCC Watch Manager at Singapore Changi Airport as soon as it is known that their service will require the use of Tengah Air Base. Revised ETAs/ETDs are to be notified as soon as known.

3 OPERATIONAL SERVICES

- 3.1 The layout of Tengah Airbase with the aircraft parking apron which is available for the use of civil aircraft (except B747 aircraft types) in the event of an emergency diversion from Singapore Changi Airport, is indicated in page WSAT AD 2-11. It is to be noted that only a limited number of civil aircraft can be accommodated at any one time.
- 3.2 Air-ground-air communication maintained by RSAF Tengah Tower/APP for AD Control Services is VHF 122.0MHz.

4 PASSENGER CLEARANCE

- 4.1 Once the aircraft has shutdown, only the Captain of the aircraft will be allowed out of the aircraft. All other passengers will remain in the aircraft due to space constraints and to avoid possible immigration problems.
- 4.2 Arrangements will be made to transport all the passengers back to Singapore Changi Airport for immigration processing.
- 4.3 The Airport Manager or his representative will be present at the Passenger Terminal to provide assistance when aircraft are required to land at Tengah Air Base.
- 4.4 No refreshment facilities are available.

5 SECURITY

- 5.1 All Airline personnel who are required to proceed to Tengah Air Base must wear their Singapore Changi Airport Passes at a prominent position and they will be escorted to the respective areas. All personnel not in possession of the laminated pass except Customs and Government Officers in uniform will be denied entry into Tengah Air Base by the RSAF Security Guard. Entry into the Air Base by both the airline personnel and service equipment is via the main gate. The Airline Engineering Coordinator shall be responsible for the proper positioning of the ground servicing equipment and vehicles in the Apron Area where arriving aircraft are to be parked.
- 5.2 No equipment, vehicles, stores, cargo or mail shall be left overnight at Tengah Air Base.
- 5.3 The security of civil aircraft parked in the Apron is the responsibility of the aircraft owner and any security service obtained shall first be cleared with the Tengah Air Base Security Authorities.

6 AIRCRAFT STAND ALLOCATION

- 6.1 Aircraft parking positions will be issued by the RSAF Tower Controller. A "follow-me" vehicle will be waiting at the accesses to guide the aircraft to the allocated parking stands.

7 COMMUNICATIONS

- 7.1 No VHF RTF surface movement frequency is available at Tengah Tower. Communication with the Tower will be by telephone, the nearest of which is in the Fire Station Building in front of the aircraft parking apron.

8 FUEL

8.1 Fuel available JET A1 F3X.

9 AIRCRAFT SERVICES

9.1 Airlines will have to provide their own services. Limited aircraft services can be obtained from the Aircraft Maintenance Unit by prior arrangement only.

9.2 Where essential facilities and services are not available at Tengah Air Base, such as the disposal of toilet waste or refuse, the resources available at Singapore Changi Airport shall be used.

10 RESCUE AND FIRE FIGHTING FACILITIES

10.1 The rescue and fire fighting facilities available at Tengah Airbase is up to ICAO CAT 8.

11 FULL EMERGENCY/CRASH PROCEDURE

11.1 In the event of a Full Emergency being declared on a civil aircraft diverted to Tengah Air Base, Full Emergency/Crash Procedures applicable to Singapore Changi Airport will equally apply to Tengah Air Base.

11.2 Alerting of all outside organisations such as the Singapore Civil Defence Force, Police, MINDEF and ambulance services shall be carried out by the Singapore Changi Airport Tower Controller.

11.3 The assembly point for all units attending to the Full Emergency incident will be at the Fire Station. No casualty clearance station is available at Tengah Air Base and in the event of an aircraft crash occurring, casualties if any, will be transported directly from the scene of crash to the Singapore General Hospital.

12 ATC SERVICE OUTSIDE OPERATING HOURS

12.1 Normal radar service will be provided by Singapore Radar (Civil). All aircraft diverting to Tengah will be vectored by Approach Control to SJ or to an agreed transfer control point before they are handed over to Tengah Tower. No radar service will be provided by Tengah.

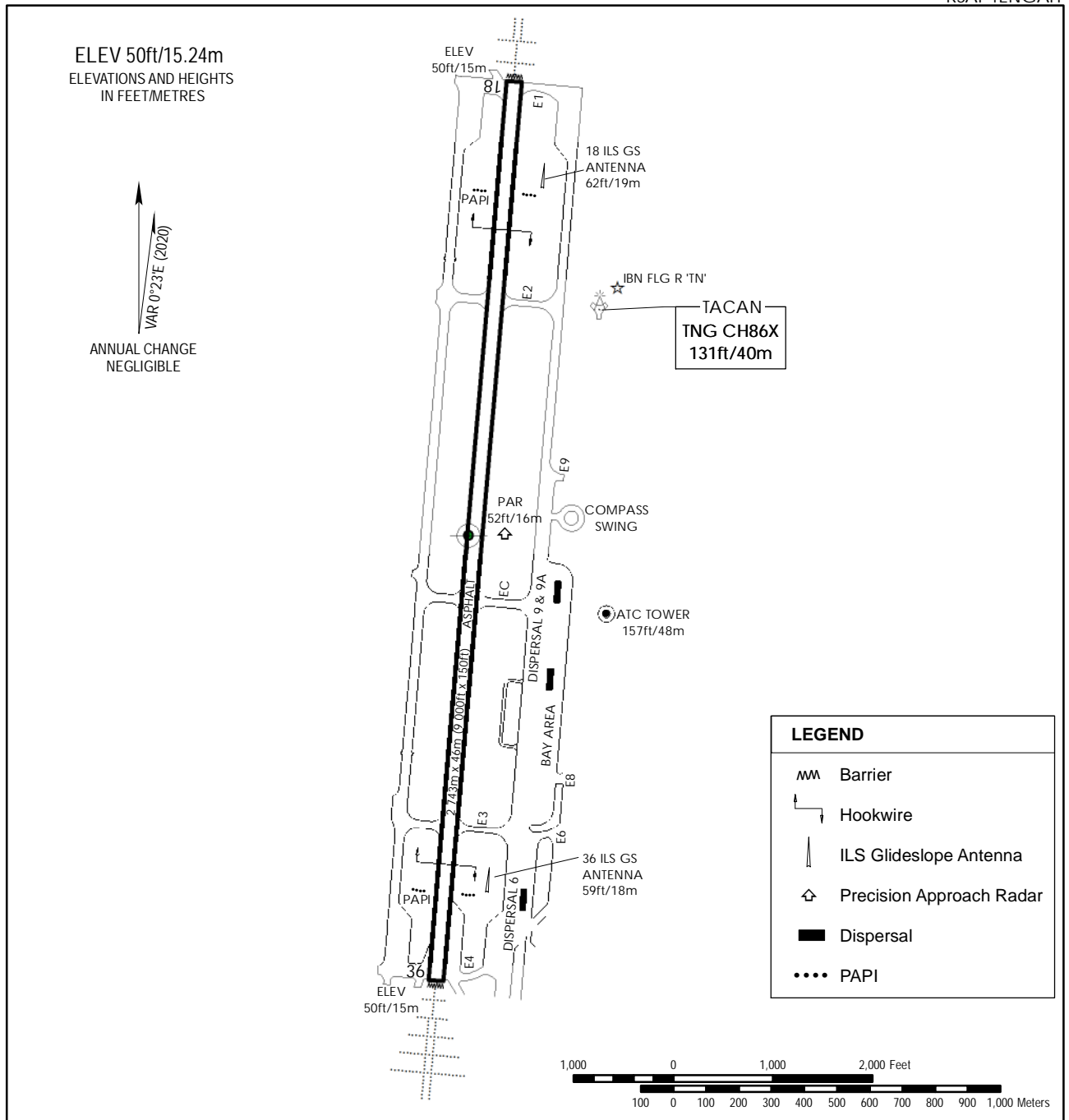
WSAT AD 2.24 CHARTS RELATED TO AN AERODROME

AERODROME CHART - TENGAH [AD-2-WSAT-ADC-1](#)

AERODROME CHART - TENGAH

01°23'15.40"N 103°42'29.80"E

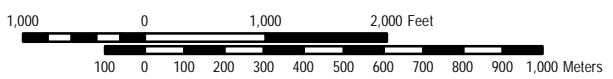
RSAF TENGAH



ELEV 50ft/15.24m
ELEVATIONS AND HEIGHTS
IN FEET/METRES

VAR 0°23'E (2020)
ANNUAL CHANGE
NEGLECTIBLE

| LEGEND | |
|--------|--------------------------|
| | Barrier |
| | Hookwire |
| | ILS Glideslope Antenna |
| | Precision Approach Radar |
| | Dispersal |
| | PAPI |



| AERODROME LIGHTING | CAUTION |
|--|---|
| <p>APPROACH LIGHTING :</p> <p>Approach RWY 18 High intensity white centre line and 2 bars.</p> <p>Approach RWY 36 High intensity white centre line and 5 bars.</p> <p>RWY 18/36 Sequenced flashing lights.</p> <p>RUNWAY LIGHTING :</p> <p>RWY 18/36 High intensity omni-directional white edge lights. Green THR lights. Red RWY end lights.</p> <p>Ident Beacon TN coding in RED.</p> <p>Taxiway Blue edge lights. Green centreline lights.</p> <p>Dispersal Blue edge lights. Floodlights</p> <p>Illuminated distance to run marker boards.</p> | <ol style="list-style-type: none"> RWY lights 0.3m out from RWY edge. All circuits east of aerodrome within 3NM up to 1 500ft (457m). RWY 36 - Right hand circuit. Two masts, height 6m, located on the eastern shoulders : <ol style="list-style-type: none"> Runway 36 - 233m from threshold, 100m from runway centre line. Runway 18 - 273m from threshold, 100m from runway centre line. <p>Obstacles lit at night. Helicopters operating in Helizone are to exercise extreme caution.</p> |

PAGE INTENTIONALLY LEFT BLANK

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 | <i>ARP coordinates and site at AD</i> | 012536N 1034858E |
| 2 | <i>Elevation/Reference temperature</i> | 25.82M (86ft) / 31.5° C |
| 3 | <i>MAG VAR</i> | 0°23' E (2020) |
| 4 | <i>Ad Administration, address, telephone, telefax, telex, AFS</i> | RSAF Sembawang Airbase, Sembawang Road, SINGAPORE TEL: (65)67508036 (Base Operations Centre) AFS: WSAGYWYX |
| 5 | <i>Types of traffic permitted</i> | VFR only |
| 6 | <i>Remarks</i> | Operator: Republic of Singapore Air Force. AD for helicopter use only. |

WSAG AD 2.3 OPERATIONAL HOURS

| | | |
|---|---------------------------------|--|
| 1 | <i>Aerodrome Administration</i> | 2300-1100 SUN/MON to THU/FRI, 2300-0500 FRI/SAT. Prior permission required on SUN and Public holidays. |
| 2 | <i>MET Briefing Office</i> | H24 |
| 3 | <i>Air Traffic Services</i> | H24 |
| 4 | <i>Remarks</i> | Nil |

WSAG AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

| | | |
|---|--|--|
| 1 | <i>AD category for fire fighting</i> | CAT 4 |
| 2 | <i>Rescue equipment</i> | Adequately provided as recommended by ICAO |
| 3 | <i>Capability for removal of disabled aircraft</i> | Sufficient salvage equipment provided by Airfield Ground Services section at Military Bases. |
| 4 | <i>Remarks</i> | 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 | <i>Apron surface and strength</i> | Strength: PCN 26 |
| 2 | <i>Taxiway width, surface and strength</i> | Strength: PCN 26 |
| 5 | <i>Remarks</i> | Nil |

WSAG AD 2.10 AERODROME OBSTACLES

| <i>In Approach / TKOF Areas</i> | <i>In Circling Area and at Aerodrome</i> |
|---|--|
| 6 tower cranes, HGT 128m, located at 012800N 1035000E (Sembawang Shipyard). Marked/Lighted. | Nil |

WSAG AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

| <i>RWY Designator</i> | <i>True and Magnetic Bearing</i> | <i>RWY Dimensions (m)</i> | <i>Strength and surface of RWY/ SWY</i> | <i>THR Coordinates</i> | <i>THR ELEV and highest ELEV of TDZ of Precision APCH RWY</i> |
|-----------------------|----------------------------------|---------------------------|---|------------------------|---|
| 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

| <i>RWY Designator</i> | <i>TORA (m)</i> | <i>TODA (m)</i> | <i>ASDA (m)</i> | <i>LDA (m)</i> | <i>Remarks</i> |
|-----------------------|-----------------|-----------------|-----------------|----------------|----------------|
| 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 | <i>IBN</i> | 012500N 1034854E, FLG R 'AG', EV 20 SEC, OPR HR: HN and IMC |
| 2 | <i>WDI/Taxiway/Stopway</i> | Lighted |

WSAG AD 2.17 ATS AIRSPACE

| | | |
|---|---------------------------------------|--|
| 1 | <i>Designation and Lateral Limits</i> | 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 | <i>Vertical Limits</i> | SFC to 4 500ft ALT Maximum Usable ALT 4 000ft |
| 3 | <i>Airspace Classification</i> | D |
| 4 | <i>ATS unit Callsign Language(s)</i> | SEMBAWANG TOWER English |
| 5 | <i>Transition Altitude</i> | 11000 FT(3,350m) |
| 6 | <i>Remarks</i> | Controlling Authority: RSAF, Sembawang Air Base. Prior permission required for non-scheduled aircraft. Traffic Circuit: RWY 05 - left hand circuit Traffic Circuit: RWY 23 - right hand circuit Transit Channel: refer to chart on page ENR 3.5-3. |

WSAG AD 2.18 COMMUNICATION FACILITIES

| <i>Service designation</i> | <i>Call sign</i> | <i>Frequency</i> | <i>Hours of operation</i> | <i>Remarks</i> | |
|----------------------------|---------------------|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | |
| APP | PAYA LEBAR APPROACH | 127.7 MHz 255.8 MHz | BTN 2300-1100 SUN/MON to THU/FRI and BTN 2300-0500 FRI/SAT. Prior permission required on SUN and Public holidays | Nil | |
| TWR | SEMBAWANG TOWER | 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, L762, M630 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), 045224N 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. | |

WSAG AD 2.19 RADIO NAVIGATION AND LANDING AIDS

| <i>Type of Aid</i> | <i>IDENT</i> | <i>Frequency</i> | <i>OPR HR</i> | <i>Coordinates</i> | <i>Remarks</i> |
|--------------------|--------------|------------------|---------------|---------------------------|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| SEMBAWANG NDB | AG | 325 kHz | H24 | 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. |

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 | <i>Designation and Lateral Limits</i> | 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 | <i>Vertical Limits</i> | GND to 3000 FT ALT |
| 3 | <i>Airspace Classification</i> | C |
| 4 | <i>ATS Unit Call Sign Language (s)</i> | Johor Approach / Johor Tower English |
| 5 | <i>Transition Altitude</i> | 11,000ft (3,350m) |
| 6 | <i>Remarks</i> | Nil |

PAGE INTENTIONALLY LEFT BLANK

WIDD — BATAM/HANG NADIM (INDONESIA)

Note: The following sections in this chapter are intentionally left blank:

AD 2.2, AD 2.3, AD 2.4, AD 2.5, AD 2.6, AD 2.7, AD 2.8, AD 2.9, AD 2.10, AD 2.11, AD 2.12, AD 2.13, AD 2.14, AD 2.15, AD 2.16, AD 2.19, AD 2.20, AD 2.21, AD 2.22, AD 2.23.

WIDD AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WIDD — BATAM/HANG NADIM (INDONESIA)

WIDD AD 2.17 ATS AIRSPACE

| | | |
|---|---|---|
| 1 | <i>Designation and lateral limits</i> | BATAM ATZ 010018N 1035530E 005315N 1040335E 011305N 1042029E 012000N 1041224E |
| 2 | <i>Vertical limits</i> | SFC to 1,500ft MSL |
| 3 | <i>Airspace Classification</i> | C |
| 4 | <i>ATS unit call sign Language(s)</i> | HANG NADIM TOWER English |
| 5 | <i>Transition altitude</i> | 11000 FT (3,350m) |
| 6 | <i>Remarks</i> | <p>Controlling Authorities:</p> <ol style="list-style-type: none"> 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. Singapore Approach - Responsible for flights through Batam ATZ outside the operating hours of Hang Nadim Tower and when Batam Airport has closed down. <p>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.</p> <p><u>Missed Approach Procedures:</u></p> <p>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.</p> <p>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.</p> |

WIDD AD 2.18 ATS COMMUNICATION FACILITIES

| <i>Service designation</i> | <i>Call sign</i> | <i>Frequency</i> | <i>Hours of operation</i> | <i>Remarks</i> |
|----------------------------|--------------------|------------------|---------------------------|----------------|
| 1 | 2 | 3 | 4 | 5 |
| APP | SINGAPORE APPROACH | 120.3 MHz | H24 | Nil |

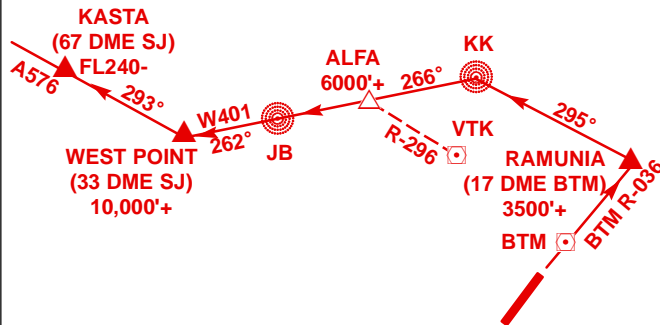
| <i>Service designation</i> | <i>Call sign</i> | <i>Frequency</i> | <i>Hours of operation</i> | <i>Remarks</i> |
|----------------------------|---------------------|--------------------------|---------------------------|--|
| 1 | 2 | 3 | 4 | 5 |
| TWR | HANG NADIM TOWER | 118.7 MHz 118.3 MHz * | H24 | * Secondary frequency. Operating Authority: Directorate-General of Civil Aviation, Indonesia. |

WIDD AD 2.24 CHARTS RELATED TO AN AERODROME

| | |
|--|----------------------------------|
| SID - RWY 04/22 West Point 2C/2D DEP, Kirda 1C/1D DEP | AD-2-WIDD-SID-1 |
| SID - RWY 04/22 Singkep 1C/1D DEP, Jitlim 2C/2D DEP | AD-2-WIDD-SID-2 |
| SID - RWY 04/22 Bobag 1C/1D DEP, Tekong 1C/1D DEP | AD-2-WIDD-SID-3 |
| SID - RWY 04/22 Tango India 1C/1D DEP, Hosba 1C/1D DEP | AD-2-WIDD-SID-4 |
| STAR - RWY 04/22 West Point 2C/2D ARR, Tango India 1C/1D ARR | AD-2-WIDD-STAR-1 |
| STAR - RWY 04/22 Singkep 1C/1D ARR, Jitlim 1C/1D ARR | AD-2-WIDD-STAR-2 |
| STAR - RWY 04/22 Bobag 1C/1D ARR, Tekong 1C/1D ARR | AD-2-WIDD-STAR-3 |
| STAR - RWY 04/22 Pardi 1C/1D ARR, Hosba 1C/1D ARR | AD-2-WIDD-STAR-4 |

BATAM AIRPORT - RUNWAY 04 AND 22
STANDARD INSTRUMENT DEPARTURE (SID)

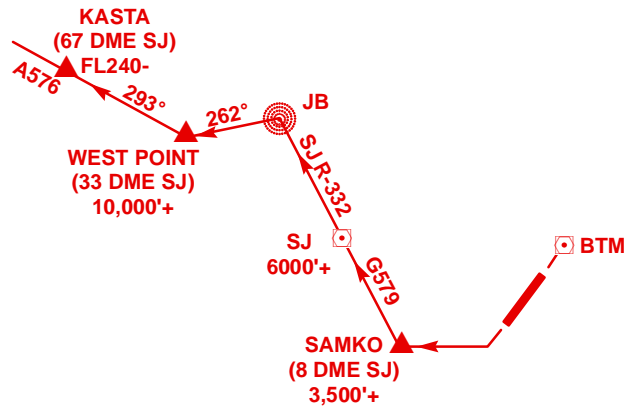
RUNWAY 04



**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.

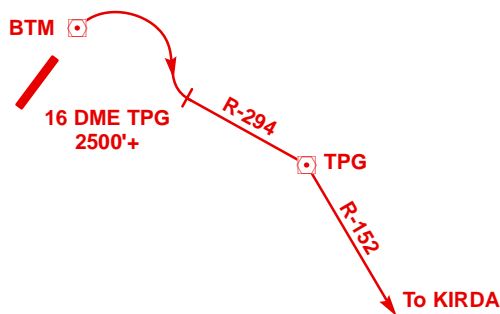
RUNWAY 22



**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 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.

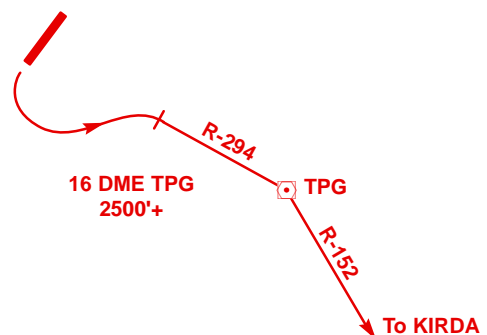
RUNWAY 04



**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



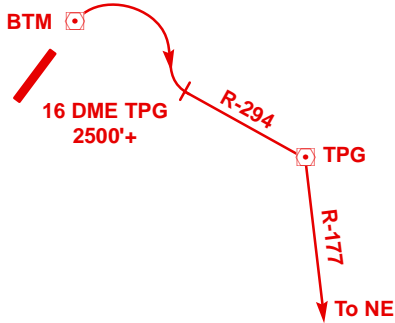
**KIRDA 1C DEP (EASTBOUND)
(TO PANGKAL PINANG/JAKARTA)**

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.

PAGE INTENTIONALLY LEFT BLANK

BATAM AIRPORT - RUNWAY 04 AND 22 STANDARD INSTRUMENT DEPARTURE (SID)

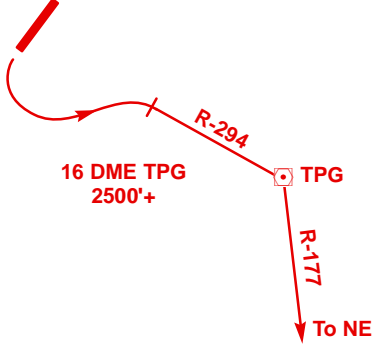
RUNWAY 04



**SINGKEP 1C DEP (WHISKEY 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).

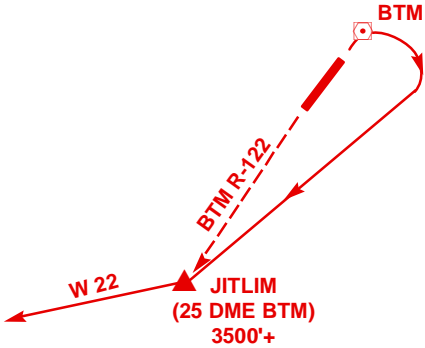
RUNWAY 22



**SINGKEP 1D DEP (WHISKEY 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).

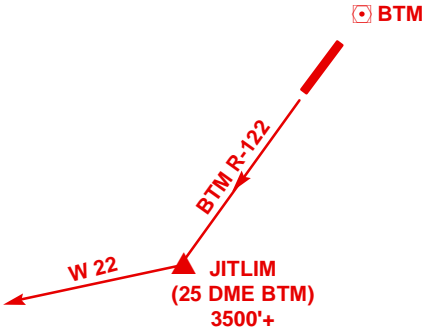
RUNWAY 04



**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



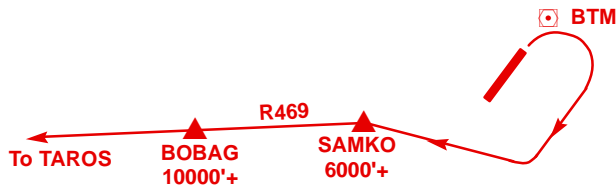
**JITLIM 2D DEP (WHISKEY 22 WESTBOUND)
(TO PEKANBARU)**

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.

PAGE INTENTIONALLY LEFT BLANK

BATAM AIRPORT - RUNWAY 04 AND 22
STANDARD INSTRUMENT DEPARTURE (SID)

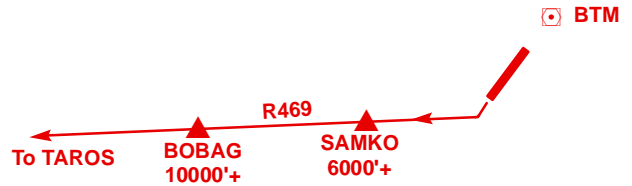
RUNWAY 04



**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.

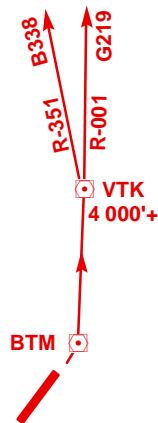
RUNWAY 22



**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.

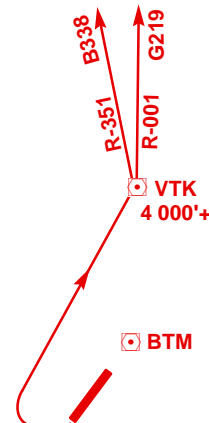
RUNWAY 04



**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.

PAGE INTENTIONALLY LEFT BLANK

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

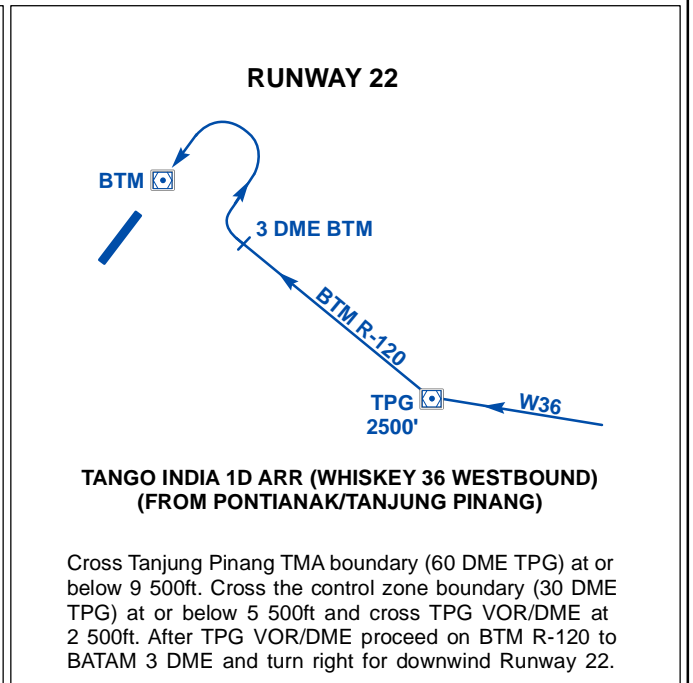
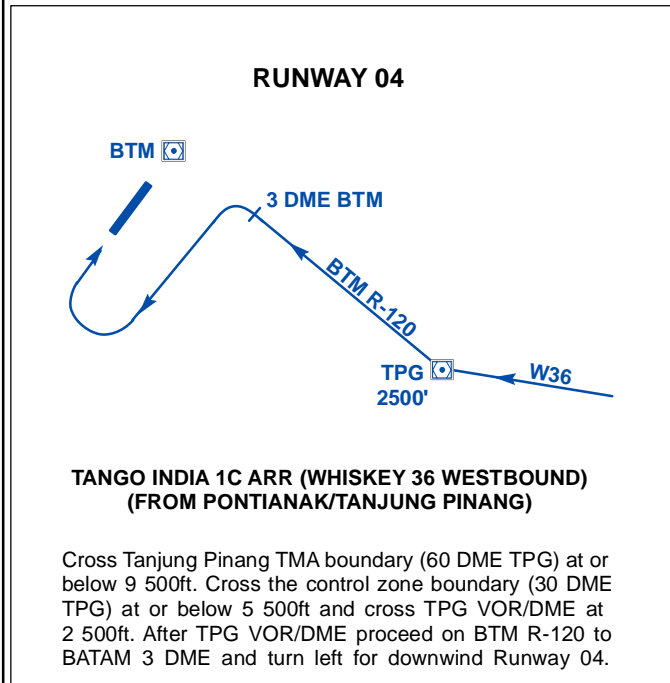
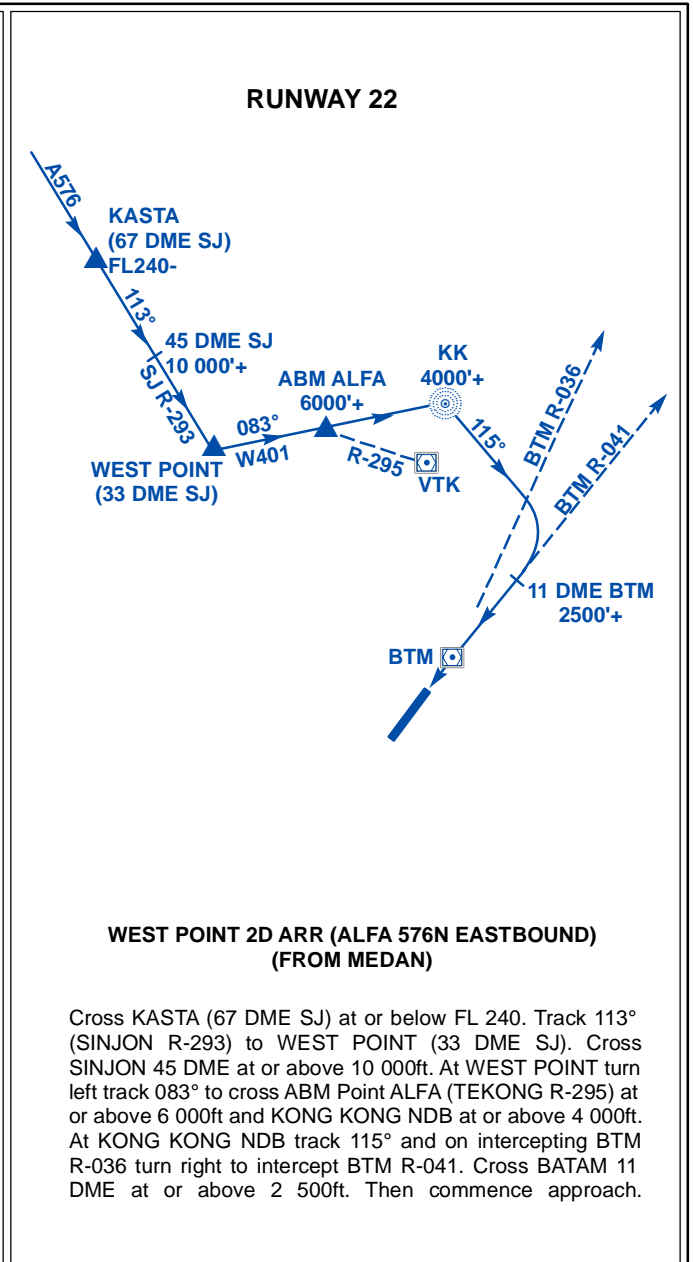
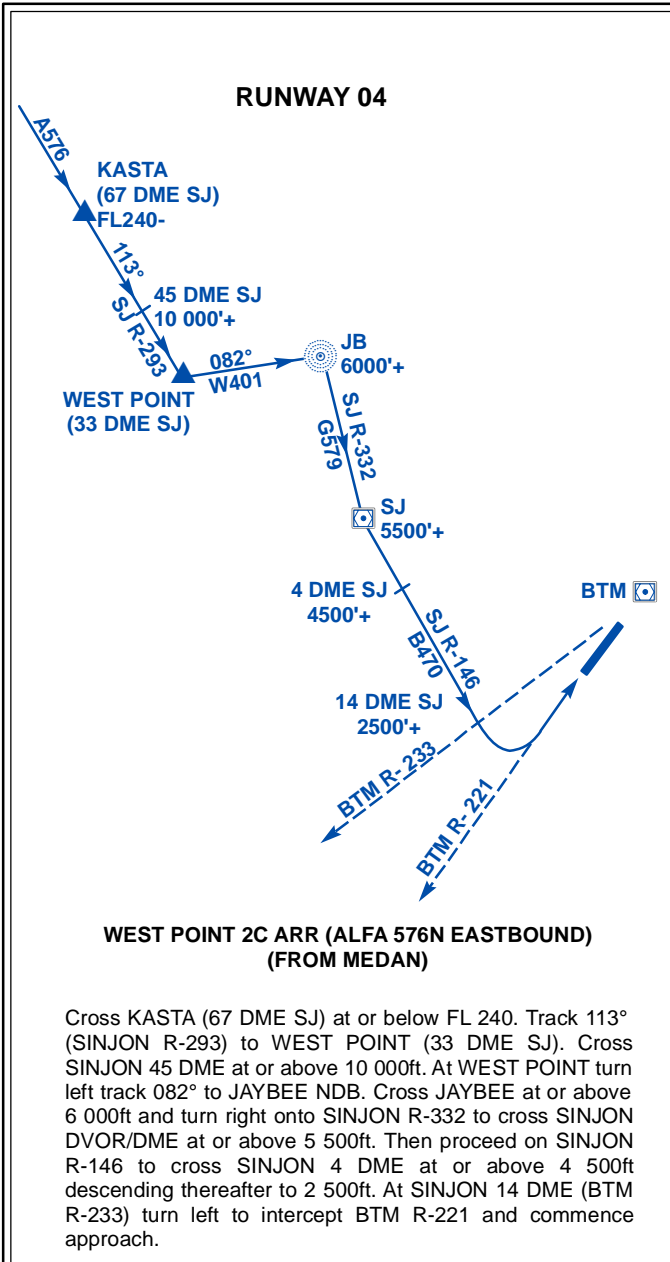
**HOSBA 1D DEP (GOLF 580 EASTBOUND)
(TO MATAK/RANAI)**

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.

PAGE INTENTIONALLY LEFT BLANK

BATAM AIRPORT - RUNWAY 04 AND 22
STANDARD INSTRUMENT ARRIVAL (STAR)



PAGE INTENTIONALLY LEFT BLANK

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.

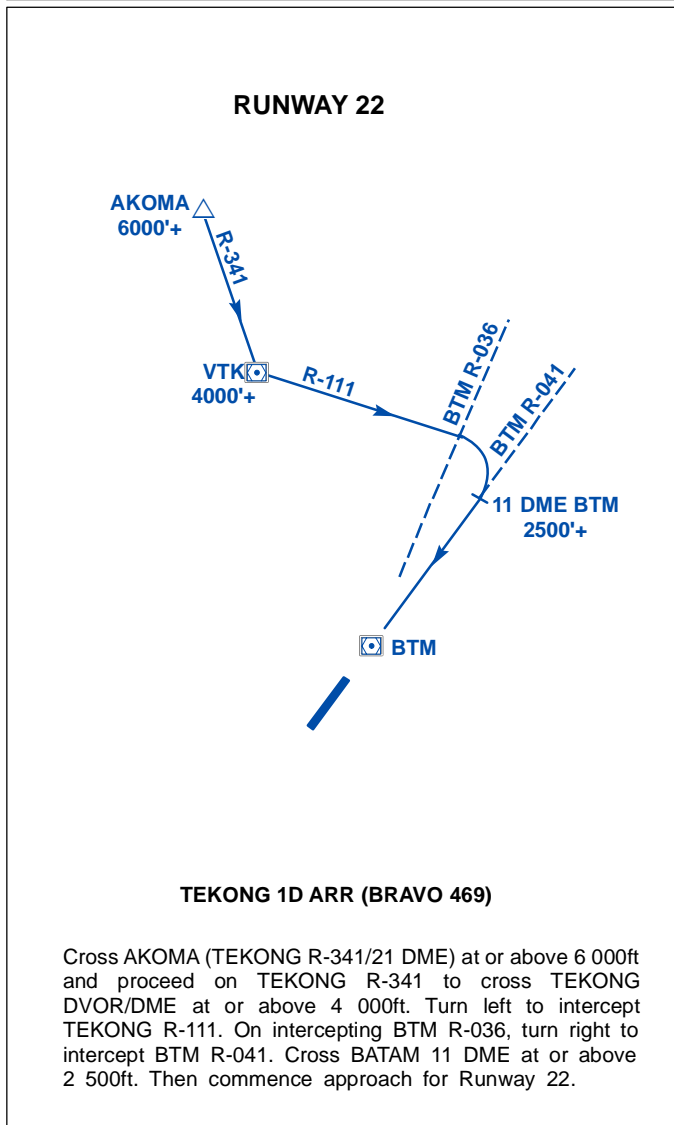
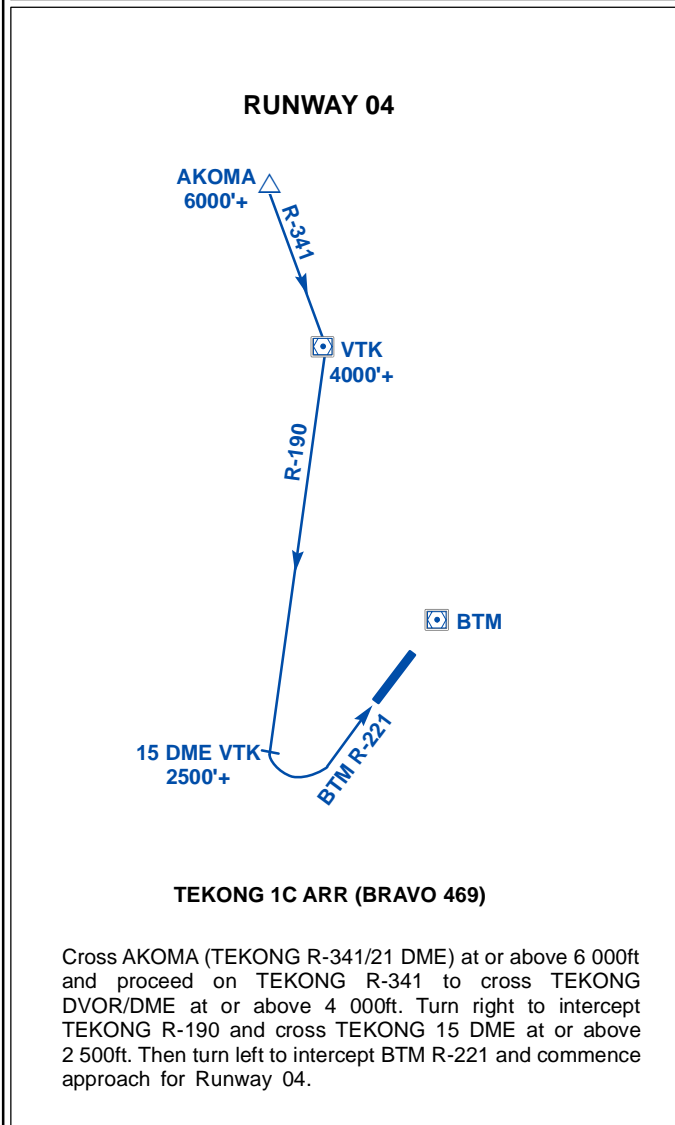
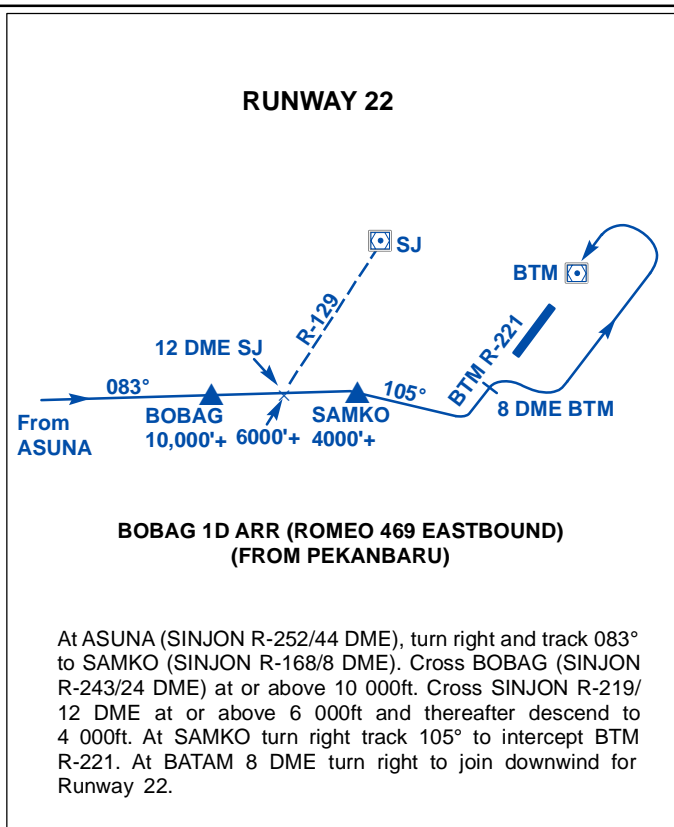
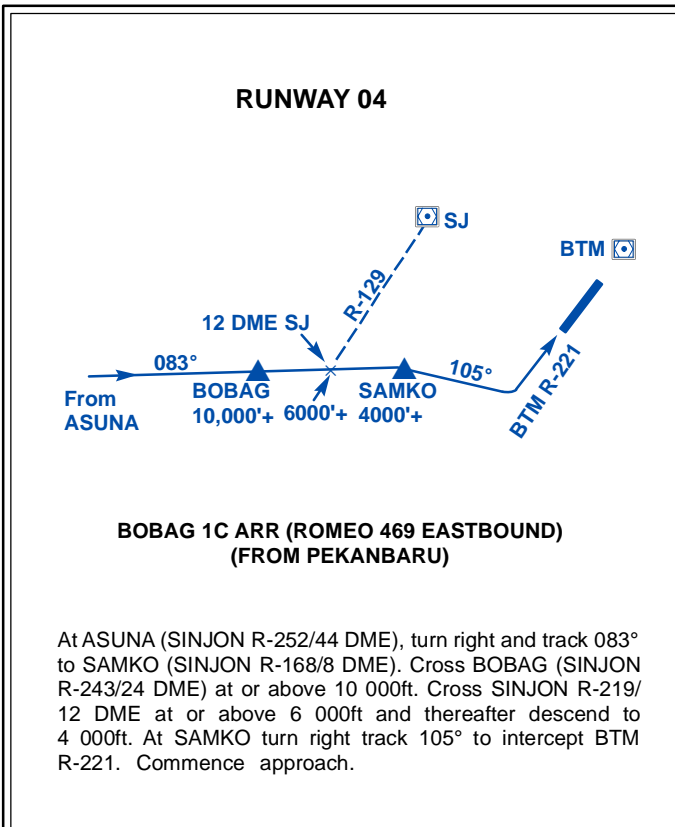
RUNWAY 22

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.

PAGE INTENTIONALLY LEFT BLANK

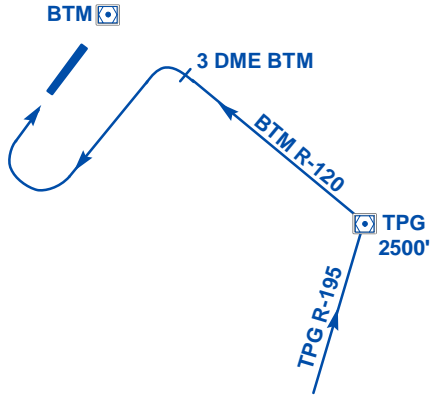
BATAM AIRPORT - RUNWAY 04 AND 22
STANDARD INSTRUMENT ARRIVAL (STAR)



PAGE INTENTIONALLY LEFT BLANK

BATAM AIRPORT - RUNWAY 04 AND 22
STANDARD INSTRUMENT ARRIVAL (STAR)

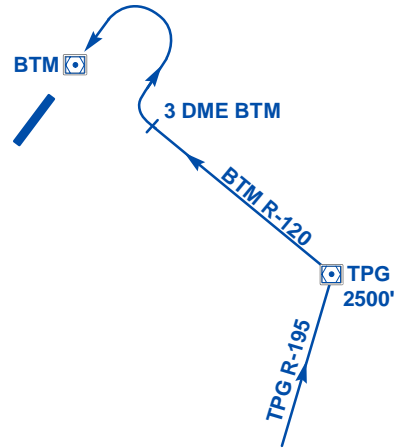
RUNWAY 04



**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.

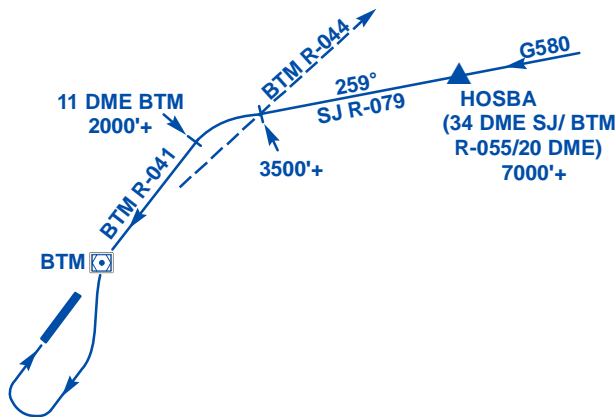
RUNWAY 22



**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.

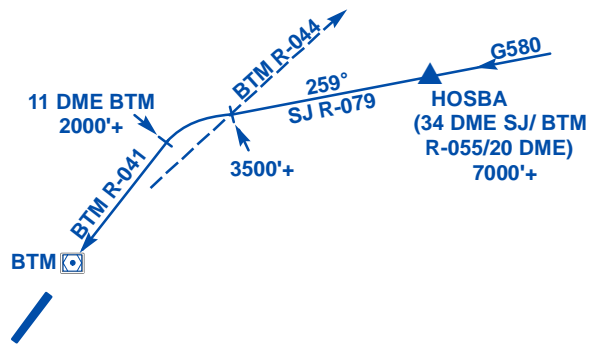
RUNWAY 04



**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.

PAGE INTENTIONALLY LEFT BLANK

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 | <i>Designation and Lateral Limits</i> | <p>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.</p> <p>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.</p> |
| 2 | <i>Vertical Limits</i> | <p>Tanjung Pinang North Control Zone (CTR) GND/WATER up to 3,000ft</p> <p>Tanjung Pinang South Control Zone (CTR) GND/WATER up to 6,000ft</p> |
| 3 | <i>Airspace Classification</i> | C |
| 4 | <i>ATS Unit Callsign</i> | Tanjung Pinang Approach |
| 5 | <i>Language(s)</i> | English |
| 6 | <i>Transition Altitude</i> | 11,000ft |
| 7 | <i>Remarks</i> | NIL |

WIDN AD 2.18 ATS COMMUNICATION FACILITIES

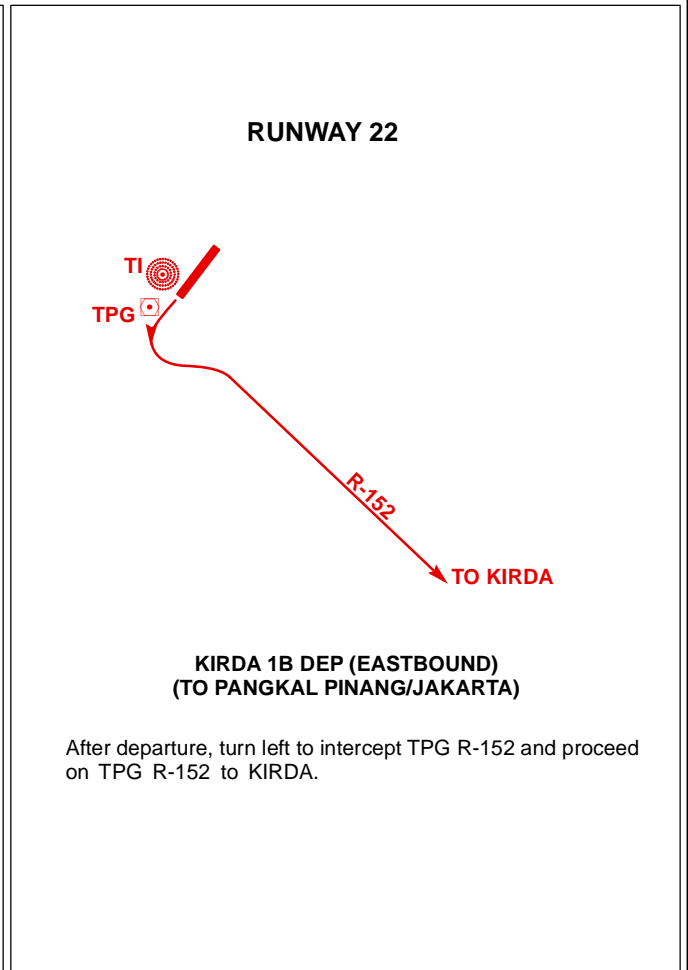
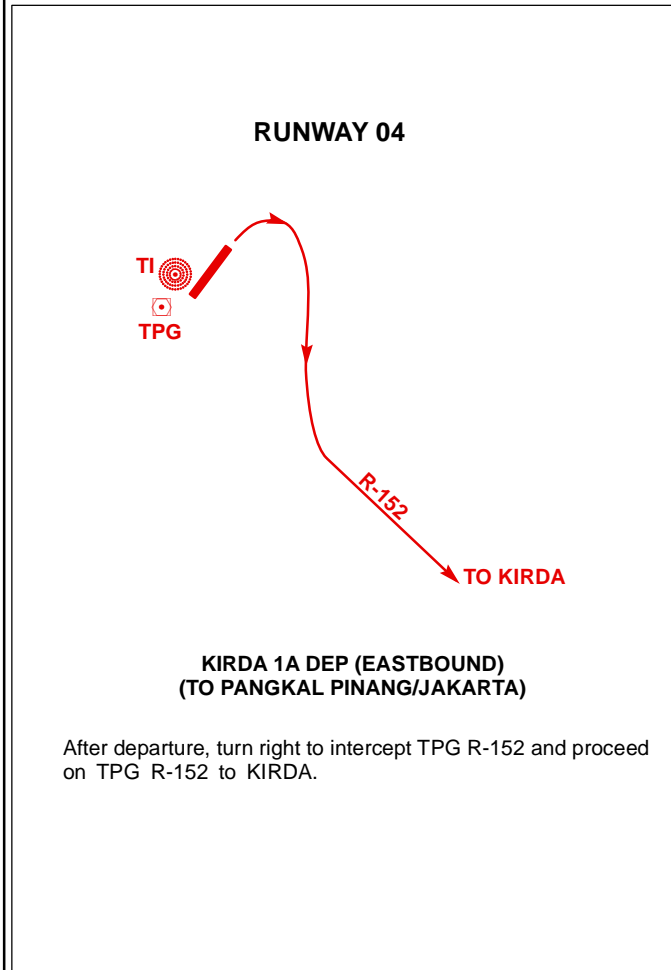
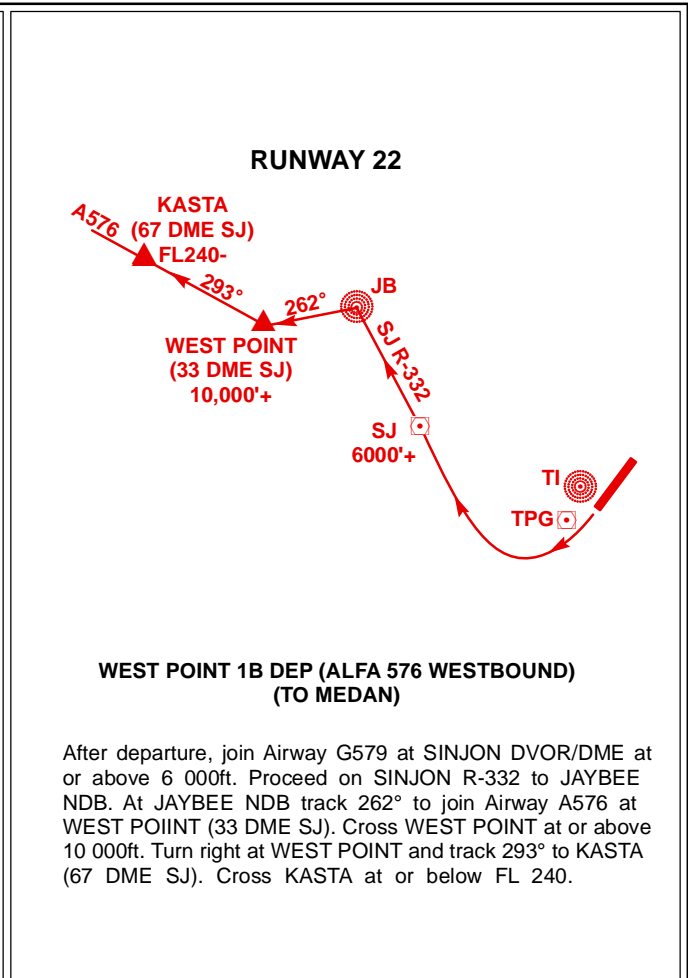
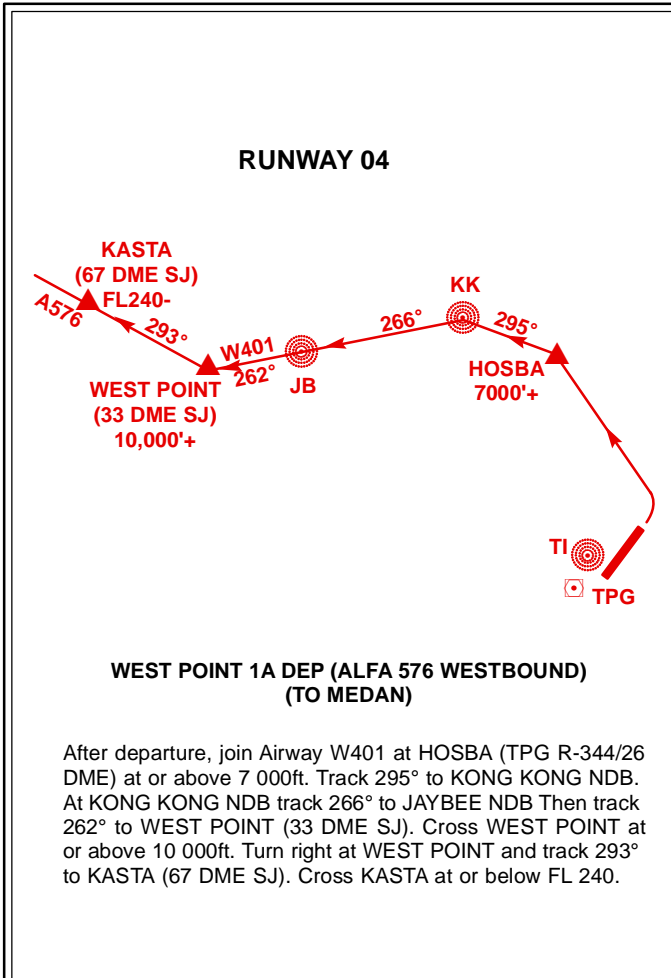
| <i>Service designation</i> | <i>Callsign</i> | <i>Frequency</i> | <i>Hours of operation</i> | <i>Remarks</i> |
|----------------------------|-------------------------------|-----------------------------|---------------------------|--|
| TWR | RAJA TOWER | 118.95 MHz | 0000-1100 | TWR coordinates: 005524.59N 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

SID - RWY 04/22 WEST POINT 1A/1B DEP, KIRDA 1A/1B DEP [AD-2-WIDN-SID-1](#)
 SID - RWY 04/22 SINGKEP 1A/1B DEP, TANGO INDIA 1A/1B DEP [AD-2-WIDN-SID-2](#)
 SID - RWY 04/22 TOMAN 1A/1B DEP, JITLIM 1 AD A/1B DEP [AD-2-WIDN-SID-3](#)

| | |
|--|----------------------------------|
| SID - RWY 04/22 TEKONG 1A/1B DEP | AD-2-WIDN-SID-4 |
| STAR - RWY 04/22 WEST POINT 1A/1B ARR, TANGO INDIA 1A/1B ARR | AD-2-WIDN-STAR-1 |
| STAR - RWY 04/22 TOMAN 1A/1B ARR, JITLIM 1A/1B ARR | AD-2-WIDN-STAR-2 |
| STAR - RWY 04/22 SINGKEP 1A/1B ARR, PARDI 1A/1B ARR | AD-2-WIDN-STAR-3 |
| STAR - RWY 04/22 TEKONG 1A/1B ARR | AD-2-WIDN-STAR-4 |

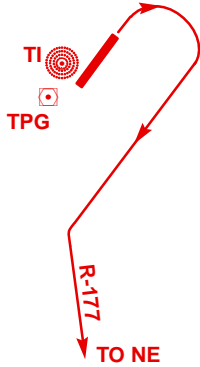
TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) - RUNWAY 04 AND 22
STANDARD INSTRUMENT DEPARTURE (SID)



PAGE INTENTIONALLY LEFT BLANK

TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) - RUNWAY 04 AND 22
STANDARD INSTRUMENT DEPARTURE (SID)

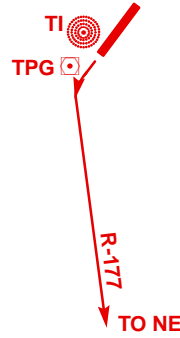
RUNWAY 04



**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).

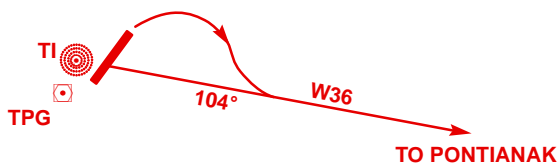
RUNWAY 22



**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.

PAGE INTENTIONALLY LEFT BLANK

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

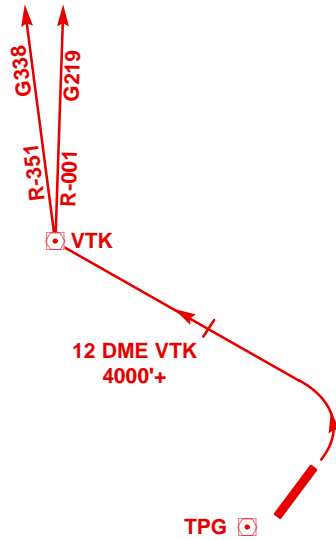
**JITLIM 1B DEP (WHISKEY 22 WESTBOUND)
(TO PEKANBARU)**

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.

PAGE INTENTIONALLY LEFT BLANK

TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) - RUNWAY 04 AND 22
STANDARD INSTRUMENT DEPARTURE (SID)

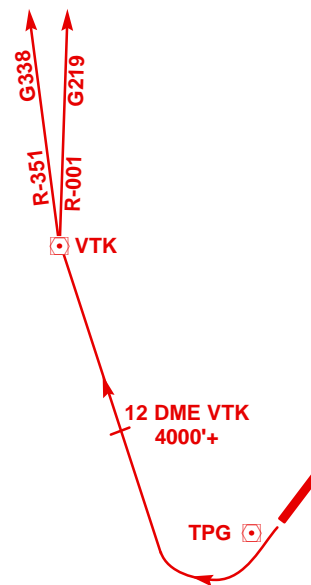
RUNWAY 04



**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.

PAGE INTENTIONALLY LEFT BLANK

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

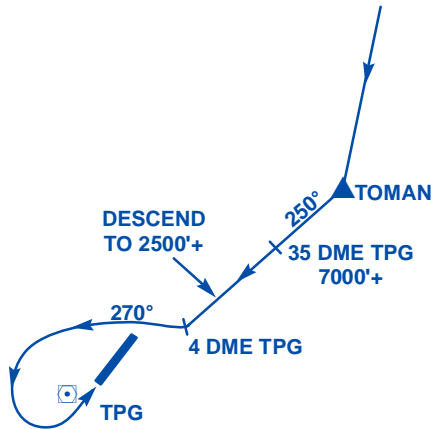
**TANGO INDIA 1B ARR (WHISKEY 36 WESTBOUND)
(FROM PONTIANAK)**

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.

PAGE INTENTIONALLY LEFT BLANK

TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) - RUNWAY 04 AND 22
STANDARD INSTRUMENT ARRIVAL (STAR)

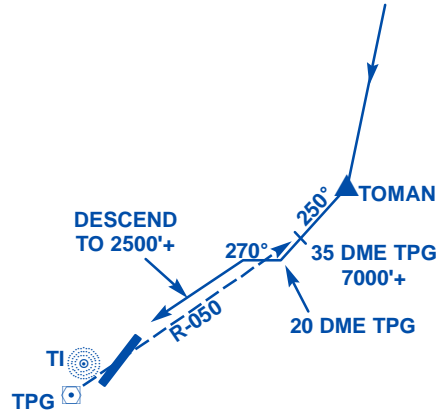
RUNWAY 04



**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.

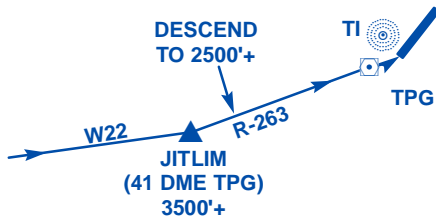
RUNWAY 22



**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.

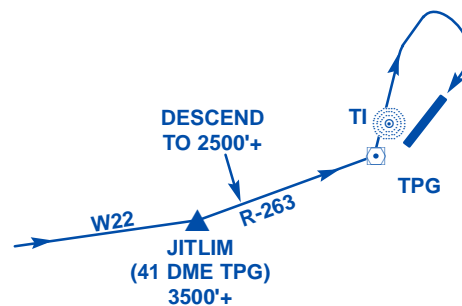
RUNWAY 04



**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



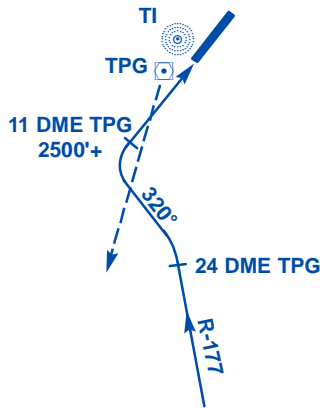
**JITLIM 1B ARR (WHISKEY 22 EASTBOUND)
(FROM PEKANBARU)**

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.

PAGE INTENTIONALLY LEFT BLANK

TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) - RUNWAY 04 AND 22
STANDARD INSTRUMENT ARRIVAL (STAR)

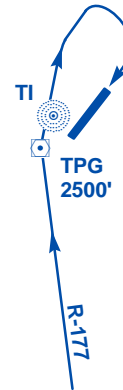
RUNWAY 04



**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.

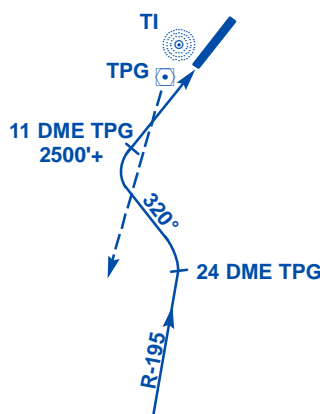
RUNWAY 22



**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.

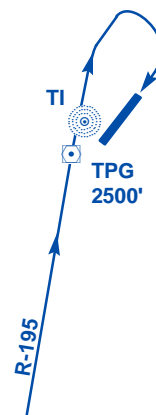
RUNWAY 04



**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



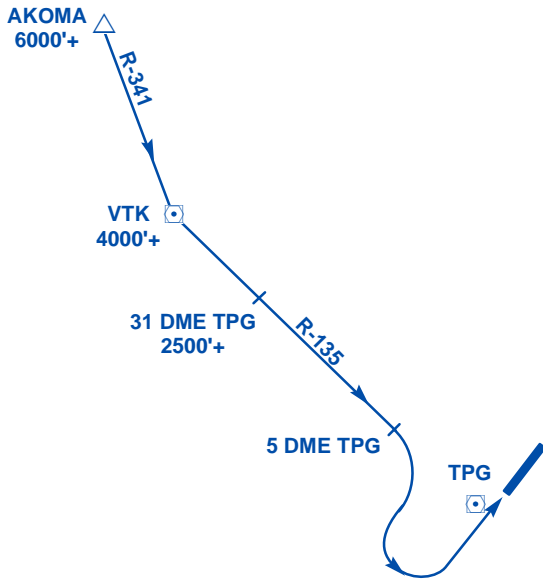
**PARDI 1A ARR (GOLF 579 EASTBOUND)
(FROM JAKARTA)**

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 downwind Runway 22 and commence approach.

PAGE INTENTIONALLY LEFT BLANK

TANJUNG PINANG/RAJA HAJI FISABILILLAH (INDONESIA) - RUNWAY 04 AND 22
STANDARD INSTRUMENT ARRIVAL (STAR)

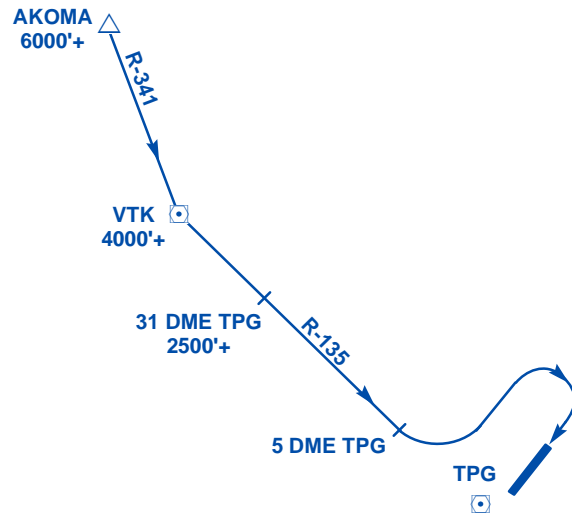
RUNWAY 04



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.

PAGE INTENTIONALLY LEFT BLANK