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eAIP

AMDT
05/2019
Effective date
15 AUG 2019
Publication date
15 AUG 2019

wp-AMDT-2019-05

1. Significant information and changes

1.1 Singapore Changi Airport

a. Taxiways/Taxilanes A1, A2, A3, A4, A5, A6, A7, B1 and B3 re-designated as Taxiways/Taxilanes P2, P3, P4, P5, P6, P7, P1, R1, R2 and R3 respectively.

b. Lead-in lines to aircraft stands E7 and F36 added.

c. Updated requirements for the carriage of dangerous goods and munitions of war (including arms and explosives) in aircraft.

1.2 Seletar Airport

a. Updated Seletar Joining Procedures(IFR Flights) and charts from SJ.

b. Updated push-back / tow forward procedures for aircraft stands D50 to D56 at northeast apron and RWY 03/21 slope data.

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 This amendment incorporates information contained in the listed NOTAMs and AIP Supplements which are hereby superseded:

NOTAMs:
A1273/16 dated 30/05/16
A2109/19 dated 10/06/19
A2326/19 dated 26/06/19
A2473/19 dated 04/07/19
A2474/19 dated 04/07/19
A2475/19 dated 04/07/19

AIP Supplements:
004/2016 dated 01/03/16
046/2019 dated 05/04/19
047/2019 dated 26/04/19
059/2019 dated 03/06/19
062/2019 dated 06/06/19
070/2019 dated 05/07/19

Amended Pages

GEN 0.1-1/2: *: replace.*
GEN 0.2-1/2: *: replace.*
GEN 0.3-1/2: *: replace.*
GEN 0.3-3/4: *: replace.*
GEN 0.3-5: *: remove.*

GEN 0.4-1/2:	*: replace.*
GEN 0.4-3:	*: replace.*
GEN 1.4-1/2:	*: replace.*
GEN 1.4-3:	*: replace.*
GEN 3.1-1/2:	*: replace.*
GEN 3.1-3/4:	*: replace.*
GEN 3.2-3/4:	*: replace.*
ENR 0.6-1/2:	*: replace.*
ENR 0.6-3/4:	*: replace.*
ENR 1.6-5/6:	*: replace.*
ENR 1.7-1/2:	*: replace.*
ENR 1.7-3/4:	*: replace.*
ENR 1.7-5/6:	*: replace.*
ENR 1.7-7:	*: replace.*
ENR 1.7-9:	*: remove.*
ENR 1.8-1/2:	*: replace.*
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ENR 1.8-5/6:	*: replace.*
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AD 2.WSSS-5/6:	*: replace.*
AD 2.WSSS-7/8:	*: replace.*
AD 2.WSSS-9/10:	*: replace.*
AD 2.WSSS-11/12:	*: replace.*
AD 2.WSSS-13/14:	*: replace.*
AD 2.WSSS-15/16:	*: replace.*
AD 2.WSSS-17/18:	*: replace.*
AD 2.WSSS-19/20:	*: replace.*
AD 2.WSSS-21/22:	*: replace.*
AD 2.WSSS-23/24:	*: replace.*
AD 2.WSSS-25/26:	*: replace.*
AD 2.WSSS-27/28:	*: replace.*
AD 2.WSSS-29/30:	*: replace.*
AD 2.WSSS-31/32:	*: replace.*
AD 2.WSSS-33/34:	*: replace.*
AD 2.WSSS-35/36:	*: replace.*
AD 2.WSSS-37/38:	*: replace.*
AD-2-WSSS-ADC-2:	*: replace.*
AD-2-WSSS-ADC-3:	*: replace.*
AD 2.WSSS-39/40:	*: remove.*
AD 2.WSSL-3/4:	*: replace.*
AD 2.WSSL-5/6:	*: replace.*
AD 2.WSSL-7/8:	*: replace.*
AD 2.WSSL-9/10:	*: replace.*
AD 2.WSSL-11/12:	*: replace.*
AD 2.WSSL-13/14:	*: replace.*
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AD 2.WSSL-25:	*: insert.*

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AD-2-WSSL-VAC-3: *: replace.*
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AD-2-WSSL-VDC-1: *: replace.*
AD-2-WSSL-VDC-2: *: replace.*
AD-2-WSSL-VFR-1: *: replace.*
AD-2-WSSL-IFR-1: *: replace.*
AD-2-WSSL-IFR-2: *: replace.*

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Part 1 — General (GEN)

GEN 0

GEN 0.1 PREFACE

1 Name of the publishing authority

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

2 Applicable ICAO documents

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

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

3 Publication Media

3.1 The Singapore Aeronautical Information Products comprising AIP Singapore, AIP Amendments, AIP Supplements, Aeronautical Information Circulars and NOTAM Lists, including NOTAMs and Pre-Flight Information Bulletins are available for retrieval from AIM-SG URL https://fpl-1.caasaim.gov.sg

4 The AIP structure and established regular amendment interval

4.1 The AIP structure

The AIP forms part of the Aeronautical Information Productas, 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
06/2018	08 November 2018
01/2019	03 January 2019
02/2019	28 February 2019
03/2019	25 April 2019
04/2019	20 June 2019
05/2019	15 August 2019
06/2019	10 October 2019
07/2019	05 December 2019

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

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

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GEN 0.2 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	

GEN 0.3 RECORD OF CURRENT AIP SUPPLEMENTS

NR/Year	*Subject*	*AIP section(s) affected*	*Period of validity (from/to)*	*Cancellation record*
070/2016	Paya Lebar Airport - Luffer Cranes and Topless Cranes	AD	*04 AUG 2016 / 31 DEC 2019*	
025/2017	Paya Lebar Airport - Topless Cranes	AD	*10 JAN 2017 / 21 NOV 2019*	
026/2017	Paya Lebar Airport - Luffer Crane	AD	*10 JAN 2017 / 08 DEC 2019*	
057/2017	Paya Lebar Airport - Luffer Cranes	AD	*13 APR 2017 / 14 JAN 2020*	
058/2017	Paya Lebar Airport - Topless Cranes	AD	*13 APR 2017 / 26 OCT 2020*	
067/2017	Sembawang Aerodrome - Topless Crane	AD	*27 APR 2017 / 01 FEB 2020*	
068/2017	Paya Lebar Airport - Obstacles	AD	*27 APR 2017 / 26 OCT 2020*	
082/2017	Paya Lebar Airport - Topless Cranes	AD	*11 JUL 2017 / 31 DEC 2019*	
083/2017	Paya Lebar Airport - Topless Cranes	AD	*11 JUL 2017 / 31 DEC 2019*	
084/2017	Paya Lebar Airport - Luffer Cranes	AD	*11 JUL 2017 / 31 DEC 2019*	
085/2017	Paya Lebar Airport - Topless Cranes	AD	*11 JUL 2017 / 01 JUN 2020*	
095/2017	Paya Lebar Airport - Topless Crane and Luffer Cranes	AD	*26 SEP 2017 / 31 DEC 2019*	
098/2017	Paya Lebar Airport - Topless Cranes	AD	*26 SEP 2017 / 31 DEC 2019*	
108/2017	Paya Lebar Airport - Topless Crane and Luffer Cranes	AD	*30 SEP 2017 / 06 JUL 2020*	
113/2017	Paya Lebar Airport - Topless Cranes	AD	*24 OCT 2017 / 18 OCT 2019*	
114/2017	Paya Lebar Airport - Luffer Crane	AD	*24 OCT 2017 / 20 OCT 2019*	
115/2017	Paya Lebar Airport - Topless Cranes	AD	*24 OCT 2017 / 24 OCT 2019*	
121/2017	Paya Lebar Airport - Topless Cranes and Luffer Cranes	AD	*10 DEC 2017 / 30 SEP 2020*	
122/2017	Paya Lebar Airport - Luffer Cranes	AD	*10 DEC 2017 / 31 DEC 2020*	
123/2017	Paya Lebar Airport - Luffer Cranes	AD	*10 DEC 2017 / 31 DEC 2020*	
124/2017	Paya Lebar Airport - Luffer Crane	AD	*10 DEC 2017 / 31 DEC 2020*	
125/2017	Paya Lebar Airport - Topless Cranes	AD	*10 DEC 2017 / 18 DEC 2019*	
126/2017	Paya Lebar Airport - Luffer Cranes	AD	*10 DEC 2017 / 19 DEC 2019*	
003/2018	Paya Lebar Airport - Luffer Crane	AD	*22 JAN 2018 / 31 DEC 2019*	
004/2018	Paya Lebar Airport - Crawler Cranes and Boring Rigs	AD	*22 JAN 2018 / 31 DEC 2019*	
005/2018	Paya Lebar Airport - Topless Cranes	AD	*22 JAN 2018 / 29 FEB 2020*	
006/2018	Paya Lebar Airport - Topless Crane and Luffer Crane	AD	*22 JAN 2018 / 28 FEB 2021*	
015/2018	Paya Lebar Airport - Luffer Crane	AD	*06 APR 2018 / 31 DEC 2019*	

NR/Year	Subject	AIP section(s) affected	Period of validity (from/to)	Cancellation record
016/2018	Paya Lebar Airport - Luffer Crane and Topless Cranes	AD	*06 APR 2018 / 01 JAN 2020*	
017/2018	Paya Lebar Airport - Luffer Crane	AD	*06 APR 2018 / 15 MAR 2020*	
018/2018	Paya Lebar Airport - Topless Cranes and Luffer Crane	AD	*25 APR 2018 / 27 OCT 2020*	
019/2018	Paya Lebar Airport - Luffer Crane	AD	*06 APR 2018 / 31 DEC 2020*	
020/2018	Paya Lebar Airport - Mobile Crane	AD	*06 APR 2018 / 03 FEB 2021*	
021/2018	Paya Lebar Airport - Luffer Crane and Saddle Cranes	AD	*06 APR 2018 / 31 DEC 2022*	
026/2018	Paya Lebar Airport - Crawler Cranes	AD	*20 JUN 2018 / 30 APR 2020*	
027/2018	Paya Lebar Airport - Mobile Crane	AD	*20 JUN 2018 / 10 MAY 2020*	
028/2018	Paya Lebar Airport - Saddle Cranes	AD	*20 JUN 2018 / 31 DEC 2022*	
029/2018	Paya Lebar Airport - Luffer Cranes	AD	*20 JUN 2018 / 31 DEC 2021*	
030/2018	Paya Lebar Airport - Luffer Crane and Topless Cranes	AD	*20 JUN 2018 / 31 DEC 2021*	
052/2018	Paya Lebar Airport - Topless Cranes	AD	*25 SEP 2018 / 31 AUG 2019*	
053/2018	Sembawang Aerodrome - Saddle Cranes	AD	*25 SEP 2018 / 31 DEC 2021*	
054/2018	Paya Lebar Airport - Luffer Cranes	AD	*25 SEP 2018 / 31 DEC 2019*	
055/2018	Paya Lebar Airport - Topless Cranes	AD	*25 SEP 2018 / 31 DEC 2019*	
056/2018	Paya Lebar Airport - Obstacles	AD	*25 SEP 2018 / 31 DEC 2019*	
057/2018	Paya Lebar Airport - Luffer Cranes	AD	*25 SEP 2018 / 30 MAR 2020*	
058/2018	Paya Lebar Airport - Luffer Crane	AD	*25 SEP 2018 / 14 AUG 2020*	
059/2018	Paya Lebar Airport - Topless Cranes	AD	*25 SEP 2018 / 31 AUG 2020*	
060/2018	Paya Lebar Airport - Topless Cranes	AD	*25 SEP 2018 / 01 SEP 2020*	
061/2018	Paya Lebar Airport - Luffer Cranes	AD	*25 SEP 2018 / 10 SEP 2020*	
062/2018	Paya Lebar Airport - Topless Cranes and Luffer Cranes	AD	*25 SEP 2018 / 31 DEC 2020*	
068/2018	Paya Lebar Airport - Topless Cranes	AD	*13 NOV 2018 / 31 OCT 2019*	
069/2018	Paya Lebar Airport - Mobile Crane	AD	*13 NOV 2018 / 10 MAY 2020*	
070/2018	Paya Lebar Airport - Luffer Cranes and Flat Top Cranes	AD	*13 NOV 2018 / 31 DEC 2020*	
071/2018	Paya Lebar Airport - Saddle Cranes	AD	*13 NOV 2018 / 31 DEC 2023*	
075/2018	Paya Lebar Airport - Luffer Crane	AD	*28 NOV 2018 / 31 MAR 2020*	
076/2018	Paya Lebar Airport - Topless Cranes	AD	*29 NOV 2018 / 30 NOV 2020*	
077/2018	Paya Lebar Airport - Luffer Crane	AD	*28 NOV 2018 / 18 NOV 2021*	
078/2018	Paya Lebar Airport - Luffer Cranes	AD	*28 NOV 2018 / 30 DEC 2022*	

NR/Year	Subject	AIP section(s) affected	Period of validity (from/to)	Cancellation record
082/2018	Paya Lebar Airport - Crawler Cranes	AD	*20 DEC 2018 / 30 AUG 2019*	
083/2018	Paya Lebar Airport - Mobile Crane	AD	*20 DEC 2018 / 31 AUG 2019*	
084/2018	Paya Lebar Airport - Hammerhead Cranes	AD	*30 DEC 2018 / 30 SEP 2019*	
085/2018	Paya Lebar Airport - Mobile Crane	AD	*20 DEC 2018 / 31 JAN 2020*	
002/2019	Paya Lebar Airport - Boring Rigs and Crawler Cranes	AD	*30 JAN 2019 / 31 AUG 2019*	
003/2019	Paya Lebar Airport - Mobile Crane	AD	*30 JAN 2019 / 31 AUG 2019*	
004/2019	Paya Lebar Airport - Luffer Crane	AD	*30 JAN 2019 / 30 NOV 2019*	
005/2019	Paya Lebar Airport - Topless Cranes	AD	*14 FEB 2019 / 30 JUN 2020*	
006/2019	Paya Lebar Airport - Topless Cranes and Luffer Crane	AD	*30 JAN 2019 / 09 JAN 2021*	
007/2019	Tengah Aerodrome - Topless Cranes and Luffer Crane	AD	*30 JAN 2019 / 31 JAN 2021*	
008/2019	Paya Lebar Airport - Mobile Crane	AD	*31 JAN 2019 / 31 JAN 2021*	
009/2019	Paya Lebar Airport - Luffer Cranes	AD	*01 JUN 2019 / 31 MAY 2021*	
011/2019	Paya Lebar Airport - Mobile Crane	AD	*01 FEB 2019 / 22 DEC 2020*	
012/2019	Sembawang Aerodrome - Mobile Crane	AD	*01 FEB 2019 / 22 DEC 2019*	
014/2019	Paya Lebar Airport - Topless Cranes	AD	*01 FEB 2019 / 31 JAN 2021*	
016/2019	Singapore Changi Airport - Updated information and data for Runway 02R/20L	AD	*15 FEB 2019* PERM	
020/2019	Paya Lebar Airport - Mobile Crane	AD	*27 MAR 2019 / 31 AUG 2019*	
021/2019	Paya Lebar Airport - Mobile Crane	AD	*27 MAR 2019 / 31 AUG 2019*	
022/2019	Paya Lebar Airport - Crawler Cranes	AD	*27 MAR 2019 / 30 OCT 2019*	
023/2019	Sembawang Aerodrome - Mobile Crane	AD	*27 MAR 2019 / 01 NOV 2019*	
024/2019	Sembawang Aerodrome - Topless Cranes	AD	*27 MAR 2019 / 31 DEC 2019*	
025/2019	Paya Lebar Airport - Mobile Cranes	AD	*31 MAR 2019 / 31 DEC 2019*	
026/2019	Paya Lebar Airport - Luffer Crane	AD	*27 MAR 2019 / 31 JAN 2020*	
027/2019	Paya Lebar Airport - Luffer Crane	AD	*27 MAR 2019 / 30 JUN 2020*	
028/2019	Paya Lebar Airport - Topless Cranes	AD	*27 MAR 2019 / 20 MAR 2021*	
029/2019	Paya Lebar Airport - Topless Cranes	AD	*27 MAR 2019 / 20 MAR 2021*	
030/2019	Paya Lebar Airport - Luffer Crane and Topless Cranes	AD	*27 MAR 2019 / 30 JUL 2021*	
031/2019	Paya Lebar Airport - Luffer Cranes	AD	*27 MAR 2019 / 28 JAN 2022*	
032/2019	Paya Lebar Airport - Topless Cranes	AD	*27 MAR 2019 / 09 MAR 2022*	
033/2019	Paya Lebar Airport - Luffer Crane	AD	*27 MAR 2019 / 31 DEC 2022*	

NR/Year	Subject	AIP section(s) affected	Period of validity (from/to)	Cancellation record
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*	
038/2019	Paya Lebar Airport - Mobile Crane	AD	*04 APR 2019 / 07 SEP 2019*	
039/2019	Paya Lebar Airport - Mobile Crane	AD	*04 APR 2019 / 30 SEP 2019*	
040/2019	Paya Lebar Airport - Mobile Crane	AD	*04 APR 2019 / 30 SEP 2019*	
041/2019	Paya Lebar Airport - Crawler Crane	AD	*04 APR 2019 / 29 FEB 2020*	
042/2019	Paya Lebar Airport - Luffer Cranes	AD	*04 APR 2019 / 31 DEC 2020*	
043/2019	Paya Lebar Airport - Saddle Cranes	AD	*04 APR 2019 / 31 DEC 2020*	
044/2019	Paya Lebar Airport - Luffer Crane	AD	*04 APR 2019 / 13 MAR 2021*	
048/2019	Paya Lebar Airport - Topless Cranes	AD	*07 MAY 2019 / 29 APR 2020*	
049/2019	Paya Lebar Airport - Topless Cranes	AD	*07 MAY 2019 / 30 DEC 2020*	
050/2019	Paya Lebar Airport - Crawler Crane	AD	*07 MAY 2019 / 30 NOV 2020*	
051/2019	Paya Lebar Airport - Luffer Crane	AD	*07 MAY 2019 / 22 APR 2021*	
052/2019	Paya Lebar Airport - Cranes and Piling Rig	AD	*07 MAY 2019 / 31 AUG 2020*	
053/2019	Paya Lebar Airport - Saddle Cranes and Luffer Crane	AD	*07 MAY 2019 / 31 DEC 2023*	
054/2019	Paya Lebar Airport - Topless Cranes	AD	*07 MAY 2019 / 30 SEP 2020*	
055/2019	Paya Lebar Airport - Topless Cranes	AD	*07 MAY 2019 / 25 APR 2021*	
056/2019	Paya Lebar Airport - Luffing Crane	AD	*07 MAY 2019 / 30 JUN 2020*	
060/2019	Paya Lebar Airport - Topless Crane	AD	*06 JUN 2019 / 14 NOV 2021*	
061/2019	Paya Lebar Airport - Crawler Cranes	AD	*06 JUN 2019 / 30 JUN 2020*	
063/2019	Singapore Changi airport - works schedule and movement area restrictions pertaining to Changi East development works	AD	*24 JUN 2019 / 26 OCT 2019*	
064/2019	Paya Lebar Airport - Luffing Crane	AD	*04 JUL 2019 / 30 AUG 2020*	
065/2019	Paya Lebar Airport - Mobile Cranes	AD	*04 JUL 2019 / 30 JUN 2020*	
066/2019	Paya Lebar Airport - Luffing Crane	AD	*04 JUL 2019 / 16 JUN 2021*	
067/2019	Paya Lebar Airport - Topless Cranes	AD	*04 JUL 2019 / 30 JUN 2021*	
068/2019	Paya Lebar Airport - Luffing Crane	AD	*04 JUL 2019 / 30 DEC 2021*	
069/2019	Paya Lebar Airport - Luffing Crane	AD	*04 JUL 2019 / 30 DEC 2020*	
071/2019	Airspace closure Kuala Lumpur and Singapore FIRs Exercise BERSAMA LIMA 2019 060001UTC to 161100UTC October 2019	AD/ENR	*06 OCT 2019 / 16 OCT 2019*	

GEN 0.4 CHECKLIST OF AIP PAGES

Part 1 – General (GEN)

GEN 0

GEN 0.1-1	08 NOV 2018
GEN 0.1-2	15 AUG 2019
GEN-0.1-3	08 NOV 2018
GEN 0.2-1	13 SEP 2018
GEN 0.2-2	15 AUG 2019
GEN 0.3-1	15 AUG 2019
GEN 0.3-2	15 AUG 2019
GEN 0.3-3	15 AUG 2019
GEN 0.3-4	15 AUG 2019
GEN 0.4-1	15 AUG 2019
GEN 0.4-2	15 AUG 2019
GEN 0.4-3	15 AUG 2019
GEN 0.5-1	05 JAN 2017
GEN 0.6-1	20 JUN 2019
GEN 0.6-2	03 JAN 2019
GEN 0.6-3	22 JUN 2017

GEN 1

GEN 1.1-1	25 APR 2019
GEN 1.1-2	25 APR 2019
GEN 1.2-1	15 SEP 2016
GEN 1.2-2	19 JUL 2018
GEN 1.2-3	19 JUL 2018
GEN 1.2-4	19 JUL 2018
GEN 1.2-5	24 MAY 2018
GEN 1.2-6	24 MAY 2018
GEN 1.3-1	25 APR 2019
GEN 1.3-2	25 APR 2019
GEN 1.3-3	25 APR 2019
GEN 1.3-4	25 APR 2019
GEN 1.3-5	25 APR 2019
GEN-1.3/ARR PAX FLOW	25 APR 2019
GEN-1.3/DEP PAX FLOW 1	25 APR 2019
GEN-1.3/DEP PAX FLOW 2	25 APR 2019
GEN 1.4-1	20 JUN 2019
GEN 1.4-2	15 AUG 2019
GEN 1.4-3	15 AUG 2019
GEN 1.5-1	12 NOV 2015
GEN 1.6-1	03 JAN 2019
GEN 1.6-2	03 JAN 2019
GEN 1.6-3	03 JAN 2019
GEN 1.6-4	03 JAN 2019
GEN 1.6-5	03 JAN 2019
GEN 1.7-1	03 JAN 2019
GEN 1.7-2	03 JAN 2019
GEN 1.7-3	03 JAN 2019
GEN 1.7-4	03 JAN 2019
GEN 1.7-5	03 JAN 2019

GEN 2

GEN 2.1-1	12 NOV 2015
GEN 2.1-2	13 SEP 2018
GEN 2.2-1	02 MAR 2017
GEN 2.2-2	02 MAR 2017
GEN 2.2-3	02 MAR 2017
GEN 2.2-4	05 JAN 2017
GEN 2.2-5	10 NOV 2016
GEN 2.3-1	12 NOV 2015
GEN 2.3-2	12 NOV 2015
GEN 2.3-3	12 NOV 2015
GEN 2.4-1	25 APR 2019
GEN 2.5-1	28 FEB 2019
GEN-2.5-3	21 JUL 2016
GEN 2.6-1	12 NOV 2015
GEN 2.6-2	12 NOV 2015
GEN 2.7-1	25 APR 2019

GEN 3

GEN 3.1-1	15 AUG 2019
GEN 3.1-2	08 NOV 2018
GEN 3.1-3	15 AUG 2019
GEN 3.1-4	13 SEP 2018
GEN 3.2-1	21 JUL 2016
GEN 3.2-2	31 MAR 2016
GEN 3.2-3	31 MAR 2016
GEN 3.2-4	15 AUG 2019
GEN 3.2-5	25 APR 2019
GEN 3.2-6	31 MAR 2016
GEN 3.3-1	12 NOV 2015
GEN 3.3-2	21 JUL 2016
GEN 3.4-1	12 NOV 2015
GEN 3.4-2	02 MAR 2017
GEN 3.4-3	02 MAR 2017
GEN 3.4-4	02 MAR 2017
GEN 3.4-5	12 NOV 2015
GEN-3.4-7	21 JUL 2016
GEN-3.4-9	21 JUL 2016
GEN 3.5-1	25 APR 2019
GEN 3.5-2	25 APR 2019
GEN 3.5-3	25 APR 2019
GEN 3.5-4	08 NOV 2018
GEN 3.5-5	19 JUL 2018
GEN 3.5-6	12 NOV 2015
GEN 3.5-7	25 APR 2019
GEN 3.5-8	25 APR 2019
GEN 3.5-9	08 NOV 2018
GEN 3.6-1	12 NOV 2015
GEN 3.6-2	12 NOV 2015
GEN 3.6-3	12 NOV 2015
GEN 3.6-4	12 NOV 2015
GEN-3.6-5	21 JUL 2016

GEN 4

GEN 4.1-1	15 SEP 2016
GEN 4.2-1	24 MAY 2018
GEN 4.2-2	12 NOV 2015
GEN 4.2-3	12 NOV 2015
GEN 4.2-4	12 NOV 2015
GEN 4.2-5	12 NOV 2015
GEN 4.2-6	12 NOV 2015

Part 2 – EN-ROUTE (ENR)

ENR 0

ENR 0.6-1	08 NOV 2018
ENR 0.6-2	15 AUG 2019
ENR 0.6-3	15 AUG 2019
ENR 0.6-4	15 AUG 2019
ENR 0.6-5	29 MAR 2018
ENR 0.6-6	03 JAN 2019

ENR 1

ENR 1.1-1	25 APR 2019
ENR 1.1-2	12 NOV 2015
ENR 1.1-3	12 NOV 2015
ENR 1.1-4	12 NOV 2015
ENR 1.1-5	12 NOV 2015
ENR 1.1-6	12 NOV 2015
ENR 1.1-7	12 NOV 2015
ENR 1.1-8	12 NOV 2015
ENR 1.1-9	12 NOV 2015
ENR 1.1-10	08 NOV 2018
ENR 1.1-11	08 NOV 2018
ENR 1.1-12	08 NOV 2018
ENR 1.1-13	08 NOV 2018
ENR 1.1-14	08 NOV 2018
ENR 1.1-15	08 NOV 2018
ENR 1.2-1	21 JUL 2016
ENR 1.3-1	12 NOV 2015
ENR 1.4-1	12 NOV 2015
ENR 1.5-1	12 NOV 2015
ENR 1.5-2	17 AUG 2017
ENR 1.5-3	08 NOV 2018
ENR 1.5-4	08 NOV 2018
ENR 1.6-1	12 NOV 2015
ENR 1.6-2	12 NOV 2015
ENR 1.6-3	12 NOV 2015
ENR 1.6-4	17 AUG 2017
ENR 1.6-5	15 AUG 2019
ENR 1.6-6	29 MAR 2018
ENR 1.6-7	29 MAR 2018
ENR 1.6-8	29 MAR 2018
ENR-1.6-9	21 JUL 2016
ENR-1.6-11	21 JUL 2016
ENR 1.7-1	15 AUG 2019
ENR 1.7-2	15 AUG 2019
ENR 1.7-3	15 AUG 2019
ENR 1.7-4	15 AUG 2019
ENR 1.7-5	15 AUG 2019
ENR 1.7-6	15 AUG 2019
ENR 1.7-7	15 AUG 2019
ENR 1.8-1	15 AUG 2019
ENR 1.8-2	15 AUG 2019
ENR 1.8-3	15 AUG 2019
ENR 1.8-4	15 AUG 2019
ENR 1.8-5	15 AUG 2019
ENR 1.8-6	15 AUG 2019
ENR 1.8-7	29 MAR 2018
ENR 1.8-8	29 MAR 2018
ENR 1.8-9	29 MAR 2018
ENR 1.8-10	29 MAR 2018
ENR 1.8-11	29 MAR 2018
ENR 1.8-12	15 AUG 2019
ENR 1.8-13	15 AUG 2019
ENR 1.8-14	15 AUG 2019
ENR 1.8-15	15 AUG 2019
ENR 1.8-16	15 AUG 2019
ENR 1.8-17	15 AUG 2019
ENR 1.8-18	15 AUG 2019
ENR 1.8-19	15 AUG 2019
ENR 1.8-20	15 AUG 2019
ENR 1.8-21	15 AUG 2019
ENR 1.8-22	15 AUG 2019
ENR 1.8-23	15 AUG 2019
ENR 1.8-24	15 AUG 2019
ENR 1.8-25	15 AUG 2019
ENR 1.8-26	15 AUG 2019
ENR 1.8-27	15 AUG 2019
ENR 1.8-28	15 AUG 2019
ENR 1.8-29	15 AUG 2019
ENR 1.9-1	07 DEC 2017
ENR 1.9-2	01 FEB 2018
ENR 1.9-3	27 APR 2017
ENR 1.9-4	27 APR 2017
ENR 1.9-5	27 APR 2017
ENR 1.10-1	01 FEB 2018
ENR 1.10-2	29 MAR 2018
ENR 1.10-3	29 MAR 2018
ENR 1.11-1	12 NOV 2015
ENR 1.12-1	12 NOV 2015
ENR 1.12-2	12 NOV 2015
ENR 1.12-3	12 NOV 2015
ENR 1.12-4	12 NOV 2015
ENR 1.13-1	12 NOV 2015
ENR 1.14-1	10 DEC 2015
ENR 1.14-2	15 SEP 2016
ENR-1.14-3 to ENR-1.14-4	15 SEP 2016
ENR-1.14-5 to ENR-1.14-6	15 SEP 2016
ENR-1.14-7 to ENR-1.14-8	15 AUG 2019

ENR 2

ENR 2.1-1	03 JAN 2019
ENR 2.1-2	03 JAN 2019
ENR 2.1-3	03 JAN 2019
ENR 2.1-4	25 APR 2019
ENR-2.1-7	21 JUL 2016
ENR-2.1-9	29 MAR 2018
ENR-2.1-11A	21 JUL 2016
ENR-2.1-11B	21 JUL 2016
ENR-2.1-13	21 JUL 2016
ENR-2.1-15	28 FEB 2019

ENR 3

ENR 3.1-1	02 MAR 2017
ENR 3.1-2	02 MAR 2017
ENR 3.1-3	28 FEB 2019
ENR 3.1-4	10 NOV 2016

ENR 3.1-5	12 NOV 2015
ENR 3.1-6	02 MAR 2017
ENR 3.1-7	19 JUL 2018
ENR 3.1-8	10 NOV 2016
ENR 3.1-9	12 NOV 2015
ENR 3.1-10	02 MAR 2017
ENR 3.1-11	02 MAR 2017
ENR 3.1-12	10 NOV 2016
ENR 3.1-13	19 JUL 2018
ENR 3.1-14	02 MAR 2017
ENR 3.1-15	12 NOV 2015
ENR 3.1-16	02 MAR 2017
ENR 3.1-17	12 NOV 2015
ENR 3.1-18	02 MAR 2017
ENR 3.1-19	02 MAR 2017
ENR 3.1-20	12 NOV 2015
ENR-3.1/ATS Chart	15 AUG 2019
ENR 3.3-1	07 DEC 2017
ENR 3.3-2	02 MAR 2017
ENR 3.3-3	19 JUL 2018
ENR 3.3-4	12 NOV 2015
ENR 3.3-5	12 NOV 2015
ENR 3.3-6	22 JUN 2017
ENR 3.3-7	19 JUL 2018
ENR 3.3-8	02 MAR 2017
ENR 3.3-9	07 DEC 2017
ENR 3.3-10	07 DEC 2017
ENR 3.3-11	29 MAR 2018
ENR 3.3-12	19 JUL 2018
ENR 3.3-13	07 DEC 2017
ENR 3.3-14	07 DEC 2017
ENR 3.3-15	07 DEC 2017
ENR 3.3-16	07 DEC 2017
ENR 3.3-17	07 DEC 2017
ENR 3.3-18	07 DEC 2017
ENR 3.3-19	19 JUL 2018
ENR 3.3-20	07 DEC 2017
ENR 3.3-21	19 JUL 2018
ENR 3.3-22	19 JUL 2018
ENR 3.3-23	07 DEC 2017
ENR 3.3-24	07 DEC 2017
ENR 3.3-25	07 DEC 2017
ENR 3.3-26	07 DEC 2017
ENR 3.3-27	07 DEC 2017
ENR 3.3-28	07 DEC 2017
ENR 3.3-29	19 JUL 2018
ENR 3.3-30	07 DEC 2017
ENR 3.3-31	07 DEC 2017
ENR 3.3-32	07 DEC 2017
ENR 3.3-33	07 DEC 2017
ENR 3.3-34	07 DEC 2017
ENR 3.3-35	07 DEC 2017
ENR 3.3-36	07 DEC 2017
ENR 3.3-37	07 DEC 2017
ENR 3.3-38	07 DEC 2017
ENR 3.3-39	07 DEC 2017
ENR 3.3-40	07 DEC 2017
ENR 3.3-41	07 DEC 2017
ENR 3.3-42	07 DEC 2017
ENR 3.3-43	07 DEC 2017
ENR 3.4-1	12 NOV 2015
ENR 3.4-2	12 OCT 2017
ENR 3.4-3	28 FEB 2019
ENR 3.4-4	12 NOV 2015
ENR-3.4-5	08 NOV 2018
ENR-3.4-7	21 JUL 2016
ENR 3.5-1	02 MAR 2017
ENR 3.5-2	02 MAR 2017
ENR-3.5-3	28 FEB 2019
ENR 3.6-1	27 APR 2017
ENR 3.6-2	27 APR 2017
ENR-3.6-3	05 JAN 2017
ENR-3.6-5	20 JUN 2019
ENR-3.6-7	20 JUN 2019
ENR-3.6-9	20 JUN 2019

ENR 4

ENR 4.1-1	02 MAR 2017
ENR 4.1-2	02 MAR 2017
ENR 4.3-1	12 NOV 2015
ENR 4.4-1	19 JUL 2018
ENR 4.4-2	19 JUL 2018
ENR 4.4-3	19 JUL 2018
ENR 4.4-4	07 DEC 2017
ENR 4.4-5	17 AUG 2017
ENR 4.4-6	17 AUG 2017
ENR 4.5-1	25 APR 2019

ENR 5

ENR 5.1-1	12 NOV 2015
ENR 5.1-2	19 JUL 2018
ENR 5.1-3	19 JUL 2018
ENR 5.1-4	19 JUL 2018
ENR 5.1-5	19 JUL 2018
ENR-5.1-7	22 JUN 2017
ENR-5.1-9	03 JAN 2019
ENR 5.2-1	03 JAN 2019
ENR 5.2-2	03 JAN 2019
ENR 5.2-3	03 JAN 2019
ENR 5.3-1	13 SEP 2018
ENR 5.4-1	12 NOV 2015
ENR 5.5-1	03 JAN 2019
ENR 5.6-1	24 MAY 2018
ENR 5.6-2	12 NOV 2015

ENR 6

ENR 6-1	15 SEP 2016
ERC-6-1 En-Route Chart	15 AUG 2019
WAC-2860-Singapore-Island	17 AUG 2017

Part 3 – AERODROMES (AD)

AD 0

AD 0.6-1	15 AUG 2019
AD 0.6-2	15 AUG 2019
AD 0.6-3	15 AUG 2019
AD 0.6-4	25 APR 2019
AD 0.6-5	25 APR 2019
AD 0.6-6	19 JUL 2018
AD 0.6-7	19 JUL 2018

AD 1

AD 1.1-1	12 NOV 2015
AD 1.1-2	12 NOV 2015
AD 1.1-3	15 AUG 2019
AD 1.1-4	15 AUG 2019
AD 1.2-1	12 NOV 2015
AD 1.3-1	12 NOV 2015
AD-1.3-3	21 JUL 2016
AD 1.4-1	12 NOV 2015
AD 1.5-1	12 NOV 2015

AD 2

AD 2.WSSS-1	13 SEP 2018
AD 2.WSSS-2	17 AUG 2017
AD 2.WSSS-3	15 AUG 2019
AD 2.WSSS-4	15 AUG 2019
AD 2.WSSS-5	15 AUG 2019
AD 2.WSSS-6	15 AUG 2019
AD 2.WSSS-7	15 AUG 2019
AD 2.WSSS-8	15 AUG 2019
AD 2.WSSS-9	15 AUG 2019
AD 2.WSSS-10	15 AUG 2019
AD 2.WSSS-11	15 AUG 2019
AD 2.WSSS-12	15 AUG 2019
AD 2.WSSS-13	15 AUG 2019
AD 2.WSSS-14	15 AUG 2019
AD 2.WSSS-15	15 AUG 2019
AD 2.WSSS-16	15 AUG 2019
AD 2.WSSS-17	15 AUG 2019
AD 2.WSSS-18	15 AUG 2019
AD 2.WSSS-19	15 AUG 2019
AD 2.WSSS-20	15 AUG 2019
AD 2.WSSS-21	15 AUG 2019
AD 2.WSSS-22	15 AUG 2019
AD 2.WSSS-23	15 AUG 2019
AD 2.WSSS-24	15 AUG 2019
AD 2.WSSS-25	15 AUG 2019
AD 2.WSSS-26	15 AUG 2019
AD 2.WSSS-27	15 AUG 2019
AD 2.WSSS-28	15 AUG 2019
AD 2.WSSS-29	15 AUG 2019
AD 2.WSSS-30	15 AUG 2019
AD 2.WSSS-31	15 AUG 2019
AD 2.WSSS-32	15 AUG 2019
AD 2.WSSS-33	15 AUG 2019
AD 2.WSSS-34	15 AUG 2019
AD 2.WSSS-35	15 AUG 2019
AD 2.WSSS-36	15 AUG 2019
AD 2.WSSS-37	15 AUG 2019
AD 2.WSSS-38	15 AUG 2019
AD-2-WSSS-ADC-1	15 SEP 2016
AD-2-WSSS-ADC-2	15 AUG 2019
AD-2-WSSS-ADC-3	15 AUG 2019
AD-2-WSSS-AOC-1	07 DEC 2017
AD-2-WSSS-AOC-2	29 MAR 2018
AD-2-WSSS-AOC-3	13 SEP 2018
AD-2-WSSS-PATC-1	01 FEB 2018
AD-2-WSSS-PATC-2	01 FEB 2018
AD-2-WSSS-SID-1 to 1.1	28 FEB 2019
AD-2-WSSS-SID-2 to 2.1	28 FEB 2019
AD-2-WSSS-SID-3 to 3.1	28 FEB 2019
AD-2-WSSS-SID-4 to 4.1	28 FEB 2019
AD-2-WSSS-SID-5 to 5.1	28 FEB 2019
AD-2-WSSS-SID-6 to 6.1	28 FEB 2019
AD-2-WSSS-SID-7 to 7.1	28 FEB 2019
AD-2-WSSS-SID-8 to 8.1	28 FEB 2019
AD-2-WSSS-SID-9 to 9.1	28 FEB 2019
AD-2-WSSS-SID-10 to 10.1	28 FEB 2019
AD-2-WSSS-SID-11 to 11.1	28 FEB 2019
AD-2-WSSS-SID-12 to 12.1	28 FEB 2019
AD-2-WSSS-SID-13 to 13.1	28 FEB 2019
AD-2-WSSS-SID-14 to 14.1	28 FEB 2019
AD-2-WSSS-SID-15 to 15.1	28 FEB 2019
AD-2-WSSS-SID-16 to 16.1	28 FEB 2019
AD-2-WSSS-SID-17 to 17.1	28 FEB 2019
AD-2-WSSS-SID-18 to 18.1	28 FEB 2019
AD-2-WSSS-STAR-1 to 1.1	12 OCT 2017
AD-2-WSSS-STAR-2 to 2.1	12 OCT 2017
AD-2-WSSS-STAR-3 to 3.1	28 FEB 2019
AD-2-WSSS-STAR-4 to 4.1	12 OCT 2017
AD-2-WSSS-STAR-5 to 5.1	12 OCT 2017
AD-2-WSSS-STAR-6 to 6.1	12 OCT 2017
AD-2-WSSS-STAR-7 to 7.1	12 OCT 2017
AD-2-WSSS-STAR-8 to 8.1	12 OCT 2017
AD-2-WSSS-STAR-9 to 9.1	28 FEB 2019
AD-2-WSSS-STAR-11 to 11.1	12 OCT 2017
AD-2-WSSS-STAR-13 to 13.1	12 OCT 2017
AD-2-WSSS-STAR-14 to 14.1	12 OCT 2017
AD-2-WSSS-STAR-15 to 15.1	12 OCT 2017
AD-2-WSSS-STAR-16 to 16.1	12 OCT 2017
AD-2-WSSS-STAR-17 to 17.1	12 OCT 2017
AD-2-WSSS-STAR-18 to 18.1	12 OCT 2017
AD-2-WSSS-STAR-19 to 19.1	12 OCT 2017
AD-2-WSSS-STAR-20 to 20.1	12 OCT 2017
AD-2-WSSS-STAR-21 to 21.1	12 OCT 2017
AD-2-WSSS-IAC-1	13 SEP 2018
AD-2-WSSS-IAC-2	13 SEP 2018
AD-2-WSSS-IAC-5	13 SEP 2018
AD-2-WSSS-IAC-6	13 SEP 2018
AD-2-WSSS-IAC-7	13 SEP 2018
AD-2-WSSS-IAC-9	13 SEP 2018
AD-2-WSSS-IAC-10	13 SEP 2018
AD-2-WSSS-IAC-11	03 JAN 2019
AD-2-WSSS-IAC-12	13 SEP 2018
AD-2-WSSS-VAC-1	28 FEB 2019
AD 2.WSSL-1	28 FEB 2019
AD 2.WSSL-2	28 FEB 2019
AD 2.WSSL-3	15 AUG 2019
AD 2.WSSL-4	15 AUG 2019

AD 2.WSSL-5	15 AUG 2019
AD 2.WSSL-6	15 AUG 2019
AD 2.WSSL-7	15 AUG 2019
AD 2.WSSL-8	15 AUG 2019
AD 2.WSSL-9	15 AUG 2019
AD 2.WSSL-10	15 AUG 2019
AD 2.WSSL-11	15 AUG 2019
AD 2.WSSL-12	15 AUG 2019
AD 2.WSSL-13	15 AUG 2019
AD 2.WSSL-14	15 AUG 2019
AD 2.WSSL-15	15 AUG 2019
AD 2.WSSL-16	15 AUG 2019
AD 2.WSSL-17	15 AUG 2019
AD 2.WSSL-18	15 AUG 2019
AD 2.WSSL-19	15 AUG 2019
AD 2.WSSL-20	15 AUG 2019
AD 2.WSSL-21	15 AUG 2019
AD 2.WSSL-22	15 AUG 2019
AD 2.WSSL-23	15 AUG 2019
AD 2.WSSL-24	15 AUG 2019
AD 2.WSSL-25	15 AUG 2019
AD-2-WSSL-ADC-1	28 FEB 2019
AD-2-WSSL-ADC-2	03 JAN 2019
AD-2-WSSL-ADC-3	08 NOV 2018
AD-2-WSSL-AOC-1	17 AUG 2017
AD-2-WSSL-AOC-2	08 NOV 2018
AD-2-WSSL-VAC-1	15 AUG 2019
AD-2-WSSL-VAC-2	15 AUG 2019
AD-2-WSSL-VAC-3	15 AUG 2019
AD-2-WSSL-VAC-4	15 AUG 2019
AD-2-WSSL-VDC-1	15 AUG 2019
AD-2-WSSL-VDC-2	15 AUG 2019
AD-2-WSSL-VFR-1	15 AUG 2019
AD-2-WSSL-IFR-1	15 AUG 2019
AD-2-WSSL-IFR-2	15 AUG 2019
AD 2.WSAP-1	19 JUL 2018
AD 2.WSAP-2	19 JUL 2018
AD 2.WSAP-3	19 JUL 2018
AD 2.WSAP-4	19 JUL 2018
AD 2.WSAP-5	19 JUL 2018
AD 2.WSAP-6	12 OCT 2017
AD 2.WSAP-7	19 JUL 2018
AD 2.WSAP-8	25 APR 2019
AD 2.WSAP-9	25 APR 2019
AD 2.WSAP-10	25 APR 2019
AD 2.WSAP-11	25 APR 2019
AD-2-WSAP-ADC-1	12 NOV 2015
AD-2-WSAP-ADC-2	12 OCT 2017
AD-2-WSAP-AOC-1	10 NOV 2016
AD-2-WSAP-IAC-1	25 APR 2019
AD-2-WSAP-IAC-2	25 APR 2019
AD-2-WSAP-IAC-3	25 APR 2019
AD-2-WSAP-IAC-4	25 APR 2019
AD-2-WSAP-IAC-5	25 APR 2019
AD-2-WSAP-IAC-6	25 APR 2019
AD 2.WSAT-1	25 APR 2019
AD 2.WSAT-2	25 APR 2019
AD 2.WSAT-3	25 APR 2019
AD 2.WSAT-4	25 APR 2019
AD 2.WSAT-5	25 APR 2019
AD 2.WSAT-6	25 APR 2019
AD 2.WSAT-7	12 NOV 2015
AD 2.WSAT-8	12 NOV 2015
AD-2-WSAT-ADC-1	12 NOV 2015
AD 2.WSAG-1	12 NOV 2015
AD 2.WSAG-2	08 NOV 2018
AD 2.WSAG-3	07 DEC 2017
AD 2.WMKJ-1	12 NOV 2015
AD 2.WIDD-1	12 NOV 2015
AD 2.WIDD-2	12 NOV 2015
AD-2-WIDD-SID-1	12 NOV 2015
AD-2-WIDD-SID-2	12 NOV 2015
AD-2-WIDD-SID-3	12 NOV 2015
AD-2-WIDD-SID-4	12 NOV 2015
AD-2-WIDD-STAR-1	12 NOV 2015
AD-2-WIDD-STAR-2	12 NOV 2015
AD-2-WIDD-STAR-3	12 NOV 2015
AD-2-WIDD-STAR-4	12 NOV 2015
AD 2.WIDN-1	03 JAN 2019
AD 2.WIDN-2	03 JAN 2019
AD-2-WIDN-SID-1	12 NOV 2015
AD-2-WIDN-SID-2	12 NOV 2015
AD-2-WIDN-SID-3	12 NOV 2015
AD-2-WIDN-SID-4	12 NOV 2015
AD-2-WIDN-STAR-1	12 NOV 2015
AD-2-WIDN-STAR-2	12 NOV 2015
AD-2-WIDN-STAR-3	21 JUL 2016
AD-2-WIDN-STAR-4	12 NOV 2015

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GEN 1.4 ENTRY, TRANSIT AND DEPARTURE OF CARGO

1 CUSTOMS REQUIREMENTS CONCERNING CARGO AND OTHER ARTICLES

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

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

a. Transhipment within the same FTZ (In Through Airway Bill cases), no Customs documentation is required if the items are not controlled by the Competent Authorities (CAs);
b. Transhipment of controlled goods within the same FTZ (In Through Airway Bill cases), a transshipment (Through transshipment within the same FTZ) permit is required; and
c. Import for re-export within the same FTZ (In Non-Through Airway Bill cases), an import permit is required for the importation of goods into the FTZ and an export permit is required for the exportation of goods from the same FTZ.

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

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

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

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

2.1 Prior permission of the Agri-Food and Veterinary Authority (AVA) 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 Agri-Food and Veterinary Authority (AVA) 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 The import, export and transhipment of all arms, explosives, component parts, munitions and weapons including swords, sword-sticks, kukris, parangs, daggers, spears, spear-heads, toy pistols, airguns, etc. are strictly controlled. Permits must be obtained and applications should be made to the Arms and Explosives Branch, Commissioner of Singapore Police, Block J, Kinloss Complex, No 3 Ladyhill Road, Singapore 258672 (Fax: 65-67340531) at least 2 weeks before the intended date of air carriage. Severe penalties are provided for non-compliance of requirements.

4 REQUIREMENTS FOR THE CARRIAGE OF DANGEROUS GOODS AND MUNITIONS OF WAR (INCLUDING ARMS AND EXPLOSIVES) 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.

4.2 MUNITIONS OF WAR

← 4.2.1 Paragraph 50C of the Air Navigation Order states that munitions of war shall not be carried or have loaded in an aircraft unless the operator of the aircraft has been granted with a munitions of war 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 munitions of war permit.

4.2.2 Applications for such permit should be submitted to the Director-General of Civil Aviation at least 7 working days before the intended date of carriage to the address indicated in paragraph 4.1.3 above. Application forms can be obtained from Flight Standards Division, CAAS (email: CAAS_dangerousgoods@caas.gov.sg).

← 4.2.3 Each application for permit to carry munitions of war to, from and/or through Singapore, should be in the prescribed form and supported by an airway bill, commercial invoice, import/export and/or end-user certificate from the final destination. In Singapore, only entities licensed under the Arms and Explosives Act are allowed to engage in the import, export and transhipment of Munitions of War in Singapore.

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.

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GEN 3 SERVICES

GEN 3.1 AERONAUTICAL INFORMATION SERVICES

1 RESPONSIBLE SERVICE

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

1.2 AIS Headquarters

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

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

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

Post:
Singapore Air Traffic Control Centre (SATCC)
60 Biggin Hill Road
Singapore 509950

Tel: (65) 65956056 (Duty Supervisor)
Tel: (65) 65956053 (NOF)
AFS: WSSSYNYX (NOF)
Tel: (65) 65956052 (Changi FPL Officer)
Fax: (65) 65431826 (Changi AIS)
AFS: WSSSYOYX (Changi AIS)
Tel: (65) 64812909 (Seletar FPL Officer)
Fax: (65) 64833044 (Seletar AIS)
AFS: WSSLYOYX (Seletar AIS)

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

2 AREA OF RESPONSIBILITY

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

3 AERONAUTICAL PUBLICATIONS

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

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

NOTAM and checklist are disseminated via the AFS and PIB via internet. All the other elements of the Aeronautical Information Products can be retrieved from AIM-SG URL at https://fpl-1.caasaim.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://fpl-1.caasaim.gov.sg

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

NOTAM exchanged with other NOF/Countries (R=Received only, S=Sent only, EAD=Received from/Sent to European AIS Database)		
Abu Dhabi/UAE	Jakarta/Indonesia	Paro/Bhutan (R)
Addis Ababa/Ethiopia	Jeddah/Saudi Arabia	Phnom Penh/Cambodia (R)
Almaty/Kazakhstan (EAD)	Johannesburg/South Africa	Plaisance/Mauritius
Amman/Jordan (EAD)	Kabul/Afghanistan	Port Moresby/Papua New Guinea
Amsterdam/Netherlands (EAD)	Karachi/Pakistan	Praha/Czech Republic (S)
Ankara/Turkey (EAD)	Kathmandu/Nepal	Pyongyang/Korea, North
Antananarivo/Madagascar	Khartoum/Sudan (R)	Riga/Latvia (EAD)
← Athinai/Greece	Kobenhavn/Denmark (EAD)	Roma/Italy
← Baghdad/Iraq	Kolkata/India	Sanaa/Yemen
Bahrain/Bahrain	Kuala Lumpur/Malaysia	Sarajevo/Bosnia & Herzegovina (S)
← Baku/Azerbaijan (EAD)	Kuwait/Kuwait	Seoul/Korea, South
← Bangkok/Thailand	Kyiv/Ukraine (EAD)	Shannon/Ireland (EAD)
← Beijing/China	Lisboa/Portugal (EAD)	Sofia/Bulgaria
← Beograd/Serbia-Montenegro (EAD)	Ljubljana/Slovenia (EAD)	Stockholm/Sweden (EAD)
← Brasilia/Brazil (S)	Lobamba/Swaziland (R)	Taipei/Taiwan
← Brazzaville/Congo (R)	London/UK (EAD)	Tallinn/Estonia (EAD)
← Brunei/Brunei	Luqa/Malta (EAD)	Tbilisi/Georgia (EAD)
← Bruxelles/Belgium (EAD)	Macao/Macao	Tehran/Iran
← Bucuresti/Romania (EAD)	Madrid/Spain (EAD)	Tel Aviv/Israel
← Budapest/Hungary (EAD)	Mahé/Seychelles	Tirana/Albania (EAD)
← Cairo/Egypt (S)	Male/Maldives	Tokyo/Japan
← Canberra/Australia	Manila/Philippines (EAD)	Tripoli/Libya
← Chennai/India	Maseru/Lesotho (R)	Vientiane/Laos
← Christchurch/New Zealand	Minsk/Belarus (EAD)	Vilnius/Lithuania (EAD)
← Colombo/Sri Lanka	Moskva/Russian Federation	Warsaw/Poland (S) (EAD)
Damascus/Syria (R)	Mumbai/India	Washington/USA
← Dar es-Salaam/Tanzania (R)	Muscat/Oman	Wien/Austria (EAD)
← Dhaka/Bangladesh	Nadi/Fiji	Windhoek/Namibia (R)
← Frankfurt/Germany (EAD)	Nairobi/Kenya	Yangon/Myanmar
← Hanoi/Vietnam	New Delhi/India	Yerevan/Armenia (S) (EAD)
← Harare/Zimbabwe	Nicosia/Cyprus (EAD)	Zagreb/Croatia (EAD)
← Helsinki/Finland (EAD)	Ottawa/Canada	Zurich/Switzerland
← Hong Kong/Hong Kong	Paris/France (EAD)	

Pre-flight Information Bulletin (PIB), a recapitulation of valid NOTAM in plain language, can be retrieved from AIM-SG URL: https://fpl-1.caasaim.gov.sg

3.6 Aeronautical Information Circular (AIC)

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

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

3.7 Checklist and NOTAM List

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

4 AIRAC SYSTEM

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

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 2018 to 2022:

AIRAC Effective Dates				
Year 2018	**Year 2019**	**Year 2020**	**Year 2021**	**Year 2022**
04 January	03 January	02 January	28 January	27 January
01 February	31 January	30 January	25 February	24 February
01 March	28 February	27 February	25 March	24 March
29 March	28 March	26 March	22 April	21 April
26 April	25 April	23 April	20 May	19 May
24 May	23 May	21 May	17 June	16 June
21 June	20 June	18 June	15 July	14 July
19 July	18 July	16 July	12 August	11 August
16 August	15 August	13 August	09 September	08 September
13 September	12 September	10 September	07 October	06 October
11 October	10 October	08 October	04 November	03 November
08 November	07 November	05 November	02 December	01 December
06 December	05 December	03 December	30 December	29 December
		31 December		

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

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

5 PRE-FLIGHT INFORMATION SERVICE AT AERODROMES

Aerodrome	***Briefing Coverage***	***Availability of Bulletins***
SINGAPORE CHANGI	All route stages emanating from Singapore.	Pre-flight Information Bulletin (PIB) can be retrieved from AIM-SG URL - https://fpl-1.caasaim.gov.sg
SELETAR		

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.

5 LIST OF AERONAUTICAL CHARTS AVAILABLE

GEN 3.2.5 LIST OF AERONAUTICAL CHARTS AVAILABLE					
Title of Chart Series	*Scale*	*Name and/or number*		*Price ($)*	*Date*
World Aeronautical Chart ICAO (WAC)	1:1 000 000		WAC 2860	In AIP	17 AUG 17
← **Enroute Chart** ICAO (ENRC)			ERC 6-1	In AIP	15 AUG 19
Instrument Approach Chart ICAO (IAC)		***Singapore Changi***			
	1:400 000	RWY 02L - ICW ILS/DME	AD-2-WSSS-IAC-1	In AIP	13 SEP 18
	1:400 000	RWY 02C - ICE ILS/DME	AD-2-WSSS-IAC-2	In AIP	13 SEP 18
	1:400 000	RWY 20R - ICH ILS/DME	AD-2-WSSS-IAC-5	In AIP	13 SEP 18
	1:400 000	RWY 20C - ICC ILS/DME	AD-2-WSSS-IAC-6	In AIP	13 SEP 18
	1:400 000	RWY 20C - VTK DVOR/DME	AD-2-WSSS-IAC-7	In AIP	13 SEP 18
	1:400 000	RWY 02L - RNAV(GNSS)	AD-2-WSSS-IAC-9	In AIP	13 SEP 18
	1:400 000	RWY 02C - RNAV(GNSS)	AD-2-WSSS-IAC-10	In AIP	13 SEP 18
	1:400 000	RWY 20R - RNAV(GNSS)	AD-2-WSSS-IAC-11	In AIP	03 JAN 19
	1:400 000	RWY 20C - RNAV(GNSS)	AD-2-WSSS-IAC-12	In AIP	13 SEP 18
		Paya Lebar			
	1:400 000	RWY 20 - PU DVOR/DME	AD-2-WSAP IAC-1	In AIP	25 APR 19
	1:400 000	RWY 02 - PU DVOR/DME	AD-2-WSAP IAC-2	In AIP	25 APR 19
	1:400 000	RWY 20 - IPS ILS/DME	AD-2-WSAP IAC-3	In AIP	25 APR 19
	1:400 000	RWY 02 - IPN ILS/DME	AD-2-WSAP IAC-4	In AIP	25 APR 19
	1:400 000	RWY 02 - RNAV(GNSS)	AD-2-WSAP-IAC-5	In AIP	25 APR 19
	1:400 000	RWY 20 - RNAV(GNSS)	AD-2-WSAP-IAC-6	In AIP	25 APR 19
Visual Approach Chart ICAO (VAC)	1:400 000	***Singapore Changi***	AD-2-WSSS-VAC-1	In AIP	28 FEB 19
		Seletar			
←	1:100 000	RWY 03	AD-2-WSSL-VAC-1	In AIP	15 AUG 19
←	1:100 000	RWY 21	AD-2-WSSL-VAC-2	In AIP	15 AUG 19
←	1:100 000	RWY 03	AD-2-WSSL-VAC-3	In AIP	15 AUG 19
←	1:100 000	RWY 21	AD-2-WSSL-VAC-4	In AIP	15 AUG 19
Visual Departure Chart		***Seletar***			
←	1:100 000	RWY 03	AD-2-WSSL-VDC-1	In AIP	15 AUG 19
←	1:100 000	RWY 21	AD-2-WSSL-VDC-2	In AIP	15 AUG 19
← **Aerodrome Chart** ICAO (AC)		***Singapore Changi***	AD-2-WSSS-ADC-2	In AIP	15 AUG 19
		Seletar	AD-2-WSSL-ADC-1	In AIP	28 FEB 19
		Paya Lebar	AD-2-WSAP-ADC-1	In AIP	12 NOV 15
Aerodrome Obstacle Chart ICAO TYPE A (AOC)		***Singapore Changi***			
	1:10 000	RWY 20R/02L	AD-2-WSSS-AOC-1	In AIP	07 DEC 17
	1:10 000	RWY 20C/02C	AD-2-WSSS-AOC-2	In AIP	29 MAR 18
		Seletar			
	1:10 000	RWY 03/21	AD-2-WSSL-AOC-1	In AIP	17 AUG 17
		Paya Lebar			
	1:20 000	RWY 20/02	AD-2-WSAP-AOC-1	In AIP	10 NOV 16
Aerodrome Obstacle Chart ICAO TYPE B (AOC)		***Singapore Changi***			
	1:20 000	RWY 02L/20R and 02C/20C	AD-2-WSSS-AOC-3	In AIP	13 SEP 18
		Seletar			
	1:20 000	RWY 03/21	AD-2-WSSL-AOC-2	In AIP	08 NOV 18
Precision Approach Terrain Chart ICAO (PATC)		***Singapore Changi***			
	1:2 500	RWY 02L	AD-2-WSSS-PATC-1	In AIP	01 FEB 18
	1:2 500	RWY 20C	AD-2-WSSS-PATC-2	In AIP	01 FEB 18

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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. 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, 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.

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

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

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

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

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

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

1.17 ACTION TAKEN BY ATC DURING RADIO FAILURE

1.17.1 In addition to the action specified in paragraph 1.8.2, if unable to establish normal communication with an aircraft, ATC will:

a. Maintain separation between the aircraft and other aircraft known to be operating in its vicinity;
b. Transmit essential information to the aircraft, including the flight levels reserved for its use, route to be flown, and any significant weather information, such as terminal weather, areas in which VMC may be expected, etc.;
c. Advise other acft in the vicinity of the presumed psn of the acft experiencing radio failure;
d. Use ground radar to check whether or not the aircraft is receiving and complying with ATC instructions, and to ensure separation from other aircraft;
e. Inform the operator concerned or his representative;
f. Inform the alternate aerodrome of the circumstances of the failure and request attempts to establish communication with the aircraft;
g. Inform all concerned and end all radio failure actions if communication with aircraft is established and when aircraft lands.

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

2.2 TAKE-OFF AND CLIMB

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

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

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

2.3 VERTICAL SEPARATION - ENROUTE

2.3.1 Aircraft en-route in the Singapore FIR (irrespective of whether IFR or VFR) shall be flown at flight levels or altitudes where appropriate.

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

2.3.3 For the purpose of en-route vertical separation IFR and VFR flights within controlled airspace and flights in uncontrolled airspace of the Singapore FIR, reference should be made to the following:

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

2.4 APPROACH AND LANDING

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

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

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

2.5 MISSED APPROACH

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

3 PROCEDURES APPLICABLE TO OPERATORS AND PILOTS

3.1 Flight Planning

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

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

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

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

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

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

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

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

4.6 CHANGING LEVELS

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

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.

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ENR 1.8 REGIONAL SUPPLEMENTARY PROCEDURES

1 RVSM PROCEDURES IN THE SINGAPORE FIR

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

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

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

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

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

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

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

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

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

1.2 RVSM OPERATIONAL APPROVAL AND MONITORING

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

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

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

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

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

1.3 ACAS II AND TRANSPONDER EQUIPAGE

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

1.4 IN-FLIGHT PROCEDURES WITHIN RVSM AIRSPACE

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

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

1.4.2 The pilot must notify ATC whenever the aircraft:

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

See pages ENR 1.8-8 to ENR 1.8-11 or Appendix 5 of FAA IG 91-RVSM for pilot and controller actions in contingency scenarios.

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

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

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

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

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

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

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

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

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

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

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

Initial action

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

Subsequent action

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

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

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

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

1.7 WEATHER DEVIATION PROCEDURES IN THE SINGAPORE FIR

General procedures

1.7.1 The following procedures are intended to provide guidance. All possible circumstances cannot be covered. The pilot's judgement shall ultimately determine the sequence of actions taken and ATC shall render all possible assistance.

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

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

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

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

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

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

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

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

SAMPLE PHRASEOLOGY:

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

1.7.7 The pilot will take the following actions:

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

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

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

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

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

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

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

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

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

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

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

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

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

g. if contact was not established prior to deviating, continue to attempt to contact ATC to obtain a clearance. If contact was established, continue to keep ATC advised of intentions and obtain essential traffic information.

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

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

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

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

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

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

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

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

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

1.9 FLIGHT PLANNING REQUIREMENTS

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

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

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

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

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

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

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

1.10.5 Non-RVSM compliant aircraft may not flight plan between FL290 and FL410 inclusive within RVSM airspace. After special coordination as detailed in paragraph 1.10.6 below, the following non-RVSM aircraft may flight plan at RVSM flight levels in the RVSM stratum:

a. is being initially delivered to the State of Registry or Operator (see paragraph 1.11 for additional details and information); or
b. was formally RVSM approved but has experienced an equipment failure and is being flown to a maintenance facility for repair in order to meet RVSM requirements and/or obtain approval; or
c. is transporting a spare engine mounted under the wing; or
d. is being utilized for mercy or humanitarian purposes; or
e. State aircraft (those aircraft used in military, custom and police services shall be deemed State aircraft).

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

1.10.7 Contact details for approval request are as follows:

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

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

1.11 DELIVERY FLIGHTS FOR AIRCRAFT THAT ARE RVSM COMPLIANT ON DELIVERY

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

1.12 PROCEDURES FOR SUSPENSION OF RVSM

1.12.1 Air traffic services will consider suspending RVSM procedures within affected areas of the Singapore FIR when there are pilot reports of greater than moderate turbulence. Within areas where RVSM procedures are suspended, the vertical separation minimum between all aircraft will be 2,000ft.

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

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

1.14 PROCEDURES FOR AIR-GROUND COMMUNICATION FAILURE

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

CONTROLLER / PILOT PHRASEOLOGY

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

** indicates a pilot transmission*

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

2.1 INTRODUCTION

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

2.1.2 Only aircraft equipped with RNAV systems would be able to operate on the RNAV routes in 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 A

Table

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

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

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:

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

b. The offset shall be established at a distance of one or two nautical miles to the right of the centre line relative to the direction of flight. Offsets are not to exceed two nautical miles right of centre line;

c. The strategic lateral offset procedure has been designed to include offsets to mitigate the effects of wake turbulence of preceding aircraft. If wake turbulence needs to be avoided, offsets to the right of the centreline relative to the direction of flight in tenths of a nautical mile up to a maximum of 3.7km (2nm) shall be used.

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

d. In airspace where the use of lateral offsets has been authorized, ATC clearance is not required for this procedure and pilots are not required to inform ATC that an offset is being applied;

e. Position reports are based on the current ATC clearance and not the exact coordinates of the offset position.

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

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

6 CHANGI FLOW MANAGEMENT PROCEDURES

6.1 INTRODUCTION

6.1.1 The objectives of the procedures are to improve the efficiency of Singapore’s air traffic service by minimising radar vectoring as well as improving airspace capacity.

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

6.2 ENTRY AND EXIT GATES

6.2.1 'Entry gates' and 'Exit gates' are established to ensure segregation between arriving and departing aircraft operating at Singapore Changi Airport. These gates (waypoints) are incorporated in the RNAV SIDs/STARs which have been implemented to support the flow management procedures. The 'entry' and 'exit' gates are shown below:

Entry Gate	Coordinates
BOBAG	010230N 1032954E
PASPU	015915N 1040618E
REMES	004342N 1035735E
LAVAX	010950N 1042714E

6.3 ARRIVING AIRCRAFT TO SINGAPORE CHANGI AIRPORT

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

6.3.2 ENTRY GATE TIME
To regulate the flow of traffic into the Approach airspace, ATC will issue, when necessary, a time restriction at an entry gate associated with the inbound route of the flight into Singapore Changi Airport.

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

6.3.4 SPEED CONTROL
Speed control restrictions are incorporated into the STARs toenhance predictability and planning of air traffic in the Approach airspace. Pilots shall adhere to the speed control restrictions published in the STAR procedures unless otherwise advised. ATC may issue further speed adjustment during the different phases of the flight if traffic situation warrants.

6.4 APPROACH AIRSPACE HOLDING PROCEDURES

6.4.1 ENTRY PROCEDURE
The entry into the holding patterns shall be in accordance with the three-sector entry procedure as prescribed in ICAO Doc 8168 - OPS/611 Edition 1993.

6.4.2 RATE OF TURN
All turns are to be made at a bank angle of 25° or at a rate of 3° per second, whichever requires the lesser bank.

6.4.3 DESCENT PROCEDURE
When instructed to join a holding pattern, pilots shall reach their assigned altitudes prior to arriving at the holding point. This will allow appropriate traffic sequencing and the reduction of step-descents in the holding pattern.

6.4.4 DETAILS OF APPROACH AIRSPACE HOLDING AREAS

Holding Fix / ID / Co-ordinates	Inbound Track °M	Direction of Turn	MAX HLDG Speed (IAS)	Time (MIN)	MNM-MAX HLDG Level	Controlling Unit and Frequency
1	2	3	4	5	6	7
NYLON 013657N 1040624E	203°	Left	220 knots	1	FL140 3,000ft	Singapore Approach 124.05MHz (PRI) 132.15MHz (SRY)
LAVAX 010950N 1042714E	269°	Left	220 knots	1	FL140 7,000ft	Singapore Approac 124.05MHz (PRI) 132.15MHz (SRY)
REMES 004342N 1035735E	348°	Right	220 knots	1	FL140 6,000ft	Singapore Approach 124.6MHz (PRI) 132.15MHz (SRY)
BOBAG 010230N 1032954E	083°	Right	220 knots	1	FL140 6,000ft	Singapore Approac 124.6MHz (PRI) 132.15MHz (SRY)

6.4.5 ALTERNATE HOLDING AREAS
In the event of inclement weather or capacity constraints rendering a specific holding area unusable, arrivals may be cleared to an alternate holding area for re-sequencing. To ensure smooth transition to alternate holding area, all arrivals bound for Singapore Changi Airport shall have their FMS programmed with all the four promulgated holding areas (paragraph 6.4.4)

6.5 EXPECTED TIME TO LEAVE HOLDING AREA

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

6.5.2 The expected time to leave is issued to serve as an early notification of the probable holding duration as well as for unforeseen circumstance such as radio failure (see page ENR 1.6-4). Subsequently, a specified time to leave the holding area will be issued to pilots to resume the flight according to the assigned RNAV STARs.

6.6 DEPARTING AIRCRAFT FROM SINGAPORE CHANGI AIRPORT

6.6.1 DEPARTURE SPEED CONTROL

Departing aircraft shall not exceed IAS 230 knots below 4,000 feet AMSL or at the waypoints specified in the SID and not exceed IAS 250 knots below 10,000 feet AMSL. Pilots shall also comply with speed control restrictions according to published SIDs.

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

7.1 ADS-B BASED SURVEILLANCE AIRSPACE AND AIRCRAFT OPERATOR APPROVAL

7.1.1 Aircraft that operates on ATS routes L642, L644, M753, M771, M904, N891, N892, Q801, Q802, Q803 and T611 within airspace bounded by 073605N 1090045E, 040713N 1063543E, 041717N 1061247E (MABLI), 044841N 1052247E (DOLOX), 045223N 1041442E (ENREP), 045000N 1034400E, thence north along the Singapore FIR boundary to 070000N 1080000E at or above FL290 must carry serviceable ADS-B transmitting equipment that has been certified as meeting:

a. European Aviation Safety Agency - Certification Considerations for the Enhanced ATS in Non-Radar Areas using ADS-B Surveillance (ADS-B-NRA) Application via 1090MHz Extended Squitter (AMC 20-24), or
b. European Aviation Safety Agency (EASA) CS-ACNS (Subpart D - Surveillance - SUR), or
c. Federal Aviation Administration - Advisory Circular No: 20-165A (or later versions) Airworthiness Approval of Automatic Dependent Surveillance - Broadcast (ADS-B) Out Systems, or
d. The equipment configuration standards in Appendix XI of Civil Aviation Order 20.18 of the Civil Aviation Safety Authority of Australia.

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

7.1.3 If an aircraft carries ADS-B transmitting equipment but does not comply with the requirements stipulated in paragraph 7.1.1, the aircraft must not fly in the delineated airspace unless the equipment is deactivated or set to transmit only a value of zero for the Navigation Uncertainty Category (NUCp) or Navigation Integrity Category (NIC).

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

7.2 FLIGHT PLANNING REQUIREMENTS

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

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

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

CODE/7C432B

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

8.10.3 Between Singapore and Kota Kinabalu FIR

8.10.3.1 To be developed

8.10.4 Between Singapore and Kuala Lumpur FIR

8.10.4.1 To be developed

8.11 TRAFFIC INFORMATION BROADCASTS BY AIRCRAFT (TIBA)

8.11.1 Introduction and applicability of broadcasts

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

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

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

a. there is a need to supplement collision hazard information provided by air traffic services outside controlled airspace; or

b. there is a temporary disruption of normal air traffic services.

8.11.1.4 Such airspaces shall be identified by the States responsible for provision of air traffic services within these airspaces, if necessary with the assistance of the appropriate ICAO Regional Office(s), and duly promulgated in aeronautical information publications or NOTAM, together with the VHF RTF frequency, the message formats and the procedures to be used. Where, in the case of paragraph 8.11.1.3 a., more than one State is involved, the airspace should be designated on the basis of regional air navigation agreements and promulgated in Doc 7030.

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

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

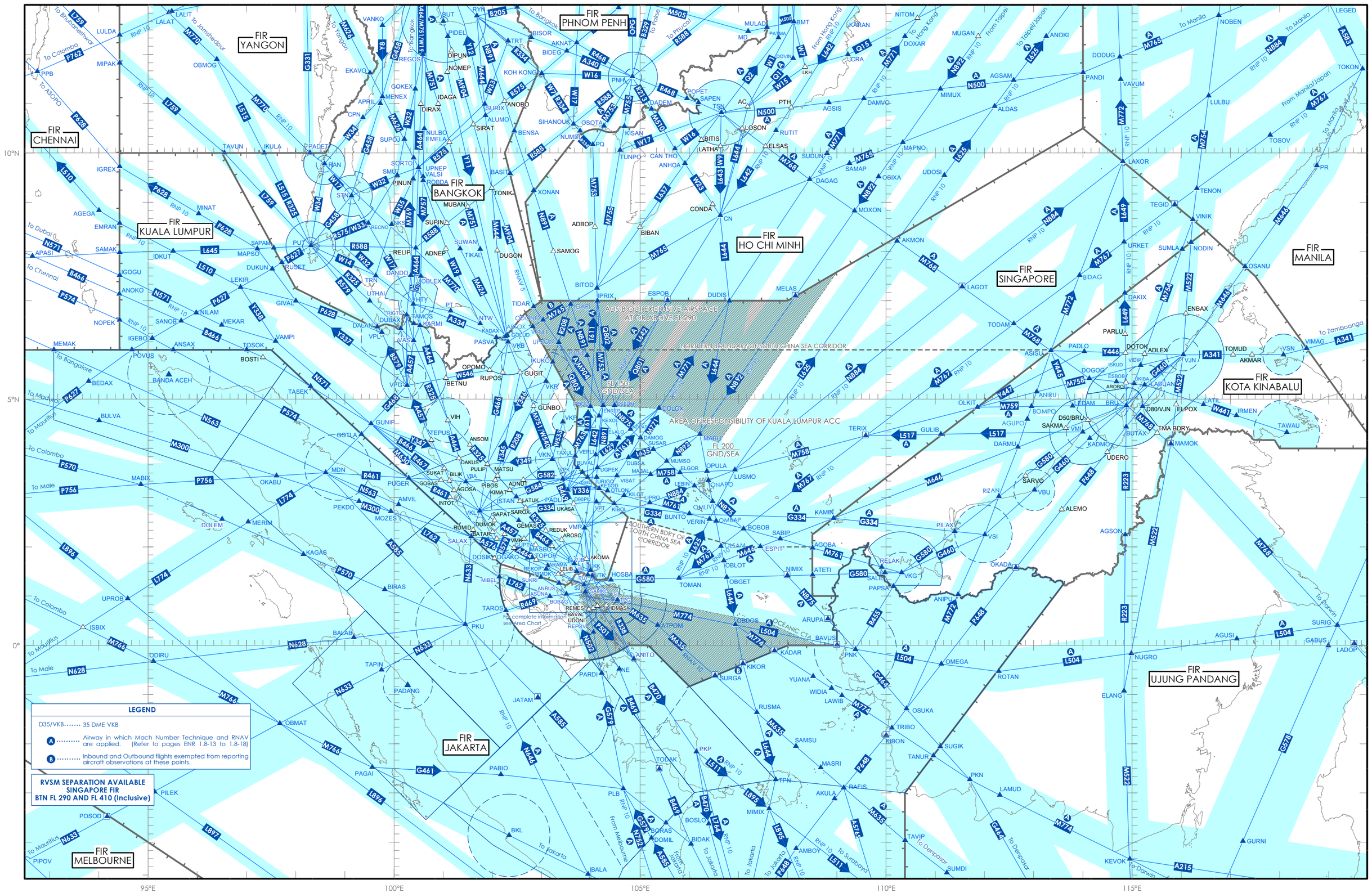
Was there any change in altitude?	☐ yes ☐ no ☐ n/a
Was there buffeting?	☐ yes ☐ no ☐ n/a
Was there stall warning?	☐ yes ☐ no ☐ n/a
Was the autopilot engaged?	☐ yes ☐ no ☐ n/a
What control action was taken?	☐ none ☐ go-around ☐ runway change ☐ other Please describe briefly:
Could you see the aircraft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

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

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

or email to: victor_tan@caas.gov.sg

AIR TRAFFIC SYSTEM CHART



CHANGES : Pontianak, Pangkal Pinang, Palembang TMAs and Pontianak, Pangkal Pinang, Jambi, Palembang, Bengkulu, Medan CTRs updated.

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ENROUTE CHART - ICAO

LEGEND

- **Aerodrome**
- **Flight Information Region (FIR)** — Name of FIR; Upper Limit; Lower Limit; Unit providing service — e.g. SINGAPORE UNL GND/WATER ACC SINGAPORE
- **Terminal Control Area (TMA)** — Name of TMA; Airspace Classification; Upper Limit; Lower Limit; Radio Frequency (ies) — e.g. TMA KUCHING A B C FL 250 / 3 000ft / 134.5 120.2
- **Control Zone (CTR)** — Name of CTR; Airspace Classification; Upper Limit; Radio Frequency (ies) — e.g. CTR KUCHING C 3 000ft 120.2
- **ATS route** — Route designator; Magnetic track; Distance in nautical miles; Minimum flight altitude (ft)/flight level; Lower limit (ft)/flight level; Required navigation performance — e.g. L642, 032° / 212, 7 000/FL 140, RNP 10 (7 000)/(FL 140)
- **ATS route reporting point by-pass** (No report is required on this route)
- **Reporting Point (REP)** — Compulsory; On Request
- **ATS/MET reporting point (MRP)** — Compulsory; On Request
- **Restricted Airspace** (P-Prohibited, R-Restricted, D-Danger) — Identification of area; Nationality letter; Vertical limits — e.g. W5D8, FL 400 / WATER

Note : Restricted airspace outside Singapore FIR are not shown

- **Collocated VOR and DME navigation aids (VOR/DME)** — Compass rose orientated on the chart to Magnetic North
- **Identification for radio navigation aids (NAVAID)** — Name; NAVAID, frequency, identification or call sign; Geographical coordinates in WGS-84; Elevation of DME site (to the nearest 30m) — e.g. SIN ION, DVOR/DME 113.5, 01°13'19"N 103°51'29"E, 60ft

COP at mid-point between VOR are not shown

Area Minimum Altitude (AMA)

Each 2° quadrilateral contains an area minimum altitude (AMA) which represents the lowest altitude which may be used under instrument meteorological conditions (IMC). The AMA provides a minimum clearance of 1 000 feet (300m) above all terrains and obstacles in the quadrilateral. It is represented in thousands and hundreds of feet above mean sea level.

Example : 3 500 feet **35**

- **A** Airway in which Mach Number Technique and RNAV are applied (Refer to pages ENR 1.8-13 to 1.8-18)
- **B** Inbound and Outbound flights exempted from reporting aircraft observations at these points.

WSJC/WMFC FIR BDRY REPORTING POINTS

TAXIL 03 50.35N 103 40.37E	**MANIM** 03 14.31N 104 05.53E
BUVAL 03 56.22N 103 43.41E	**KETOD** 03 10.42N 104 09.42E
DOVOL 03 30.47N 103 49.23E	**RAXIM** 03 03.18N 104 17.13E
IDSEL 03 24.32N 103 55.44E	**KIBOL** 02 52.29N 104 28.05E
EGOLO 03 19.34N 104 00.47E	**LENDA** 02 41.24N 104 39.32E

RVSM SEPARATION AVAILABLE SINGAPORE FIR BTN FL 290 AND FL 410 (Inclusive)

AIRSPACE CLASSIFICATION IN THE SINGAPORE FIR

Airspace		Levels	Classification
Controlled airspace		FL 150 to FL 460	A
		Surface to FL 150	B
Controlled airspace more than 100 nm seaward from the shoreline		Lower limit to FL 460	A
Control Zones (CTRs)	Changi CTR	Surface to upper limit	C
	Paya Lebar CTR		D
	Seletar CTR		C
ATZs		Surface to upper limit	D
Uncontrolled airspace			G*

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

CAUTION

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

MAGNETIC INFORMATION FOR THE YEAR 2015

COMMUNICATION FACILITIES

SINGAPORE (ACC) SINGAPORE RADAR	P123.7 S127.3 133.8 (0000-1430)		For Awy B469, G219, G334, L629, L635, L642, M751, M758, M761, M763, M771, N884, N891 & N892 in the vicinity of VMR and VPK.
	P133.25	S135.8	For Awy A457, A464, A576, B466 R325 (all northbound) and R469
	P134.2	S133.35	For Awy B348, G580, L644 & M767.
	P134.4 255.4	S128.1	For Awy A464, A576, G579 (all southbound), B470, L644, N875 and in area in the immediate vicinity of Singapore.
SINGAPORE RADIO	6 556, 11 297 5 655, 8 942, 11 396 6 556.		SEA 1 SEA 2 SEA 3
SINGAPORE APPROACH	APP	P120.3 S124.6	TAR - 1) Intermediate approach to Singapore Changi Airport and other airports in Singapore. 2) Dep from all airports in Singapore.
SINGAPORE ARRIVAL	APP	119.3	TAR - Intermediate and final approach to Singapore Changi Airport.
SINGAPORE/ Singapore Changi (WSSS)	D-ATIS TWR	128.6 118.6	Data Link Service available H24. For Take-off/Landing

P - Primary ; S - Secondary

NOTE : Information on radio communication facilities outside Singapore FIR are not included. See respective AIPs of States concerned.

CONICAL CONFORMAL PROJECTION

CHANGES : Pontianak, Pangkal Pinang, Palembang TMAs and Pontianak, Pangkal Pinang, Jambi, Palembang, Pekanbaru CTRs updated. Jakarta FIR Upper Limit updated.

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WSSL AD 2.6	RESCUE AND FIRE FIGHTING SERVICES	AD 2.WSSL-2
WSSL AD 2.7	SEASONAL AVAILABILITY - CLEARING	AD 2.WSSL-2
WSSL AD 2.8	APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA	AD 2.WSSL-3
WSSL AD 2.9	SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS	AD 2.WSSL-4
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WSSL AD 2.11	METEOROLOGICAL INFORMATION PROVIDED	AD 2.WSSL-11
WSSL AD 2.12	RUNWAY PHYSICAL CHARACTERISTICS	AD 2.WSSL-12
WSSL AD 2.13	DECLARED DISTANCES	AD 2.WSSL-12
WSSL AD 2.14	APPROACH AND RUNWAY LIGHTING	AD 2.WSSL-13
WSSL AD 2.15	OTHER LIGHTING, SECONDARY POWER SUPPLY	AD 2.WSSL-13
WSSL AD 2.16	HELICOPTER LANDING AREA	AD 2.WSSL-14
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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
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11	ATC SERVICE OUTSIDE STIPULATED OPERATING HOURS	AD 2.WSAP-10
WSAP AD 2.21	[NIL] NOISE ABATEMENT PROCEDURES	NIL
WSAP AD 2.22	FLIGHT AND GROUND PROCEDURES	AD 2.WSAP-11
1	DEPARTURE AND ARRIVAL PROCEDURES	AD 2.WSAP-11
2	STANDARD INSTRUMENT DEPARTURES	AD 2.WSAP-11
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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

from such use. It must, further be clearly understood that the controlling authority does not in any way guarantee the safety or fitness of any such apparatus or of any equipment, petrol or oil, or similar products, supplied.

3.7 Production of Documents for Inspection

3.7.1 The pilot-in-command of an aircraft shall produce to any authorised person as and when requested by that person to do so, within reasonable time before the commencement or after the termination of a flight, any of the following documents:

a. Certificate of Airworthiness;
b. Certificate of Registration;
c. The licences of its operating crew and of any person required under paragraph 19 of the Air Navigation Order to be the holder of such a licence;
d. The Telecommunications Log Book in all cases which is required under the Air Navigation Order to be carried in the aircraft;
e. Radio Station Licence;
f. Copy of Load Sheet (Singapore registered aircraft only);
g. Passenger Manifest showing name and place of embarkation and destination;
h. Cargo Manifest;
i. Copy of Certificate of Maintenance Review (Singapore registered aircraft only);
j. Noise Certificate as required by paragraph 51 of the Air Navigation Order.

Note: An 'authorised person' means any person authorised by the Minister either generally or in relation to a particular case or class of cases, and reference to an authorised person include references to the holder for the time being of any office designated by the Minister.

4 CAT II / III OPERATIONS AT AERODROMES

← Refer to WSSS AD 2.22 paragraphs 1.1 to 1.7.

5 FRICTION MEASURING DEVICE USED AND FRICTION LEVEL BELOW WHICH THE RUNWAY IS DECLARED SLIPPERY WHEN IT IS WET

5.1 Responsibility

5.1.1 The Changi Airport Group (Singapore) Pte Ltd is responsible for maintaining the civil aerodromes in a satisfactory condition for flight operations.

5.2 Measurement of Runway Surface Friction

5.2.1 The friction of the runway is calibrated periodically by the use of a Surface Friction Tester using self- wetting features on a clean surface at a speed of 95 km/hr. The principle employed in this case is the measurement of the force acting on the measuring wheel along the distance travelled. The equipment provides a continuous register of the mean coefficient of friction values.

5.2.2 Friction tests will be made over the usable length of the runway, by sections of one third of the length, and at approximately 3, 6, and 9 metres each side of the centreline in such manner as to produce mean values for each runway.

5.2.3 Should the friction value fall to 0.34 or less, NOTAM will be promulgated to notify the runway as liable to be slippery when wet.

5.2.4 The following table would be adopted by Changi Airport Group (Singapore) Civil Maintenance when they report the friction values tested on the runways.

Friction Value (from friction test)	**Changi Airport Group's Comment on values obtained**
> 0.34	Normal
≤ 0.34	May be Slippery when wet (NOTAM would be issued)

6 OTHERS

6.1 Dissemination of Information on Wet Runways

The presence of water on a runway will be reported on RTF using the following descriptions:

DAMP	- the surface shows a change of colour due to moisture
WET	- the surface is soaked but there is no standing water
STANDING WATER	- for aeroplane performance purposes, a runway where more than 25 percent of the runway surface area (whether in isolated areas or not) within the required length and width being used is covered by water more than 3mm deep.

When a runway is reported as DAMP or WET, subject to any notification to the contrary, pilots may assume that an acceptable level of runway wheel braking friction is available. When a runway is reported as having STANDING WATER, wheel braking may be affected by aquaplaning and appropriate operational adjustments should be considered.

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

1	*Apron surface and strength*	*RWY 02L/20R* *RWY 02C/20C*	*Surface:* *Strength:*	Concrete PCN 85/R/B/W/U
2	*Taxiway width, surface and strength*	*RWY 02L/20R* *RWY 02C/20C*	*Width:*	Minimum width of 23m for all taxiways
			Surface:	Cement Concrete - Taxiways W1, W9, E1, E3, E11 and EP (between E10 and E11); Bituminous Concrete - All other Taxiways
			Strength:	PCN 85/R/B/W/U - Taxiways W1, W9, E1, E3, E11 and EP (between E10 and E11); PCN 72/F/B/W/U - All other Taxiways
3	*ACL location and elevation*	See AD-2.WSSS-ADC-2/Chart (flip side) for coordinates and elevations of aircraft stands.		
4	*INS checkpoints*			
5	*Remarks*	NIL		

WSSS AD 2.9 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS

1	*Use of aircraft stand ID signs, TWY guidelines and visual docking/parking guidance system of aircraft stands.*
	Taxiing guidance signs at all intersections with TWY and RWY at all holding positions. Guidelines at apron. Nose-in guidance at aircraft stands. For information on Safegate Aircraft Docking Guidance System, Taxiing Guidance System at Singapore Changi Airport, refer to WSSS AD 2.9. Aircraft stand manoeuvring guidance lights are provided at aircraft stands at Terminal 3, Terminal 4 and South Aprons.
2	*RWY and TWY markings and LGT*
	RWY 02L/02C and RWY 20C RWY LGT: refer to WSSS AD 2.14 and WSSS AD 2.15. TWY LGT: Blue LGT on TWY curved edges, selected straight TWY edge sections and apron TWY edges only. Blue TWY edge markers along selected straight TWY edge sections. Red stop bar at TWY INT controllable on/off. Red stop bar LGT at TWY HLDG PSN entrances to RWY are controllable on/off and are supplemented with elevated RWY guard LGT at the sides. Internally/externally lighted mandatory or information TWY signboards. Yellow TWY centre line markings, supplemented by green centre line LGT with selective control along rapid exit TWY, taxi-routes to and from main RWY and aprons. MARKING AIDS: THR, touchdown zone, centre line, side stripe, RWY designations, aiming point markings, TWY centre line, taxi holding positions - all taxiways, apron guide lines. For positions of aircraft nosewheel in relation to stopbar and description of the Safegate Aircraft Docking Guidance System - refer to WSSS AD 2.9.
	RWY 20R RWY LGT: refer to WSSS AD 2.14 and WSSS AD 2.15. TWY LGT: same as for RWY 02L/02C and RWY 20C. MARKING AIDS: Pre-threshold centre-line, transverse stripe for displaced THR, RWY designations, THR, touchdown zone, aiming point marking, RWY centre-line and stripe marking aids.
3	*Stop bars:* Stop bars where appropriate.
4	*Remarks:* Where Red stop bar is not present at the TWY INT, Yellow INTERMEDIATE HLDG PSN LGT will be used at TWY INT and switched on between sunset and sunrise or during periods of poor visibility.

1 SAFEGATE AIRCRAFT DOCKING GUIDANCE SYSTEM - SAFEDOCK

1.1 INTRODUCTION

1.1.1 The 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. There are two types of ADGS in Singapore Changi Airport, Safedock Type 1 ADGS and Safedock Type 2 ADGS.

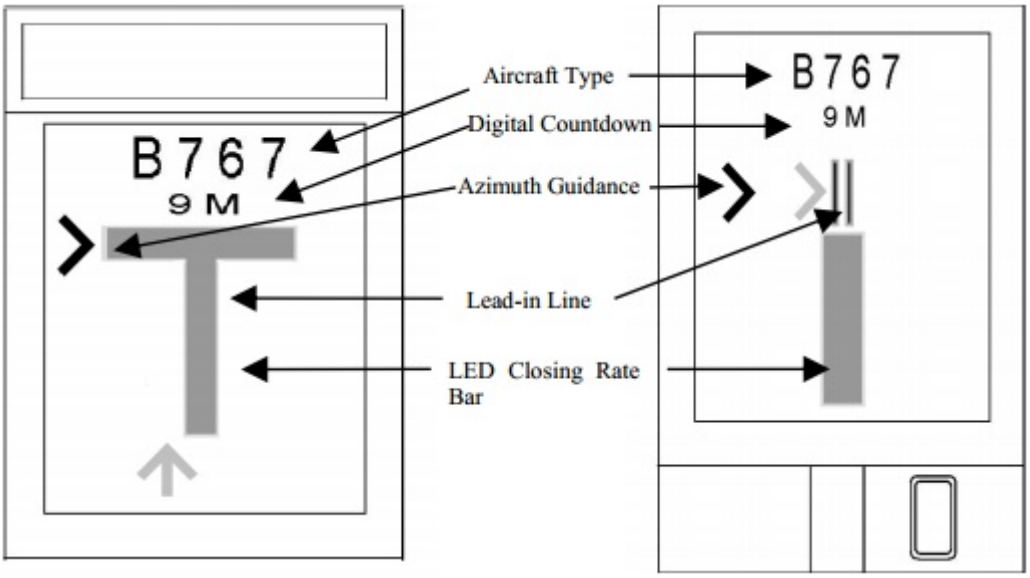
1.2 DESCRIPTION OF SYSTEM

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.

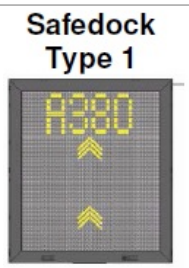
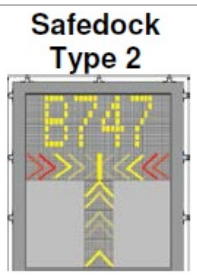
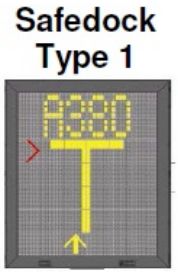
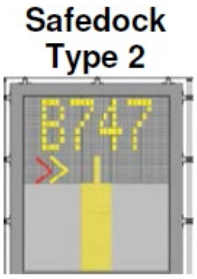
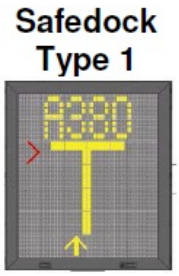
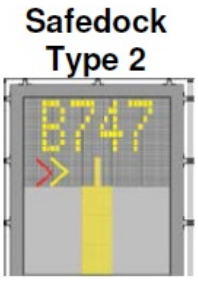
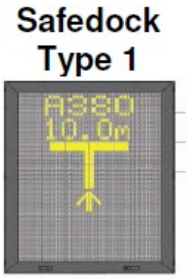
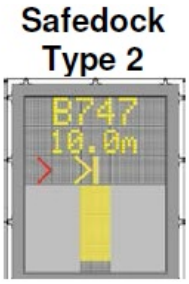
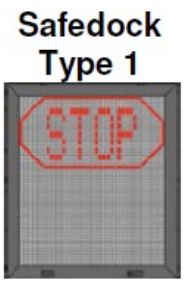
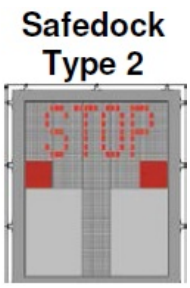
LED DISPLAY AND LASER SCANNING UNIT

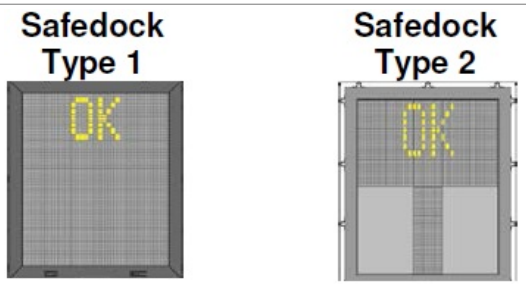
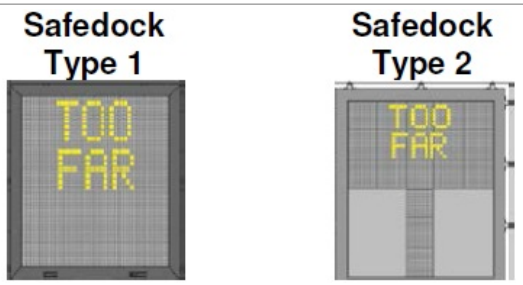
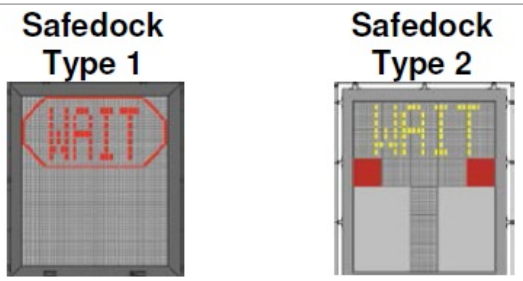
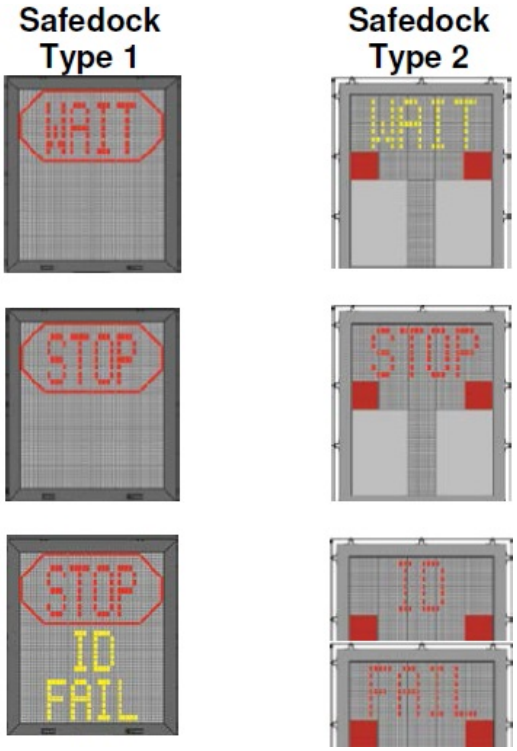


Safedock Type 1 Safedock Type 2

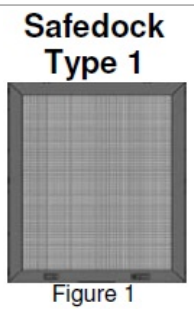
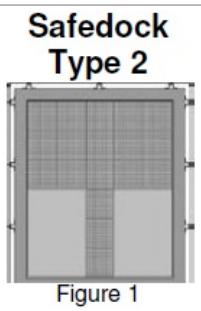
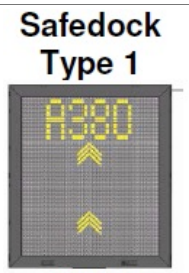
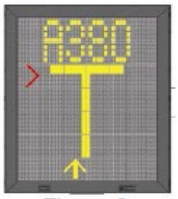
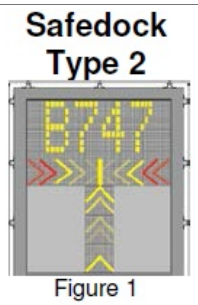
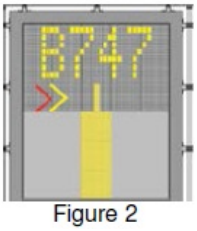
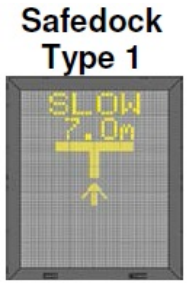
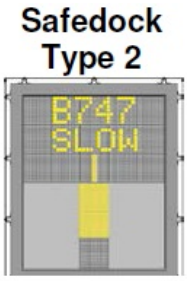
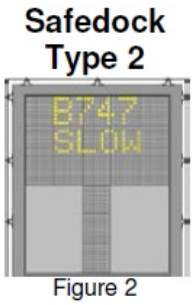
Figure A

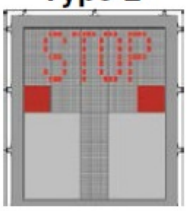
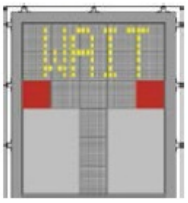
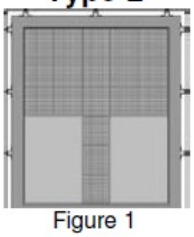
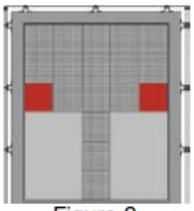
1.3 DOCKING PROCEDURES

Description	Display on ADGS
Checking of Aircraft Type • Check that the correct aircraft type is displayed. The scrolling arrows indicate that the system is activated. • Follow the lead-in line.	 
Capture of Correct Aircraft Type • When the aircraft has been caught by the scanning unit, the scanning unit checks that the aircraft is the correct type and the display provides azimuth guidance information. When the solid yellow closing rate bar appears, the aircraft is being tracked by the system.	 
Steering and Alignment of Aircraft • Look for the flashing red arrow and solid yellow arrow which provide azimuth guidance information. The flashing red arrow shows which direction to steer, while the solid yellow arrow gives an indication of how far the aircraft is off the centreline.	 
Distance of Aircraft from STOP Position • When the aircraft is 15m from the stop position, closing rate information is given. “Distance to go” is indicated by turning off one row of LEDs (Laser Electronic Displays) for every half metre that the aircraft advances towards the stop position. From 15m to the stop position, the display will indicate the distance from the stop position for every 1m. At 3m from the stop position, the display will indicate the distance from the stop position for every 0.2m.	 
STOP Position • When the correct stop position is reached, all of the LEDs for the closing rate bar will be off, the word “STOP” will appear in the display. For Safedock Type 1 ADGS, the word “STOP” will be displayed in red with red border. For Safedock Type 2 ADGS, the word “STOP” will be displayed in yellow and two red, rectangular fields will light in the azimuth guidance area of the display.	 

Description	Display on ADGS
Checking of STOP Position • If the aircraft stops at the correct position, “OK” will be displayed after a few seconds.	
Overshooting of STOP Position • If the aircraft has gone past the correct stop position, the display will show “TOO FAR” after the aircraft comes to a complete stop.	
Object Blocking the View • If some object is blocking the view towards the approaching aircraft or the detected aircraft is lost before 12m to the correct stop position, the system will show “WAIT”.	
Identification of Aircraft • The aircraft must be identified at least 12m before the correct stop position. Otherwise, the display will show “WAIT”, “STOP” and “ID FAIL”.	

1.4 SAFETY MEASURES

Description	Display on ADGS
ADGS Blank / Wrong Aircraft Type • Pilot should not turn an aircraft into the aircraft stand if the docking system is not activated or on seeing a wrong aircraft type displayed on the system.	 Figure 1  Figure 1
Proceeding beyond Passenger Loading Bridges • Pilot should not proceed beyond the passenger loading bridges unless the scrolling arrows (see figure 1) have been superseded by the solid yellow closing rate bar (see figure 2).	 Figure 1  Figure 2  Figure 1  Figure 2
Minimum Speed • When using the docking system, pilots are to taxi into the aircraft stand at minimum speed. The system will display “SLOW” to inform the pilot if the aircraft’s taxiing speed is exceeded 1.2 m/ s.	 
Slow Down (In Abnormal Situations) • In bad weather conditions, the docking system may go into downgrade mode. The display will show the aircraft type and “SLOW” and the scrolling arrows are disabled (see figures 1 & 2). When the system has detected the aircraft, the solid yellow closing rate bar appears. Docking process is allowed to continue but pilot should exercise caution.	 Figure 1  Figure 2

Description	Display on ADGS
Overshooting • To avoid overshooting, pilots are advised to approach the stop position slowly and observe the closing rate information displayed. Pilots should stop the aircraft immediately when seeing the “STOP” or “WAIT” display or when given the stop sign by the aircraft marshaller or is unsure of the information displayed during the docking process.	Safedock Type 1   Safedock Type 2  
No Display • Pilot should stop the aircraft immediately if the display goes black, for power failure (see figure 1) or system failure (see figure 2), during the docking process. The aircraft is to be manually marshalled into the aircraft stand.	Safedock Type 1  Figure 1  Figure 2 Safedock Type 2  Figure 1  Figure 2

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

4.2 ROUTE SELECTION AND PRIORITY

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

4.2.2 All taxiing guidance lights on taxiways leading to the runways terminate at the runway holding positions where, by default, red stopbar lights remain on unless deselected by the runway controller. When deselected, these stopbar lights will re-activate automatically after 60 seconds. Pilots and drivers shall not cross any lighted red stopbar 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 the directional guidance provided by the green taxiway centreline lights and red stop bar lights, 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.

4.4 TAXI INSTRUCTIONS USING THE GREEN TAXIWAY CENTRELINE LIGHTS

4.4.1 ATC will use the phraseology “Taxi on the greens .....” when issuing a clearance to pilots to taxi along the directional guidance provided by the green taxiway centreline lights.

WSSS AD 2.10 AERODROME OBSTACLES

1. Obstacles in Approach / TKOF areas

IN APPROACH / TKOF AREAS			
RWY/Area affected		***Obstacles type, ELEV,Markings/LGT***	**Location of Obstacles**
1		2	3
a)	RWY 20R APCH RWY 02L TKOF	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 1290m from THR RWY 20R
b)	RWY 20C APCH RWY 02C TKOF	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 2630m from THR RWY 20C.
c)	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.
d)	RWY 20R APCH	Two antennae, HGT 72ft AMSL, marked and LGTD	012311N 1035928E
e)	RWY 20R APCH	Antenna, HGT 88ft AMSL, marked and LGTD	012315N 1035931E
f)	RWY 02L APCH	Antenna, HGT 82ft AMSL, marked and LGTD	012051N 1035827E
g)	RWY 02L APCH	Pole, HGT 128ft AMSL, marked and LGTD	011859N 1035748E
h)	RWY 02L APCH	Pole, HGT 160ft AMSL, marked and LGTD	012058N 1035814E
i)	RWY 02L APCH	Pole, HGT 131ft AMSL, marked and LGTD	012038N 1035848E
j)	RWY 20L APCH	Shipping channel	APRX 1600m from THR RWY 20L.
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
a)	Surface wind direction sleeves		LOC at each end of RWY adjacent to GP hut
b)	PAR hut		Besides RWY 02L/20R, opposite the PTB
c)	Frangible PAR reflectors		Located at ends of RWY 02L/20R
d)	GP huts co-located with GP antennae		Within the RWY strip
e)	Antenna, HGT 82ft AMSL, marked and LGTD		012036N 1035819E
f)	Antenna, HGT 85ft AMSL, marked and LGTD		012039N 1035821E
g)	Antenna, HGT 78ft AMSL, marked and LGTD		012042N 1035823E
h)	Antenna, HGT 82ft AMSL, marked and LGTD		012053N 1035827E
i)	Antenna, HGT 78ft AMSL, marked and LGTD		012049N 1035826E
j)	Frangible poles, HGT 9ft AMSL		Installed APRX 200m from centre of RET to identify 58m away from TWY WP CL towards RWY 02L/20R
k)	Frangible mast, HGT 29ft AMSL		012131N 1035956E
l)	Frangible mast, HGT 29ft AMSL		012124N 1035953E
m)	Frangible mast, HGT 29ft AMSL		012114N 1035949E
n)	Frangible mast, HGT 29ft AMSL		012109N 1035947E
o)	Frangible mast, HGT 29ft AMSL		012057N 1035941E
p)	Frangible mast, HGT 29ft AMSL		012046N 1035937E
q)	Frangible mast, HGT 29ft AMSL		012034N 1035932E
r)	Frangible mast, HGT 29ft AMSL		012029N 1035930E
S)	Frangible mast, HGT 29ft AMSL		012017N 1035925E
t)	Frangible mast, HGT 29ft AMSL		012005N 1035920E
u)	Frangible mast, HGT 29ft AMSL		011959N 1035917E
v)	Frangible mast, HGT 29ft AMSL		011952N 1035914E
Remarks: Obstacles are shown on the AOC, IAC and VAC.			

WSSS AD 2.11 METEOROLOGICAL INFORMATION PROVIDED

1	*Associated MET Office*	Singapore Changi (WSSS)
2	*Hours of service*	H24
3	*Office responsible for TAF preparation* *Periods of validity*	Singapore Changi (WSSS) 12, 30
4	*Type of landing forecast, Interval of issuance*	TREND
5	*Briefing/consultation provided*	P
6	*Flight documentation, Language used*	Charts or Tabular forms, English
7	*Charts and other information available for briefing or consultation*	S, U, P
8	*Supplementary equipment available for providing information*	HRPT: High Resolution Picture Transmission APT: Automatic Picture Transmission MDWR: MET Doppler Weather Radar MAINT: Second WED of every month BTN 0200-0900 ALTN period: THU following the second WED.
9	*ATS units provided with information*	Singapore ACC, Singapore RCC
10	*Additional information*	Tel: 65422837 (MET Office)

WSSS AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

Designations RWY NR	TRUE BRG	Dimensions of RWY	Strength (PCN) and surface of RWY and SWY	THR 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	012056.27N 1035838.82E (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	012233.95N 1035920.06E (10.25 M)	4.01 M 4.31 M
02C	023.03°	4000 M x 60 M	72/F/B/W/U Bituminous concrete	011943.51N 1035905.86E (10.27 M)	4.22 M 4.52 M
20C	203.03°	4000 M x 60 M	72/F/B/W/U Bituminous concrete	012143.37N 1035956.46E (10.30 M)	4.48 M 4.56 M

Slope of RWY-SWY Transverse / Longitudinal	SWY Dimensions (m)	CWY Dimensions (m)	STRIP dimensions (m)	OFZ	Remarks
7	8	9	10	11	12
RWY 02L 1.10 / 0.07%	60 X 60	270 X 150	4240 X 300	Yes	Scheduled closure of runways (see below)
RWY 20R 1.10 / 0.07%	60 X 60	270 X 150	4240 X 300		
RWY 02C 1.33 / 0.01%	60 X 60	60 X 150	4240 X 300		
RWY 20C 1.33 / 0.01%	60 X 60	60 X 150	4240 X 300		

Remarks (continued from above)	
Scheduled Closure of RWY 02L/20R	
1a)	BTN 1630-2200 on every MON and THU of the month (*preventive maintenance work*). In the event of an emergency, RWY will be re-opened within 30 minutes.
1b)	BTN 0225-0240 0630-0635 1000-1005 2300-2305 daily (*inspection*). In the event of an emergency, RWY will be re-opened within 5 minutes.
Scheduled Closure of RWY 02C/20C	
2a)	BTN 1630-2200 every SUN and WED (*preventive maintenance work*). In the event of an emergency, RWY will be re-opened within 30 minutes.
2b)	BTN 0300-0315 0650-0655 1020-1025 2320-2325 daily (*inspection*). In the event of emergency, RWY will be re-opened within 5 minutes.

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	3850	4120	3910	Not applicable	
	W3	3050	3320	3110	Not applicable	
	W4	2600	2870	2660	Not applicable	
	W5	2150	2420	2210	Not applicable	
02L	Not applicable	4000	4270	4060	4000	NIL
	W8	3850	4120	3910	Not applicable	
	W7	3050	3320	3110	Not applicable	
	W6	2600	2870	2660	Not applicable	
20C	Not applicable	4000	4060	4060	4000	NIL
	E2	3850	3910	3910	Not applicable	
	E3	3425	3485	3485	Not applicable	
	E4	2750	2810	2810	Not applicable	
	E5	2250	2310	2310	Not applicable	
02C	Not applicable	4000	4060	4060	4000	NIL
	E10	3850	3910	3910	Not applicable	
	E9	3345	3405	3405	Not applicable	
	E8	3205	3265	3265	Not applicable	
	E7	2555	2615	2615	Not applicable	
	E6	2105	2165	2165	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 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 raised White/Amber edge lights.	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 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 in the direction of Rwy 20R before the displaced THR. Bi-directional raised White/Amber edge lights 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 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 raised White/Amber edge lights.	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 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 raised White/Amber edge lights.	Red	Elevated Red

WSSS AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

1	*ABN/IBN location, characteristics and hours of operation*	ABN: 012209.20N 1035858.43E (western side of RWY 02L/20R) ALTN FLG W G EV 2.3 SEC, Operating hours HN + IMC IBN: 012301.27N 1035959.49E (top of Cargo Agents Building E) FLG G 'CH' EV 7 SEC, Operating hours HN + IMC
2	*LDI location and LGT* *Anemometer location and LGT*	Pressure tube anemometer and wind vane situated 345m west of middle of RWY 02L/20R. Cup anemometers and wind vanes at ends and middle of both runways. Windsocks at ends of both runways. Transmissometers at both ends and in the middle of both runways
3	*TWY Edge and Centreline Lighting*	RWY 02L/20R and RWY 02C/20C: Blue lights on TWY curved edges and apron TWY edges and Green centreline lights on all TWY.
4	*Secondary power supply/switch-over time*	Automatic standby generator power supply AVBL for airfield lighting with switchover time of 1 second during Category II low visibility operations.
5	*Remarks*	Vehicles painted yellow or displaying chequered red/white or orange/white flag at highest point of vehicle

WSSS AD 2.16 HELICOPTER LANDING AREA

Refer to ENR 3.4

WSSS AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	**CHANGI CTR** 013300N 1040149E 013042N 1040654E 012542N 1040448E thence along Kuala Lumpur/Singapore FIR BDRY to 012000N 1041218E 010018N 1035524E 011100N 1035134E 013300N 1040149E
2	*Vertical Limits*	SFC to 3,000ft ALT
3	*Airspace Classification*	C
4	*ATS Unit Callsign* *Language(s)*	Singapore Tower English
5	*Transition Altitude*	11000 FT (3,350m)
6	*Remarks*	A helicopter shall not be operated within the Changi CTR unless prior permission has been obtained from the Director-General of Civil Aviation, CAAS. Email to caas_ats_ansp@caas.gov.sg

WSSS AD 2.18 ATS COMMUNICATION FACILITIES

Service Designation	Call sign	*Frequency (P-Pri, S-Sec)*	Hours of operation	Remarks
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, N884, N891 and N892.
		133.8 MHz	0000-1430	
		P133.25 MHz S135.8 MHz	H24	for ATS Routes A457, A464, A576, B466, L762, R325 (all northbound) and R469.
		P134.2 MHz S133.35 MHz		for ATS Routes , G580, L644, M646 and M767
		P134.4 MHz S128.1 MHz 255.4 MHz		for ATS Routes A464, A576, G579 (all southbound), B470, L644, N875 and in area in the immediate vicinity of Singapore.
		124.05 MHz	0000-1530	Flow control service provided for ARR/DEP ACFT
		MAINT Period: Monthly - EV third SAT 1601-2359		
	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	P120.3 MHz S124.6 MHz	H24	TAR - Intermediate approach to Singapore Changi AP and other airports in Singapore. DEP from all airports in Singapore.
	Singapore Arrival	119.3 MHz		TAR - Intermediate and final approach to Singapore Changi Airport.
	ASR I MAINT Period: Monthly, EV first SAT 1601-2359 ASR II MAINT Period: Monthly, EV fourth SAT 1601-2359			

Service Designation	Call sign	*Frequency (P-Pri, S-Sec)*	Hours of operation	Remarks
TWR	Singapore Tower	118.6 MHz	H24	for TKOF/LDG. for ACFT operating on RWY 02L/20R for vehicular movements on RWY 02L/20R
		118.25 MHz	H24	for ACFT operating on RWY 02C/20C for vehicular movements on RWY 02C/20C
	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	H24	for push-back / taxiing of all aircraft for ground movement of aircraft (including towing aircraft) of Terminal 4
		125.65 MHz	H24	for push-back / taxiing of all aircraft for ground movement of aircraft (including towing aircraft) west of Terminal 4
	Singapore Delivery	121.65 MHz	H24	for Pre-flight check/ATC clearance
		119.6 MHz	0030-0230 1200-1300	for issuance of ATC clearance
	Changi Tower / Changi Apron	121.9 MHz	H24	Requests for engine runs on aprons and taxiways, excluding runways, would be regulated by Changi Apron. All towing request to contact Changi Apron followed by instruction to contact respective Singapore Ground frequency for towing clearance. Request for vehicular movements on taxiways, excluding runways, would be regulated by Changi Tower. For aircraft on tow and vehicular movements on the runway when the runway is closed for maintenance. All personnel operating the radio station on board an aircraft that is on the ground in Changi Airport should possess the Aircraft Radio Operator Approval (AROA) or other equivalent certification.
D-ATIS	Singapore Changi Airport Information	128.6 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

WSSS AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of aid and Variation	IDENT	Frequency	OPR Hour	Position of Transmitting Antenna Coordinates	DME Transmitting Antenna Elevation / Remarks
1	2	3	4	5	6 & 7
SINJON DVOR/DME	SJ	113.5 MHz CH82X	H24	011319.28N 1035120.08E	201° MAG 14.5km from THR RWY 02 (Paya Lebar). Antenna HGT: 194ft AMSL. Coverage 200NM. EM: F1. Maintenance period: Third Thursday of every month between 0200-0600
TEKONG DVOR/DME	VTK	116.5 MHz CH112X	H24	012455.36N 1040120.17E	023° MAG 6.4km from THR RWY 20C (Singapore Changi). Antenna HGT: 150ft AMSL. Coverage 200NM. EM: F1 Maintenance Period: Third Friday of every month between 0200-0600
RWY 20C ILS LLZ	ICC	109.7MHz	H24	011932.48N 1035901.21E	Located 368m (1207ft) from THR RWY 02C, along RWY centreline. Course width 3.38°. EM: A0/A2.
RWY 20C ILS GP	-	333.2MHz	H24	012131.70N 1035955.79E	Located 338m (1109ft) from THR RWY 20C on left side of RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS Reference Datum: 17m (56ft). EM: A0/A2.
RWY 20C ILS DME	ICC	CH34X	H24	012131.70N 1035955.79E	DME co-located with GP. EM: P9.
RWY 20C ILS MM	-	75MHz	H24	012212.17N 1040008.60E	Located 960m (3150ft) from THR RWY 20C along extended centreline of RWY. No back beam.
RWY 02C ILS LLZ	ICE	108.3MHz	H24	012154.39N 1040001.14E	Located 368m (1207ft) from THR RWY 20C, along RWY centreline. Course width 3.38°. EM: A0/A2.
RWY 02C ILS GP	-	334.1MHz	H24	011952.09N 1035913.75E	Located 338m (1109ft) from THR RWY 02C on left side of RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS Reference Datum: 17m (56ft). EM: A0/A2.
RWY 02C ILS DME	ICE	CH20X	H24	011952.09N 1035913.75E	DME co-located with GP. EM: P9.
RWY 02C ILS MM	-	75MHz	H24	011915.04N 1035853.83E	Located 945m (3100ft) from THR RWY 02C along extended centreline of RWY. No back beam.
RWY 20R ILS LLZ	ICH	108.9MHz	H24	012045.23N 1035834.17E	Located 368m (1207ft) from THR RWY 02L, along centreline of the RWY. Course width 3.38°. EM: A0/A2.
RWY 20R ILS GP	-	329.3MHz	H24	012225.59N 1035912.29E	Located 330m (1083ft) from displaced THR RWY 20R on right side of the RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS Reference Datum: 17m (56ft). EM: A0/A2.
RWY 20R ILS DME	ICH	CH26X	H24	012225.59N 1035912.29E	DME co-located with GP. RWY 20R ILS DME not available beyond 15 degrees west of RWY 20R centreline below 2500ft. EM: P9.
RWY 20R ILS MM	-	75MHz	H24	012307.51N 1035934.24E	Located 1122m (3681ft) from displaced THR RWY 20R, along centreline of the RWY.

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.

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	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 ‘CH’ 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 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 is 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), the distance from threshold to the furthest edge of the exit taxiway:

RWY	Exit Taxiway (LED in metres)	Remarks
20R	**W6*** (**1655**), **W7*** (**2123**) and W8 (3061)	Note 1: Recommended exit taxiways are bold and underlined. Note 2: * Indicates Rapid Exit Taxiway (RET) and maximum design ground speed for the exit taxiway is 50kts.
20C	**E6*** (**1948**), **E7*** (**2391**) and E8 (3152)	
02L	**W5*** (**1966**), **W4*** (**2491**) and W3* (2876)	
02C	**E5*** (**2055**), **E4*** (**2565**) and E3* (3267)	

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 V7 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 V7 for RWY 20R).
RWY 02C/20C	The preceding aircraft has landed and has passed a point at least 2500m from the threshold of the runway (abeam TWY E4 for RWY 02C or TWY E7 for RWY 20C), is in motion and will vacate the runway without backtracking.	The departing aircraft is/will be airborne and has passed a point at least 2500m from the threshold of the runway (abeam TWY E4 for RWY 02C or TWY E7 for RWY 20C).

2.6 Phraseology

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

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

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

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

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

3.3 Definition of commonly used terms in A-CDM

a. Target Off Block Time (TOBT) – The time an aircraft operator (AO) or ground handling agent (GHA) estimates that an aircraft will be ready, all doors closed, boarding bridge removed, pushback vehicle available and ready to start-up / pushback immediately upon receipt of clearance from ATC.
b. Target Start Up Approval Time (TSAT) – The time provided by ATC that an aircraft can expect start-up / push back approval.
c. Calculated Take Off Time (CTOT) – A time calculated as a result of tactical slot allocation, at which a flight is expected to become airborne.

4 A-CDM PRE-DEPARTURE PROCEDURES

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

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

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

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

4.5 TOBT shall be updated through the following systems:

a. Airport Operations Centre System (AOCS) A-CDM web based portal; or
b. Gate Message Input Display (GMID) at boarding rooms;

4.6 AO/GHA is encouraged to update TOBT through ONLY one of the above systems in order to avoid any chance of a miscommunication.

4.7 TOBT information is available through the following channels:

a. AOCS A-CDM portal;
b. GMID;
c. Aircraft Docking Guidance System (ADGS) at contact stands;
d. Radio communication with GHA or AO.

4.8 The Pre-Departure Sequencer (PDS) will calculate the TSAT automatically by taking into account factors such as TOBT, calculated take-off time (CTOT), variable taxi times (VTT), wake turbulence category, departure separation, etc. A pre-departure sequence is determined from the calculated TSATs, thus the accuracy of TOBT is vital to an optimal TSAT.

4.9 Flights with an invalid or expired TOBT will be instructed by ATC to update TOBT when requesting for clearance. For non-compliant flights, delays can be expected. AO or GHA are strongly encouraged to update TOBT as soon as any expected delay to the aircraft readiness for pushback is made available to avoid unnecessary hold-ups.

4.10 TSAT information is available through the following channels:

a. AOCS A-CDM portal;
b. GMID;
c. ADGS at contact stands;
d. Radio communication with GHA or AO;
e. ATC - Upon issuance of ATC clearance (for flights parked at aircraft stands without ADGS).

5 A-CDM START-UP PROCEDURES

5.1 Pilot shall ensure aircraft is ready for pushback at TOBT.

5.2 Pilot to maintain communication with the AO / GHA as they are responsible for updating the TOBT. Notify the AO / GHA to update the TOBT if it is expected to differ by 5 minutes or more.

5.3 Pilot utilising the DCL service on selected routes shall request for ATC clearance through 'Request for Departure Clearance Downlink' (RCD) message no earlier than 20 minutes before TOBT. Refer to WSSS AD 2.22 paragraph 8.4 on the applicable routes for DCL service and procedures.

5.4 Pilot using voice request to contact Ground Movement Planner (Clearance Delivery) and request for ATC clearance within 5 minutes of TOBT using the following phraseology:

- Callsign
- Destination
- Proposed flight level and alternate level, if any
- Parking position

a. Pilot shall only request for ATC clearance provided aircraft is ready to pushback at TOBT.

5.5 Regardless of clearance through voice or datalink, all departing aircraft must report to Clearance Delivery when ready for push within 5 minutes of TOBT.

5.6 ATC will advise the pilot whether the proposed flight level or other alternate flight level is available and an ATC clearance will be issued accordingly. If pre-departure coordination with an adjacent unit or centre is required, the pilot will be instructed to standby.

5.7 ATC will update TSAT changes if any, during issuance of ATC clearances. Note that TSAT displayed on ADGS may not be final and can be revised due to en-route clearance restrictions, ground congestion or flow measures.

5.8 Pilot shall request for pushback from Ground Movement Control within 5 minutes of TSAT after obtaining ATC clearance, or as directed by ATC.

a. ATC may swap pushback sequence based on real-time readiness of aircrafts to maximise apron and runway capacity and reduce the overall delay to traffic as and when required.
b. At the end of pushback, the departing aircraft must 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

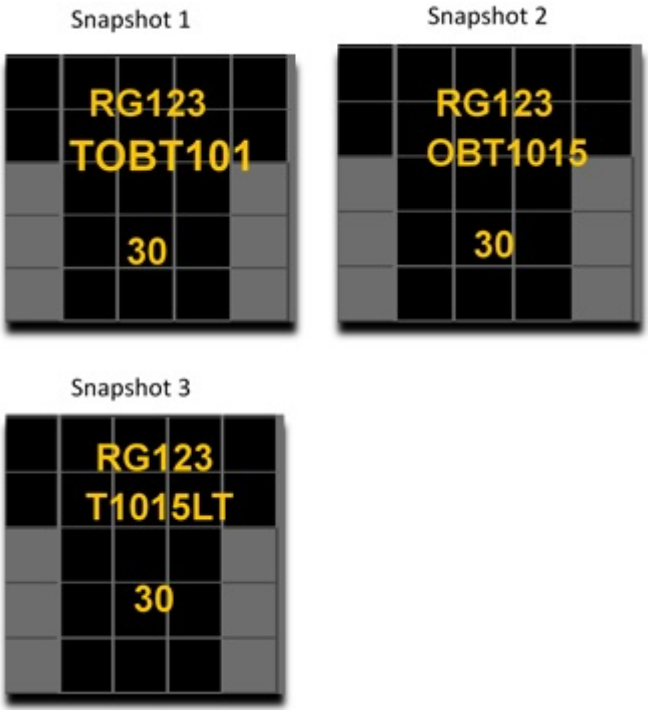
- ATC Clearance on selected ATS routes can be requested via Data Link Departure Clearance (DCL) at TOBT- 20 minutes.
- If DCL is not available, ATC Clearance should be requested via Clearance Delivery at TOBT +/-5 minutes.

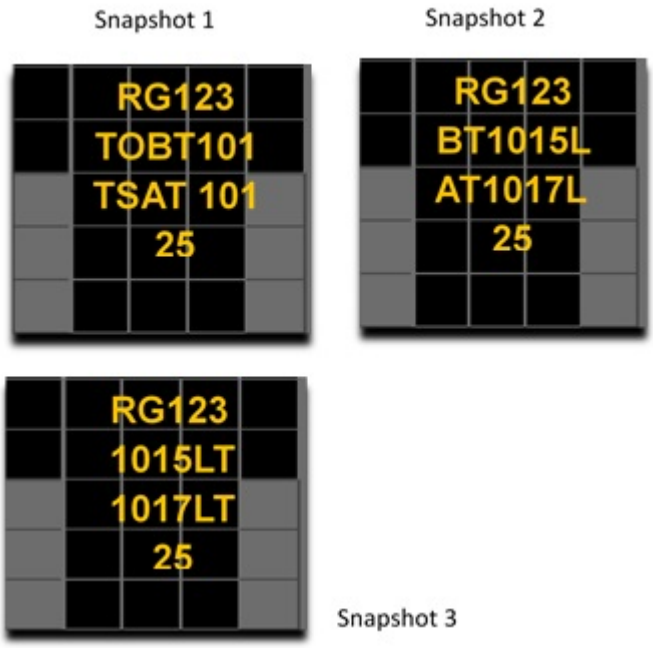
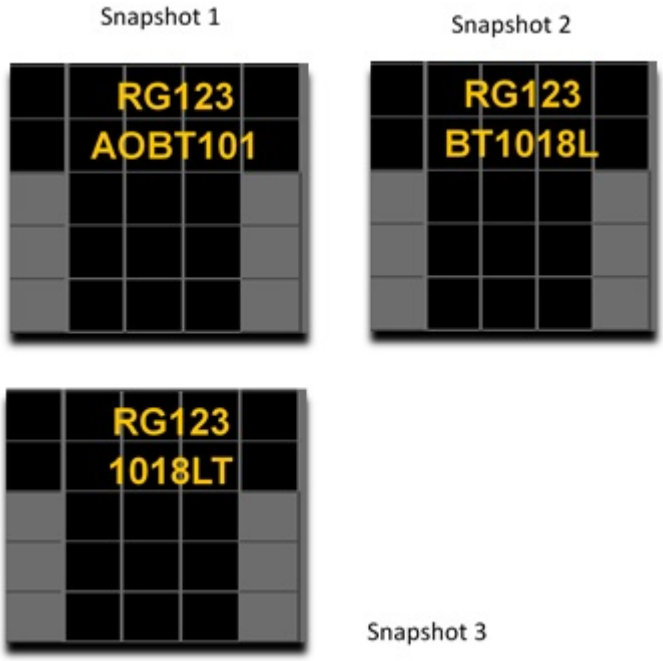
Start-up / Pushback Clearance

- 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.

<table>
<tr><th colspan="2">Aircraft Docking Guidance System (ADGS)</th></tr>
<tr><th>Description</th><th>Display on ADGS</th></tr>
<tr><td>Aircraft arrival to stand
• No change in existing functionality and display</td><td> 
</td></tr>
<tr><td>40 minutes prior to TOBT
• ADGS will display TOBT submitted by AO / GHA and a count down timer (2 digits) to TOBT in minutes
• As ADGS can only display up to 7 characters per line, the displayed message will be scrolling.
• Timings displayed will be in Local Time (LT)
• TOBT timings will change instantly if there is an update done by AO / GHA</td><td> 
</td></tr>
</table>

Aircraft Docking Guidance System (ADGS)	
Description	**Display on ADGS**
25 minutes prior to TOBT • ADGS will display TSAT derived by PDS • As ADGS can only display up to 7 characters per line, the displayed message will be scrolling. • TSAT timings may change as the PDS is continuously optimising push back times based on real time traffic conditions	
Aircraft departure from stand • ADGS will display the actual off-block time (AOBT) • As ADGS can only display up to 7 characters per line, the displayed message will be scrolling • TOBT, TSAT and TOBT countdown timer will be removed • AOBT display will be removed 3 minutes after AOBT	

7 CONTACT AND INFORMATION

7.1 Please contact the airport operator, Changi Airport Group (CAG), at a-cdm@changiairport.com for application of AOCS A-CDM and GMID account or if you have any queries.

7.2 Aircraft operators may also contact their ground handling agent directly on queries regarding TOBT submission.

8 DEPARTURE CLEARANCE (DCL) VIA DATALINK PROCEDURES

8.1 Aircraft need to be equipped with Aircraft Communications Addressing and Reporting System (ACARS) to support DCL application and be compliant with the European Organisation for Civil Aviation Equipment (EUROCAE) ED-85A (Data Link Application System Document (DLASD) for the DCL datalink service) and ARINC Specification 623-3.

8.2 Singapore application of DCL is in accordance with ED-85A.

8.3 The logon ID of the ground system for the provision of DCL service is WSSS.

8.4 DCL service is only applicable for flights departing from WSSS to the following routes / destinations:

a. Destinations in Peninsular Malaysia via ATS Routes A457 and B466
b. Destinations in Thailand via ATS Routes B466 and B469 / M751
c. Destinations in Indonesia via ATS Route A457, R469 and B470
d. Destinations in Australia and New Zealand via ATS Route B470
e. Flights with allocated Calculated Take-Off Time (CTOT) under Bay of Bengal Cooperative Air Traffic Flow Management (BOBCAT)

8.5 Pilot utilising the DCL service on selected routes shall request for ATC clearance through RCD message no earlier than 20 minutes before TOBT.

a. For flights with allocated CTOT under BOBCAT, to input "CTOT HHMMz'' under the free text field in RCD message.
b. For flights routed via ANITO B470, to input "ANITO FLxxx"(ANITO crossing level) under the free text field in RCD message.
c. Pilot shall contact Clearance Delivery or the next assigned frequency in 'Departure Clearance Uplink' (CLD) message within 5 minutes of TOBT using the following phraseology:

- <"Callsign"...With P-D-C, fully ready>

- Provide requested flight level if it differs from PFL filed in flight plan

- Provide CTOT or ANITO crossing if not previously given in RCD message

8.6 DCL message format does not include the requested cruising level and final cruising level.

a. The planned flight level (PFL) filed in flight plan field 15b will be used as requested level unless otherwise specified by pilot.
b. Final cruising level will be assigned by Singapore ATC after airborne and it is subjected to traffic disposition. No on-ground level negotiations or reservations are allowed.

8.7 DCL service does not provide clearance revision. Any revision to the clearance issued via datalink will be made by ATC through voice communications.

8.8 Clearance request through VHF using the existing voice procedures is still available for applicable flights under the DCL service.

8.9 ATC will reject the DCL request and send a "revert to voice procedures" message to the pilot if one of the following occurs:

a. Flight's routes / destinations not stated in paragraph 8.4
b. RCD message does not comply with ED-85A or have inaccurate flight data, e.g. different Callsign / ADES from flight plan
c. Invalid TOBT
d. When required by ATC due to flow restriction

8.10 Upon receipt of any "revert to voice procedures" message, pilot shall cancel any clearance received previously (if any) and follow the existing voice procedures for clearance request, i.e. contact Clearance Delivery within 5 minutes of TOBT.

8.11 Pilot shall monitor the clearance delivery frequency once the DCL process is initiated. In the event of any issues encountered, ATC will revert to voice procedures.

8.12 ATC will revert with CLD message within 5 minutes of receipt of the RCD message. If no CLD message is received, pilot is to call on delivery frequency to verify request.

8.13 Pilot shall respond with 'Departure Clearance Readback Downlink' (CDA) message within 5 minutes of receipt of CLD message. Failure to comply may result in a "revert to voice procedures" message being sent.

Note: The DCL process is only complete and clearance confirmed when CDA message is received and processed successfully.
A "CDA received – clearance confirmed" message will be sent to the pilot.

8.14 Aircraft operator / ground handling agent shall continue to update TOBT to reflect any changes in readiness time in accordance to A-CDM startup procedures stated in AIP Singapore section WSSS AD 2.22 paragraph 5.

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 and 125.65MHz

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 or 118.25MHz). 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 or 118.25MHz 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 or 118.25MHz to 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz or 125.65MHz immediately upon instructed by ATC after clearing the runway. He shall maintain watch on 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz or 125.65MHz 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 02C - TWY E10 or E11

RWY 02L - TWY W8, W9 or W10

RWY 20C - TWY E1, E2

RWY 20R - TWY W1, W2

18.2 The pilot-in-command shall not take-off or land without a clearance from Aerodrome Control.

18.3 The pilot-in-command shall not run-up on the runway in use unless authorised by Aerodrome Control. Engine run-ups in the holding pan or taxiway holding point clear of the runway in use may be carried out subject to approval by Aerodrome Control.

18.4 After landing, the pilot-in-command shall vacate the runway by the shortest suitable route and to contact Singapore Ground Movement Control who will issue specific taxi route instructions to its assigned aircraft stand.

18.5 Aircraft with radio communication failure shall vacate the runway and stop on the taxiway and watch for light signals from Aerodrome Control.

← 19 STANDARD INSTRUMENT DEPARTURE (SID) AND STANDARD INSTRUMENT ARRIVAL (STAR)

19.1 INTRODUCTION

19.1.1 The SIDs and STARs for Singapore Changi Airport require aircraft to be GNSS-equipped and approved with navigation systems that meet the ICAO RNAV-1 navigation specification in accordance to the ICAO Performance Based Navigation Manual (Doc 9613).

19.1.2 To avoid proliferation of SIDs and STARs, the basic RNAV SIDs and STARs follow similar tracks as the RNAV-1 (GNSS) SIDs and STARs using the same set of SIDs and STARs identification.

19.1.3 Operators / pilots who are not approved to operate on the RNAV-1 (GNSS) SIDs and STARs shall notify ATC and operate on the alternate basic RNAV SIDs and STARs or expect radar vectors from ATC.

19.2 ARRIVALS

19.2.1 Arriving aircraft from the various ATS routes shall plan for the respective RNAV-1 STARs with the associated flight planning requirement as shown below:

ATS Route	RNAV-1 STAR	Remarks and Flight Planning Requirement
A464 (southbound to Singapore)	ARAMA	Default STAR shall be ARAMA. When traffic permits and WSSS Runway 20 is in use, ATC will offer LELIB STAR.
A576 (southbound to Singapore)	Not applicable	Southbound flight landing at WSSS are not permitted to flight plan via A576.
G579	REPOV	NIL
G580	KARTO	NIL
L504	OBDOS	NIL
L642	ELALO	ESPOB Q801 Q802 ELALO
L762	ASUNA	NIL

ATS Route	RNAV-1 STAR	Remarks and Flight Planning Requirement
M635	SURGA	NIL
M646	KARTO	NIL
M751 / B469	Not applicable	M751 VPK B469 90 DME PU 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 to intercept the localizer for an ILS approach to the respective runways.

19.3 DEPARTURES

19.3.1 All departing aircraft will be cleared on the appropriate RNAV-1 (GNSS) SIDs and shall climb initially to 3,000ft.

19.3.2 RNAV-1 (GNSS) SIDs will be assigned to departures from Singapore Changi Airport that flight plan on the following ATS routes:

ATS Route	RNAV-1 SID	Remarks and Flight Planning Requirements
A457	MASBO	NIL
B470	ANITO	NIL
G580 / M646	TOMAN	NIL
L504	BAVUS	NIL
L625 / N884	TOMAN	NIL
L762	ADMIM	NIL
M635	VENIX	NIL
M751	MERSING	NIL
M753	MERSING	VMR L642 ENREP M753 Expect radar vectors or further ATC clearance on approaching VMR.
M771	MERSING	VMR DOLOX M771 Expect radar vectors or further ATC clearance on approaching VMR.
M774	KADAR	NIL
N884	Not applicable	Not available for flight planning between VMR and LUSMO. Flight plan via TOMAN L625 LUSMO N884.
N891	MERSING	VMR ENREP N891 Expect radar vectors or further ATC clearance on approaching VMR.
R469	ADMIM	NIL
Y339	AROSO	Flight planning permitted for flights departing from or overflying Singapore to destinations north of Kuala Lumpur and Subang Airports. For flights operating at FL220 and below, to flight plan on A457.

19.4 VERTICAL AND SPEED RESTRICTIONS

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

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
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

Name	Latitude	Longitude	Radius/Distance from VTK	Radius/DIstance from SJ
PAMSI	010459N	1034845E	VTK R-212.3 / D23.6	SJ R-197.2 / D8.7
PASPU	015915N	1040618E	VTK R-008.3 / D34.5	SJ R-018.3 / D48.1
PIBAP	023023N	1040618E	VTK R-004.4 / D65.3	SJ R-011.1 / D78.1
POSUB	012725N	1040748E	VTK R-069.0 / D6.9	SJ R-049.8 / D21.7
PU	012524N	1035600E	VTK R-275.2 / D5.4	SJ R-021.1 / D13.0
REMES	004342N	1035735E	VTK R-185.2 / D41.2	SJ R-167.9 / D30.2
REPOV	001623N	1040300E	VTK R-178.6 / D68.2	SJ R-168.3 / D57.9
RUVIK	011422N	1042033E	VTK R-118.8 / D21.9	SJ R-088.0 / D29.2
RWY 02C DER	012152N	1040000E	VTK R-203.5 / D3.3	SJ R-046.0 / D12.2
RWY 02L DER	012305N	1035933E	VTK R-224.1 / D2.5	SJ R-040.6 / D12.8
RWY 20C DER	011935N	1035902E	VTK R-203.3 / D5.8	SJ R-051.5 / D10.0
RWY 20R DER	012047N	1035835E	VTK R-213.7 / D4.9	SJ R-044.8 / D10.4
SABKA	015051N	1031713E	VTK R-300.4/ D51.2	SJ R-317.7 / D50.7
SAMKO	010530N	1035255E	VTK R-203.5 / D21.1	SJ R-168.0 / D8.0
SANAT	010749N	1035930E	VTK R-186.1 / D17.1	SJ R-123.7 / D9.9
SJ (SINJON)	011319N	1035120E	-	-
SURGA	003657S	1063119E	VTK R-129.1 / D193.3	SJ R-124.6 / D194.3
TOKIM	012933N	1040315E	VTK R-022.7 / D5.0	SJ R-036.7 / D20.1
TOMAN	012147N	1054717E	VTK R-091.7 / D106.2	SJ R-085.9 / D116.5
TOPOM	012955N	1040227E	VTK R-012.8 / D5.1	SJ R-034.2 / D20.0
VENIX	002156S	1060521E	VTK R-130.6 / D163.5	SJ R-125.3 / D164.3
VENPA	002141N	1044955E	VTK R-142.3 / D79.6	SJ R-131.2 / D78.1
VMR	022318N	1035218E	VTK R-351.2 / D58.8	SJ R-000.9 / D69.6
VTK (TEKONG)	012455N	1040120E	-	-

21 SID / STAR PHRASEOLOGIES

21.1 SID / STAR phraseologies allow ATC and pilot to communicate and understand detailed clearance information that would otherwise require long and potentially complex transmissions. To eliminate safety risk due to a mismatch between ATC and pilot expectations when SID / STAR phraseologies are used, and what certain terms may mean, ICAO has published Amendment 7-A to Doc 4444, PANS- ATM to harmonise the core phraseologies that positively reinforce the lateral, vertical and speed requirements embedded in a SID or STAR that will continue to apply, unless explicitly cancelled or amended by the controller.

21.2 The core phraseologies are:

i. CLIMB VIA SID TO (level)
ii. DESCEND VIA STAR TO (level)

21.3 These require the aircraft to:

i. Climb / descend to the cleared level in accordance with published level restrictions;
ii. Follow the lateral profile of the procedure; and
iii. Comply with published speed restrictions or ATC-issued speed control instructions as applicable.

21.4 Phraseologies for removal of speed or level restrictions are:

i. CLIMB VIA SID TO (level), CANCEL SPEED RESTRICTION(S)
ii. DESCEND VIA STAR TO (level), CANCEL LEVEL RESTRICTION(S) AT (point(s))

21.5 These phraseologies mean that:

i. The lateral profile of the procedure continue to apply and
ii. Speed or level restrictions which have not been referred to will continue to apply.

21.6 Phraseologies for variations to the lateral profile of the SID / STAR are:

i. PROCEED DIRECT (waypoint), or
ii. VECTORING

21.7 These phraseologies mean that speed and level restrictions associated with the bypassed waypoints are cancelled.

21.8 Phraseology to clear aircraft to return to SID / STAR is: REJOIN SID / STAR

21.9 This phraseology means that speed and level restrictions associated with the waypoint where the rejoin occurs, as well as those associated with all subsequent waypoints must be complied with.

21.10 The term 'VIA' will no longer be used when issuing lateral routing clearances.

22 ARRIVING AIRCRAFT

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

23 LIGHT AIRCRAFT OPERATIONS

23.1 Light aircraft operations into and out of Singapore Changi Airport may be approved subject to the following conditions:

a. Prior permission has been granted;
b. Aircraft is suitably equipped;
c. Pilot is appropriately rated;
d. Subject to ATC.

23.2 Flight notification shall be given by filing a flight plan.

23.3 All such operations will be regulated in accordance with IFR procedures.

24 SIMULTANEOUS INDEPENDENT PARALLEL APPROACHES

24.1 Introduction

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

24.2 Procedures for simultaneous independent parallel approaches

24.2.1 To ensure safe operations between aircraft on parallel approaches, Normal Operating Zones (NOZs) are established for each extended runway centreline and a No Transgression Zone (NTZ) is established between the NOZs.

24.2.2 ATC will vector arriving flights into Singapore Changi Airport from the final waypoint of the respective STARs to the respective NOZs.

24.2.3 Within the NOZ, ATC shall provide a minimum vertical separation of 1,000ft or 3NM surveillance separation between pairs of aircraft until both aircraft are established on the ILS Localizer course.

24.2.4 ATC is not required to provide separation between aircraft on adjacent ILS Localizers and will monitor aircraft for deviation from the approach path.

24.2.5 Aircraft can expect to maintain altitude 3,500ft till Glide Path Interception for Runway 20R / 02L and 2,500ft till Glide Path Interception for Runway 20C / 02C. This is to ensure the necessary vertical separation prior to establishing on the respective ILS Localizer course.

24.2.6 Aircraft can expect the following radiotelephony phraseology when intercepting the ILS:

a. to intercept the Localizer before clearing for ILS

"**TURN LEFT (RIGHT) HEADING (three digits) MAINTAIN (altitude) REPORT ESTABLISHED ON THE LOCALIZER RUNWAY (number) LEFT (CENTRE / RIGHT)**"

followed by ...

"MAINTAIN (altitude), CLEARED FOR ILS APPROACH RUNWAY (number) LEFT (CENTRE/RIGHT)"

or

b. to intercept ILS

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

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

24.3 Break-out manoeuvre

24.3.1 When an aircraft is observed to have not established on the appropriate Localizer course or deviated from its course towards the NTZ, ATC will instruct the aircraft to return immediately to the correct Localizer course with the following radiotelephony phraseology:

"YOU HAVE CROSSED THE LOCALIZER, TURN LEFT (or RIGHT) IMMEDIATELY AND RETURN TO THE LOCALIZER"

or

"TURN LEFT (or RIGHT) TO RETURN TO LOCALIZER COURSE"

24.3.2 When ATC observed aircraft to be penetrating or will penetrate the NTZ, ATC will instruct the aircraft on the adjacent Localizer course to alter course to avoid the deviating aircraft with the following radiotelephony phraseology:

"TRAFFIC ALERT, TURN LEFT (or RIGHT) IMMEDIATELY HEADING (degrees), CLIMB AND MAINTAIN (altitude)"

24.4 Pilot notification and conditions for operations

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

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

WSSS AD 2.23 ADDITIONAL INFORMATION

1 BIRD CONCENTRATION IN THE VICINITY OF THE AIRPORT

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

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

1.2 There could be an increase in bird activities during the migratory months of September to April. 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/20/R 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
Precision Approach Terrain Chart - ICAO - RWY 02L AD-2-WSSS-PATC-1
Precision Approach Terrain Chart - ICAO - RWY 20C AD-2-WSSS-PATC-2
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$_{(GNSS)}$ STAR - RWY 02L/02C - ARAMA 1A ..... AD-2-WSSS-STAR-1 to 1.1
RNAV$_{(GNSS)}$ STAR - RWY 02L/02C - ASUNA 1A ..... AD-2-WSSS-STAR-2 to 2.1
RNAV$_{(GNSS)}$ STAR - RWY 20R/20C - ARAMA 1B ..... AD-2-WSSS-STAR-3 to 3.1
RNAV$_{(GNSS)}$ STAR - RWY 20R/20C - ASUNA 1B ..... AD-2-WSSS-STAR-4 to 4.1
RNAV$_{(GNSS)}$ STAR - RWY 02L/02C - KARTO 1A ..... AD-2-WSSS-STAR-5 to 5.1
RNAV$_{(GNSS)}$ STAR - RWY 02L/02C - OBDOS 1A ..... AD-2-WSSS-STAR-6 to 6.1
RNAV$_{(GNSS)}$ STAR - RWY 20R/20C - KARTO 1B ..... AD-2-WSSS-STAR-7 to 7.1
RNAV$_{(GNSS)}$ STAR - RWY 20R/20C - OBDOS 1B ..... AD-2-WSSS-STAR-8 to 8.1
RNAV$_{(GNSS)}$ STAR - RWY 20R/20C - LELIB 3B ..... AD-2-WSSS-STAR-9 to 9.1
RNAV$_{(GNSS)}$ STAR - RWY 02L/02C - MABAL 2A ..... AD-2-WSSS-STAR-11 to 11.1
RNAV$_{(GNSS)}$ STAR - RWY 20R/20C - MABAL 2B ..... AD-2-WSSS-STAR-13 to 13.1
RNAV$_{(GNSS)}$ STAR - RWY 02L - LEBAR 2A ..... AD-2-WSSS-STAR-14 to 14.1
RNAV$_{(GNSS)}$ STAR - RWY 20R - LEBAR 2B ..... AD-2-WSSS-STAR-15 to 15.1
RNAV$_{(GNSS)}$ STAR - RWY 02L/02C - REPOV 1A ..... AD-2-WSSS-STAR-16 to 16.1
RNAV$_{(GNSS)}$ STAR - RWY 02L/02C - SURGA 1A ..... AD-2-WSSS-STAR-17 to 17.1
RNAV$_{(GNSS)}$ STAR - RWY 20R/20C - REPOV 1B ..... AD-2-WSSS-STAR-18 to 18.1
RNAV$_{(GNSS)}$ STAR - RWY 20R/20C - SURGA 1B ..... AD-2-WSSS-STAR-19 to 19.1
RNAV$_{(GNSS)}$ STAR - RWY 02L/02C - ELALO 1A ..... AD-2-WSSS-STAR-20 to 20.1
RNAV$_{(GNSS)}$ STAR - RWY 20R/20C - 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 - RNAV$_{(GNSS)}$ AD-2-WSSS-IAC-9
Instrument Approach Chart - ICAO - RWY 02C - RNAV$_{(GNSS)}$ AD-2-WSSS-IAC-10
Instrument Approach Chart - ICAO - RWY 20R - RNAV$_{(GNSS)}$ AD-2-WSSS-IAC-11
Instrument Approach Chart - ICAO - RWY 20C - RNAV$_{(GNSS)}$ AD-2-WSSS-IAC-12
Visual Approach Chart - ICAO AD-2-WSSS-VAC-1

AERODROME CHART - ICAO

01° 21' 33"N
103°59' 22"E

AERODROME ELEVATION 6.66m

		RAMP TWR	
TWR	118.6 / 118.25	GND	122.55 (GMC 4 EAST)
GND	124.3 / 121.85 / 121.725		125.65 (GMC 4 WEST)
DELIVERY	121.65		

SINGAPORE/SINGAPORE CHANGI

PAPI 3° (MEHT)*

Pilot's eye height over the threshold when the following PAPI lights come into view.	RUNWAY 02L	20R	02C	20C
2 White lights and 2 red lights	20.0m	20.0m	19.8m	19.8m
3 White lights and 1 red light	24.0m	22.6m	23.7m	23.7m
4 White lights	26.4m	25.0m	26.2m	26.2m

* MEHT . Minimum Eye Height Over the Threshold.
Note . Aircraft with eye-to-wheel height greater than 8 metres are advised to fly with 2 white lights and 2 red lights visible so as to achieve sufficient wheel clearance.

RWY	DIRECTION	THR	GEOID UNDULATION	BEARING STRENGTH
02L	023°	01 20 56.27N 103 58 38.82E	10.24m	PCN 72/F/B/W/U
20R (DISP THR)	203°	01 22 33.95N 103 59 20.06E	10.25m	
02C	023°	01 19 43.51N 103 59 05.86E	10.27m	
20C	203°	01 21 43.37N 103 59 56.46E	10.30m	
TAXIWAYS	BEARING STRENGTH PCN 85/R/B/W/U - Taxiways W1, W9, E1, E3, E11 and EP (between E10-E11) PCN 72/F/B/W/U - All other Taxiways			
APRONS	BEARING STRENGTH PCN 85/R/B/W/U			

ANNUAL CHANGE NEGLIGIBLE VAR 26E (2015)

ELEVATIONS AND DIMENSIONS IN METRES

TAXIWAYS 30m WIDE

NOTE :
SEE FLIP SIDE FOR DETAILS OF
I) INS COORDINATES FOR AIRCRAFT STANDS AND PRE-FLIGHT ALTIMETER CHECK LOCATIONS.
II) RESTRICTIONS ON TAXIWAYS.

TANAH MERAH COUNTRY CLUB CLUB HOUSE

4 000m X 60m BITUMINOUS CONCRETE

3 260m X 60m BITUMINOUS CONCRETE

STRIP 4 240m X 300m

OBSTACLE FREE ZONE

ILS LLZ ICH 108.9 — ILS GP 330.8 DME CH46x — ILS GP 329.3 DME CH26x — ILS LLZ ICW 110.9 — ILS LLZ ICC 109.7 — ILS GP 334.1 DME CH20x — ILS GP 333.2 DME CH34x — ILS LLZ ICE 108.3

T1 WEST APRON · T1 CENTRAL APRON · T1 EAST APRON · T2 SOUTH APRON · T2 NORTH APRON · T2 CENTRAL APRON · T3 SOUTH APRON · T3 NORTH APRON · TERMINAL 1 · TERMINAL 2 · TERMINAL 3 · TERMINAL 4 · JEWEL · SOUTH APRON · EAST REMOTE APRON · SOUTH-EAST REMOTE APRON · NORTH REMOTE APRON · NORTH - EAST REMOTE APRON · ECHO NORTH (EN) · WEST CARGO APRON · EAST CARGO APRON · NORTH SERVICE APRON · EAST SERVICE APRON · AIRPORT LOGISTIC APRON

Taxilane S6 · Taxilane WD · Taxilane N1 · Taxilane N2 · Taxilane N3 · Taxilane C6 · Taxilane C5 · Taxilane C2 · Taxilane C1 · Taxilane P7 · Taxilane P2 · Taxilane EA

Airport Boulevard · East Coast Parkway (ECP) · Pan Island Expressway (PIE) · Changi Coast Road · Aviation Park Road · Changi Creek Reservoir · Basin Canal

TAXIWAY GATE

JOHOR-SINGAPORE Ferry Terminal

LEGEND

	Aircraft Stands and Taxiways Markings
	Runway Centre Line Lights
	Runway Edge Lights
	White Touchdown Zone Lights
	Blue Taxiway Edge Lights
	Green Taxiway CentreLine Lights
	Cat II Holding Position Markings Red Stop Bar Lights Controllable ON/OFF
	Twy Intersection Holding Position Markings Red Stop Bar Lights Controllable ON/OFF
	Blue Taxiway Edge Markers
EN NC1 NC2 NC3 SC1 SC2	ECHO NORTH NORTH CROSS 1 NORTH CROSS 2 NORTH CROSS 3 SOUTH CROSS 1 SOUTH CROSS 2
⊠	iFERRET Tower

Metres 100 0 100 200 300 400 500 600 700 800 900 1000 Metres

Changes : Lead-in lines to Aircraft Stands E7 and F36 added. Perimeter fence, road alignment at Runway 20C end and road diversion to Acehub facilities building updated. Taxiways/Taxilanes A1, A2, A3, A4, A5, A6, A7, B1, B2 and B3 redesignated as Taxiways/Taxilanes P2, P3, P4, P5, P6, P7, P1, R1, R2 and R3 respectively.

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

LOCATION	STAND NR	NORTH LAT	EAST LONG	ELEVATION
T3 SOUTH APRON	A1	01 21 21.52	103 59 06.25	4.75m (15.58ft)
	A2	01 21 21.75	103 59 04.00	4.65m (15.26ft)
	A3	01 21 19.86	103 59 02.79	4.66m (15.29ft)
	A4	01 21 17.61	103 59 02.54	4.79m (15.72ft)
	A5	01 21 15.50	103 59 03.62	4.86m (15.94ft)
	A9	01 21 12.56	103 59 03.65	5.02m (16.47ft)
	A10	01 21 10.34	103 59 02.40	5.04m (16.54ft)
	A11	01 21 07.93	103 59 01.41	5.25m (17.22ft)
	A12	01 21 05.76	103 59 00.49	5.38m (17.65ft)
	A13	01 21 03.59	103 58 59.58	5.48m (17.98ft)
	A14	01 21 01.66	103 58 57.59	5.57m (18.27ft)
	A15	01 21 00.77	103 58 55.41	5.46m (17.91ft)
	A16	01 20 59.27	103 58 54.20	5.51m (18.08ft)
	A17	01 20 57.25	103 58 54.06	5.23m (17.16ft)
	A18	01 20 55.87	103 58 55.25	5.37m (17.62ft)
	A19	01 20 55.26	103 58 57.13	5.40m (17.72ft)
	A20	01 20 56.09	103 58 58.83	5.45m (17.88ft)
	A21	01 20 57.10	103 59 00.80	5.49m (18.01ft)
T3 NORTH APRON	B1	01 21 26.86	103 59 08.37	4.82m (15.81ft)
	B2	01 21 28.18	103 59 06.82	4.68m (15.35ft)
	B3	01 21 30.33	103 59 07.30	4.65m (15.26ft)
	B4	01 21 32.03	103 59 08.60	4.75m (15.58ft)
	B5	01 21 32.98	103 59 10.89	4.80m (15.75ft)
	B6	01 21 35.15	103 59 13.16	4.96m (16.27ft)
	B7	01 21 37.65	103 59 13.93	4.97m (16.31ft)
	B8	01 21 39.94	103 59 15.20	5.09m (16.70ft)
	B9	01 21 42.19	103 59 16.16	5.13m (16.83ft)
	B10	01 21 44.47	103 59 17.12	5.10m (16.73ft)
T1 WEST APRON	C1	01 21 46.75	103 59 18.08	5.09m (16.70ft)
	C20	01 21 48.83	103 59 19.23	5.08m (16.67ft)
	C22	01 21 51.00	103 59 20.13	5.15m (16.90ft)
	C23	01 21 53.56	103 59 20.77	5.08m (16.67ft)
	C24	01 21 56.54	103 59 20.97	4.89m (16.04ft)
	C25	01 21 59.12	103 59 20.59	4.99m (16.37ft)
	C26	01 22 01.48	103 59 20.76	5.01m (16.44ft)
T1 CENTRAL APRON	C11	01 21 47.42	103 59 23.82	5.07m (16.63ft)
	C13	01 21 49.64	103 59 24.75	5.05m (16.57ft)
	C15	01 21 51.90	103 59 25.71	5.05m (16.57ft)
	C16	01 21 53.47	103 59 26.62	4.86m (15.94ft)
	C17	01 21 55.50	103 59 26.20	5.01m (16.44ft)
	C17L	01 21 54.75	103 59 26.22	4.96m (16.27ft)
	C17R	01 21 56.01	103 59 25.68	5.12m (16.80ft)
	C18	01 21 57.86	103 59 25.75	4.99m (16.37ft)
	C19	01 21 59.79	103 59 25.63	4.95m (16.24ft)
	D30	01 21 44.54	103 59 30.14	5.09m (16.70ft)
	D32	01 21 46.73	103 59 31.07	5.08m (16.67ft)
	D34	01 21 49.03	103 59 32.04	5.07m (16.63ft)
	D35	01 21 50.87	103 59 32.82	5.02m (16.47ft)
	D36	01 21 51.98	103 59 34.52	5.06m (16.60ft)
	D37	01 21 53.37	103 59 36.28	4.97m (16.31ft)
	D38	01 21 54.58	103 59 37.77	4.99m (16.37ft)
T1 EAST APRON	D40	01 21 38.13	103 59 32.89	5.11m (16.77ft)
	D40L	01 21 37.38	103 59 32.83	5.09m (16.70ft)
	D40R	01 21 38.77	103 59 32.84	5.13m (16.83ft)
	D41	01 21 40.30	103 59 33.81	5.07m (16.63ft)
	D42	01 21 42.77	103 59 34.58	5.15m (16.89ft)
	D42L	01 21 42.00	103 59 34.47	5.12m (16.79ft)
	D42R	01 21 43.45	103 59 34.44	5.21m (17.09ft)
	D44	01 21 44.97	103 59 35.44	5.14m (16.86ft)
	D46	01 21 47.40	103 59 36.72	5.08m (16.67ft)
	D47	01 21 49.19	103 59 38.89	4.93m (16.17ft)
	D48	01 21 50.60	103 59 40.77	4.96m (16.31ft)
	D49	01 21 52.23	103 59 42.35	4.98m (16.34ft)
T2 NORTH APRON	E8	01 21 27.99	103 59 38.45	4.68m (15.35ft)
	E10	01 21 24.15	103 59 32.67	4.71m (15.45ft)
	E11	01 21 25.57	103 59 34.37	4.78m (15.68ft)
	E12	01 21 27.20	103 59 36.42	4.75m (15.58ft)
	E20	01 21 24.36	103 59 27.08	5.04m (16.54ft)
	E22	01 21 26.64	103 59 28.04	5.07m (16.63ft)
	E24	01 21 29.01	103 59 29.06	5.09m (16.70ft)
	E24L	01 21 28.32	103 59 28.77	5.10m (16.73ft)
	E24R	01 21 29.53	103 59 29.28	5.08m (16.67ft)
	E26	01 21 31.19	103 59 29.96	5.08m (16.67ft)
	E27	01 21 33.56	103 59 30.96	5.07m (16.62ft)
	E27L	01 21 32.79	103 59 30.86	5.03m (16.48ft)
	E27R	01 21 34.20	103 59 30.91	5.12m (16.80ft)
	E28	01 21 35.74	103 59 31.89	5.08m (16.67ft)

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

LOCATION	STAND NR	NORTH LAT	EAST LONG	ELEVATION
T2 CENTRAL APRON	E1	01 21 20.02	103 59 25.58	4.91m (16.11ft)
	E2	01 21 19.28	103 59 27.30	4.90m (16.08ft)
	E3	01 21 18.44	103 59 29.27	4.82m (15.81ft)
	E4	01 21 18.10	103 59 31.70	4.80m (15.75ft)
	E5	01 21 19.56	103 59 33.72	4.90m (16.08ft)
	E6	01 21 21.22	103 59 35.93	4.84m (15.88ft)
	E7	01 21 22.48	103 59 37.46	4.73m (15.52ft)
	F30	01 21 14.71	103 59 23.33	4.92m (16.14ft)
	F31	01 21 13.87	103 59 25.30	4.91m(16.11ft)
	F32	01 21 13.03	103 59 27.26	4.85m (15.91ft)
	F33	01 21 11.30	103 59 28.54	4.91m (16.11ft)
	F34	01 21 08.98	103 59 28.96	4.92m (16.14ft)
	F35	01 21 06.60	103 59 29.55	4.91m (16.11ft)
	F35L	01 21 06.06	103 59 30.13	4.74m (15.55ft)
	F35R	01 21 06.96	103 59 29.05	5.04m (16.54ft)
	F36	01 21 04.34	103 59 29.67	4.82m (15.81ft)
T2 SOUTH APRON	F37	01 20 59.83	103 59 27.87	4.75m (15.58ft)
	F40	01 21 05.62	103 59 25.34	4.85m (15.91ft)
	F41	01 21 03.19	103 59 25.58	4.82m (15.81ft)
	F42	01 21 00.61	103 59 25.96	4.72m (15.49ft)
	F50	01 21 10.69	103 59 21.32	5.03m (16.50ft)
	F52	01 21 08.51	103 59 20.40	5.11m (16.77ft)
	F52L	01 21 07.82	103 59 20.11	5.16m (16.93ft)
	F52R	01 21 09.04	103 59 20.62	5.08m (16.67ft)
	F54	01 21 06.14	103 59 19.40	5.22m (17.13ft)
	F56	01 21 03.96	103 59 18.48	5.30m (17.39ft)
	F56L	01 21 03.27	103 59 18.18	5.42m (17.78ft)
	F56R	01 21 04.49	103 59 18.70	5.34m (17.52ft)
	F58	01 21 01.58	103 59 17.47	5.49m (18.01ft)
	F59	01 20 59.41	103 59 16.55	5.64m (18.50ft)
	F59L	01 20 58.72	103 59 16.26	5.67m (18.60ft)
	F59R	01 20 59.93	103 59 16.78	5.60m (18.37ft)
	F60	01 20 56.91	103 59 15.50	5.77m (18.93ft)
EAST REMOTE APRON	200	01 20 47.83	103 59 11.67	6.23m (20.44ft)
	200L	01 20 46.91	103 59 11.92	6.29m (20.64ft)
	200R	01 20 48.35	103 59 11.89	6.18m (20.28ft)
	201	01 20 49.99	103 59 12.62	5.96m (19.55ft)
	202	01 20 52.34	103 59 13.57	5.94m (19.49ft)
	202L	01 20 51.65	103 59 13.28	5.76m (18.90ft)
	202R	01 20 52.87	103 59 13.79	5.73m (18.80ft)
	203	01 20 54.52	103 59 14.47	5.92m (19.42ft)
SOUTH-EAST REMOTE APRON	205	01 20 43.91	103 59 17.06	4.77m (15.65ft)
	206	01 20 46.08	103 59 17.98	4.76m (15.62ft)
	207	01 20 47.91	103 59 18.88	4.74m (15.55ft)
	208	01 20 49.48	103 59 19.54	4.74m (15.55ft)
	209	01 20 51.06	103 59 20.21	4.75m (15.58ft)
NORTH REMOTE APRON	300	01 22 06.95	103 59 22.67	4.53m (14.86ft)
	301	01 22 06.41	103 59 24.69	4.93m (16.17ft)
	302	01 22 05.21	103 59 26.75	4.97m (16.31ft)
	303	01 22 03.55	103 59 31.40	5.32m (17.45ft)
	304	01 22 02.84	103 59 33.06	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	3.91m (12.83ft)
SOUTH APRON	461	01 20 39.67	103 58 52.75	5.28m (17.32ft)
	462	01 20 40.89	103 58 50.37	5.75m (18.86ft)
	462L	01 20 40.41	103 58 51.02	5.48m (17.98ft)
	462R	01 20 40.97	103 58 49.71	5.71m (18.73ft)
	463	01 20 41.80	103 58 47.76	5.97m (19.59ft)
	463L	01 20 41.52	103 58 48.42	5.82m (19.10ft)
	463R	01 20 42.06	103 58 47.17	5.82m (19.10ft)
	464	01 20 32.33	103 58 49.39	4.98m (16.34ft)
	465	01 20 33.61	103 58 47.20	5.01m (16.44ft)
	466	01 20 34.53	103 58 45.05	5.01m (16.44ft)
	467	01 20 27.32	103 58 45.73	5.01m (16.44ft)
	468	01 20 28.34	103 58 43.34	5.00m (16.41ft)
	469	01 20 29.36	103 58 40.96	5.02m (16.47ft)
	471	01 20 23.76	103 58 44.49	5.16m (16.93ft)
	472	01 20 24.55	103 58 43.24	5.16m (16.93ft)
	473	01 20 25.12	103 58 41.90	5.16m (16.93ft)
	474	01 20 25.70	103 58 40.56	5.16m (16.93ft)
	475	01 20 26.27	103 58 39.22	5.16m (16.93ft)
	476	01 20 19.16	103 58 41.47	5.16m (16.93ft)
	477	01 20 19.74	103 58 40.13	5.16m (16.93ft)
	478	01 20 20.31	103 58 38.79	5.16m (16.93ft)
	479	01 20 20.88	103 58 37.45	5.16m (16.93ft)
	480	01 20 21.45	103 58 36.11	5.16m (16.93ft)
	481	01 20 25.27	103 58 32.56	5.22m (17.13ft)
	482	01 20 26.62	103 58 33.13	5.22m (17.13ft)
	483	01 20 27.96	103 58 33.70	5.22m (17.13ft)
	484	01 20 29.31	103 58 34.27	5.22m (17.13ft)
	485	01 20 30.66	103 58 34.84	5.22m (17.13ft)
	486	01 20 32.01	103 58 35.41	5.22m (17.13ft)
	487	01 20 33.36	103 58 35.98	5.22m (17.13ft)
T4 APRON	G1	01 20 07.58	103 59 00.97	3.95m (12.96ft)
	G2	01 20 08.88	103 59 01.52	3.95m (12.96ft)
	G3	01 20 10.18	103 59 02.07	3.95m (12.96ft)
	G4	01 20 11.48	103 59 02.07	3.94m (12.93ft)
	G5	01 20 12.77	103 59 03.17	3.94m (12.93ft)
	G6	01 20 14.49	103 59 03.89	3.93m (12.89ft)
	G7	01 20 15.70	103 59 04.57	3.89m (12.76ft)
	G8	01 20 17.01	103 59 05.12	3.85m (12.63ft)
	G9	01 20 18.31	103 59 05.67	3.85m (12.63ft)
	G10	01 20 19.60	103 59 06.22	3.86m (12.66ft)
	G11	01 20 20.90	103 59 06.77	3.84m (12.60ft)
	G12	01 20 22.20	103 59 07.31	3.83m (12.57ft)
	G13	01 20 23.50	103 59 07.86	3.82m (12.53ft)
	G14	01 20 24.79	103 59 08.41	3.83m (12.57ft)
	G15	01 20 26.09	103 59 08.96	3.83m (12.73ft)
	G16	01 20 27.39	103 59 09.50	4.05m (13.29ft)
	G17	01 20 28.69	103 59 10.05	4.00m (13.12ft)
	G18	01 20 31.53	103 59 11.86	4.36m (14.30ft)
	G18L	01 20 32.05	103 59 12.85	4.34m (14.24ft)
	G18R	01 20 31.65	103 59 11.26	4.43m (14.53ft)
	G19	01 20 32.64	103 59 09.25	4.56m (14.96ft)
	G19L	01 20 33.17	103 59 11.26	4.47m (14.67ft)
	G19R	01 20 32.77	103 59 08.66	4.56m (14.96ft)
	G20	01 20 33.75	103 59 06.65	4.52m (14.83ft)
	G20L	01 20 34.13	103 59 07.58	4.44m (14.57ft)
	G20R	01 20 33.99	103 59 06.10	4.52m (14.83ft)
	G21	01 20 34.87	103 59 04.04	4.51m (14.80ft)
	G21L	01 20 35.24	103 59 04.98	4.52m (14.83ft)
	G21R	01 20 35.10	103 59 03.49	4.55m (14.93ft)

RESTRICTIONS ON TAXIWAYS

1) Pilots are advised to apply minimum thrust when
   i) turning into TWY P2, P4, P5 and Taxilane P6 while taxiing either northwards or southwards on Taxilane P7, and
   ii) thereafter when taxiing along TWY P2 up to and including the TWY P1/P2 junction.
   This is in view of apron activities at aircraft stands D40, D41, D47, D48, D49, E22, E24, E27 and E28.

2) TWY SA can only be used by aircraft with maximum wingspan 65m. TWY SA is a one-way live TWY for aircraft taxiing into SASCO hangar via RWY 02L. Only tow-out operation is allowed from SASCO hangar into TWY SA and RWY 02L.

3) TWY NC3 (between TWY WA and TWY P7) can only be used by aircraft with maximum wingspan 65m.

4) Taxiway centreline along TWY EP between TWY R1 and R3 offset eastward by 2.5m away from aircraft stands E7 and F36.

5) Pilots are advised to apply minimum thrust when turning into taxiway WA from taxilane V6.

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

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

8) Taxilane P7 (behind aircraft stands E20 to E24) and Taxilane C6 (behind aircraft stands F50 to F54) can only be used by aircraft with maximum wingspan 65m (towing and pushback exempted).

9) Taxilane L5 can only be used by aircraft with maximum wingspan 36m.

10) TWY L8, L9 and L10 can only be used by aircraft with maximum wingspan 65m.

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

12) Pilots are advised to apply speed limit of 20 knots when taxiing along TWY SOUTH CROSS 1 and SOUTH CROSS 2.

13) Pilots turning aircraft into aircraft stand A2 or aircraft stand B2 are advised to wait for any aircraft holding at Taxilane V6, at the inner cul-de-sac portion of the terminal building to vacate this portion before turning into aircraft stand A2 or aircraft stand B2.

14) TWY M, M4, M5, M6 and M7 are solely for use by Republic of Singapore Air Force (RSAF) aircraft.

15) TWY located western side of RWY 02L/20R, between TWY M5 and TWY M6 is solely for use by Republic of Singapore Air Force (RSAF) aircraft.

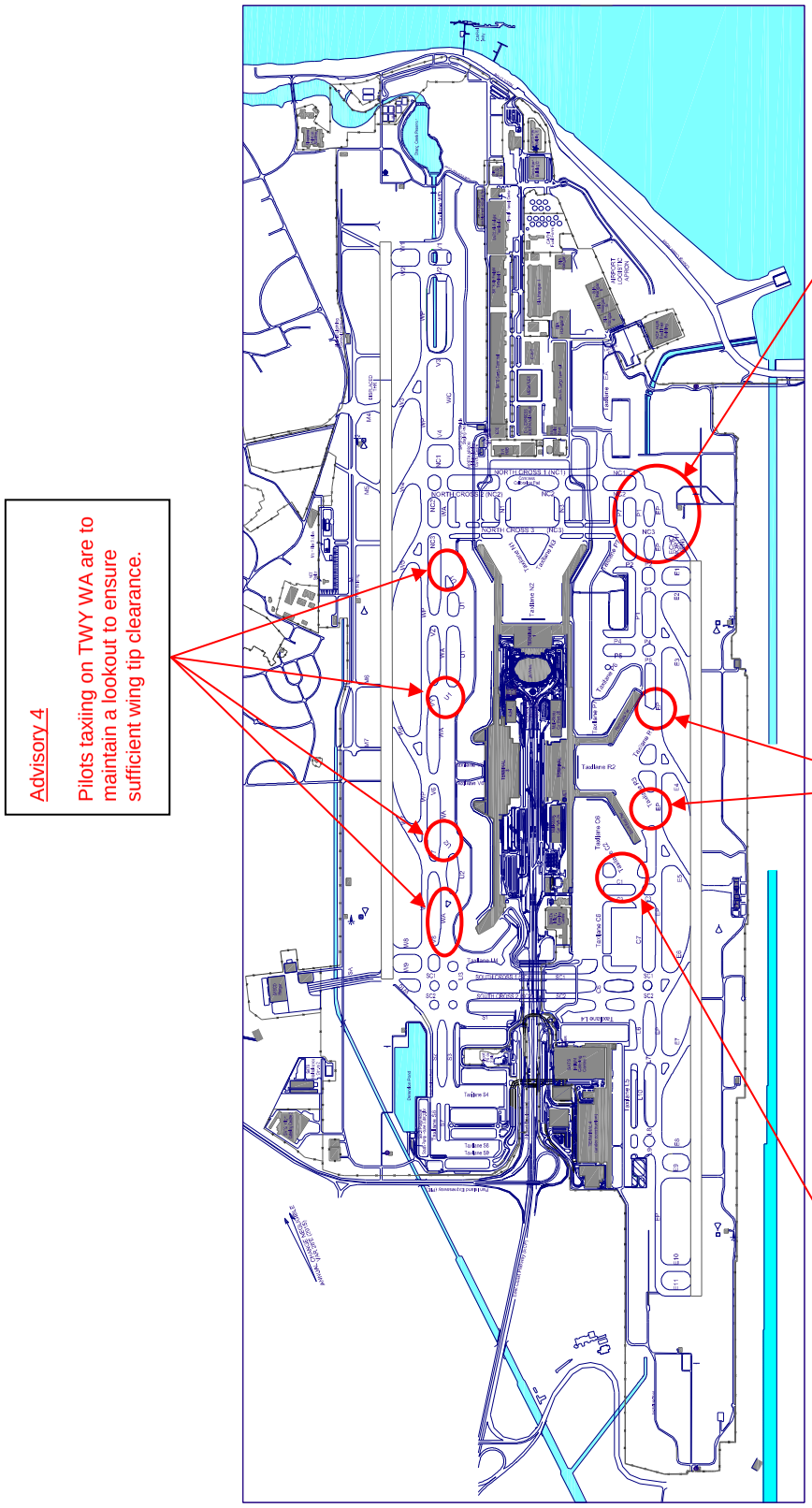
RADIO ALTIMETER OPERATIONS AREA

A radio altimeter operating area is established in the pre-threshold area of Runway 02L/20R and Runway 02C/20C. The size of the radio altimeter operating area is 300m length and 120m width.

AIRCRAFT STANDS WITH SAFEGATE AIRCRAFT DOCKING GUIDANCE SYSTEM.

TOTAL AIRCRAFT PARKING POSITIONS : 230

AERODROME ADVISORY CHART



Changes : Base chart updated.

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

1	*Apron surface and strength*	Surface: Bituminous concrete (aircraft stand C7) Strength: PCN44/F/C/X/T Surface: Concrete (all other aircraft stands) Strength: PCN41/R/C/W/T
2	*Taxiway width, surface and strength*	Width: 23 M (75.5ft), 18 M (59.1ft)TWY EC4, EC5 AND EC6 8 M (26.2ft) TWY WS1 and WS2 Surface: Bituminous concrete Strength: PCN44/F/C/X/T
3	*Remarks : NIL*	

WSSL AD 2.9 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS

SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS		
1	*Use of aircraft stand ID signs, TWY guidelines and visual docking/parking guidance system of aircraft stands*	Taxiing guidance signs at all intersections with TWY and RWY at all holding positions. Guidelines at apron. Nose-in guidance at aircraft stands.
2	*RWY and TWY markings and LGT*	RWY LGT: refer to page WSSL AD 2-5 for details. RWY Turn Pad LGT / Markings: Only AVBL at THR RWY 03. Yellow turnpad centreline. TWY LGT: TWY Edge LGT: Blue LGT, inset, elevated and omni-directional. TWY Centreline LGT: Green LGT, fixed. Intermediate Holding Position LGT: Yellow LGT, fixed, unidirectional. TWY markings: Yellow TWY centreline. The fixed green taxiway centreline lights and fixed unidirectional yellow intermediate holding position lights shall be switched on between sunset and sunrise or during periods of poor visibility. ATC will continue to verbalise the taxi route as per current practice. Pilots shall continue to adhere strictly to the taxi clearances issued by ATC at all times. In the event that the fixed green taxiway centreline lights and fixed unidirectional yellow intermediate holding position lights become unserviceable, pilots shall taxi following the single continuous yellow taxiway centreline markings and intermediate holding position markings (single broken line laid across the entire width of the taxiway) as per mode of operations during VMC daylight hours. MARKING AIDS: Threshold, touchdown zone, centreline stripes and RWY designation. RWY width outline from bituminous concrete surface by white lines. AIMING POINT MARKINGS: RWY 03: coincident with PAPI origin located 311.6m from THR respectively. RWY 21: coincident with PAPI origin located 232.8m from THR respectively.
3	*Stop Bars*	Stop Bars: Red LGT across taxiways W1, W2, W3, E1, E2, E3 and E4, flushed with TWY surface and are supplemented with elevated RWY guard LGT at the sides. By default, red stop bar lights remain on unless deselected by the runway controller. When deselected, these stop bar lights will re-activate automatically after 45 seconds. Pilots shall not cross any lighted red stop bar lights. Pilots and drivers shall enter / cross the runway only when **both** the following conditions are met: The crew have a) received positive ATC clearance to enter / cross the runway or taxiway, and b) observed that the red stop bar lights are turned off. Crash Alarm Stop Bars: Red LGT across junctions of EP, EC4 and EH2 TWY, flushed with TWY surface. (Note to pilots and tow-crew: Slow down when taxiing / towing on TWY EP between TWY EC4 and abeam the Control Tower. Keep a lookout for emergency vehicles that may cross the taxiway to respond to emergency on the RWY.)

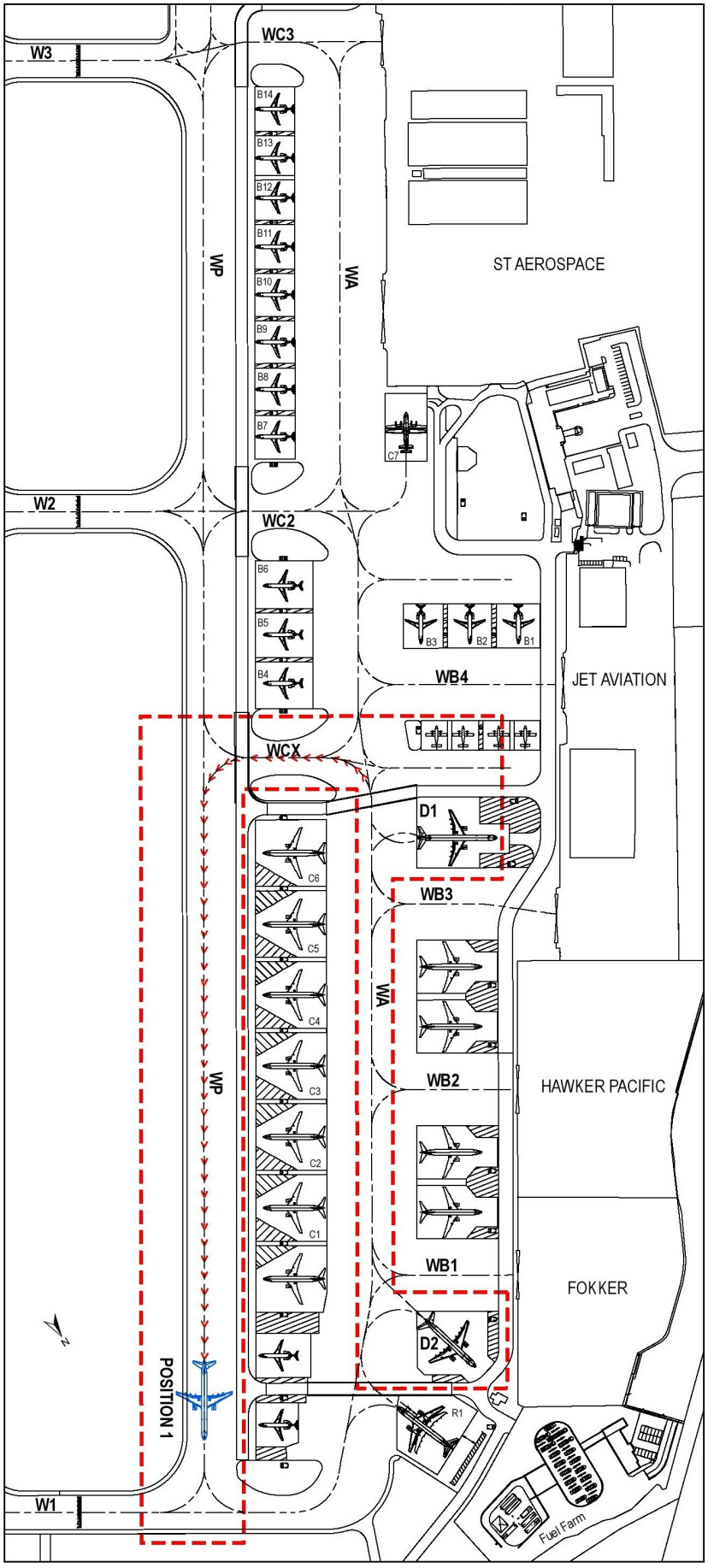
SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS			
4	Remarks	a.	Aircraft operators/ground handlers shall be responsible for the safe and smooth operations of aircraft at the aircraft stands.
		b.	To enhance airside safety, all aircraft larger than Code A (i.e. up to but not including 15m wingspan) shall be marshalled into the aircraft stands.
		c.	Arriving aircraft will be assigned an aircraft stand. A ground handler shall marshall the aircraft into the aircraft stand.
		d.	A ground handler shall be at the aircraft stand when the aircraft is ready to depart. When the pilot signals that he is ready to taxi, the ground handler shall ensure that the area around the aircraft is clear before marshalling the aircraft out of the aircraft stand.
		e.	Only Code A aircraft, Code B aircraft, aircraft type Global Express (GLEX), Global 5000 (GL5T), Global Express XRS (GLEX), Fokker 50 (F50), Fokker 70 (F70), Fokker 100 (F100), Gulfstream 500 (GLF5), Gulfstream 550 (GLF5), ATR 42-500 (AT45), ATR 42-600 (AT46), ATR 72-500 (AT75), DASH 7 (DHC7)and Falcon 7X (FA7X) are allowed to self-power out from aircraft stands C1, C2, C3, C4, C5 and C6.
		f.	Aircraft at stand C1 shall self-power out towards the north only.
		g.	Aircraft at stand C6 shall self-power towards the south only.
		h.	Aircraft at stands C2, C3, C4 and C5 are allowed to self-power out towards the south or the north.
		i.	Aircraft can self-power in from the north as well as the south via TWY WA.
		j.	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.
		k.	Aircraft with wingspan larger than 28.35m are not allowed to park at aircraft stand C7. Refuelling will not be allowed at aircraft stand C7.
		l.	Aircraft stands D50, D51, D52, D53, D54, D55 and D56 can support arriving taxi in operations for aircraft types up to B757-200, and departing aircraft taxi out operations for Code A aircraft, Code B aircraft and Code C aircraft (A319, A320, A321, ATR 42, ATR 72, DASH 7, Embraer 190STD, ERJ 135ER, Falcon 7X, Fokker 50, Fokker 70, Fokker 100, Global Express, Global 5000, Global Express XRS, Gulfstream 500, Gulfstream 550 and Q400 only).
		m.	Only aircraft type ATR72 and Code C and below aircraft with wingspan less than 27.2m can be parked at aircraft stands C60, C61 and C62.
		n.	Aircraft type C130 is restricted to tow in operations at aircraft stand D50. Aircraft is required to shut down at designated shut down area and be towed to aircraft stand D50.

SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS		
Aircraft Stands	**Pushback / Tow Forward Procedures**	**Phraseology Used By SELETAR GROUND**
C1, C2, C3, C4, C5, C6	**PUSHBACK** The aircraft (on idle thrust) shall be pushed back onto TWY WA to face North (or South) until its nose wheel is at the intersection of the aircraft stand lead-in line and the centreline of TWY WA. The aircraft may breakaway from there. **TOW FORWARD** The aircraft (on idle thrust) shall be towed forward onto the centreline of TWY WP to face North (or South) until its nose wheel is at the intersection of the aircraft tow-out line and TWY WP centreline. The aircraft may breakaway from there.	Pushback approved, to face North (or South) Tow forward approved, to face North (or South)
C7	**PUSHBACK** The aircraft (on idle thrust) shall be pushed back onto TWY WA to face North (or South) until its nose wheel is at the intersection of the aircraft stand lead-in line and the centreline of TWY WA. The aircraft may breakaway from there.	Pushback approved, to face North (or South)
C50, C51, C52	**PUSHBACK** The aircraft (on idle thrust) shall be pushed back onto TWY ES to face North (or South) until its nose wheel is at the intersection of the aircraft stand lead-in line (or pushback line) and the centreline of TWY ES. The aircraft may breakaway from there.	Pushback approved, to face North (or South)
C60, C61	**Pushback to face North** The aircraft (on idle thrust) shall be pushed back onto TWY EC to face North until its nose wheel is abeam the centreline of aircraft stand C62. The aircraft may break away from there. **Pushback to face East** The aircraft (on idle thrust) shall be pushed back onto TWY EC2 to face East until its nose wheel is at the “EOP C60/C61” position. The aircraft may break away from there.	Pushback approved, to face North. Pushback approved, to face East.
C62	**Pushback to face North** The aircraft (on idle thrust) shall be pushed back onto TWY EC to face North until its nose wheel is at the “EOP C62” position. The aircraft may break away from there. **Pushback to face South** The aircraft (on idle thrust) shall be pushed back onto TWY EC to face South until its nose wheel is abeam the centreline of aircraft stand C61. The aircraft may break away from there.	Pushback approved, to face North. Pushback approved, to face South.

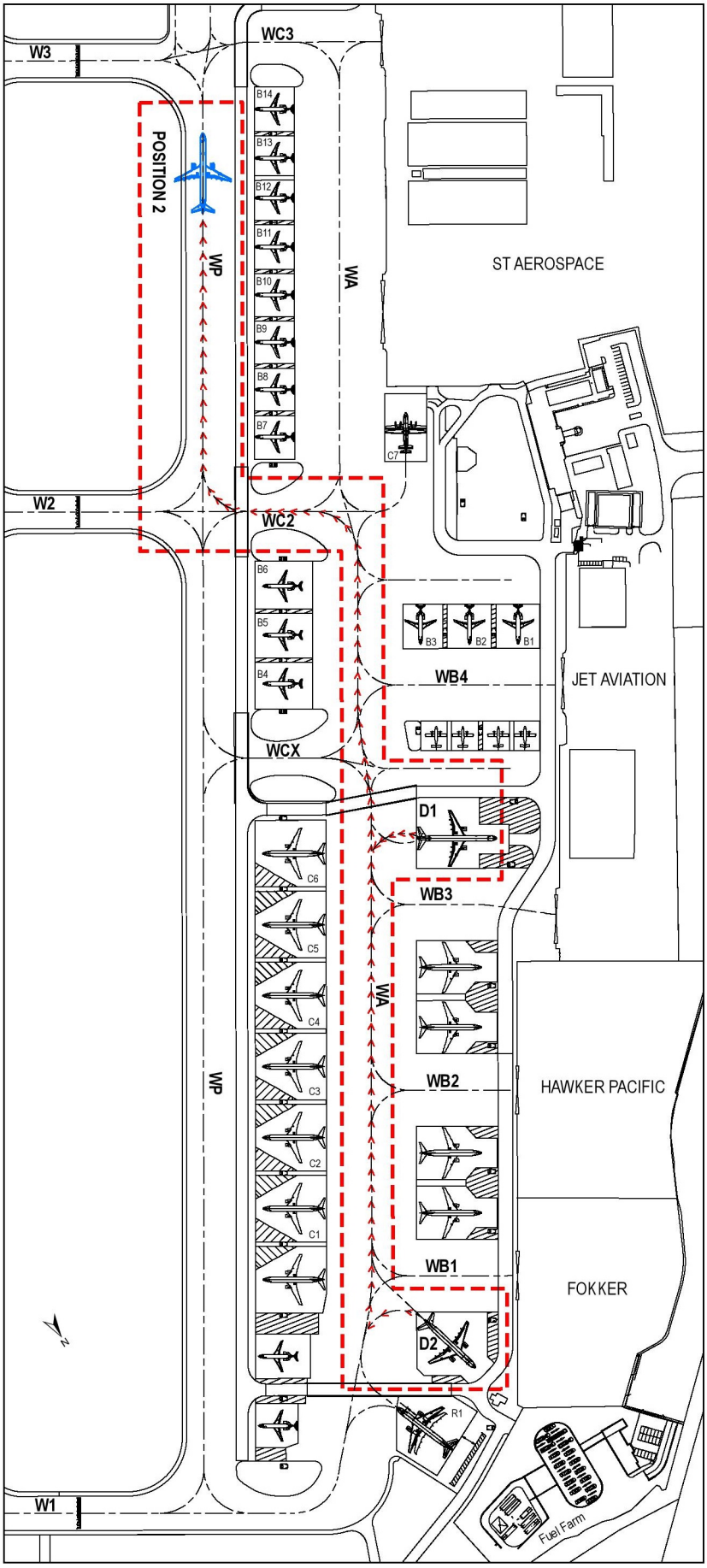
Aircraft Stands	Pushback / Tow Forward Procedures	Phraseology Used By SELETAR GROUND
D1, D2 (for B757-200 and C130)	**PUSHBACK AND TOW FORWARD TO TWY WP** The tow-crew shall request from Seletar Ground (vehicular) on 122.9MHz for departure pushback approval. Upon receiving the approval, the aircraft shall be pushed back onto TWY WA to face South until its nose wheel is at the intersection of the aircraft stand lead-in line and TWY WA centreline. The aircraft shall then be towed forward to TWY WP until the tow tug towing the aircraft is at the intermediate holding position short of TWY W1 (see chart AD 2.WSSL-9) or TWY W3 (see chart AD 2.WSSL-10). Once the tow tug is disengaged, the aircraft will request start up approval from Seletar Ground (aircraft) on 121.6MHz. The aircraft shall breakaway from there.	1) Tow approved to intermediate holding position on TWY WP short of TWY W1 to face North; or 2) Tow approved to intermediate holding position on TWY WP short of TWY W3 to face South
	FOR LANDED B757-200/C130 AIRCRAFT EXITING VIA TWY W1 After landing, B757-200/C130 aircraft exiting TWY W1 shall stop when its nose is at the information marking “B757/C130 HOLD FOR TOW” on TWY W1. The aircraft shall be on tow starting from this point onwards until they park inside the aircraft stands.	Not applicable
	FOR LANDED B757-200/C130 AIRCRAFT EXITING VIA TWY W2 After landing, B757-200/C130 aircraft exiting TWY W2 shall stop when its nose is at the information marking “B757/C130 HOLD FOR TOW” on TWY W2. The aircraft shall be on tow starting from this point onwards until they park inside the aircraft stands.	Not applicable
	FOR LANDED B757-200/C130 AIRCRAFT EXITING VIA TWY W3 After landing, B757-200/C130 aircraft exiting TWY W3 shall stop when its nose is at the information marking “B757/C130 HOLD FOR TOW” on TWY W3. The aircraft shall be on tow starting from this point onwards until they park inside the aircraft stands.	Not applicable
D50	**Pushback to face North** The aircraft (on idle thrust) shall be pushed back onto TWY EN to face North until its nose wheel is at the intersection of the aircraft stand pushback line and TWY EN centreline. The aircraft shall then be towed forward until its nose wheel is abeam the centreline of aircraft stand D51. The aircraft may break away from there.	Pushback approved, to face North.
	Pushback to face South The aircraft (on idle thrust) shall be pushed back onto TWY EN to face South until its nose wheel is at the intersection of the aircraft stand pushback line and TWY EN centreline. The aircraft may break away from there.	Pushback approved, to face South.
	Tow Forward The aircraft (on idle thrust) shall be towed forward onto TWY EP to face North (or South) until its nose wheel is at the intersection of the aircraft lead-out line and TWY EP centreline. The aircraft may break away from there.	Tow forward approved, to face North (or South)
D51, D52, D53, D54, D55	**Pushback** The aircraft (on idle thrust) shall be pushed back onto TWY EN to face North (or South) until its nose wheel is at the intersection of the aircraft stand pushback line and TWY EN centreline. The aircraft may break away from there.	Pushback approved, to face North (or South).
	Tow Forward The aircraft (on idle thrust) shall be towed forward onto TWY EP to face North (or South) until its nose wheel is at the intersection of the aircraft lead-out line and TWY EP centreline. The aircraft may break away from there.	Tow forward approved, to face North (or South)

Aircraft Stands	Pushback / Tow Forward Procedures	Phraseology Used By SELETAR GROUND
D56	**Pushback to face North**	
	The aircraft (on idle thrust) shall be pushed back onto TWY EN to face North until its nose wheel is at the intersection of the aircraft stand pushback line and TWY EN centreline. The aircraft may break away from there.	Pushback approved, to face North.
	Pushback to face South	
	The aircraft (on idle thrust) shall be pushed back onto TWY EN to face South until its nose wheel is at the intersection of the aircraft stand pushback line and TWY EN centreline. The aircraft shall then be towed forward until its nose wheel is abeam the centreline of aircraft stand D55. The aircraft may break away from there.	Pushback approved, to face South.
	Tow Forward	
	The aircraft (on idle thrust) shall be towed forward onto TWY EP to face North (or South) until its nose wheel is at the intersection of the aircraft lead-out line and TWY EP centreline. The aircraft may break away from there.	Tow forward approved, to face North (or South)

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	*Associated MET Office*	Seletar
2	*Hours of service*	H24
3	*Office responsible for TAF preparation, Periods of validity*	Singapore Changi, 30 hours
4	*Type of landing forecast, Interval of issuance*	METAR, SPECI and AD warning of adverse weather (H24). TREND NIL.
5	*Briefing/consultation provided*	NIL
6	*Flight documentation, Language(s) used*	Tabular forms, English
7	*Charts/other information available for briefing or consultation*	NIL
8	*Supplementary equipment available for providing information*	MDWR (Met Doppler Weather Radar) Maintenance Period: Second WED of every month between 0200-0900. In case of bad weather, THU following the second WED between 0200-0900.
9	*ATS units provided with information*	NIL
10	*Additional information*	TEL: 64815978 (MET Office)

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 Bituminous Concrete	012430.846N 1035143.791E (9.78M)	14 M 13 M
21	213.33°	1836 x 46	44/F/C/X/T Bituminous Concrete	012520.791N 1035216.425E (9.78M)	5M 10 M

Slope of RWY – SWY Transverse / Longitudinal	SWY Dimensions (m)	CWY Dimensions (m)	STRIP Dimensions (m)	Dimensions of RESA (m)	Locations and description of ARST system
7	8	9	10	11	12
RWY 03 1.23 / 0.49% SWY: Not Applicable	Not Applicable	60 X 150	1956 X 150	RWY 03-240 X 92	Not Applicable
RWY 21 1.23 / 0.49% SWY: Not Applicable	Not Applicable			RWY 21-240 X 150	Not Applicable

OFZ	Remarks
13	14
Not Applicable	**i) Scheduled closure period for RWY 03/21** a. BTN 1600-2300 on first and third FRI of every month or the following FRI if the first or third FRI is a public holiday. RWY CLSD to all TFC except medevac and EMERG flights. Advance notice of 30 minutes is required for EMERG reopening of RWY. b. BTN 0500-0515, 1030-1045, 1600-1615 and 2300-2315 daily for RWY inspection. Aircraft to expect delay. **ii)** A lighted RWY turn pad with centreline marking is provided at the threshold of RWY 03 which is able to serve aircraft up to B757-200. **iii)** Orange frangible posts are positioned along the boundary 90m on either sides of the RWY centreline demarcating the boundary for grass cutting and other maintenance works. **iv)** Wind Direction Indicators (WDIs) are located at both northern and southern ends of the RWY.

WSSL AD 2.13 DECLARED DISTANCES

RWY Designator	TORA (m)	TODA (m)	ASDA (m)	LDA (m)	Remarks
1	2	3	4	5	6
03	1836	1896	1836	1836	NIL
21	1836	1896	1836	1836	NIL

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° (both sides of RWY) 2 white 2 red LGT (17.720m) 3 white 1 red LGT (20.323m) 4 white LGT (22.927m). ACFT with eye-to-wheel HGT greater than 6.3m are ADZ to fly with 2 white 2 red LGT visible so as to achieve sufficient wheel CLR.	NIL	NIL	White with yellow on last 600m of either end. Elevated, omni-directional and brilliancy controlled.	Red	NIL
21	APCH LGT: 1 row of inset APCH LGT of 4 LGT and 4 rows of barettes of 4 LGT each. White inset uni-directional APCH LGT and white omni-directional CGL on top of white, elevated uni-directional APCH LGT. Simple TDZ LGT: 2 pairs white, inset, uni-directional LGT.	Green with THR IDENT LGT	PAPI 3.5° (both sides of RWY) 2 white 2 red LGT (17.720m) 3 white 1 red LGT (19.286m) 4 white LGT (20.871m). ACFT with eye-to-wheel HGT greater than 6.3m are ADZ to fly with 2 white 2 red LGT visible so as to achieve sufficient wheel CLR.	NIL	NIL	White with yellow on last 600m of either end. Elevated, omni-directional and brilliancy controlled.	Red	NIL
	RWY 21 THR and RWY END LGT symmetrically disposed in 2 groups with a gap between the groups. RWY 21 THR and RWY END LGT reinstated to inset fitting.							

WSSL AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

1	*ABN/IBN location, characteristics and hours of operation*	ABN: 012448.00N 1035207.96E (on top of Control Tower) ALTN FLG W G EV 2.5 SEC. HN and IMC IBN: 012509.94N 1035152.14E (on top of West Substation) FLG G 'SL' EV 7 SEC. HN and IMC
2	*LD and LGTI location Ultrasonic wind sensor location and LGT*	Ultrasonic wind sensors and windsocks at ends of RWY.
3	*TWY edge and centreline lighting*	TWY Edge LGT: Blue, elevated and omni-directional. TWY Centreline LGT: Green , fixed. Intermediate holding position LGT: Yellow, fixed, unidirectional.
4	*Secondary power supply/switch-over time*	Automatic standby generator power supply available for airfield lighting.
5	*Remarks*	Vehicles painted yellow or displaying checkered red/white or orange/white flag at highest point of vehicle. WDI lighted.

WSSL AD 2.16 HELICOPTER LANDING AREA

1	**Coordinates of THR of FATO Geoid undulation**	**H03 H21 012437.963N 1035152.072E 012446.046N 1035157.344E**
2	**FATO elevation M/FT**	H03- 10.45m/34.3ft; H21 - 9.36m/30.7ft
3	**FATO area dimensions, surface, strength, marking**	Rectangle 297m x 21.5m, compacted turf, helicopter landing area designations, outline by concrete kerbs painted white.
4	**True BRG of FATO**	033.33/213.33° Direction of TKOF zones: 034°GEO / 214°GEO
5	**Declared distance available**	**TODAH RTODAH LDAH H03 297m 297m 297m H21 297m 297m 297m**
6	**Approach and FATO lighting**	Nil
7	**Remarks**	Slope of helicopter landing area (transverse/longitudinal) H03 - 1.19%/0.44% ; H21 - 0.96%/0.44%

WSSL AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	**SELETAR CTR** 012703N 1035009E 012825N 1035009E 012900N 1035425E 012534N 1035454E thence along international boundary to 012556N 1035326E 012227N 1035158E 012232N 1035016E 012327N 1034922E 012607N 1035053E and thence an arc of 2NM radius (centred at position 012527N 1034856E) joining 012607N 1035053E and 012703N 1035009E **SELETAR CONTROL ZONE A** Portion of Seletar CTR within Singapore FIR is known as Seletar CTR 'A'. **SELETAR CONTROL ZONE 'B'** The part in the Kuala Lumpur FIR is known as Seletar CTR 'B' and is bounded by 012825N 1035009E, 012900N 1035425E, 012534N 1035454E thence along the Peninsular Malaysia/Singapore international boundary to 012808N 1035010E to 012825N 1035009E from GND/sea level to 3,000ft. It will be activated only with prior approval of Johor Bahru ATC. (see chart AD-2-WSSL-VFR-1).
2	*Vertical Limits*	**SELETAR CONTROL ZONE A** SFC to 4 500ft ALT Maximum Usable ALT 4 000ft **SELETAR CONTROL ZONE B** SFC to 3 000ft ALT
3	*Airspace Classification*	C
4	*ATS Unit Call sign Language(s)*	SELETAR TOWER English
5	*Transition Altitude*	11000 FT (3,350m)
6	*Remarks*	NIL

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	
	Seletar Ground	121.6 MHz * 122.9 MHz		* for vehicular movements
ACC	Singapore Radar	P123.7 MHz S127.3 MHz		For AWY B469, G334, R208, L625, L629, L635, L642, M751, M753, M758, M761, M763, M771, N884, N891 and N892
		133.8 MHz	0000-1430	
		P133.25 MHz S135.8 MHz	H24	For AWY A457, A464, A576, B466, L762, R325 (all northbound) and R469.
		P134.2 MHz S133.35 MHz		For AWY G580, M646 and M767
		P134.4 MHz S128.1 MHz 255.4 MHz		For AWY A464, A576, G579 (all southbound), B470, G220, N875 and in area in the immediate vicinity of Singapore
				Radar Maintenance Period: Monthly - every third SAT BTN 1601-2359
	Singapore Radio	6556 kHz 11297 kHz		SEA 1. SATCOM SER AVBL SSB suppressed carrier
		5655 kHz 8942 kHz 11396 kHz		SEA 2. SATCOM SER AVBL SSB suppressed carrier
		6556 kHz		SEA 3. SATCOM SER AVBL SSB suppressed carrier
APP	Singapore Approach	P120.3 MHz S124.6 MHz		TAR: a) Intermediate APCH to Singapore Changi AP and other airports in Singapore b) DEP from all airports in Singapore Maintenance Period: Monthly: every first SAT BTN 1601-2359 (ASR I) and every fourth SAT BTN 1601-2359 (ASR II)
	Seletar Approach	126.025 MHz	0000-1500	TAR - Intermediate and final approach to Seletar Airport

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://fpl-1.caasaim.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.

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.
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

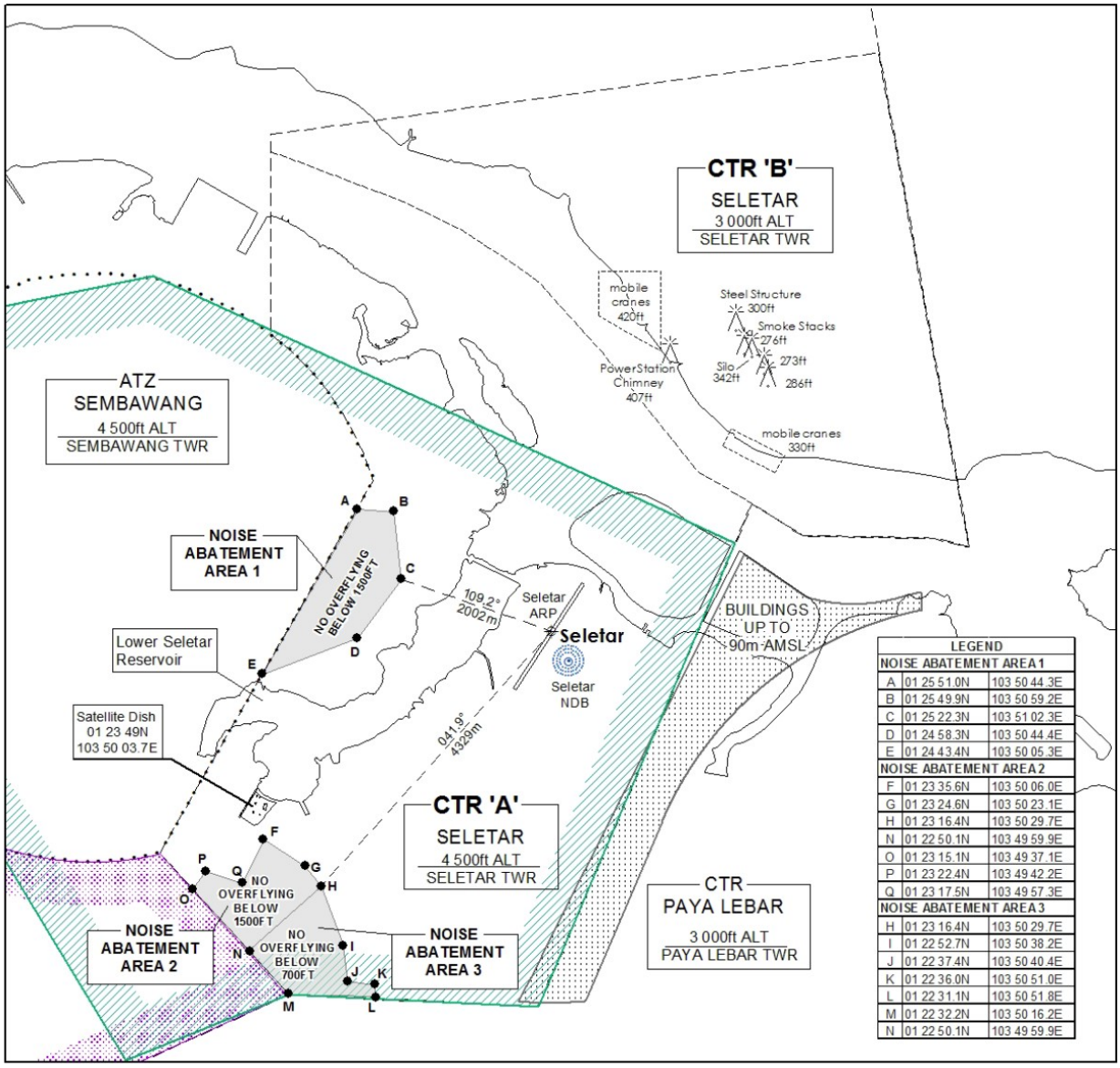
1.5 Noise Abatement Area 2 is bounded by the following points, and aircraft are to maintain a minimum altitude of 1,500ft when overflying the area.

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 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. 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.

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 and Paya Lebar CTR.

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 KK or JB - 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.

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 on RWY 03 to PONJO - SJ or on RWY 21 to KK are required to keep clear of Sembawang ATZ.

← 2.2 The pilot-in-command or the operator of IFR flight operating out of Seletar is required to file via KK or PONJO - SJ under item 15 of the flight plan. All departure clearances subject to ATC coordination.

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.

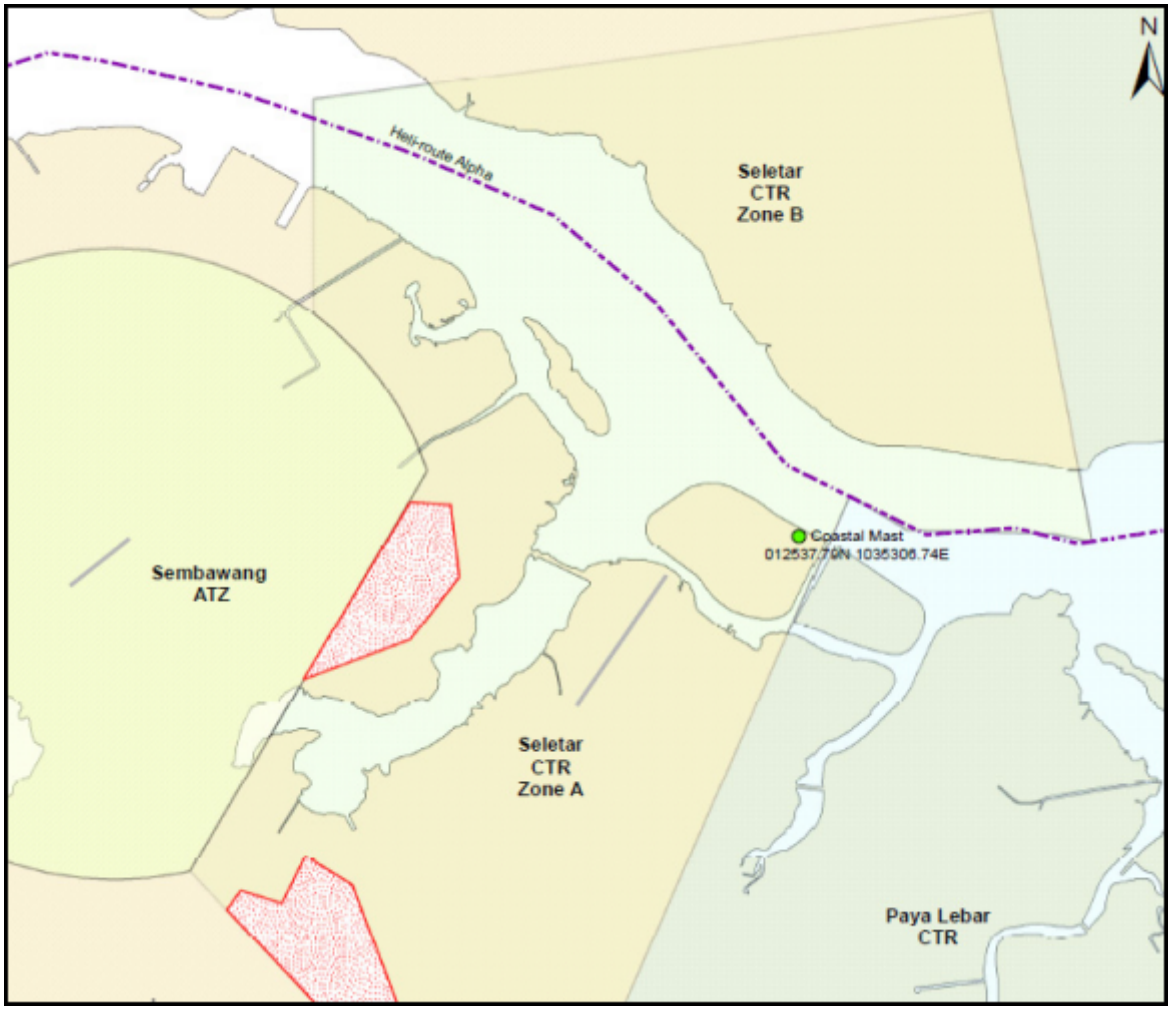
2 HELICOPTER CROSSING SELETAR NORTHERN EXTENDED CENTRELINE

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 - Joining procedures From JB and KK - RWY 03 ..... AD-2-WSSL-VAC-3
Visual Approach Chart (VAC) - ICAO - Joining procedures From JB and KK - 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

Joining Procedures - VFR Flights from JB AD-2-WSSL-VFR-1
Joining procedures - IFR Flights from JB and KK - RWY 03 ..... AD-2-WSSL-IFR-1
Joining procedures - IFR Flights from JB and KK - RWY 21 ..... AD-2-WSSL-IFR-2

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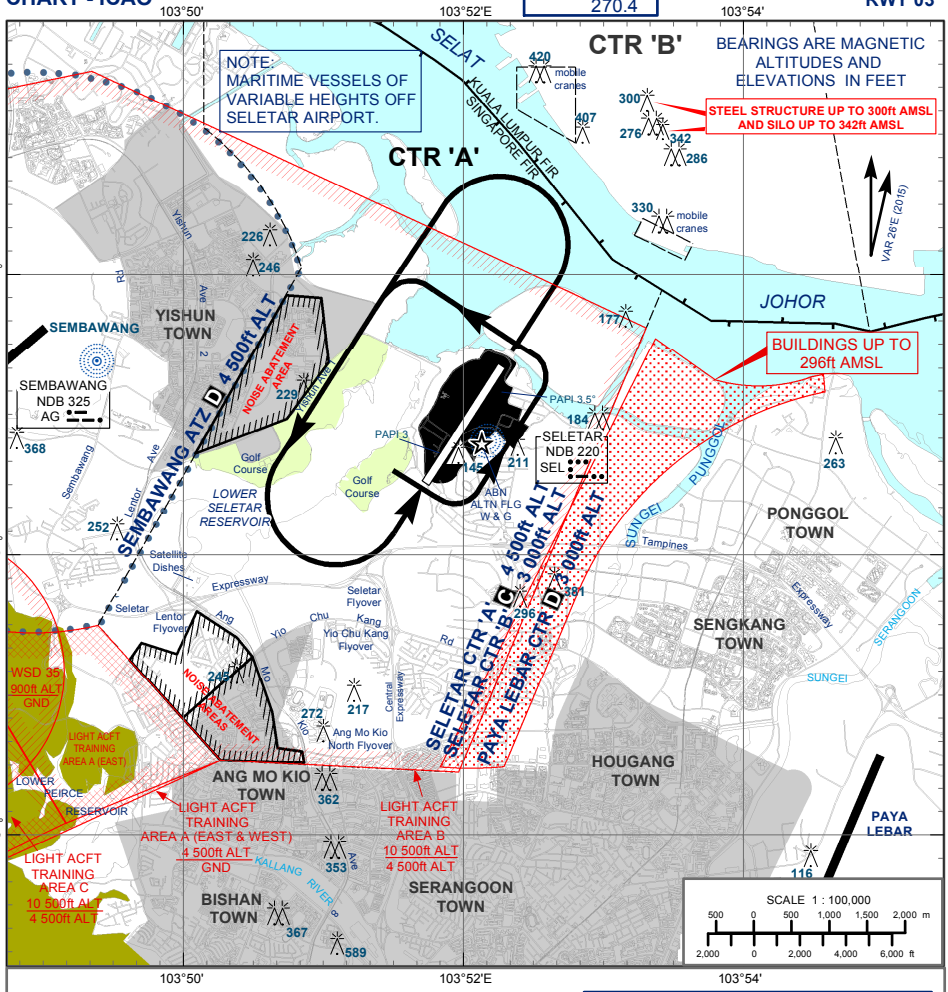
VISUAL APPROACH CHART - ICAO

AD ELEV 46 ft

APP	120.3 126.025
TWR	118.45 270.4

SINGAPORE/SELETAR

RWY 03



JOINING PROCEDURE - RWY 03

1) Join overhead at 2 000ft ALT or as cleared by ATC and at a speed of not more than 170kt.

2) When over the south-end of the runway (THR RWY 03), join the circuit crossing the upwind north-end of the runway (THR RWY 21) at 1 500ft ALT or above or at the altitude cleared by ATC.

3) Joining aircraft shall give way to circuit traffic already on downwind.

CAUTION

a) Pilots are required to keep clear of Sembawang ATZ.

b) Pilots should not fly to the east of the runway.
This is to keep clear of tall buildings up to 296ft AMSL to the east of Seletar CTR.
(See area shaded in red).

Minimum altitudes apply over noise abatement areas (WSSL AD 2.21)
Aircraft types which are unable to safely manoeuvre clear of the noise abatement areas are not allowed to operate at Seletar Airport.

PAPI 3°		
Pilot's eye height over the threshold when the following PAPI lights come into view	RUNWAY	
	03	21
2 white lights and 2 red lights (MEHT)*	17.720m	17.720m
3 white lights and 1 red light	20.323m	19.286m
4 white lights	22.927m	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.

CHANGES : Joining procedure revised.
Noise Abatement Areas revised.

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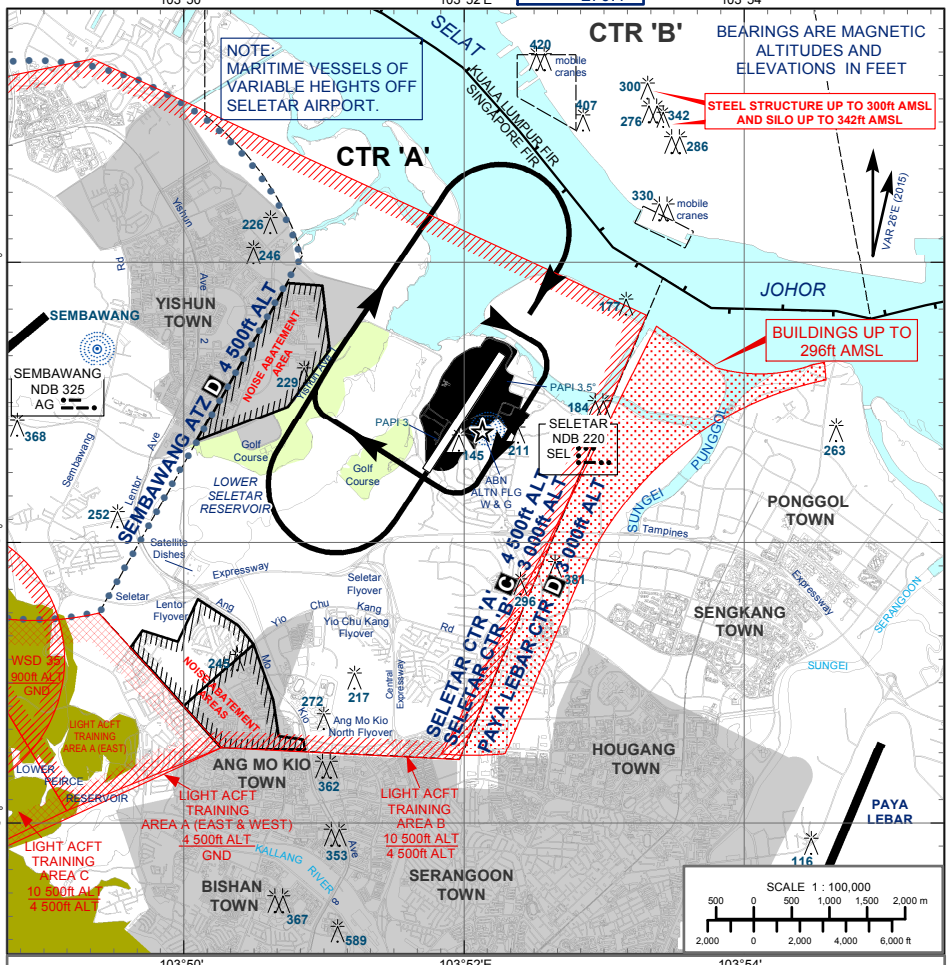
VISUAL APPROACH CHART - ICAO

AD ELEV 46 ft

APP	120.3
	126.025
TWR	118.45
	270.4

SINGAPORE/SELETAR

RWY 21



JOINING PROCEDURE - RWY 21

1) Join overhead at 2 000ft ALT or as cleared by ATC and at a speed of not more than 170kt.

2) When over the north-end of the runway (THR RWY 21), join the circuit crossing the upwind south-end of the runway (THR RWY 03) at 1 500ft ALT or above or at the altitude cleared by ATC.

3) Joining aircraft shall give way to circuit traffic already on downwind.

CAUTION

a) Pilots are required to keep clear of Sembawang ATZ.

b) Pilots should not fly to the east of the runway.
This is to keep clear of tall buildings up to 296ft AMSL to the east of Seletar CTR.
(See area shaded in red).

Minimum altitudes apply over noise abatement areas (WSSL AD 2.21)
Aircraft types which are unable to safely manoeuvre clear of the noise abatement areas are not allowed to operate at Seletar Airport.

PAPI 3.5°		
Pilot's eye height over the threshold when the following PAPI lights come into view	RUNWAY	
	03	21
2 white lights and 2 red lights (MEHT)*	17.720m	17.720m
3 white lights and 1 red light	20.323m	19.286m
4 white lights	22.927m	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.

CHANGES : Joining procedure revised.
Noise Abatement Areas revised.

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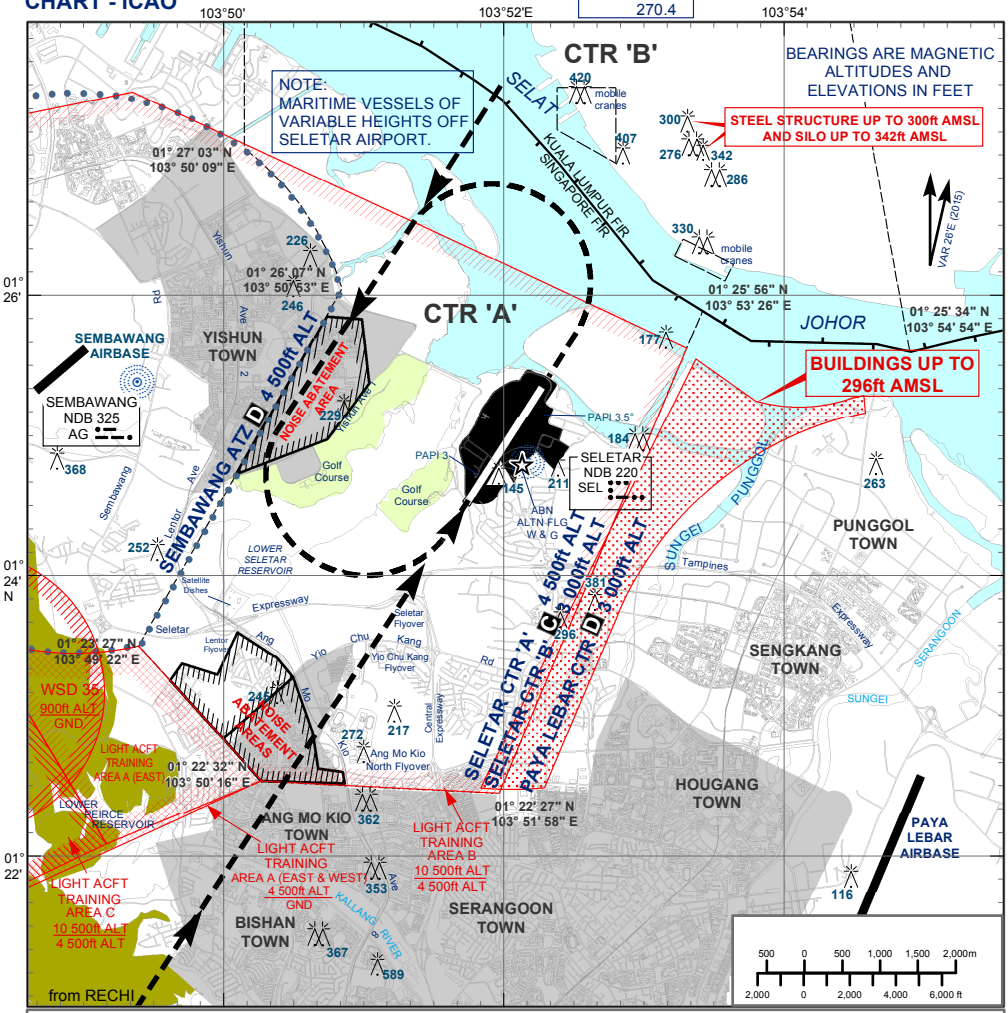
VISUAL APPROACH CHART - ICAO

AD ELEV 46 ft

APP	120.3 126.025
TWR	118.45 270.4

SINGAPORE/SELETAR

RWY 03



ADVISORY JOINING PROCEDURES - RWY 03

Straight-in Approach

1) From JB or KK, join downwind at 2 000ft at a speed of not more than 170kt. When downwind, descend from 2 000ft for visual approach or as cleared by ATC. Pilots should have runway in sight.
2) From SJ-PONJO-RECHI, join direct for visual approach, descending from 2 000ft at a speed of not more than 170kt, or as cleared by ATC. Pilots should have runway in sight.
3) Joining aircraft shall give way to circuit traffic already on downwind.

Circling Approach

1) From JB or KK, join downwind at 2 000ft at a speed of not more than 160kt. Passing over north-end of the runway (THR RWY 21), descend from 2 000ft to 1 500ft and turn left for downwind RWY 03. At downwind, descend for a visual approach or as cleared by ATC. Pilots should have the runway in sight.
2) From SJ-PONJO-RECHI, overfly the runway at 2 000ft at a speed of not more than160kt. or as cleared by ATC. When passing over the north-end of the runway (THR 21), descend from 2 000ft to 1 500ft and turn left for downwind RWY 03. At downwind, descend for a visual approach or as cleared by ATC. Pilots should have runway in sight.
3) Joining aircraft shall give way to circuit traffic already on downwind.

CAUTION

a) Pilots are required to keep clear of Sembawang ATZ. Turns should therefore be kept within Seletar CTR.
b) Pilots should not fly to the east of the runway. This is to keep clear of tall buildings up to 296ft AMSL there. Pilots should have all relevant obstructions in sight, including the steel structure 300ft AMSL and the Silo 342ft AMSL 2nm north of the airfield.
c) Minimum altitudes apply over noise abatement areas (WSSL AD 2.21)
Aircraft types which are unable to safely manoeuvre clear of the noise abatement areas are not allowed to operate at Seletar Airport.

PAPI 3°		
Pilot's eye height over the threshold when the following PAPI lights come into view	RUNWAY	
	03	21
2 white lights and 2 red lights (MEHT)*	17.720m	17.720m
3 white lights and 1 red light	20.323m	19.286m
4 white lights	22.927m	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.

CHANGES : Joining procedure for IFR flights from SINJON added. Noise Abatement Areas revised.

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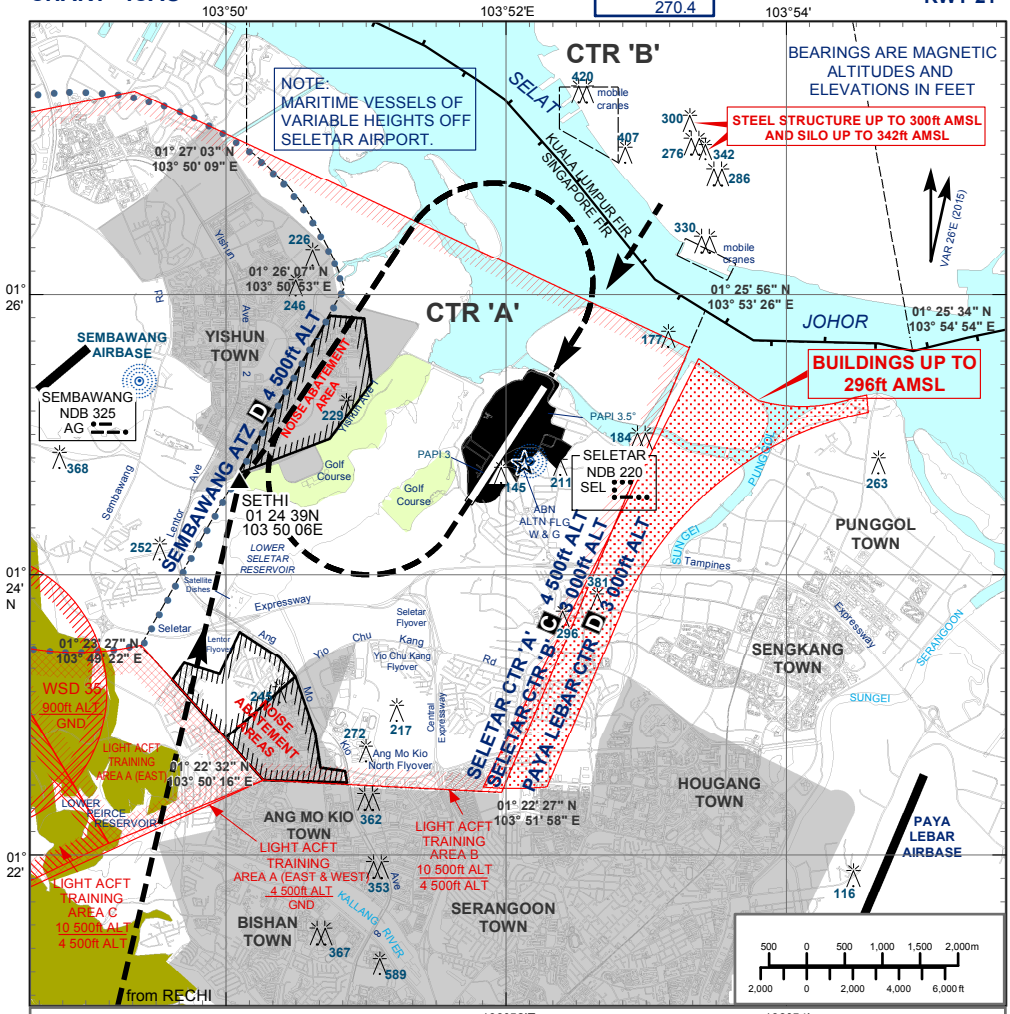
VISUAL APPROACH CHART - ICAO

AD ELEV 46 ft

APP	120.3
	126.025
TWR	118.45
	270.4

SINGAPORE/SELETAR

RWY 21



ADVISORY JOINING PROCEDURES - RWY 21

Straight-in Approach

1) From JB or KK, join direct for a visual approach RWY 21, descending from 2 000ft at a speed of not more than 170kt, or as cleared by ATC. Pilots should have runway in sight.
2) From SJ-PONJO-RECHI-SETHI, join downwind RWY 21 via SETHI at 2 000ft at a speed of not more than 170kt, When downwind, descend from 2 000ft for a visual approach or as cleared by ATC. Pilots should have runway in sight.
3) Joining aircraft shall give way to circuit traffic already on downwind.

Circling Approach

1) From JB or KK, overfly the runway at 2 000ft at a speed of not more than 160kt. When passing over south-end of the runway (THR RWY 03), descend from 2 000ft to 1 500ft and turn right for downwind RWY 21. At downwind, descend for a visual approach or as cleared by ATC. Pilots should have the runway in sight.
2) From SJ-PONJO-RECHI-SETHI, join downwind RWY 21 via SETHI at 2 000ft at a speed of not more than160kt. At end of downwind, turn right and overfly the runway. When passing over south-end of the runway (THR RWY 03), descend from 2 000ft to 1 500ft and turn right for downwind RWY 21. At downwind, descend for a visual approach or as cleared by ATC. Pilots should have runway in sight.
3) Joining aircraft shall give way to circuit traffic already on downwind.

CAUTION

a) Pilots are required to keep clear of Sembawang ATZ. Turns should therefore be kept within Seletar CTR.
b) Pilots should not fly to the east of the runway. This is to keep clear of tall buildings up to 296ft AMSL there. Pilots should have all relevant obstructions in sight, including the steel structure 300ft AMSL and the Silo 342ft AMSL 2nm north of the airfield.
c) Minimum altitudes apply over noise abatement areas (WSSL AD 2.21) Aircraft types which are unable to safely manoeuvre clear of the noise abatement areas are not allowed to operate at Seletar Airport.

PAPI 3.5°		
Pilot's eye height over the threshold when the following PAPI lights come into view	RUNWAY	
	03	21
2 white lights and 2 red lights (MEHT)*	17.720m	17.720m
3 white lights and 1 red light	20.323m	19.286m
4 white lights	22.927m	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.

CHANGES : Joining procedure for IFR flights from SINJON added. Noise Abatement Areas revised.

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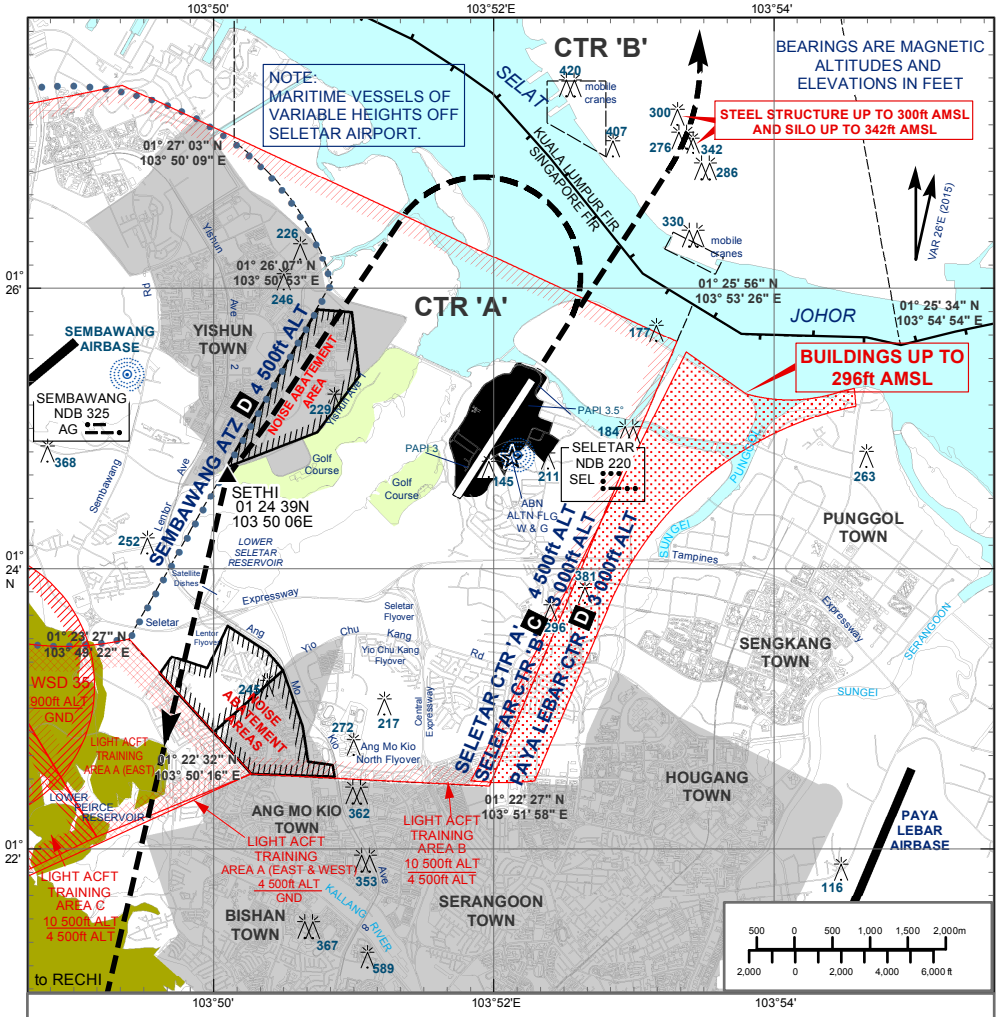
VISUAL DEPARTURE CHART

AD ELEV 46 ft

APP	120.3
	126.025
TWR	118.45
	270.4

SINGAPORE/SELETAR

RWY 03



ADVISORY DEPARTURE PROCEDURE 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 the next waypoint in accordance with their clearance.

CAUTION

a) Pilots are required to keep clear of Sembawang ATZ. Turns should therefore be kept within Seletar CTR.

b) Pilots should not fly to the east of the runway. This is to keep clear of tall buildings up to 296ft AMSL there. Pilots should have all relevant obstructions in sight, including the steel structure 300ft AMSL and the Silo 342ft AMSL 2nm north of the airfield.

c) Minimum altitudes apply over noise abatement areas (WSSL AD 2.21)
Aircraft types which are unable to safely manoeuvre clear of the noise abatement areas are not allowed to operate at Seletar Airport.

CHANGES : Joining procedure for IFR departures via SINJON added. Noise Abatement Areas revised.

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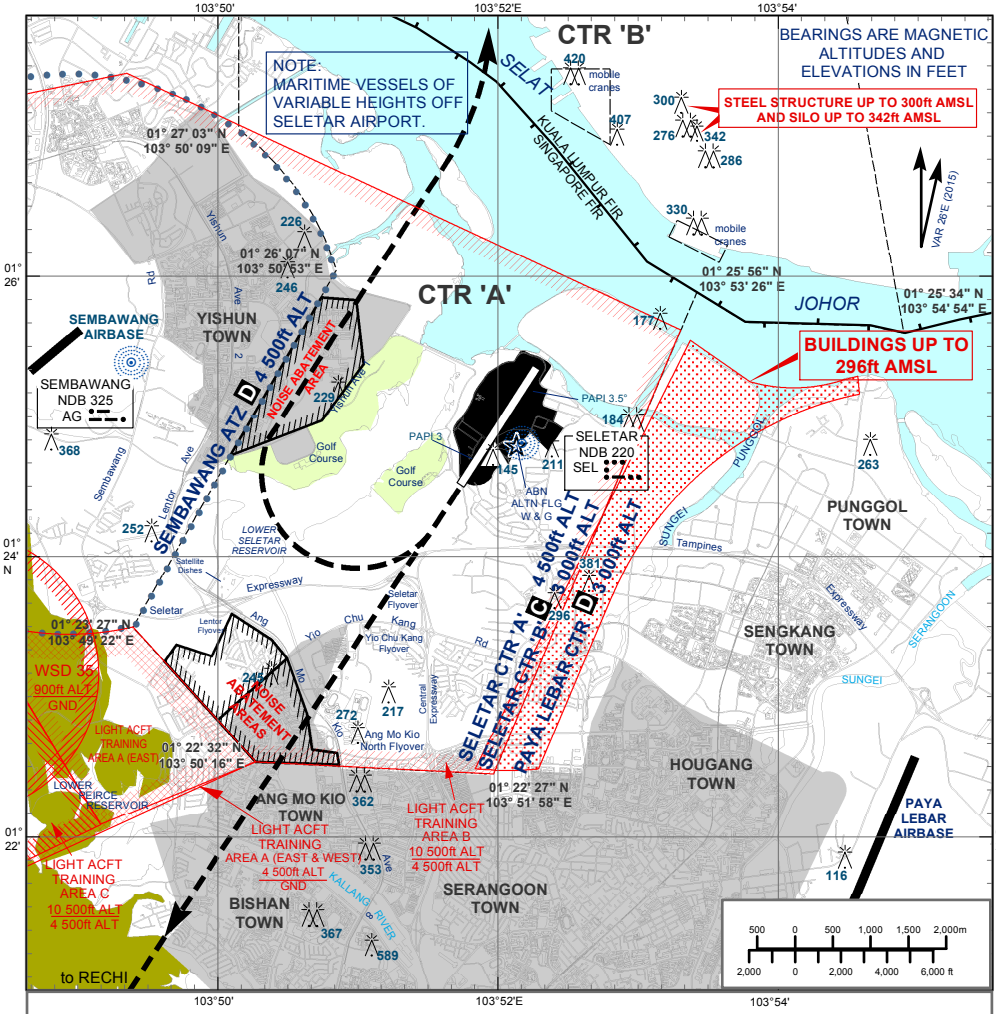
VISUAL DEPARTURE CHART

AD ELEV 46 ft

APP	120.3
	126.025
TWR	118.45
	270.4

SINGAPORE/SELETAR

RWY 21



ADVISORY DEPARTURE PROCEDURES FOR RUNWAY 21

On departure, pilots can expect climb to an initial altitude cleared by ATC. Pilots of fixed-wing aircraft can expect to turn right to join the circuit pattern 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 the next waypoint 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) Minimum altitudes apply over noise abatement areas (WSSL AD 2.21)
Aircraft types which are unable to safely manoeuvre clear of the noise abatement areas are not allowed to operate at Seletar Airport.

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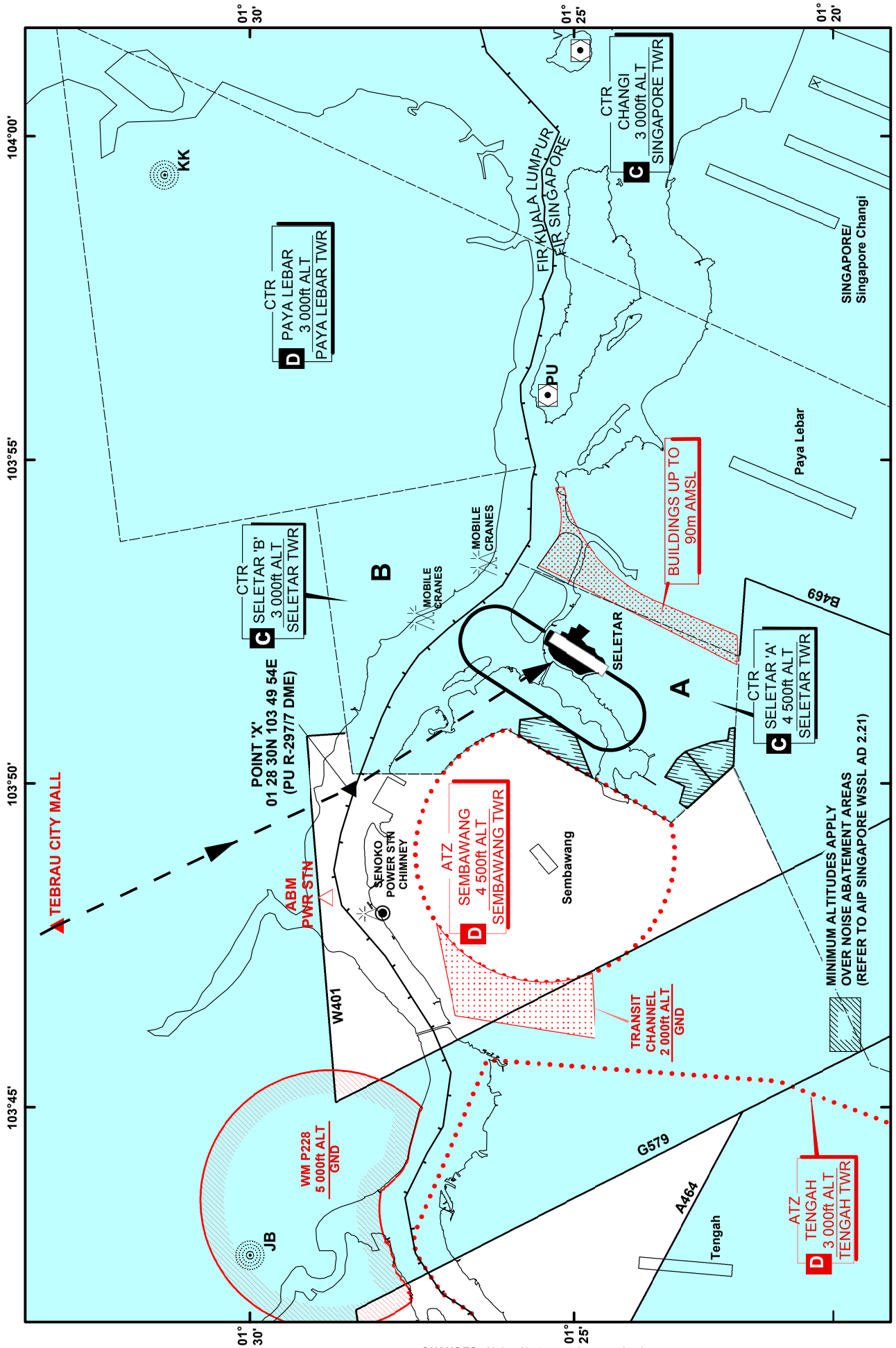
SELETAR AERODROME
JOINING PROCEDURE (VFR FLIGHTS) FROM JOHOR BAHRU



CHANGES : Noise Abatement Areas revised.

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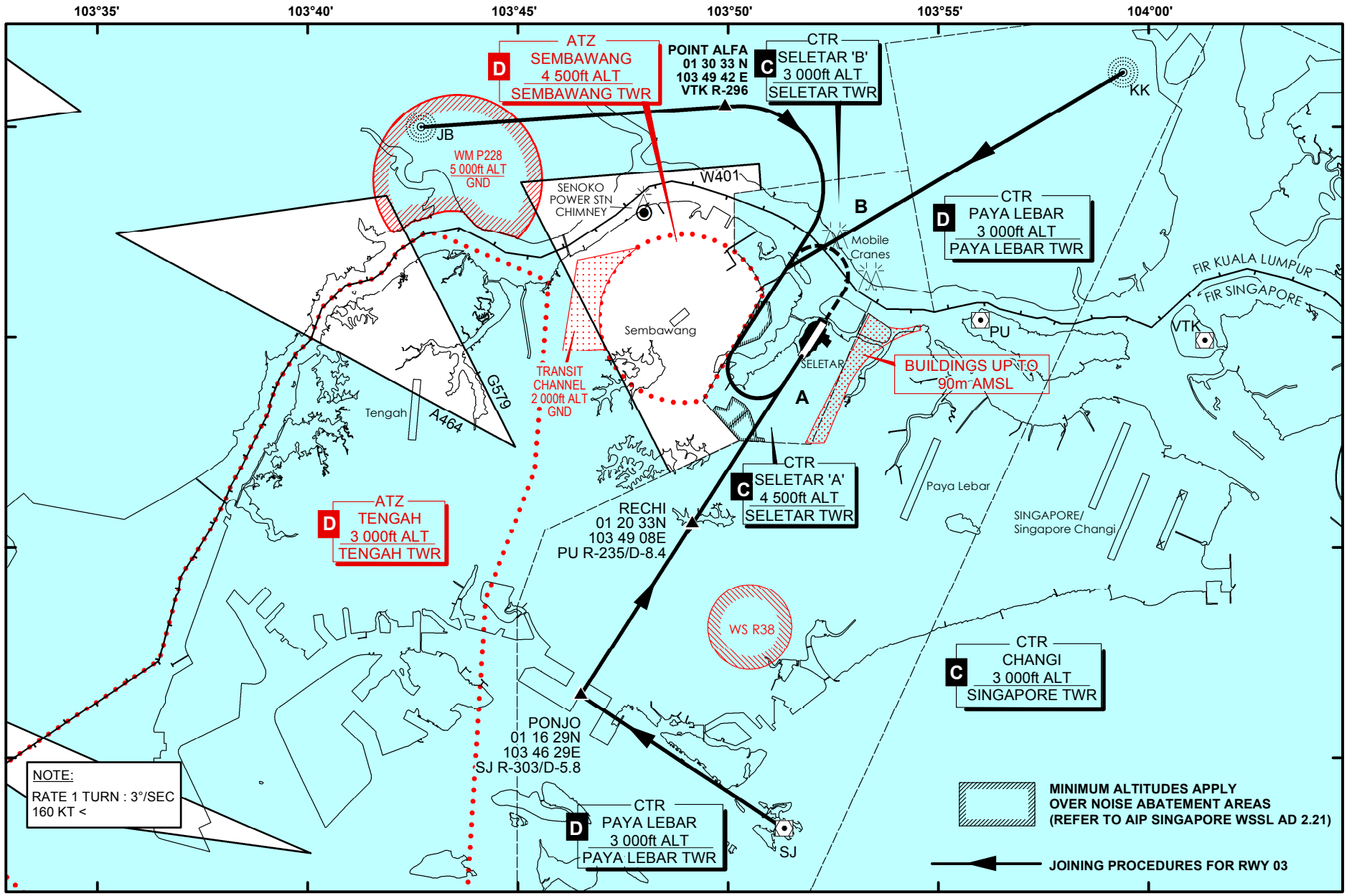
SELETAR AERODROME JOINING PROCEDURE (IFR FLIGHTS) FROM JB, KK AND SJ - RUNWAY 03



CHANGES : Joining pocedure for IFR flights from SINJON added. Noise Abatement Areas revised.

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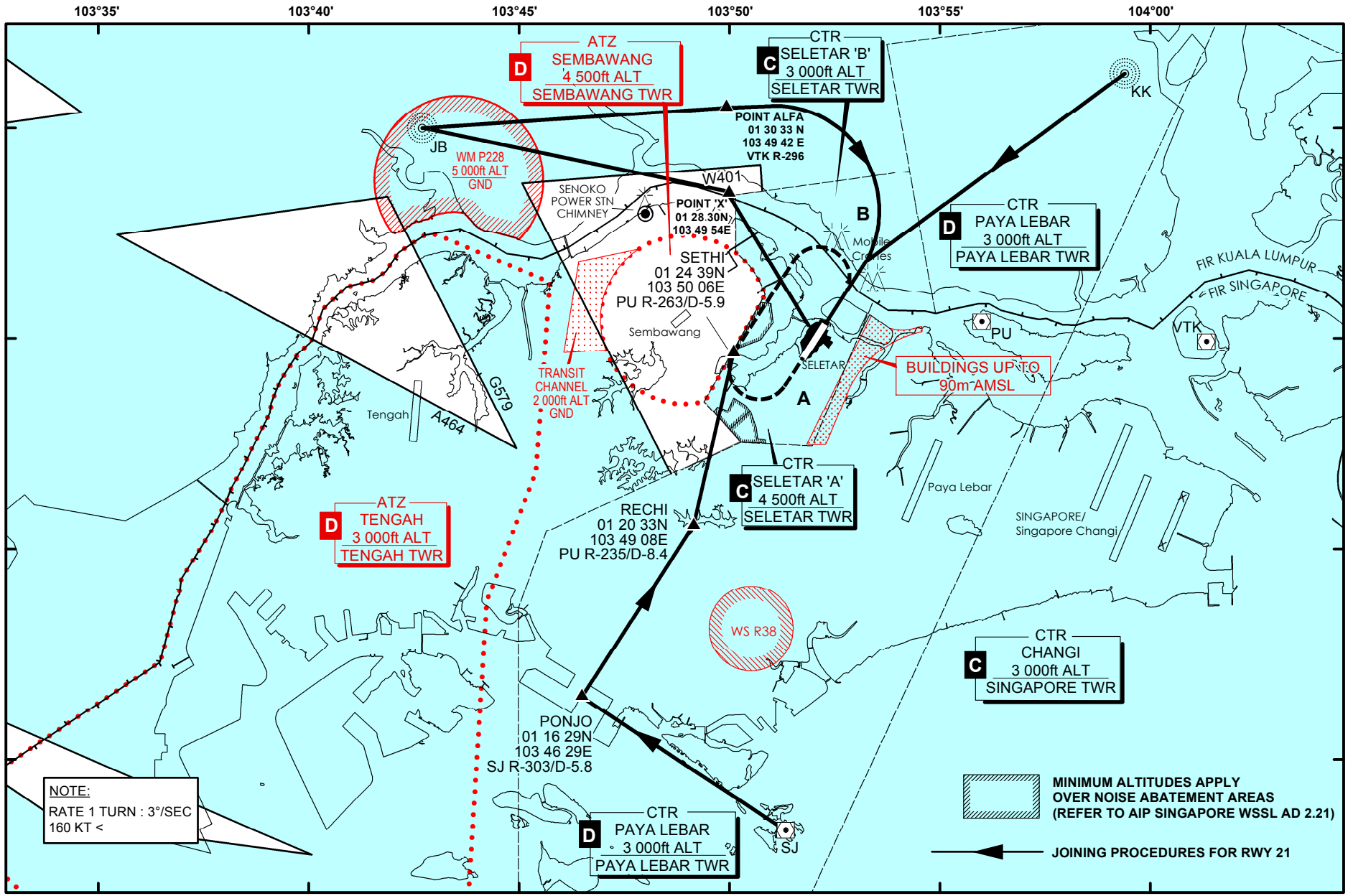
SELETAR AERODROME JOINING PROCEDURE (IFR FLIGHTS) FROM JB, KK AND SJ - RUNWAY 21



CHANGES : Joining pocedure for IFR flights from SINJON added. Noise Abatement Areas revised.

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