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AMDT 06/2022 Effective date 03 NOV 2022 Publication date 03 NOV 2022

wp-AMDT-2022-06

1. Significant information and changes

1.1 Singapore FIR

a. Updated the addressing of flight plan and its associated ATS messages within Singapore FIR.

b. Updated AIP Section ENR 1.8 - Weather Deviation Procedures in the Singapore FIR.

1.2 Singapore Changi Airport

a. Updated AIP Section WSSS AD 2.22 - Changi Flow Management Procedures.

1.3 Seletar Airport

a. Updated AIP Section WSSL AD 2.20 - Local Traffic Regulations.

b. Inclusion of Seletar Ground Procedures in AIP Section WSSL AD 2.22.

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 This amendment incorporates information contained in the listed AIP Supplement and NOTAM which are hereby superseded:

AIP Supplement

121/2022 dated 01/09/2022

NOTAM

A3640/22 dated 12/10/2022

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:	: replace.
GEN 0.4-1/2:	: replace.
GEN 0.4-3:	: replace.
GEN 2.1-1/2:	: replace.
ENR 0.6-1/2:	: replace.
ENR 0.6-3/4:	: replace.
ENR 0.6-5/6:	: replace.
ENR 1.1-1/2:	: replace.
ENR 1.1-3/4:	: replace.
ENR 1.1-5/6:	: replace.
ENR 1.1-11/12:	: replace.
ENR 1.1-13/14:	: replace.
ENR 1.1-15:	: remove.

ENR 1.5-1/2:	: replace.
ENR 1.5-3/4:	: replace.
ENR 1.6-1/2:	: replace.
ENR 1.6-3/4:	: replace.
ENR 1.6-5/6:	: replace.
ENR 1.6-7/8:	: replace.
ENR 1.6-9/10:	: replace.
ENR 1.6-11:	: replace.
ENR 1.7-5/6:	: replace.
ENR 1.7-7:	: replace.
ENR 1.8-1/2:	: replace.
ENR 1.8-3/4:	; replace.
ENR 1.8-5/6:	; replace.
ENR 1.8-7/8:	; replace.
ENR 1.8-9/10:	: replace.
ENR 1.8-11/12:	: replace.
ENR 1.8-13/14:	: replace.
ENR 1.8-15/16:	: replace.
ENR 1.8-17/18:	: replace.
ENR 1.8-19/20:	: replace.
ENR 1.8-21/22:	: replace.
ENR 1.8-23/24:	: replace.
ENR 1.8-25/26:	: replace.
ENR 1.8-27/28:	: replace.
ENR 1.8-29:	: remove.
ENR 1.11-1:	: replace.
ENR-3.6-3:	; insert.
ENR-3.6-5:	: insert.
ENR-3.6-7:	: remove.
ENR-3.6-9:	: remove.
ENR 4.1-1/2:	: replace.
AD 0.6-1/2:	; replace.
AD 0.6-3/4:	: replace.
AD 0.6-5/6:	: replace.
AD 0.6-7:	: replace.
AD 2.WSSS-17/18:	: replace.
AD 2.WSSS-43/44:	: replace.
AD 2.WSSS-45/46:	: replace.
AD 2.WSSS-47/48:	: insert.
AD 2.WSSL-11/12:	: replace.
AD 2.WSSL-17/18:	: replace.
AD 2.WSSL-19/20:	: replace.
AD 2.WSSL-21:	: insert.
AD-2-WSSL-ADC-2:	: replace.
AD-2-WSSL-ADC-3:	: replace.
AD 2.WSAG-3/4:	: 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 <u>https://aim-sg.caas.gov.sg</u>

4 The AIP structure and established regular amendment interval

4.1 The AIP structure

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

The AIP is made up of three Parts, General (<u>GEN</u>), En-route (<u>ENR</u>) and Aerodromes (<u>AD</u>), 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.

- <u>GEN 0</u> 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.
- <u>GEN 1</u> 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.
- <u>GEN 2</u> *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.
- <u>GEN 3</u> Services Aeronautical Information Services; Aeronautical Charts; Air Traffic Services; Communication Services; Meteorological Services; and Search and Rescue.
- <u>GEN 4</u> 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.
- <u>ENR 2</u> *Air traffic services airspace* Detailed description of Flight Information Region (FIR); Terminal Control Areas (TMA); and other regulated airspace.
- <u>ENR 3</u> 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.

- <u>ENR 4</u> *Radio navigation aids/systems* Radio navigation aids en-route; special navigation systems; name-code designators for significant points; and aeronautical ground lights en-route.
- <u>ENR 5</u> *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.
- <u>AD 1</u> *Aerodromes* Introduction Aerodromes availability; Rescue and fire fighting services; Index to aerodromes; and Grouping of aerodromes.
- <u>AD 2</u> *Aerodromes* Detailed information about aerodromes listed under 24 sub-sections.
- AD 3 This section has been omitted as there are no heliports in Singapore.

4.2 Regular Amendment Interval

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

Amendment Number	Publication Date
07/2022	29 December 2022
01/2023	23 February 2023
02/2023	20 April 2023
03/2023	15 June 2023
04/2023	10 August 2023
05/2023	05 October 2023
06/2023	30 November 2023

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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				
06/2019	10 OCT 2019	10 OCT 2019				
07/2019	05 DEC 2019	05 DEC 2019				
01/2020	30 JAN 2020	30 JAN 2020				
02/2020	26 MAR 2020	26 MAR 2020				
03/2020	21 MAY 2020	21 MAY 2020				
04/2020	16 JUL 2020	16 JUL 2020				
05/2020	10 SEP 2020	10 SEP 2020				
06/2020	05 NOV 2020	05 NOV 2020				
07/2020	31 DEC 2020	31 DEC 2020				
01/2021	25 FEB 2021	25 FEB 2021				
02/2021	22 APR 2021	22 APR 2021				
03/2021	17 JUN 2021	17 JUN 2021				
04/2021	12 AUG 2021	12 AUG 2021				
05/2021	07 OCT 2021	07 OCT 2021				
06/2021	02 DEC 2021	02 DEC 2021				
01/2022	27 JAN 2022	27 JAN 2022				
02/2022	24 MAR 2022	24 MAR 2022				
03/2022	19 MAY 2022	19 MAY 2022				
04/2022	14 JUL 2022	14 JUL 2022				
05/2022	08 SEP 2022	08 SEP 2022				
06/2022	03 NOV 2022	03 NOV 2022				

GEN 0.3 RECORD OF CURRENT AIP SUPPLEMENTS

NR/Year	Subject	AIP section(s) affected	Period of validity (from/to)	Cancellation record
021/2018	Paya Lebar Airport - Luffer Crane and Saddle Cranes	AD	06 APR 2018 / 31 DFC 2022	
028/2018	Paya Lebar Airport - Saddle Cranes	AD	20 JUN 2018 / 31 DEC 2022	
071/2018	Paya Lebar Airport - Saddle Cranes	AD	13 NOV 2018 / 31 DEC 2023	
078/2018	Paya Lebar Airport - Luffer Cranes	AD	28 NOV 2018	
033/2019	Paya Lebar Airport - Luffer Crane	AD	/ 30 DEC 2022 27 MAR 2019 / 31 DEC 2022	
034/2019	Paya Lebar Airport - Saddle Cranes	AD	27 MAR 2019 / 31 DEC 2022	
035/2019	Paya Lebar Airport - Luffer Crane	AD	27 MAR 2019 / 31 DEC 2022	
053/2019	Paya Lebar Airport - Saddle Cranes and Luffer Crane	AD	07 MAY 2019 / 31 DEC 2023	
126/2019	Paya Lebar Airport - Luffer Cranes	AD	12 NOV 2019 / 31 DEC 2022	
021/2020	Singapore Changi Airport - Long term closure of aircraft stand E5 at Terminal 2, Singapore Changi Airport	AD	30 MAR 2020 / 30 DEC 2024	
059/2020	Singapore Changi Airport - Long term closure of aircraft stand E20 at Terminal 2, Singapore Changi Airport	AD	25 AUG 2020 / 30 DEC 2026	
134/2021	Paya Lebar Airport - Mobile Cranes	AD	21 OCT 2021 / 01 DEC 2022	
135/2021	Paya Lebar Airport - Topless Cranes	AD	09 NOV 2021 / 01 DEC 2022	
140/2021	Paya Lebar Airport - Crawler Cranes	AD	09 NOV 2021 / 31 DEC 2022	
144/2021	Paya Lebar Airport - Luffer Cranes	AD	16 DEC 2021 / 01 DEC 2022	
145/2021	Paya Lebar Airport - Cranes	AD	16 DEC 2021 / 01 DEC 2022	
146/2021	Paya Lebar Airport - Cranes	AD	16 DEC 2021 / 01 DEC 2022	
147/2021	Paya Lebar Airport - Cranes	AD	16 DEC 2021 / 31 DEC 2022	
148/2021	Paya Lebar Airport - Flat-Top Cranes	AD	16 DEC 2021 / 31 DEC 2022	
149/2021	Paya Lebar Airport - Topless Cranes	AD	16 DEC 2021 / 31 DEC 2022	
150/2021	Paya Lebar Airport - Cranes	AD	16 DEC 2021 / 31 DEC 2022	
153/2021	Paya Lebar Airport - Luffing Cranes	AD	16 DEC 2021 / 31 DEC 2022	
154/2021	Paya Lebar Airport - Luffing Tower Cranes	AD	16 DEC 2021 / 15 DEC 2022	
156/2021	Paya Lebar Airport - Crawler Cranes	AD	16 DEC 2021 / 31 DEC 2022	
157/2021	Paya Lebar Airport - Cranes	AD	16 DEC 2021 / 01 DEC 2022	
158/2021	Sembawang Aerodrome - Tower Cranes	AD	16 DEC 2021 / 01 DEC 2022	
159/2021	Sembawang Aerodrome - Mobile Crane	AD	16 DEC 2021 / 08 NOV 2022	

NR/Year	Subject	AIP section(s) affected	Period of validity (from/to)	Cancellation record
161/2021	Singapore Changi Airport - Steel Frame	AD	17 JAN 2022 / 17 DEC 2024	
002/2022	Paya Lebar Airport - Luffing Crane	AD	11 JAN 2022 / 31 DEC 2022	
004/2022	Paya Lebar Airport - Tower Cranes	AD	11 JAN 2022	
005/2022	Paya Lebar Airport - Tower Cranes	AD	11 JAN 2022 / 31 DEC 2022	
006/2022	Paya Lebar Airport - Luffer Cranes	AD	11 JAN 2022 / 31 DEC 2022	
007/2022	Paya Lebar Airport - Cranes	AD	11 JAN 2022 / 31 DEC 2022	
008/2022	Paya Lebar Airport - Luffing Crane	AD	11 JAN 2022	
009/2022	Paya Lebar Airport - Cranes	AD	11 JAN 2022 / 31 DEC 2022	
010/2022	Paya Lebar Airport - Topless Cranes	AD	11 JAN 2022 / 31 DEC 2022	
011/2022	Paya Lebar Airport - Luffing Crane	AD	11 JAN 2022 / 31 DEC 2022	
012/2022	Paya Lebar Airport - Topless Cranes	AD	11 JAN 2022 / 31 DEC 2022	
013/2022	Paya Lebar Airport - Topless Cranes	AD	11 JAN 2022 / 31 DEC 2022	
015/2022	Paya Lebar Airport - Luffing Crane	AD	11 JAN 2022 / 31 DEC 2022	
017/2022	Paya Lebar Airport - Flat-Top Cranes	AD	11 JAN 2022 / 31 DEC 2022	
018/2022	Paya Lebar Airport - Luffing Crane	AD	11 JAN 2022 / 31 DEC 2022	
020/2022	Paya Lebar Airport - Luffing Crane	AD	11 JAN 2022 / 31 DEC 2022	
021/2022	Paya Lebar Airport - Cranes	AD	11 JAN 2022 / 31 DEC 2022	
022/2022	Paya Lebar Airport - Cranes	AD	11 JAN 2022 / 31 DEC 2022	
023/2022	Paya Lebar Airport - Tower Cranes	AD	11 JAN 2022 / 09 DEC 2022	
024/2022	Paya Lebar Airport - Flat-Top Cranes	AD	11 JAN 2022 / 31 DEC 2022	
025/2022	Paya Lebar Airport - Saddle Cranes	AD	11 JAN 2022 / 31 DEC 2022	
028/2022	Paya Lebar Airport - Flat-Top Cranes	AD	12 JAN 2022 / 31 DEC 2023	
032/2022	Paya Lebar Airport - Cranes	AD	10 FEB 2022 / 31 DEC 2023	
033/2022	Paya Lebar Airport - Topless Cranes	AD	10 FEB 2022 / 01 FEB 2023	
034/2022	Paya Lebar Airport - Crawler Cranes	AD	10 FEB 2022 / 31 JAN 2023	
035/2022	Paya Lebar Airport - Suspended Scaffold	AD	10 FEB 2022 / 31 DEC 2023	
036/2022	Paya Lebar Airport - Mobile Crane	AD	10 FEB 2022 / 31 DEC 2023	
037/2022	Paya Lebar Airport - Crawler Cranes	AD	10 FEB 2022 / 31 DEC 2023	
039/2022	Paya Lebar Airport - Topless Cranes	AD	10 FEB 2022 / 24 DEC 2022	
040/2022	Paya Lebar Airport - Tower Cranes	AD	10 FEB 2022 / 18 JAN 2023	

NR/Year	Subject	AIP section(s) affected	Period of validity (from/to)	Cancellation record
042/2022	Paya Lebar Airport - Mobile Crane	AD	10 FEB 2022 / 31 DEC 2023	
043/2022	Paya Lebar Airport - Luffing Tower Crane	AD	10 FEB 2022 / 08 JAN 2023	
045/2022	Singapore Changi Airport - Frangible Frames	AD	01 APR 2022 / 31 JAN 2024	
046/2022	Paya Lebar Airport - Crawler Cranes	AD	10 MAR 2022 / 31 DEC 2022	
047/2022	Paya Lebar Airport - Luffing Crane	AD	10 MAR 2022 / 31 DEC 2022	
048/2022	Paya Lebar Airport - Cranes	AD	10 MAR 2022 / 31 DEC 2023	
049/2022	Paya Lebar Airport - Cranes	AD	10 MAR 2022 / 31 JAN 2023	
051/2022	Paya Lebar Airport - Tower Cranes	AD	10 MAR 2022 / 31 DEC 2023	
052/2022	Paya Lebar Airport - Topless Cranes	AD	10 MAR 2022 / 03 FEB 2023	
057/2022	Paya Lebar Airport - Luffing Cranes	AD	12 APR 2022 / 31 MAR 2023	
058/2022	Paya Lebar Airport - Mobile Cranes	AD	12 APR 2022 / 30 SEP 2023	
059/2022	Paya Lebar Airport - Topless Cranes	AD	12 APR 2022 / 30 SEP 2023	
060/2022	Paya Lebar Airport - Cranes	AD	12 APR 2022 / 31 MAR 2023	
062/2022	Paya Lebar Airport - Cranes	AD	12 APR 2022 / 31 MAR 2023	
063/2022	Paya Lebar Airport - Topless Cranes	AD	12 APR 2022 / 01 APR 2023	
066/2022	Paya Lebar Airport - Topless Cranes	AD	12 APR 2022 / 19 MAR 2023	
067/2022	Paya Lebar Airport - Obstacles	AD	12 APR 2022 / 30 DEC 2023	
068/2022	Paya Lebar Airport - Topless Cranes	AD	12 APR 2022 / 09 MAR 2023	
069/2022	Paya Lebar Airport - Luffing Crane	AD	12 APR 2022 / 01 MAR 2023	
071/2022	Paya Lebar Airport - Mobile Crane	AD	05 MAY 2022 / 31 DEC 2022	
072/2022	Paya Lebar Airport - Tower Crane	AD	05 MAY 2022 / 11 APR 2023	
073/2022	Paya Lebar Airport - Cranes	AD	05 MAY 2022 / 30 APR 2023	
074/2022	Paya Lebar Airport - Cranes	AD	05 MAY 2022 / 06 APR 2023	
076/2022	Sembawang Aerodrome - Mobile Crane	AD	05 MAY 2022 / 11 DEC 2022	
079/2022	Paya Lebar Airport - Luffing Cranes	AD	02 JUN 2022 / 30 MAY 2023	
080/2022	Sembawang Aerodrome - Excavator Cranes	AD	02 JUN 2022 / 05 APR 2023	
082/2022	Paya Lebar Airport - Mobile Crane	AD	07 JUL 2022 / 31 DEC 2022	
083/2022	Paya Lebar Airport - Topless Tower Cranes	AD	07 JUL 2022 / 10 JUN 2023	
084/2022	Paya Lebar Airport - Mobile Crane	AD	07 JUL 2022 / 13 DEC 2022	
085/2022	Paya Lebar Airport - Tower Crane	AD	07 JUL 2022 / 17 JUN 2023	

NR/Year	Subject	AIP section(s) affected	Period of validity (from/to)	Cancellation record
086/2022	Paya Lebar Airport - Mobile Cranes	AD	07 JUL 2022 / 21 JUN 2023	
087/2022	Paya Lebar Airport - Luffing Crane	AD	07 JUL 2022 / 25 JUN 2023	
088/2022	Paya Lebar Airport - Crawler Crane	AD	07 JUL 2022 / 31 DEC 2023	
089/2022	Paya Lebar Airport - Luffer Crane	AD	07 JUL 2022 / 21 JUN 2023	
090/2022	Paya Lebar Airport - Mobile Crane	AD	07 JUL 2022 / 31 DEC 2022	
091/2022	Paya Lebar Airport - Cranes	AD	07 JUL 2022 / 31 DEC 2023	
092/2022	Paya Lebar Airport - Cranes	AD	07 JUL 2022 / 08 APB 2023	
093/2022	Paya Lebar Airport - Mobile Crane	AD	07 JUL 2022 / 31 DEC 2023	
094/2022	Paya Lebar Airport - Mobile Crane	AD	07 JUL 2022 / 17 DEC 2022	
095/2022	Paya Lebar Airport - Luffer Cranes	AD	07 JUL 2022 / 31 DEC 2023	
096/2022	Paya Lebar Airport - Mobile Cranes	AD	07 JUL 2022 / 21 JUN 2023	
097/2022	Paya Lebar Airport - Luffing Crane	AD	07 JUL 2022 / 31 DEC 2023	
098/2022	Paya Lebar Airport - Mobile Crane	AD	07 JUL 2022 / 13 DEC 2022	
099/2022	Sembawang Aerodrome - Crawler Crane	AD	07 JUL 2022 / 30 DEC 2022	
100/2022	Sembawang Aerodrome - Mobile Cranes	AD	07 JUL 2022 / 03 JUN 2023	
102/2022	Implementation of Direct Routing Operations (DRO) for Arrivals into Singapore Changi Airport on ATS Routes L642 and N892	ENR	<i>08 SEP 2022</i> PERM	
103/2022	Paya Lebar Airport - Mobile Cranes	AD	04 AUG 2022 / 04 AUG 2023	
104/2022	Paya Lebar Airport - Topless Cranes	AD	04 AUG 2022 / 31 AUG 2023	
105/2022	Paya Lebar Airport - Cranes	AD	04 AUG 2022 / 30 JUL 2023	
106/2022	Paya Lebar Airport - Luffer Crane	AD	04 AUG 2022 / 31 JUL 2023	
107/2022	Paya Lebar Airport - Mobile Crane	AD	04 AUG 2022 / 31 DEC 2023	
108/2022	Paya Lebar Airport - Mobile Crane	AD	04 AUG 2022 / 31 JUL 2023	
109/2022	Paya Lebar Airport - Tower Cranes	AD	04 AUG 2022 / 01 AUG 2023	
110/2022	Paya Lebar Airport - Luffing Crane	AD	04 AUG 2022 / 31 DEC 2022	
111/2022	Paya Lebar Airport - Tower Crane	AD	04 AUG 2022 / 05 AUG 2023	
112/2022	Paya Lebar Airport - Mobile Crane	AD	04 AUG 2022 / 31 DEC 2023	
113/2022	Paya Lebar Airport - Mobile Crane	AD	04 AUG 2022 / 31 DEC 2023	
114/2022	Paya Lebar Airport - Cranes	AD	04 AUG 2022 / 30 DEC 2023	
115/2022	Paya Lebar Airport - Cranes	AD	04 AUG 2022 / 09 JUL 2023	

NR/Year	Subject	AIP section(s) affected	Period of validity (from/to)	Cancellation record
116/2022	Paya Lebar Airport - Tower Crane	AD	04 AUG 2022 / 09 JUL 2023	
117/2022	Paya Lebar Airport - Topless Cranes	AD	04 AUG 2022 / 01 DEC 2023	
118/2022	Paya Lebar Airport - Luffing Cranes	AD	04 AUG 2022 / 01 DEC 2023	
119/2022	Singapore Changi Airport - Closure of Runway 02C/20C and Taxiways due to Changi East Development Works	AD	06 OCT 2022 / 22 MAR 2023	
120/2022	Singapore Changi Airport - Closure of aircraft stand F50 and taxilane R7 behind aircraft stand at Terminal 2	AD	25 AUG 2022 / 31 JAN 2023	
122/2022	Paya Lebar Airport - Cranes	AD	06 SEP 2022 / 31 DEC 2023	
123/2022	Paya Lebar Airport - Luffing Cranes	AD	06 SEP 2022 / 31 DEC 2023	
124/2022	Paya Lebar Airport - Mobile Cranes	AD	06 SEP 2022 / 28 DEC 2023	
125/2022	Paya Lebar Airport - Luffer Cranes	AD	06 SEP 2022 / 31 DEC 2023	
126/2022	Paya Lebar Airport - Mobile Crane	AD	06 SEP 2022 / 02 SEP 2023	
127/2022	Paya Lebar Airport - Luffer Crane	AD	06 SEP 2022 / 05 AUG 2023	
128/2022	Paya Lebar Airport - Cranes	AD	06 SEP 2022 / 05 AUG 2023	
129/2022	Singapore Changi Airport - Release of weather balloon with dual radiosondes	ENR	22 SEP 2022 / 21 JUN 2023	
130/2022	Seletar Airport - Closure of Helicopter	AD	28 SEP 2022 / 30 SEP 2023	
131/2022	Paya Lebar Airport - Flat-Top Cranes	AD	30 NOV 2022 / 31 DEC 2023	
132/2022	Paya Lebar Airport - Cranes	AD	06 OCT 2022 / 07 OCT 2023	
133/2022	Paya Lebar Airport - Derrick Cranes	AD	06 OCT 2022 / 31 DEC 2023	
134/2022	Paya Lebar Airport - Mobile Crane	AD	06 OCT 2022 / 06 JUN 2023	
135/2022	Paya Lebar Airport - Crawler Cranes	AD	06 OCT 2022 / 20 SEP 2023	
136/2022	Paya Lebar Airport - Luffing Cranes	AD	06 OCT 2022 / 01 OCT 2023	
137/2022	Paya Lebar Airport - Mobile Cranes	AD	06 OCT 2022 / 20 MAR 2023	
138/2022	Paya Lebar Airport - Luffing Cranes	AD	06 OCT 2022 / 01 MAY 2023	
139/2022	Paya Lebar Airport - Tower Cranes	AD	06 OCT 2022 / 23 SEP 2023	
140/2022	Paya Lebar Airport - Topless Cranes	AD	06 OCT 2022 / 01 SEP 2023	
141/2022	Paya Lebar Airport - Luffer Crane	AD	06 OCT 2022 / 10 DEC 2023	
142/2022	Paya Lebar Airport - Mobile Cranes	AD	06 OCT 2022 / 10 FEB 2023	
143/2022	Singapore Changi Airport - Frangible Frames	AD	31 OCT 2022 / 31 JAN 2024	
144/2022	Temporary withdrawal and replacement of Mersing DVOR/DME (VMR)	AD/ENR	01 DEC 2022 / 03 JUN 2023	

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ENF	R 3.1-9	08 SEP 2022	ENR 5.1-4		14 JUL 2022	AD 2.WSSS-39
ENF	R 3.1-10	08 SEP 2022	ENR 5.1-5		14 JUL 2022	AD 2.WSSS-40
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GEN 2 TABLES AND CODES

GEN 2.1 MEASURING SYSTEM, AIRCRAFT MARKING, HOLIDAYS

2.1.1 UNITS OF MEASUREMENT

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

2.1.2 TEMPORAL REFERENCE SYSTEM

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

2.1.3 HORIZONTAL REFERENCE SYSTEM

3.1 Name/designation of system

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

3.2 Parameters of the Projection

Projection is expressed in terms of Conical Conformal Projection.

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

* International nautical miles, for which conversion into metres is given by: 1 international NM = 1852 metres

3.3 Ellipsoid

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

3.4 Datum

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

3.5 Area of application

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

3.6 Use of an asterisk to identify published geographical coordinates

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

2.1.4 VERTICAL REFERENCE SYSTEM

4.1 Name/designation of system

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

4.2 Geoid model

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

2.1.5 AIRCRAFT NATIONALITY AND REGISTRATION MARKS

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

2.1.6 PUBLIC HOLIDAYS IN SINGAPORE

The following dates are notified as public holidays:

Name of Holiday	Date	Day
Christmas Day	25 December 2022*	Sunday
New Year's Day	01 January 2023*	Sunday
Chinese New Year	22 January 2023**	Sunday
	23 January 2023	Monday
Good Friday	07 April 2023	Friday
Hari Raya Puasa	22 April 2023	Saturday
Labour Day	01 May 2023	Monday
Vesak Day	02 June 2023	Friday
Hari Raya Haji	29 June 2023	Thursday
National Day	09 August 2023	Wednesday
Deepavali	12 November 2023*	Sunday
Christmas Day	25 December 2023	Monday
		1

* The following Monday will be a public holiday.

** The following Tuesday will be a public holiday for Chinese New Year.

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ENR 1 GENERAL RULES AND PROCEDURES

ENR 1.1 GENERAL RULES

1 INTRODUCTION

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

\leftarrow 2 FLIGHTS ON AIRWAYS

$\leftarrow 2.1$ SEPARATION

- 2.1.1 Areas of responsibility for the control of flights on airways and the units providing this service are shown in subsection ENR 2.1.
- 2.1.2 Separation is based on:
 - a. Estimated and actual times over position reporting points;
 - b. Reports of visual sighting; and
 - c. Radar identification.

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

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

2.2 COMMUNICATIONS AND RADIO NAVIGATION REQUIREMENTS

- 2.2.1 All aircraft operating under IFR or VFR within controlled airspaces shall be equipped with appropriate communications and navigation equipment enabling them:
 - a. To maintain two-way communication with the appropriate ATC unit. The minimum requirement is VHF RTF equipment suitable for communicating on ATC frequencies and HF RTF beyond the range of VHF.
 - b. To maintain track within the lateral limits of the airway and to navigate in accordance with ATC instructions. The minimum requirement is one radio compass.
- 2.2.2 The pilot-in-command shall maintain a continuous listening watch on the appropriate air/ground frequency.

2.3 AIR TRAFFIC CONTROL CLEARANCE

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

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

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

2.4 ROUTE AND LEVEL ASSIGNMENT

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

2.5 ESSENTIAL TRAFFIC INFORMATION

- 2.5.1 Essential traffic is that controlled traffic to which the provision of separation by ATC is applicable but, which in relation to a particular controlled traffic, does not have the required minimum separation.
- \leftarrow 2.5.2 Essential traffic information will be issued to controlled flights concerned whenever they constitute essential traffic to each other.
- ← Note: This information will inevitably relate to controlled flights which are cleared subject to maintaining own separation and remaining in visual meteorological conditions.
- \leftarrow 2.5.3 Essential traffic information will include:
 - a. Direction of flight of aircraft concerned;
 - b. Type of aircraft concerned;
 - c. Level(s) of aircraft concerned and estimated time of passing or if this is not available, the estimated time of arrival for the reporting point nearest to where the level will be crossed.

2.6 INSTRUCTIONS TO DEPARTING AIRCRAFT

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

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2.7	ARRIVAL/APPROACH INSTRUCTIONS
2.7.1	ATC clearance or control instructions for approach to an aerodrome or holding point will be issued to an arriving aircraft on initial contact with the appropriate ATC unit.
2.7.2	The clearance will specify the clearance limit, route and level to be flown. An Expected Approach Time will be included if it is anticipated that the arriving aircraft will be required to hold.
2.7.3	Pilots are reminded to use the phraseology minimum fuel and MAYDAY MAYDAY MAYDAY fuel to notify ATC of their low fuel state or fuel emergency. For details, refer to CAAS Information Circular IC 5/ 2013 available at URL https://www.caas.gov.sg - Regulations - Safety - Documents and Notices - Information Circulars.
2.8	WEATHER INFORMATION
2.8.1	Weather information will be passed to inbound aircraft on request. However, pilots should tune on to ATIS frequency 128.6 MHz for the weather.
2.8.2	The term CAVOK will be used in place of visibility, weather and cloud when the following conditions apply simultaneously:
	 a. Visibility 10km or more; b. No precipitations or thunderstorms; c. No cloud below 1 500m.
2.8.3	Deterioration and improvement weather reports and significant weather information, e.g. severe turbulence, thunderstorms, icing conditions etc. will be passed to all aircraft concerned.
2.9	AIRCRAFT JOINING OR CROSSING AIRWAYS

- 2.9.1 Pilots-in-command of aircraft joining or crossing an airway will:
 - a. When flying under VFR outside the Singapore/Johor Airspace Complex and CTRs notify the appropriate authority; or
 - b. When flying under IFR, or when joining or crossing the Singapore/Johor Airspace Complex and CTRs request clearance from the appropriate authority not later than 10 minutes on VHF RTF or 20 minutes on HF RTF before joining or crossing.
- 2.9.2 An in-flight request or notification or intention to join an Airway shall include the following information, as appropriate:
 - a. Aircraft identification;
 - b. Aircraft type;
 - c. Position;

- d. Level and flight conditions;
- e. Estimated time at point of joining;
- f. Desired level;
- g. Route and point of first intended landing;
- h. True airspeed;
- i. The words "Request joining clearance".
- 2.9.3 An in-flight request or notification of intention to cross an Airway shall include the following information:
 - a. Aircraft identification;
 - b. Aircraft type;
 - c. True track;
 - d. Place and estimated time of crossing;
 - e. Desired crossing level;
 - f. Ground Speed;
 - g. The words "Request crossing clearance"
- 2.9.4 The selected crossing or joining point should, where possible, be associated with a radio facility to assist accurate navigation.

2.10 VFR Flights Crossing Airways

- 2.10.1 VFR flights intending to cross Airways outside the Singapore/Johor Airspace Complex shall only cross them at various levels plus 500ft at an angle of 90° to the direction of the Airway, or as close as possible to this angle. Condition for operation of VFR flights are given in page <u>ENR 1.2</u> para 2.
- 2.10.2 In an emergency, where neither a radar nor a procedural crossing can be obtained, an Airway may be crossed at various levels plus 500ft. The various levels referred to are flight levels of whole thousands in feet.

2.11 TEMPORARY DANGER AREAS ON AIRWAYS

- 2.11.1 Military operations, both air and ground, frequently take place within the Singapore FIR. Danger Areas will be promulgated by NOTAM, giving the reference point, vertical extent, radius and duration of the operation.
- 2.11.2 Where danger areas infringe controlled airspace, the areas will not be available for use by civil aircraft at the levels affected.

2.12 SINGAPORE/JOHOR AIRSPACE COMPLEX - SPECIAL REQUIREMENTS

- 2.12.1 All flights, IFR and VFR, conducted within the Singapore/Johor Airspace Complex are subject to an Air Traffic Control Clearance and are regulated in accordance with IFR separation standards.
- 2.12.2 Singapore ACC performs both Area and Approach Control functions for all aircraft landing at Singapore Changi and Seletar Airports. Procedural traffic bound for RSAF Paya Lebar, Tengah or Sembawang are likewise controlled by Singapore ACC but such traffic will normally be released to the respective military aerodrome/approach unit according to traffic circumstances and at the most convenient point within the Singapore/Johor Airspace Complex. Due to the close proximity of these aerodromes, all FIR procedural traffic are processed in order of priority irrespective of destination and slight delays may be expected. The pilot-in-command will call the appropriate Tower at the time, level or place specified by Singapore ACC.
- 2.12.3 Control instructions for arriving and departing aircraft will be issued in accordance with paras 2.6 and 2.7.

2.13 IFR FLIGHTS OUTSIDE SINGAPORE/JOHOR AIRSPACE COMPLEX IN VMC

- 2.13.1 The pilot-in-command of an aircraft operating under IFR within 183km (100nm) from Singapore Changi Airport below FL150 may request a VFR clearance for any portion of the flight. In the absence of such a request, ATC will issue a full IFR clearance regardless of weather conditions.
- 2.13.2 Outside the Singapore/Johor Airspace Complex within 100nm from Singapore Changi Airport, when necessary to expedite traffic, ATC may request a pilot-in-command under IFR below FL150 to conduct portion of the flight under VFR. An alternative clearance will be issued if the pilot-in-command has any doubt as to his ability to maintain VFR.

3 AIR TRAFFIC ADVISORY SERVICE

Not Provided

4 FLIGHT INFORMATION SERVICE

4.1 INTRODUCTION

- 4.1.1 Flight Information Service is provided to all flights.
- 4.1.2 Units providing FIS and the areas they serve are shown in section ENR 2.

4.2 PROVISION OF FLIGHT INFORMATION SERVICE

- 4.2.1 Under this service the following information is provided to pilots by the FIC or at the request of the pilot:
 - a. SIGMET Information concerning tropical revolving storm, active thunderstorm areas, severe line squall, heavy hail, severe turbulence, severe icing and marked mountain waves, is provided;
 - b. Special Air-Reports are provided as available;
 - c. Landing Forecast (Trend Type) for Singapore is provided to turbine operations when approximately one hour from landing;
 - d. Aerodrome Forecasts are readily available on request for Singapore, Kuala Lumpur and Soekarno-Hatta; Note: Aerodrome Forecasts for other aerodromes are also provided on request but are not readily available.
 - e. Amended Aerodrome Forecasts for local as well as foreign aerodromes are provided as available;
 - f. Special Met Reports (aviation selected special weather reports) are provided for Singapore and Kuala Lumpur;
 - g. Met Reports (aviation routine weather reports) (half-hourly) are readily available on request for Singapore, Kuala Lumpur and Soekarno Hatta; *Note: Met Reports for other aerodromes are also provided on request but are not readily available.*
 - h. Upper-Air Information Forecast of en-route upper winds and temperatures are available on request.
- 4.2.2 In addition, the FIC may arrange diversions of aircraft in consultation with the appropriate operating company representative.

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

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

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

7

LIGHT SIGNALS

Appendix A

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

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

8 DATA LINK SERVICES IN SINGAPORE FIR

8.1 BACKGROUND

- 8.1.1 Controller Pilot Data Link Communications (CPDLC) and Automatic Dependent Surveillance (ADS) data link applications will be used to provide services to FANS 1/A equipped aircraft, in particular within the Singapore FIR beyond the range of existing radar / ADS-B and VHF voice communications. Area Navigation (RNAV) routes suitable for ADS-C and / or CPDLC logon are described in ENR 3.3.
- 8.1.2 Messages will be transferred by VHF and satellite data link.
- 8.1.3 CPDLC supports the following services:
 - a. Emergency alerting;
 - b. Pilot to Controller downlink of position reports and clearance requests;
 - c. Controller to Pilot uplink of ATC clearances and instructions; and
 - d. Free text as a supplement to pre-formatted message elements.
- 8.1.4 Pre-Departure Clearance (PDC) via CPDLC is available on selected ATS routes/destinations as described in WSSS AD 2.22 paragraph 8.4.
- 8.1.5 Automatic Dependent Surveillance (ADS) supports automatic reporting by the aircraft Flight Management System (FMS) of aircraft position and intent information. The FMS reports the required information in accordance with parameters selected by the ground system.

8.2 LOGON PROCEDURES

- 8.2.1 The AFN LOGON address for the Singapore FIR is WSJC.
- 8.2.2 To avoid automatic rejection of the LOGON, the flight identification number used by the pilot in the LOGON process must be identical to the flight identification number filed in the flight plan.
- 8.2.3 A LOGON must be received from the aircraft before any data link connections can be initiated by the ground system. This is achieved via the ATS facility notification (AFN) LOGON process to be initiated by the pilot in accordance with company procedures.
- 8.2.4 Aircraft requesting data link services inbound to Singapore FIR are required to manually LOGON onto WSJC at least 10 minutes prior to the estimated time for entering Singapore FIR. Data link equipped aircraft departing from aerodromes within the Singapore FIR and requesting data link may LOGON to WSJC prior to departure. Pilots who are unable to establish a data link connection are to inform ATC on VHF or HF RTF.
- 8.2.5 Pilots are reminded to provide the flight level on first contact with HF, including when established on data link.

8.3 APPLICATION OF CPDLC

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

8.4 APPLICATION OF ADS

- 8.4.1 ADS Periodic contracts will be established automatically on receipt of a LOGON.
- 8.4.2 The Periodic reporting rate is 10 minutes for aircraft operating outside radar coverage and 20 minutes for aircraft operating within radar coverage.
- 8.4.3 For ADS logged-on aircraft, CPDLC position reports are not required except when the following event occurs:
 - a. upon position over first compulsory reporting point when aircraft enters Singapore FIR;
 - b. aircraft at ATS/MET reporting point.
- 8.4.4 ADS contracts will be terminated automatically at a system parameter time after the aircraft has left the Singapore FIR.

8.5 DATA LINK FAILURE

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

8.6 FLIGHT PLAN NOTIFICATION

- 8.6.1 Aircraft planning to utilise data link communications must annotate their ICAO flight plan as follows:
 - a. Data link communication serviceability and capability must be notified by inserting one or more of the following letters in Item 10a (radio communication, navigation and approach aid equipment and capabilities):

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

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

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

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

ENR 1.5 HOLDING, APPROACH AND DEPARTURE PROCEDURES

1.5.1 GENERAL

- 1.1 The arrival, holding, approach and departure procedures in use throughout the Singapore FIR are developed in accordance with the criteria contained in ICAO DOC 8168-OPS/611: Procedures for Air Navigation Services Operations (PANS-OPS).
- ← 1.1.2 An aircraft approaching an aerodrome under IFR for the purpose of making a landing shall conform to the holding and instrument approach procedures for the radio navigational aid employed as prescribed in the appropriate Instrument Approach Charts in WSSS AD 2.24.
 - 1.1.3 Pilots will be expected to know the correct holding, approach and departure procedures.

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

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

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

1.5.2 ARRIVING FLIGHTS

2.1 INSTRUMENT APPROACH PROCEDURES

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

2.2 CATEGORY I ILS APPROACHES

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

2.3 CATEGORY II ILS APPROACHES

(refer to WSSS AD 2-22 for details)

2.4 VISUAL APPROACH PROCEDURES

- 2.4.1 An IFR flight operating into Singapore Changi Airport may be cleared for a visual approach subject to the following conditions:
 - a. the pilot has the aerodrome in sight and can conduct his approach with visual reference to terrain;
 - b. the flight will not cause delay to other traffic;
 - c. there is no conflicting tall vessel movement;
 - d. the cloud ceiling at the aerodrome is 4,000ft or more for landing on RWY 20 and 3,000ft or more for landing on RWY 02; and
 - e. the visibility at the aerodrome is 5km or more.
- \leftarrow 2.4.2 Notwithstanding paragraphs 2.4.1(d) and 2.4.1(e), if the pilot reports that he has the aerodrome in sight and can conduct his approach with visual reference to terrain, the flight may be cleared for a visual approach.
 - 2.4.3 Pilots may expect radar vectoring for separation and sequencing with other traffic prior to being cleared for a visual approach.

2.5 VESSEL MOVEMENT AFFECTING INSTRUMENT APPROACHES ON RUNWAY 02 AND 20

- 2.5.1 There are possible tall vessel movements in waters around Singapore Changi Airport. As these mobile vessels vary in height and location, they are only indicated as "possible vessel" obstacles in the instrument approach charts.
- 2.5.2 Information on the heights of these tall vessels are relayed to ATC by the Maritime and Port Authority of Singapore. ATC will advise arriving aircraft of any restrictions on the types of instrument approaches and landing runway.

1.5.3 DEPARTING FLIGHTS

3.1 INTRODUCTION

- a. The Instrument Departure Procedures are only applicable for aircraft with all engines operating. It remains the responsibility of the operator to develop contingency procedures for the individual type of aeroplane and to conduct the necessary examination of obstacles throughout the areas concerned in relation to the certificated performance of the individual aeroplane type. It is also the responsibility of the operator to ensure that contingency procedures comply fully with the aeroplane performance requirements of ICAO Annex 6.
- b. The specific routes to be followed are depicted in SID charts AD-2-WSSS-SID-1 to AD-2-WSSS-SID-19. Altitude restrictions at fixes and/or DME specify ATC/airspace requirements.
- c. Minimum climb gradient specifies obstacle clearance requirements.
- d. In the event that the minimum climb gradient cannot be achieved pilots shall inform ATC. ATC shall hold departures if pilots indicate that they are unable to meet the required climb gradient.

3.2 RUNWAY 02L

- a. When there are no reports of vessel movement along the northern shipping channel or where the reported vessel height is 35m AMSL and below, all aircraft departures on Runway 02L, regardless of on SID or vectors, shall be on a minimum climb gradient of 3.3%.
- b. Where the reported vessel height is above 35m AMSL, ATC shall advise departing pilots of the vessel height. Pilots on receipt of this information shall apply the minimum climb gradient in accordance with Para 3.6.
- c. After the aircraft has reached or passed the minimum crossing altitude over vessel, the minimum climb gradient shall be 3.3%.

3.3 RUNWAY 02C

- a. When there are no reports of vessel movement along the northern shipping channel or where the reported vessel height is 70m AMSL and below, all aircraft departures on Runway 02C, regardless of on SID or vectors, shall be on a minimum climb gradient of 3.3%.
- b. Where the reported vessel height is above 70m AMSL, ATC shall advise departing pilots of the vessel height. Pilots on receipt of this information shall apply the minimum climb gradient in accordance with Para 3.6.
- c. After the aircraft has reached or passed the minimum crossing altitude over vessel, the minimum climb gradient shall be 3.3%.

3.4 RUNWAYS 20L, 20C AND 20R

- 3.4.1 All aircraft departures on Runway 20C, regardless of on SID or vectors, shall be on a minimum climb gradient of 7% until reaching or passing 2,500ft. Thereafter, the minimum climb gradient shall be 3.3%.
- 3.4.2 All aircraft departures on Runway 20R, regardless of on SID or vectors, shall be on a minimum climb gradient of 6% until reaching or passing 2,500ft. Thereafter, the minimum climb gradient shall be 3.3%.
- 3.4.3 All aircraft departures on Runway 20L, regardless of on SID or vectors, shall be on a minimum climb gradient of 9% until reaching or passing 2,500ft. Thereafter, the minimum climb gradient shall be 3.3%.
3.4.4 The minimum climb gradient restrictions stated above for Runway 20C/20R/20L are for the purpose of air traffic management. If the climb gradient restriction cannot be complied with, the pilot-in-command of an aircraft departure shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. Delays can be expected as coordination is required.

(Please also refer to charts AD-2-WSSS-SID-1 to AD-2-WSSS-SID-19: Standard Instrument Departures for Runway 20L, Runway 20C and Runway 20R).

3.5 RUNWAY 02R

- a. When there are no reports of vessel movement along the northern shipping channel or where the reported vessel height is 65m AMSL and below, all aircraft departures on Runway 02R, regardless of on SID or vectors, shall be on a minimum climb gradient of 5% until reaching or passing 2,500ft. Thereafter, the minimum climb gradient shall be 3.3%.
- b. Where the reported vessel height is above 65m AMSL, ATC shall advise departing pilots of the vessel height. Pilots on receipt of this information shall apply the minimum climb gradient in accordance with Para 3.6.
- c. After the aircraft has reached or passed the minimum crossing altitude over vessel, the minimum climb gradient shall be 3.3%.
- d. The minimum climb gradient restriction stated above for Runway 02R is for the purpose of air traffic management. If the climb gradient restriction cannot be complied with, the pilot-in-command of an aircraft departure shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. Delays can be expected as coordination is required.

3.6 DETERMINATION OF CLIMB GRADIENT BY OPERATORS

- 3.6.1 Aircraft operators shall calculate their own climb gradients based on actual lift off point to ensure enough clearance with the vessels crossing the northern shipping channel. The calculation will have to ensure the following:
 - i. The most penalising obstacle is taken into account under both all engines operating procedures as well as one engine out procedures; and
 - ii. The required minimum obstacle clearance (MOC) is met under all engines operating procedures.
- Note: The calculated climb gradient shall not be lower than the procedure climb gradient for departures.
- 3.6.2 For the above calculations, operators shall use the distance information for the various departure runways as follows:

DEP RWY	02L	02C	02R
Distance d	1 100m	2 590m	2 310m

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

1.5.4 OTHER RELEVANT INFORMATION AND PROCEDURES

4.1 HOLDING PROCEDURES

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

4.1.1 LOW LEVEL HOLDING AREAS

- 4.1.1.1 The holding areas for procedural traffic landing at Singapore Changi Airport or Seletar Airport depend on the runway in use at Singapore Changi Airport and are as follows:
- \leftarrow a. RWY 02L/02C/02R SAMKO Holding Area (SHA).
- $\leftarrow \qquad b. \quad RWY 20R/20C/20L NYLON Holding Area (NHA).$
 - c. Details of these holding areas and those mentioned in paragraphs 4.1.1.2 and 4.1.1.3 are given in ENR 3.6. They are also shown in ENR 3.6 Area Charts.

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←	4.1.1.2	An intermediate holding area - HOSBA Holding Area (HHA) - is also established.	
\leftarrow	4.1.1.3	A bad weather holding area - SINJON Holding Area - is established for Seletar bound commercial t	raffic.
	4.1.2	HIGH LEVEL HOLDING AREAS	
~	4.1.2.1	High Level Holding Areas are also established at NHA, SHA and HHA. Details of these areas are gi ENR 3.6.	iven in
	4.1.3	HOLDING SPEEDS	
	4.1.3.1	The maximum holding speeds for all holding areas are detailed in ENR 3.6.	
	4.1.3.2	During conditions of turbulence, pilots could request ATC clearance to hold at speeds up to 280kt fo and low level holding areas.	r both high

ENR 1.6 ATC SURVEILLANCE SERVICES AND PROCEDURES

1.6.1 PRIMARY RADAR

1.1 DESCRIPTION OF PRIMARY RADAR SERVICES AND PROCEDURES

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

Table A

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

Note:

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

- 1.1.2 Radar advisory service is provided to aircraft operating outside controlled airspace. This service may be provided to identified aircraft subject to radar coverage and workload and involves the provision of position information to aircraft to assist in its navigation, warnings of other aircraft operating in its proximity and assistance to aircraft in an emergency. Advice and/or suggestion to pilots will be given. Aircraft receiving radar advisory service are not obliged to follow instructions given by ATC.
- 1.1.3 Radar control will be exercised outside controlled airspace only in respect of aircraft which are intending to enter or cross controlled airspace.
- 1.1.4 Singapore Radar Units will use the following callsigns when providing radar service:
 - a. Aircraft under Area Control (ACC) Singapore Radar;
 - b. Aircraft under Approach Control (ACR)
 - i. Flow Control;
 - ii. Singapore Approach;
 - iii. Singapore Arrival.

← ← 1.1.5

- 5 The minimum horizontal radar separation are:
 - a. 7NM beyond 150NM from Singapore Changi Airport;
 - b. 5NM up to 150NM from Singapore Changi Airport.

- 1.1.6 Radar separation may be reduced to 3NM provided the following conditions exist:
 - a. Aircraft are under the Terminal Approach Control Radar Unit;
 - b. Aircraft are below FL245;
 - c. Aircraft are within 40NM of Singapore Changi Airport.
- 1.1.7 It is not possible to specify separation minima between identified aircraft and unknown traffic considered to constitute a hazard due to unpredictable manoeuvres of the latter. However, whenever practicable, the minimum radar separation shall be applied.

1.2 AIRCRAFT IDENTIFICATION PROCEDURES

1.2.1

1.4.1

Before providing a radar service aircraft will be identified by one of the following methods:

- a. By a pilot report over a prescribed position displayed on the radar map or plotted on the radar map outlay;
- b. By issuing instructions to a pilot to carry out a turn or turns or by observing a turn or turns reported by a pilot;
- c. By observing and correlating the radar echo of a departing aircraft to a known airborne time;
- d. By the use of SSR.

1.3 RADAR NAVIGATION

- 1.3.1 Whether or not radar control is being applied, navigation along the authorised flight routes is normally the responsibility of the pilot-in-command but, for a number of reasons, primarily the separation and expedition of traffic, the radar controller may require to establish positive control. Pilots will be advised when radar navigation of the aircraft is terminated whereupon pilots will resume their own navigation.
- 1.3.2 Position information will be given as follows:
 - a. A well-known geographical position;
 - b. Bearing and distance (using points of the compass) from a known position;
 - c. Magnetic heading (QDM) and distance to the appropriate reporting point or en-route navigational facility;
 - d. A distance to the runway touchdown point (as "track miles" to run).

1.4 MILITARY RADAR UNITS AUTHORISED TO PROVIDE RADAR CROSSING SERVICE

- The Military Radar Units authorised to provide radar crossings of controlled areas (airways) by military aircraft are:
 - a. RSAF 201 Squadron (Air Defence Radar Unit-ADRU); and
 - b. RSAF 203 Squadron (Singapore Air Traffic Control Centre).

1.5 RADAR FAILURE

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

1.6 RADIO FAILURE

- 1.6.1 In the event of failure of two-way communications while operating on the radar frequency, the pilot shall change to any other alternative ATC frequencies and request instructions.
- 1.6.2 If able to receive but not transmit, the pilot shall remain on the frequency on which he has been communicating and comply with instructions issued by the radar controller designed to establish that the aircraft is receiving. If this is established, further instructions appropriate to the circumstances will be issued.
- 1.6.3 If unable to make contact on the alternative frequencies, the pilot shall comply with the standard radio failure procedures as specified below.

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1.7	TOTAL RADIO COMMUNICATION FAILURE PROCEDURES	
1.7.1	If total radio communication failure occurs in VMC during daylight hours, the pilot shall continue to fly in VMC and land at the most suitable aerodrome. If it occurs in VMC during the hours of darkness (between sunset and sunrise) action shall be taken in accordance with paragraph 1.7.2 below.	
1.7.2	If total radio communication failure occurs in IMC, ATC action is based on the assumption that the aircraft will continue to its destination and if unable to land, will proceed to its nominated alternate. Separation standards will be increased and airspace reserved accordingly (see Appendices 'A' and 'B').	
1.7.3	In IMC, or if unable to maintain VFR, the pilot shall either leave or avoid controlled airspace and areas of dense traffic and establish VFR operation or, alternatively, shall:	
	a. Proceed according to the current flight plan, at the last assigned flight level, to the clearance limit and thereafter at the flight plan level.	
	b. Arrive at the destination as close as possible to ETA.	
	c. Commence descent as close as possible to EAT (or ETA if no EAT has been acknowledged).	
	d. If unable to land within 30 minutes of the time descent should have started (i.e. EAT or ETA if no EAT has been acknowledged), proceed to cross SAMKO Holding Area (SHA) at 4,000ft then via A457 at FL200 if Kuala Lumpur is the nominated alternate or via B470 at FL290 if Soekarno- Hatta is the nominated alternate or via B470 at FL290 if Soekarno- Hatta is the nominated alternate or otherwise proceed at the planned flight level to other nominated alternate.	
	<u>Note:</u>	
	1) Aircraft are to follow the established radio failure procedures as laid down by the respective airports.	
	2) During this 30 minute period ATC will reserve the airspace at the aircraft's flight level and below. At the expiry of this period with the concurrence of other users normal operations will resume.	
1.7.4	In all cases, the pilot shall contact ATC as soon as possible after landing.	
1.8	RADIO FAILURE - TRANSPONDER - EQUIPPED AIRCRAFT	
1.8.1	Aircraft equipped with transponder shall set transponder to Mode A/C Code 7600.	
1.8.2	Partial Radio Failure	
	 Aircraft Unable to Receive Pilots shall adopt the complete RTF failure procedures specified in paragraph 1.7. 	
	 Aircraft Able to Receive Following verification that aircraft is able to receive ground transmissions, ATC will continue to issue instructions and/or clearance to pilots. Such instructions and clearances will be repeated. 	

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1.9	TOTAL RADIO FAILURE - SPECIAL PROCEDURES - SINGAPORE CHANGI AP - ARRIVALS	
1.9.1	In VI Char air tra	IC during daylight hours, if total radio communication failure occurs to an aircraft bound for Singapore ngi Airport, the pilot shall maintain VMC to land at the most suitable airfield and report to the appropriate affic control unit by the most expeditious means.
1.9.2	For I	FR flights to Singapore Changi Airport, aircraft experiencing radio failure shall:
	i.	Proceed according to the last acknowledged clearance received from Singapore ATC, or
	ii.	If no specific instructions or clearance has been received from Singapore ATC:
		a. Maintain the last assigned altitude or flight level and proceed via planned ATS Routes thereafter the appropriate STAR for RWY 02L/02C/02R to SAMKO Holding Area (SHA). If SHA is not part of the STAR, flight shall proceed to SHA after the last waypoint on the STAR.
		b. Commence descent from SHA at or as close as possible to the ETA as indicated on the flight plan.
		c. Carry out the appropriate instrument approach procedure from SHA to land on RWY 02L/02C/02R.
	iii.	If radio failure occurs while flight is on assigned heading from an ATC issued instruction which takes the aircraft off the STAR, the pilot shall rejoin the last assigned STAR by resuming own navigation to the next ensuing waypoint on STAR
	iv.	Identify the runway-in-use in accordance with paragraph 1.10. If unable to effect a landing on:
		a. <u>RWY 02L</u> Carry out missed approach procedure to AKOMA (PU R-356/20DME) (014522N 1035443E). Leave AKOMA at 4,000ft to NYLON Holding Area (NHA) and execute the appropriate instrument procedure from NHA to land on RWY 20R, RWY 20C or RWY 20L, as appropriate.
		b. <u>RWY 02C</u> Carry out missed approach procedure to NYLON Holding Area (NHA) and execute the appropriate instrument procedure from NHA to land on RWY 20R, RWY 20C or RWY 20L, as appropriate.
		c. <u>RWY 20R</u> Carry out missed approach procedure to SAMKO Holding Area (SHA) and execute the appropriate instrument procedure from SHA to land on RWY 02L, RWY 02C or RWY 02R, as appropriate.
		d. <u>RWY 20C</u> Carry out missed approach procedure to EXOMO (VTK R-158/22DME) (010425.49N 1040933.17E). Leave EXOMO at 4,000ft to SAMKO Holding Area (SHA) and execute the appropriate instrument procedure from SHA to land on RWY 02L, RWY 02C or RWY 02R, as appropriate.
		e. <u>RWY 02R</u> Carry out missed approach procedure to HOSBA (VTK R-103/24DME) (011948N 1042418E) Holding Area (HHA). Leave HHA at 7,000ft to NHA via ATS route W401 and VTK DVOR. Execute the appropriate instrument procedure from NHA to land on RWY 20L, RWY 20C or RWY 20R.
		f. <u>RWY 20L</u> Carry out missed approach procedure to HOSBA (SJ R-079/34DME) (011948N 1042418E) Holding Area (HHA). Leave HHA at 7,000ft to SHA via ATS route G580 and SJ DVOR. Execute the appropriate instrument procedure from SHA to land on RWY 02L, RWY 02C or RWY 02R.
1.10	IDE	NTIFICATION OF RUNWAY-IN-USE
1.10.1	ATC its id the p lights	will switch on the appropriate approach lights and the ILS serving the runway-in-use to assist the pilot in entification. If the approach lights for the runway-in-use are sighted but the ILS frequency is not received, ilot shall assume that the ILS is inoperative and shall proceed to land on the runway on which the approach shave been sighted.
1 10 0	14	

1.10.2 If unable to land within 30 minutes of EAT or ETA, if no EAT has been received and acknowledged, proceed in accordance with paragraph 1.7.3 (d) above.

1.11	TOTAL RADIO FAILURE - SPECIAL PROCEDURES - SINGAPORE CHANGI AP - DEPARTURES	
1.11.1	When an aircraft which has been cleared by ATC to an intermediate level experiences total radio communication failure immediately after departure from Singapore Changi Airport and it is deemed unsafe for it to continue to its destination, the pilot will set the aircraft transponder to Mode A/C Code 7600 and adhere to the procedures below.	
1.11.2	When radio communication failure occurs immediately after the aircraft has departed on RWY 02L/02C/02R, the pilot shall proceed according to the following procedures:	
	1. Proceed straight ahead to NYLON Holding Area (NHA) climbing to the last assigned altitude. At NHA, climb/descend to maintain 7,000ft;	
	 Hold at NHA for 4 minutes and leave NHA on track 203°. At 10 DME north of VTK, turn left for HOSBA Holding Area (HHA) to jettison fuel, maintaining 7,000ft; 	
	3. After fuel jettison, proceed to SAMKO Holding Area (SHA) via Airway G580 and SINJON DVOR. Maintain 7,000ft. At SHA descend for an instrument approach on RWY 02L/02C/02R. Identify the runway-in-use in accordance with paragraph 1.10 above.	
1.11.3	When radio communication failure occurs immediately after the aircraft has departed on RWY 20R/20C/20L, the pilot shall proceed according to the following procedures:	
	a. Proceed straight ahead to SAMKO Holding Area (SHA) climbing to the last assigned altitude. At SHA climb/descend to maintain 7,000ft;	
	b. Hold at SHA for 4 minutes. Leave SHA for HOSBA Holding Area (HHA) via SJ DVOR and Airway G580 to jettison fuel, maintaining 7,000ft;	
	c. After fuel jettison, proceed to NHA via Airway W401. Maintain 7,000ft. On crossing VTK 042R turn right to intercept VTK 023R. At NHA descend to carry out an instrument approach on RWY 20R/20C/20L.	
1.11.4	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.	
1.11.5	eq:alternatively, aircraft may jett is on fuel between HOSBA and point 80 NM from VTK DVOR/DME on Airway G580.	
1.12	TOTAL RADIO FAILURE - SPECIAL PROCEDURES - SELETAR AP - ARRIVALS	
1.12.1	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.	
1.12.2	If in IMC or when weather conditions are such that the total radio communication failure aircraft cannot complete its flight in accordance with paragraph 1.12.1, the pilot will EITHER:	
	a. proceed in accordance with the last acknowledged clearance from ATC; OR	
	b. if no specific instructions or clearances have been received and acknowledged:	
	i. maintain the last assigned level and proceed via flight planned route, then to OMKOM;	
	ii. commence descent from OMKOM at or as close as possible to the ETA Seletar AD as indicated on the flight plan or last EAT passed by ATC and acknowledged by aircraft;	
	iii. leave OMKOM at 2,500ft and proceed to overhead Seletar;	
	iv. if Seletar Aerodrome is visual, initiate the standard arrival procedures for RWY 21;	
	v. if unable to effect a landing on RWY 21, carry out a missed approach at or below 1,500ft and land on RWY 03.	
1.12.3	ATC will assist the pilot in identifying RWY-in-use by switching on the RWY lights and appropriate PAPI.	
1.12.4	The pilot shall keep a look-out for light signals from Seletar Tower. On receipt of a green light from Seletar Tower, a landing may be made.	

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1.12.5	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.	
1.12.6	It is the pilot's responsibility to ensure that he is clear of other traffic while carrying out the standard arrival procedure.	
1.13	TOTAL RADIO FAILURE - SPECIAL PROCEDURES - SELETAR AP - DEPARTURES	
1.13.1	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.	
1.13.2	If departing aircraft experiences total radio communication failure outside the Seletar Control Zone, the pilot shall follow procedures as set out in paragraph 1.12.	
1.13.3	At night, aircraft experiencing total radio communication failure will proceed to its flight planned alternate.	
1.14	RADIO FAILURE - SPECIAL PROCEDURES - SELETAR AP - HELICOPTERS	
1.14.1	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.	
1.14.2	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.	
1.14.3	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.	
1.15	RADIO FAILURE - SPECIAL PROCEDURES - SELETAR AP - FIXED WING AIRCRAFT	
1.15.1	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.	
1.15.2	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	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.	
1.16	ACTION TAKEN BY ATC DURING RADIO FAILURE	
1.16.1	In addition to the action specified in paragraph 1.7.2, if unable to establish normal communication with an aircraft, ATC will:	
	 a. Maintain separation between the aircraft and other aircraft known to be operating in its vicinity; b. Transmit essential information to the aircraft, including the flight levels reserved for its use, route to be flown, and any significant weather information, such as terminal weather, areas in which VMC may be expected, etc.; c. Advise other aircraft in the vicinity of the presumed position of the aircraft experiencing radio failure; d. Use ground radar to check whether or not the aircraft is receiving and complying with ATC instructions, and to ensure separation from other aircraft; e. Inform the operator concerned or his representative; f. Inform the alternate aerodrome of the circumstances of the failure and request attempts to establish communication with the aircraft; g. Inform all concerned and end all radio failure actions if communication with aircraft is established and when aircraft lands. 	

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1.6.2 SECONDARY SURVEILLANCE RADAR (SSR)

2.1 OPERATING PROCEDURES

- 2.1.1 All aircraft flying in controlled airspace in the Singapore FIR are required to operate SSR transponders selecting Mode 3/A (4096 codes) and Mode C simultaneously.
- 2.1.2 Aircraft dep Singapore shall operate transponders in accordance with instructions given by ATC.
- 2.1.3 Pilots who have received specific instructions from ATC concerning the setting of the transponder shall maintain that setting except in circumstances detailed in paragraphs 2.2, 2.3 and 2.4.
- 2.1.4 Aircraft bound for Singapore shall transpond on the SSR code last assigned to them by the adjacent FIR, or if no code has been previously assigned, advise the ATC unit concerned who will provide the required code.

2.2 EMERGENCY PROCEDURES

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

2.3 RADIO COMMUNICATION FAILURE

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

2.4 SYSTEM OF SSR CODE ASSIGNMENT

2.4.1 Aircraft operating in the Singapore FIR will be assigned the following codes except for those aircraft already assigned codes by adjacent FIRs:

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



PILOT PROCEDURE FOR RADIO FAILURE



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



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

3.1 ADS-B BASED SURVEILLANCE AIRSPACE AND AIRCRAFT OPERATOR APPROVAL

- 3.1.1 Aircraft that operates on ATS routes L642, L644, M753, M771, M904, N891, N892, Q801, Q802, Q803 and T611 within airspace bounded by 073605N 1090045E, 040713N 1063543E, 041717N 1061247E (MABLI), 044841N 1052247E (DOLOX), 045224N 1041442E (ENREP), 045000N 1034400E, thence north along the Singapore FIR boundary to 070000N 1080000E at or above FL290 must carry serviceable ADS-B transmitting equipment that has been certified as meeting:
 - a. European Aviation Safety Agency Certification Considerations for the Enhanced ATS in Non-Radar Areas using ADS-B Surveillance (ADS-B-NRA) Application via 1090MHz Extended Squitter (AMC 20-24), or
 - b. European Aviation Safety Agency (EASA) CS-ACNS (Subpart D Surveillance SUR), or
 - c. Federal Aviation Administration Advisory Circular No: 20-165A (or later versions) Airworthiness Approval of Automatic Dependent Surveillance Broadcast (ADS-B) Out Systems, or
 - d. An 'approved ADS-B Out equipment configuration' as specified in Part 91 (General Operating and Flight Rules) Manual of Standards 2020, issued by the Civil Aviation Safety Authority of Australia.
- 3.1.2 Aircraft that does not comply with the requirements stipulated in paragraph 3.1.1 will not be accorded priority in the delineated airspace and flight level assignments would be subjected to air traffic conditions.
- 3.1.3 If an aircraft carries ADS-B transmitting equipment but does not comply with the requirements stipulated in paragraph 3.1.1, the aircraft must not fly in the delineated airspace unless the equipment is deactivated or set to transmit only a value of zero for the Navigation Uncertainty Category (NUCp) or Navigation Integrity Category (NIC).
- 3.1.4 Flights operating in the delineated airspace are to contact Singapore Radar on 134.35MHz (primary frequency) and 133.6MHz (secondary frequency).

3.2 FLIGHT PLANNING REQUIREMENTS

- 3.2.1 Aircraft operators complying with the requirements stipulated in paragraph 3.1.1 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
- 3.2.2 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

3.2.3 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.

3.3 STATE AIRCRAFT

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

3.4 INFLIGHT CONTINGENCIES

3.4.1 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.

3.5 ATC-PILOT PHRASEOLOGIES

3.5.1 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)

1.6.4 OTHER RELEVANT INFORMATION AND PROCEDURES

NIL

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

- 4.6.2 When required, the pilot-in-command may be instructed to reach an assigned level by a specified time or position. The pilot-in-command shall advise ATC immediately if he is doubtful whether the assigned level can be reached as instructed.
- 4.6.3 A pilot-in-command shall report:
 - a. At the time of leaving a level for a newly assigned level;
 - b. When leaving or passing through such other levels as may be specified by ATC;
 - c. On reaching an assigned level.
- 4.6.4 A pilot-in-command shall read back level clearances.

4.7 UNIDIRECTIONAL ATS ROUTES LEVEL ASSIGNMENTS - SINGAPORE/JAKARTA SECTOR

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

4.7.2 Level Assignments

- 4.7.2.1 Jakarta ACC shall assign:
 - a. All even flight levels plus 500ft above the minimum enroute level up to and including FL185.
 - b. Above FL185, starting at FL220 all even flight levels up to and including FL280.
 - c. Above FL280, all flight levels at 1,000ft intervals starting at FL290 and up to FL410 (inclusive), except for flights beyond Singapore where only even flight levels shall be assigned.
- 4.7.2.2 Singapore ACC shall assign:
 - a. All odd flight levels plus 500ft above the minimum enroute level up to and including FL195.
 - b. Above FL195, starting at FL210 all odd flight levels up to and including FL290.
 - c. Above FL290, all flight levels at 1,000ft intervals starting at FL290 and up to FL410 (inclusive), except for flights beyond Jakarta where only odd flight levels shall be assigned.

4.8 POSITION REPORTS

- 4.8.1 In so far as range permits, the pilot-in-command shall report position to the responsible ATC unit on the appropriate VHF RTF frequency. When outside VHF RTF range, the pilot-in-command shall report position on HF RTF.
- 4.8.2 The pilot-in-command shall report position as soon as possible after the aircraft has passed each designated reporting point or "on request" reporting point (when so required by ATC).
- 4.8.3 Where no designated or "on request" position report is required, the pilot-in-command shall report position hourly in latitude and longitude and shall report "operations normal" every 30 minutes in between.

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

- 4.8.4 When reporting their positions, pilots shall transmit the word "POSITION" either immediately before or after the callsign of their aircraft.
- 4.8.5 A position report shall comprise Section 1 or Sections 2 and 3, or the AIREP form of report:

Section 1 (Position Information)

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

Section 2 (Operational Information)

- 7. estimated time of arrival
- 8. endurance

Section 3 (Meteorological Information)

- 9. air temperature
- 10. wind direction
- 11. wind speed
- turbulence
 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 GEN 3.5 paragraph 6.3.

4.9 HOLDING

- 4.9.1 An aircraft required to hold en-route or over the destination holding point shall do so in accordance with the holding pattern specified for the radio aid in subsection ENR 3.6.
- 4.9.2 Where no specified holding pattern is established and en-route holding is required by ATC, the pilot-in- command shall hold in accordance with the standard holding pattern as follows:
 - a. Follow the specified track inbound to the holding point;
 - b. On passing the holding point, make a 180° rate one turn to the right;
 - c. Maintain a parallel track outbound from the holding point for 1 min if at or below FL140 and 1½ min if above FL140;
 - d. Make a 180° rate one turn to the right; and
 - e. follow the specified track inbound.

Note:

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

4.10 FLIGHT IN CONTROLLED AIRSPACES

- 4.10.1 Within controlled airspaces ATC separate IFR flights:
 - a. Vertically: by assigning them different levels or altitude;
 - b. Longitudinally: by instructing two aircrafts to maintain a minimum time interval between them; and
 - c. Laterally: by providing different flight paths;
 - d. By use of radar to ensure a minimum horizontal separation.
- 4.10.2 Standard separation in accordance with PANS-ATM DOC 4444-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 ENR 3.6 Area Charts
 - 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:
 - https://www.caas.gov.sg/legislation-regulations/guidelines-advisory/air-operations
 - Each aircraft operating in RVSM airspace shall hold a valid RVSM approval. RVSM approval issued for one region will always be valid for RVSM operations in another region provided specific restrictions have not been imposed on the operator by the State of the Operator or State of Registry. The Monitoring Agency for Asia Region (MAAR) monitors operator compliance with State approvals requirements by performing periodic scrutiny checks using Traffic Sample Data and the RVSM approvals record (https://www.aerothai.co.th/maar/approvals.php)

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1.2.2	Operators are required to participate in the RVSM aircraft monitoring program. This is an essential element of the RVSM implementation program in that it confirms that the aircraft altitude-keeping performance standard is being met. Monitoring accomplished for other regions can be used to fulfil the monitoring requirements for the Asia/Pacific Region. The information on height-keeping performance monitoring options can be found at:
I	https://www.aerothai.co.th/maar/
← 1.3	ACAS II AND TRANSPONDER EQUIPAGE
1.3.1	Aircraft operating in RVSM airspace shall be equipped with an airborne collision avoidance system (ACAS II) and to operate the ACAS system in accordance with the relevant provisions of ICAO Annex 10, Volume IV, Chapter 4.
1.4	IN-FLIGHT PROCEDURES WITHIN RVSM AIRSPACE
1.4.1	Before entering RVSM airspace, the pilot should review the status of required equipment. The following equipment should be operating normally:
	 a. two primary altimetry systems; b. one automatic altitude-keeping device; and c. one altitude-alerting device.
1.4.2	The pilot must notify ATC whenever the aircraft:
	 a. is no longer RVSM compliant due to equipment failure; or b. experiences loss of redundancy of altimetry systems; or c. encounters turbulence that affects the capability to maintain flight level.
\leftarrow	See Appendix A for pilot and controller actions in contingency scenarios.
1.4.3	During cleared transition between levels, the aircraft should not overshoot or undershoot the assigned FL by more than 150ft (45m).
1.4.4	Except in an ADS or radar environment, pilots shall report reaching any altitude assigned within RVSM airspace.
← 1.5	SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES IN OCEANIC AIRSPACE
	Introduction
1.5.1	Although all possible contingencies cannot be covered, the procedures in 1.5.4, 1.5.5 and 1.5.6 provide for the more frequent cases such as:
	 a. the inability to comply with assigned clearance due to meteorological conditions (1.5.6 refers); b. en-route diversion across the prevailing traffic flow (for example, due to medical emergencies (1.5.4 and 1.5.5 refers); and
	 c. the loss of, or significant reduction in, the required navigation capability when operating in an airspace where the navigation performance accuracy is a prerequisite to the safe conduct of flight operations, or pressurization failure (1.5.4 and 1.5.5 refer).
1.5.2	The pilot shall take action as necessary to ensure the safety of the aircraft, and the pilot's judgement shall determine the sequence of actions to be taken, having regard to the prevailing circumstances. Air traffic control shall render all possible assistance.
	General Procedures
	Note Figure 1.5-1 provides an aid for understanding and applying the contingency procedures contained in Section 1.5
1.5.3	If an aircraft is unable to continue the flight in accordance with its ATC clearance, a revised clearance shall be obtained, whenever possible, prior to initiating any action.

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

Note.- Guidance on emergency procedures for controllers, radio operators, and flight crew in data link operations can be found in the Global Operational Data Link (GOLD) Manual (Doc 10037).

i. establish communications with and alert nearby aircraft by broadcasting on the frequencies in use and at suitable intervals on 121.5 MHz (or, as a backup, on the inter-pilot air-to-air frequency 123.45 MHz): aircraft identification, the nature of the distress condition, intention of the pilot, position (including the ATS route designator or the track code, as appropriate) and flight level.

Actions to be taken once offset from track

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

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

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



Figure 1.5-1. Visual aid for contingency procedures guidance

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

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

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

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

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

1.7 FLIGHT PLANNING REQUIREMENTS 1.7.1 Unless special arrangement is made as detailed below, RVSM approval is required for aircraft to operate within designated RVSM airspace. The operator must determine that the appropriate State authority has approved the aircraft and will meet the RVSM requirements for the filed route of flight and any planned alternate routes. The letter "W" shall be inserted in item 10 (Equipment) of the ICAO standard flight plan to indicate that the aircraft is RVSM approved aircraft. 1.8 PROCEDURES FOR OPERATION OF NON-RVSM COMPLIANT AIRCRAFT IN RVSM AIRSPACE 1.8.1 It should be noted that RVSM approved aircraft will be given priority for level allocation over non-RVSM approved aircraft. 1.8.2 The vertical separation minimum between non-RVSM aircraft operating in the RVSM stratum and all other aircraft is 2,000ft. Non-RVSM compliant aircraft operating in RVSM airspace should use the phraseology as contained in 1.8.3 Appendix A. 1.8.4 Non-RVSM compliant aircraft may be cleared to climb to and operate above FL290 or descend to and operate below FL410 provided that they: do not climb or descend at less than the normal rate for the aircraft, and a. do not level off at an intermediate level while passing through the RVSM stratum. b. Non-RVSM compliant aircraft may not flight plan between FL290 and FL410 inclusive within RVSM airspace. 1.8.5 After special coordination as detailed in paragraph 1.8.6 below, the following non-RVSM aircraft may flight plan at RVSM flight levels in the RVSM stratum: \leftarrow is being initially delivered to the State of Registry or Operator (see paragraph 1.10 for additional details a. and information): or was formally RVSM approved but has experienced an equipment failure and is being flown to a maintenance b. 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 State aircraft (those aircraft used in military, custom and police services shall be deemed State aircraft). e. 1.8.6 The assignment of cruising level to non-RVSM compliant aircraft listed in paragraph 1.10.5 (a) to (e) shall be subject to an ATC clearance. Aircraft operators shall include "STS/CATEGORY (FERRY/ HUMANITARIAN/ MILITARY/ CUSTOMS/POLICE)/NON-RVSM COMPLIANT" in field 18 of the ICAO flight plan. 1.8.7 Contact details for approval request are as follows: Watch Manager, Singapore Air Traffic Control Centre: TEL: (65) 65412668 AFS: WSJCZRZX FAX: (65) 65457526

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

1.9 DELIVERY FLIGHTS FOR AIRCRAFT THAT ARE RVSM COMPLIANT ON DELIVERY

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

1.10 PROCEDURES FOR SUSPENSION OF RVSM

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

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

 \leftarrow 1.11.1 See Appendix A for guidance in these circumstances.

1.12 PROCEDURES FOR AIR-GROUND COMMUNICATION FAILURE

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

I

APPENDIX A

CONTINGENCY SCENARIOS

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

* Scenario 1 : The pilot is

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

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

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

The pilot should:

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

EXPANDED EQUIPMENT FAILURE AND TURBULENCE ENCOUNTER SCENARIOS

Operators may consider this material for use in training programs.

^{* &}lt;u>Scenario 1</u>: All automatic altitude control systems failed (e.g. Automatic Altitude Hold).

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

* <u>Scenario 2</u>: Loss of redundancy in primary altimetry systems

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

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

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

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

The pilot should: Attempt to determine the defective system through established trouble-shooting procedures and/or comparing the primary altimeter displace to the standby altimeter (as corrected by the correction cards, if required).

If the defective system can be determined, couple the functioning altimeter system to the altitude-keeping device.

If the defective system cannot be determined, follow the guidance in Scenario 3 for failure or unreliable altimeter indications of all primary altimeters.

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

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

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

	2.5.1	Longitudinal Separation Minimum					
		The minimum longitudinal separation between RNAV equipped aircraft on ATS routes M758 and M761 is 10 minutes based on MNT.					
	2.5.2	Separation of aircraft when the following aircraft is faster					
~		When the following aircraft is faster, for each 600NM in distance between the entry and exit points of the area where the Mach Number Technique is used, 1 minute is added for each 0.01 difference in Mach number between the two aircraft concerned to compensate for the fact that the second aircraft is overtaking the first aircraft according to the table in Appendix B.					
	2.5.3	Separation of aircraft when the preceding aircraft is faster					
		When the preceding aircraft is maintaining a greater Mach number than the following aircraft, the following separation shall be applied:					
		 a. 9 minutes if the preceding aircraft is Mach 0.02 faster than the following aircraft; b. 8 minutes if the preceding aircraft is Mach 0.03 faster than the following aircraft; c. 7 minutes if the preceding aircraft is Mach 0.04 faster than the following aircraft; d. 6 minutes if the preceding aircraft is Mach 0.05 faster than the following aircraft; and e. 5 minutes if the preceding aircraft is Mach 0.06 faster than the following aircraft. 					
	2.6	LONGITUDINAL SEPARATION ON ATS ROUTES A464, A576, 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					
\leftarrow		The same buffer as stated in paragraph 2.5.2 shall be applied.					
	2.6.4	Separation of aircraft when the preceding aircraft is faster					
\leftarrow		The separation minima specified in paragraph 2.5.3 shall apply.					
	2.6.5	15 minutes longitudinal separation minimum					
\leftarrow		15 minutes longitudinal separation minimum shall be applied on these ATS routes between aircraft which cannot comply with RNAV procedures mentioned in paragraph 2.6.1.					

LONGITUDINAL SEPARATION ON ATS ROUTES M758 AND M761

\leftarrow

APPENDIX B

Table

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

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

3 PERFORMANCE-BASED NAVIGATION ON RNAV ROUTES WITHIN SINGAPORE FIR

3.1 INTRODUCTION

- 3.1.1 ATC separation minima based on RNP 10 navigation specification will be applied accordingly for aircraft which are approved for RNP 10 operations on the following segments of RNAV routes which fall within the Singapore FIR:
 - L625 - BTN TOMAN and AKMON - BTN ESPOB and MERSING L642 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 - BTN DUDIS and KIKOR L644 M772 - BTN ASISU and LAXOR
- 3.1.2 Additionally, to facilitate reduction of separation between suitably equipped aircraft, ATC separation minima based on RNP 4 navigation specification will be applied accordingly for aircraft which are approved for RNP 4 operations on the following segments of RNAV routes which fall within the Singapore FIR:

M767 – BTN TEGID and TOMAN N884 – BTN LUSMO and LAXOR

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

- 3.1.3 RCP240 and RSP180 performance specifications shall be required for the application of the Performance-Based Longitudinal Separation Minima and in accordance with ICAO Doc 4444 PANS-ATM paragraph 5.4.2.9.2.
- 3.1.4 Pilots shall inform ATC of any deterioration or failure of the navigation systems below the navigation requirements for RNP 10. ATC shall then provide alternative separation and / or alternative routing.

3.2 OPERATIONS BY AIRCRAFT NOT MEETING RNP 10

- 3.2.1 An aircraft that is unable to meet the minimum navigational requirements for RNP 10 must file flight plan at below FL280. Operations at or above FL290 for these aircraft will be subjected to ATC approval, in accordance with the provisions of paragraph 3.2.2.
- 3.2.2 ATC units receiving a request for a non-RNP 10 approved aircraft to operate on ATS routes specified in paragraph 3.1, at or above FL290, will co-ordinate with adjacent ATC units affected by the flight. In deciding whether or not to approve the flight, each ATC unit will take into consideration:
 - a. traffic density;
 - b. communications, including the non-availability of normal communication facilities;
 - c. weather conditions en-route; and
 - d. any other factors pertinent at the time.

3.3 SAFETY ASSESSMENT CRITERIA

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

3.4 MONITORING OF AIRCRAFT NAVIGATION PERFORMANCE

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

Lateral Deviations

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

Longitudinal Deviations

- i. where time separation is applied by ATC when the reported separation based on ATC verified pilot estimates varies by 3 minutes or more from the expected separation at the reporting point; or
- ii. where a distance based standard is applied by ATC based on ADS, radar observation or RNAV distance reports when the distance varies by 10NM or more from the expected distance.
- 3.4.2 ATC will advise the pilot-in-command when such deviations are observed and implement the required investigation procedures.
- 3.4.3 The ATC authority will investigate the causes of such deviations in conjunction with the aircraft operator and the State of Registry, or the State of the Operator, as applicable.

3.5 SEPARATION MINIMA

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

3.5.2 Longitudinal Separation

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

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

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

3.6 OPERATORS' PROCEDURES

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

3.7 CONTINGENCY PROCEDURES (including WEATHER DEVIATION)

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

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

4.1 INTRODUCTION

- 4.1.1 No Pre-Departure Co-ordination (No PDC) procedures apply to flights departing from airports within 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		
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:

Elight Lovel	ATS Route and Direction of Flight					
Allocation	L642	M771	N892	L625	N884	M767
(LSWD)	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 WEATHER DEVIATION PROCEDURES IN THE SINGAPORE FIR

6.1 GENERAL

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

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

6.2 OBTAINING ATC PRIORITY WHEN WEATHER DEVIATION IS REQUIRED

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

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

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

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

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

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

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

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

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

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

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

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

- 7 AIR TRAFFIC MANAGEMENT CONTINGENCY PLAN

7.1 INTRODUCTION

- 7.1.1 The Air Traffic Management (ATM) Contingency Plan for Singapore FIR 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.
- 7.1.2 However, this contingency plan does not address arrangements for aircraft arriving and departing at Singapore airports. Aircraft departing or landing at Changi operating within 60NM from Singapore will be subjected to contingency procedures stated in ENR 1.8 paragraphs 1.5, 1.6, 1.7 and 1.8.

- 7.1.3 This ATM Contingency Plan provides:
 - a. the contingency routes structure using existing published airways to enable transit through the Singapore FIR; and
 - b. the associated Air Traffic Control (ATC) procedures to support the contingency plan.
- 7.1.4 As and where dictated by circumstances, aircraft planning to operate through Singapore FIR that have not yet departed may be temporarily suspended until a full assessment of the prevailing conditions has been determined and sufficient air traffic services restored.
- 7.1.5 Long-haul international aircraft and special operations (e.g. Search and Rescue (SAR), State aircraft, humanitarian flights, etc.) shall be afforded priority for levels at FL290 and above. Aircraft operators that operate domestic and regional flights should plan on the basis that FL290 and above may not be available.
- 7.1.6 Aircraft operators may elect to avoid the Singapore FIR by using ATS routes outside of Singapore FIR.

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

- 7.2.1 During the period where the contingency arrangements are in place, ATS including ATC services may not be available, a NOTAM will be issued providing the relevant information. The contingency plan provides for limited flight information and alerting services to be provided by Singapore ACC.
- 7.2.2 FIS and flight monitoring will be provided by the designated ATS authorities for the adjacent FIRs on the contingency routes that enter their respective FIRs.
- 7.2.3 During the early stages of a contingency event, ATC may be overloaded and tactical action may be taken to re-clear aircraft on alternative routes not included in this Plan.
- 7.2.4 In the event that ATS cannot be provided in the Singapore FIR, a NOTAM shall be issued indicating the following:
 - a. time and date on the commencement of the contingency measures;
 - b. airspace available for aircraft operations and airspace to be avoided;
 - c. details of the facilities and services available or not available and any limits on ATS provision, including an expected date of restoration of services if available;
 - d. information on the provisions made for alternative services;
 - e. applicable ATS routes, AIP-published contingency routes, or tactically defined contingency routes;
 - f. any special procedures to be complied by neighbouring ATS units not covered by this Plan;
 - g. any special procedures to be complied by pilots; and
 - h. any other details that aircraft operators may find useful with respect to the disruption and actions taken.
- 7.2.5 In the event that the Singapore International NOTAM Office is unable to issue the NOTAM, the alternate International NOTAM Office will take action to issue the contingency NOTAM upon notification by CAAS.

7.3 AIRCRAFT SEPARATION AND SPACING

- 7.3.1 Aircraft separation criteria, where applicable, will be in accordance with the ICAO Procedures for Air Navigation Services Air Traffic Management (PANS-ATM, Doc 4444) and the Regional Supplementary Procedures (Doc 7030).
- 7.3.2 The longitudinal separation / spacing will be 15 minutes. However, this may be reduced to 10 minutes in conjunction with application of the Mach number technique where authorized by CAAS and the agreed ATS coordination with the adjacent ATS authority.
- 7.3.3 The contingency route structure provides for lateral separation / spacing of 100NM. In cases where the lateral spacing of contingency routes is less than 100NM, a minimum vertical separation of 1000 feet will be applicable.

7.4 PRIORITY FOR FLIGHT LEVELS

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

7.5 AIRSPACE CLASSIFICATIONS

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

7.6 AIRCRAFT POSITION REPORTING

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

7.7 EXCLUSIONS

7.7.1 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.

7.8 PILOT AND OPERATOR PROCEDURES

7.8.1 Filing of flight plans

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

7.8.2 **Overflight approval**

7.8.2.1 Airspace users must obtain overflight approval from CAAS prior to operating aircraft through the Singapore FIR. 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.

7.8.3 Pilot operating procedures

- 7.8.3.1 Pilots will continue to make or broadcast routine position reports in line with normal ATC procedures.
- 7.8.3.2 Pilots of aircraft operating in the Singapore FIR during contingency operations shall comply with the following procedures:
 - a. all aircraft proceeding along the ATS routes established in this Contingency Plan will comply with the instrument flight rules (IFR) and will be assigned a flight level in accordance with the flight level allocation scheme applicable to the route(s) being flown as specified in paragraph 7.10;
 - b. aircraft are to flight plan using the Contingency Routes specified in paragraph 7.10, according to their airport of origin and destination;
 - c. aircraft are to operate as close as possible to the centre line of the assigned contingency route;
 - d. a continuous communications watch shall be maintained on the specified contingency frequency as specified in paragraph 7.10;
 - e. aircraft position reports and other information as necessary shall be broadcast in accordance with TIBA procedures defined in paragraph 7.11;
 - f. aircraft navigation and anti-collision lights shall be displayed;
 - g. except in cases of emergency or for reasons of flight safety, pilots are to maintain the last assigned flight level, MACH number and SSR transponder code during their entire flight within Singapore FIR. 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 7.11, on the specified VHF and HF frequencies listed in paragraph 7.10. When necessitated by emergency conditions or flight safety requirements, pilots are to transmit blind on these frequencies, their current circumstances and the commencement and completion of any climb and descent or deviation from the cleared contingency route;
- k. whenever emergencies and / or flight safety reasons make it impossible to maintain the flight level assigned for transit of Singapore FIR, 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;
- I. pilots are to maintain own longitudinal separation of 15 minutes from preceding aircraft at the same cruising level. However, this may be reduced to 10 minutes in conjunction with application of the Mach number technique where authorized by CAAS and the agreed ATS coordination with the adjacent ATS authority; and
- m. not all operational circumstances can be addressed by this Contingency Plan and pilots are to maintain a high level of alertness when operating in the contingency airspace and take appropriate action to ensure safety of aircraft.

7.8.4 Interception of civil aircraft

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

7.9 COMMUNICATION PROCEDURES

7.9.1 Degradation of Communication - Pilot Radio Procedures

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

7.9.2 Communication frequencies

7.9.2.1 A list of frequencies to be used for the contingency routes and the ATS units providing FIS and air-ground communication monitoring for the Singapore FIR is detailed in paragraph 7.10.

7.10 CONTINGENCY ROUTES

7.10.1 Between Singapore and Manila FIR

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

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

7.10.2 Between Singapore and Ho Chi Minh FIR

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

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

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

ENR 1.8-26 03 NOV 2022	AIP Singapore			
7.10.3	Between Singapore and Kota Kinabalu FIR			
7.10.3.1	To be developed			
7.10.4	Between Singapore and Kuala Lumpur FIR			
7.10.4.1	To be developed			
7.11	TRAFFIC INFORMATION BROADCASTS BY AIRCRAFT (TIBA)			
7.11.1	Introduction and applicability of broadcasts			
7.11.1.1	Traffic information broadcasts by aircraft are intended to permit reports and relevant supplementary informatior of an advisory nature to be transmitted by pilots on a designated VHF radiotelephone (RTF) frequency for the information of pilots of other aircraft in the vicinity.			
7.11.1.2	TIBAs shall be introduced only when necessary and as a temporary measure.			
7.11.1.3	The broadcast procedures shall be applied in designated airspace where:			
	a. there is a need to supplement collision hazard information provided by air traffic services outside controlled airspace; or			
	b. there is a temporary disruption of normal air traffic services.			
7.11.1.4	Such airspaces shall be identified by the States responsible for provision of air traffic services within these airspaces, if necessary with the assistance of the appropriate ICAO Regional Office(s), and duly promulgated in aeronautical information publications or NOTAM, together with the VHF RTF frequency, the message formats and the procedures to be used. Where, in the case of paragraph 7.11.1.3 a., more than one State is involved, the airspace should be designated on the basis of regional air navigation agreements and promulgated in Doc 7030.			
7.11.1.5	When establishing a designated airspace, dates for the review of its applicability at intervals not exceeding 12 months should be agreed by the appropriate ATS authority(ies).			

7.11.2 Details of broadcasts

VHF RTF frequency to be used

- 7.11.2.1 The VHF RTF frequency to be used shall be determined and promulgated on a regional basis. However, in the case of temporary disruption occurring in controlled airspace, the States responsible may promulgate, as the VHF RTF frequency to be used within the limits of that airspace, a frequency used normally for the provision of air traffic control service within that airspace.
- 7.11.2.2 Where VHF is used for air-ground communications with ATS and an aircraft has only two serviceable VHF sets, one should be tuned to the appropriate ATS frequency and the other to the TIBA frequency.

Listening watch

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

Time of broadcasts

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

Forms of broadcast

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

ALL STATIONS (necessary to identify a traffic information broadcast)

(call sign)

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

(direction)

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

POSITION (position**) AT (time)

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

(call sign)

FLIGHT LEVEL (number) (direction)

Fictitious example:

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

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

ALL STATIONS

(call sign)

(direction)

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

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

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

ALL STATIONS

(call sign)

(direction)

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

 $\label{eq:leavest} \mbox{LEAVING FLIGHT LEVEL (number) NOW FOR FLIGHT LEVEL (number) followed by:$

ALL STATIONS

(call sign)

MAINTAINING FLIGHT LEVEL (number)

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

ALL STATIONS

(call sign)

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

ALL STATIONS

(call sign)

RETURNING TO FLIGHT LEVEL (number) NOW

1

4

ENR 1.11 ADDRESSING OF FLIGHT PLAN MESSAGES

Flight movement messages relating to traffic into or via the Singapore FIR shall be addressed as stated below in order to warrant correct relay and delivery.

Category of Flight (IFR, VFR or both)	Route (Into or via FIR and/or TMA)	Message Address		
1	2	3		
	Transiting into or via:			
	Singapore FIR (WSJC)	WSJCZQZX		
All flights	Inbound to:			
	Singapore Changi Airport (WSSS) Seletar Airport (WSSL) Paya Lebar Airport (WSAP) Tengah Airport (WSAT)	WSJCZQZX		
	Outbound from:			
	Singapore Changi Airport (WSSS)	WSSSZPZX		
	Seletar Airport (WSSL)	WSSLZPZX		
	Paya Lebar Airport (WSAP)	WSAPZPZX		
	Tengah Airport (WSAT)	WSATZPZX		

Note:

ote:

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

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-			-
Air	space	Levels	Classification
Controlled airspace	ce	FL150 to FL460	A
		Surface to FL150	В
Controlled airspace more than 100 nm seaward from the shoreline		Lower limit to FL460	A
Control Zone (CTRs)	Changi CTR		с
	Paya Lebar CTR Surface to upper lim	Surface to upper limit	D
	Seletar CTR		с
ATZs		Surface to upper limit	D
Uncontrolled airsp	ace		G*

SINGAPORE	D-ATIS	DEP	128.6
		ARR	128.025
	APP	DEP	120.3
		ARR	119.3
		APP	124.05
	TWR		118.6
			118 25

PROHIBITED, RESTRICTED AND DANGER AREAS

	ACTIVITY	UPPER LIMIT LOWER LIMIT	REMARKS	1. W
WSP3	-	750ft ALT GND	Permanently Active as in ENR 5	RE
WSD4	A/G and G/G Firing Range	<u>FL 160</u> GND/WATER	Permanently Active as in ENR 5	RV
WMD8	Naval Air/Air Firing Range	FL 550 WATER	Activation by NOTAM	(1)
WSD11	Small Arm Firing	<u>1 300ft ALT</u> GND	Permanently Active as in ENR 5	
WSD11A	Artillery Firing	FL 125 GND	Activation by NOTAM	
WSD11B	Artillery Firing	<u>FL 125</u> GND	Activation by NOTAM	
WMD12	Naval Anti-aircraft Firing	FL 550 WATER	Activation by NOTAM	(II)
WSD13	Naval Anti-aircraft Firing	FL 550 WATER	Activation by NOTAM	
WSD14	Naval Anti-aircraft Firing & Live Air/Air Firing	FL 550 WATER	Activation by NOTAM	
WSP24	-	<u>800ft ALT</u> GND/WATER	Permanently Active as in ENR 5	
WSR6	Helicopter Operations	200ft ALT GND	Permanently Active as in ENR 5	2. AE
WSR9	Helicopter Operations	200ft ALT GND	Permanently Active as in ENR 5	
WSR16	Helicopter Operations	200ft ALT GND	Permanently Active as in ENR 5	
WSD34	Rifle Range	500ft ALT GND	Permanently Active as in ENR 5	
WSD35	Rifle Range	900ft ALT GND	Permanently Active as in ENR 5	
WSD36	Rifle Range	750ft ALT GND	Permanently Active as in ENR 5	
WSR10	-	<u>5 500ft ALT</u> GND	Permanently Active as in ENR 5	
WSR38	-	10 000ft ALT GND	Permanently Active as in ENR 5	
	Transit Channel	<u>2 000ft ALT</u> GND	Activated only for Military acft crossing	
*	Light Aircraft Training Area A	<u>4 500ft ALT</u> GND/*2 000ft	Training & Local Flts in VMC only	* In Transit Channel
*	Light Aircraft Training Area B	10 500ft ALT 4 500ft ALT	High Flying Training Ops in VMC only	_
*	Light Aircraft Training Area C	10 500ft ALT 4 500ft ALT	High Flying Training Ops in VMC only	
WMR223	Parachute Dropping	<u>10 000ft ALT</u> GND	Permanently Active as in ENR 5	_
WMD224	Firing Range	<u>12 000ft ALT</u> SEA	Activation by NOTAM	
WMR225	RMAF Helicopter Training Area	<u>3 500ft AL</u> T GND	Permanently Active as in ENR 5	
WMR226	RMAF Helicopter Training Area	<u>2 000ft AL</u> T GND	Permanently Active as in ENR 5	
WMD227	Radar Bombing Range	<u>10 000ft ALT</u> SEA	Activation by NOTAM	
WMP228	Sultan's Palace	<u>5 000ft AL</u> T GND	Permanently Active as in ENR 5	
WMR229	Helicopter Operations	<u>1 500ft ALT</u> GND	Permanently Active as in ENR 5	_
WMD230	Artillery Firing Range	<u>2 000ft AL</u> T GND	Permanently Active as in ENR 5	
WMD231	Artillery Firing Range	2 000ft ALT	Permanently Active	

SPECIAL NOTE :-

1. WEATHER BALLOONS

BALLOONS WILL BE RELEASED FOR MET OBSERVATION AT THE CENTRE FOR CLIMATE RESEARCH SINGAPORE, UPPER AIR OBSERVATORY (012025N 1035317E), BEARING 244° MAG AND DISTANCE 1.5NM FROM SOUTHERN END OF PAYA LEBAR RWY 02.

- (I) BALLOONS WILL BE RELEASED DAILY AT 2330UTC AND 1040UTC. CUT-OFF TIMINGS FOR THE RELEASE ARE AT 0030UTC AND 1230UTC RESPECTIVLEY. RATE OF ASCENT IS 320M PER MIN. MAX HGT OF BALLOON 115 000FT (35 000M). THE BALLOON, UNCOLOURED AND 162CM IN DIAMETER, IS ATTACHED WITH RADIOSONDE EQUIPMENT. IT WILL BURST 1.5 TO 2HRS AFTER RELEASE AND RADIOSONDE EQUIPMENT WILL DECSEND WITHIN 60NM RADIUS.
- (II) A BALLOON WILL BE RELEASED BETWEEN 2330UTC AND 0030UTC ON EITHER THE 3rd OR 4th WEEK OF THE MONTH. RATE OF ASCENT IS 320M PER MIN. MAX HGT OF BALLOONS IS 115 000FT (35 000M). THE BALLOON, UNCOLOURED AND 191CM IN DIAMETER, IS ATTACHED WITH OZONESONDE/RADIOSONDE EQUIPMENT AND PARACHUTE. IT WILL BURST 1.5 TO 2HR AFTER RELEASE.

2. AEROMODELLING AND KITE FLYING

(A) GENERAL WARNING

- i) PILOTS FLYING AT LOW ALTITUDES SHOULD WATCH OUT FOR POSSIBLE HAZARDS SUCH AS MODEL AIRCRAFT AND KITES, ESPECIALLY WHEN FLYING NEAR PARKS AND OPEN GROUND.
- ii) THE LOCATION OF SOME OF THE PARKS IN SINGAPORE WHERE KITE AND AERO MODEL FLYING MAY OCCUR ARE SHOWN ON ENR 3.4-5. PILOTS SHOULD NOTE THAT THE CHART AT ENR 3.4-5 DOES NOT SHOW ALL THE PARKS IN SINGAPORE AND THAT HAZARDS SUCH AS KITE FLYING AND AERO MODEL FLYING MAY TAKE PLACE AT PARKS AND OPEN GROUND NOT INDICATED IN ENR 3.4-5.
- iii) ACCORDING TO THE SINGAPORE AIR NAVIGATION ORDER, 1985, KITE FLYING AND AERO MODEL FLYING ARE NOT PERMITTED ABOVE 200ft OR WITHIN 5km OF AN AERODROME. HOWEVER, PILOTS ARE ADVISED TO LOOK OUT FOR SUCH HAZARDS AT ALL TIMES AS MEMBERS OF THE PUBLIC MAY INADVERTENTLY FLY KITES OR AERO MODELS ABOVE THE HGT OF 200ft OR WITHIN 5km OF AN AERODROME.

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



Airspace		Levels	Classification
Controlled airspace	xe	FL150 to FL460	A
		Surface to FL150	В
Controlled airspac seaward from the	e more than 100 nm shoreline	Lower limit to FL460	А
Control Zone (CTRs)	Changi CTR		с
	Paya Lebar CTR	Surface to upper limit	D
	Seletar CTR		с
ATZs		Surface to upper limit	D
Uncontrolled airsp	ace		G*

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

PROHIBITED, RESTRICTED AND DANGER AREAS

	ACTIVITY	UPPER LIMIT LOWER LIMIT	REMARKS	1. W
WSP3	-	750ft ALT GND	Permanently Active as in ENR 5	RE
WSD4	A/G and G/G Firing Range	<u>FL 160</u> GND/WATER	Permanently Active as in ENR 5	RV
WMD8	Naval Air/Air Firing Range	FL 550 WATER	Activation by NOTAM	(1)
WSD11	Small Arm Firing	<u>1 300ft ALT</u> GND	Permanently Active as in ENR 5	
WSD11A	Artillery Firing	FL 125 GND	Activation by NOTAM	
WSD11B	Artillery Firing	<u>FL 125</u> GND	Activation by NOTAM	
WMD12	Naval Anti-aircraft Firing	FL 550 WATER	Activation by NOTAM	(II)
WSD13	Naval Anti-aircraft Firing	FL 550 WATER	Activation by NOTAM	
WSD14	Naval Anti-aircraft Firing & Live Air/Air Firing	FL 550 WATER	Activation by NOTAM	
WSP24	-	<u>800ft ALT</u> GND/WATER	Permanently Active as in ENR 5	
WSR6	Helicopter Operations	200ft ALT GND	Permanently Active as in ENR 5	2. AE
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WSD35	Rifle Range	900ft ALT GND	Permanently Active as in ENR 5	
WSD36	Rifle Range	750ft ALT GND	Permanently Active as in ENR 5	
WSR10	-	<u>5 500ft ALT</u> GND	Permanently Active as in ENR 5	
WSR38	-	10 000ft ALT GND	Permanently Active as in ENR 5	
	Transit Channel	<u>2 000ft ALT</u> GND	Activated only for Military acft crossing	
*	Light Aircraft Training Area A	<u>4 500ft ALT</u> GND/*2 000ft	Training & Local Flts in VMC only	* In Transit Channel
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WMR226	RMAF Helicopter Training Area	<u>2 000ft AL</u> T GND	Permanently Active as in ENR 5	
WMD227	Radar Bombing Range	<u>10 000ft ALT</u> SEA	Activation by NOTAM	
WMP228	Sultan's Palace	<u>5 000ft AL</u> T GND	Permanently Active as in ENR 5	
WMR229	Helicopter Operations	<u>1 500ft ALT</u> GND	Permanently Active as in ENR 5	_
WMD230	Artillery Firing Range	<u>2 000ft AL</u> T GND	Permanently Active as in ENR 5	
WMD231	Artillery Firing Range	2 000ft ALT	Permanently Active	

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

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ENR 4 RADIO NAVIGATION AIDS/SYSTEMS

ENR 4.1 RADIO NAVIGATION AIDS - ENROUTE

Name of station (VOR/VAR)	ld	Frequency (CH)	Hours of operation	Co-ordinates	ELEV DME antenna	Remarks
1	2	3	4	5	6	7
BATAM/ HANG NADIM VOR/DME	BTM	116.0 MHz (CH 107X)	from 00:00 to 12:00	010812.77N 1040757.32E	-	Operating Authority: Directorate-General of Civil Aviation, Indonesia. PPR outside OPR HR. EM: A2A (DVOR/DME)
BATAM/ HANG NADIM NDB	BM	370 kHz	from 00:00 to 12:00	010716.54N 1040638.07E	-	Operating Authority: Directorate-General of Civil Aviation, Indonesia. PPR outside OPR HR. EM: Non/A2A (NDB)
JOHOR BAHRU DVOR/DME	VJB	112.5 MHz (CH 72X)	H24	013950.4N 1033939.2E	43.07 M	Operating Authority: Department of Civil Aviation Malaysia
JOHOR BAHRU NDB	JR	245 kHz	H24	014030N 1033936E	-	Operating Authority: Department of Civil Aviation Malaysia EM: A0/A2 (NDB)
MERSING DVOR/DME	VMR	116.8 MHz (CH 115X)	H24	022318N 1035218E	-	Operating Authority: Department of Civil Aviation Malaysia. 50w
PAPA UNIFORM DVOR/DME	PU	115.1 MHz (CH 98X)	H24	012523.99N 1035559.74E	Antenna HGT: 190 FT AMSL	BRG 020° DIST 9km from THR RWY 02 (Paya Lebar). MAINT Period: Third WED of EV month BTN 0200-0600 Coverage 200NM. EM: F1
PAYA LEBAR TACAN	PLA	(CH 110X)	BTN 2300-1100 SUN/MON to THU/FRI; BTN 2300-0500 FRI/SAT; PPR from RSAF HQ via Paya Lebar OPS at other times.	012224N 1035451E	-	BRG 015° DIST 1.5km from ARP. MAINT Period: Second THU of EV month BTN 0001-1100
SEMBAWANG NDB	AG	325 kHz	H24	012526.4N 1034913.0E	-	BRG 198° DIST 0.54km from ARP. MAINT Period: Second FRI of EV month BTN 0200-0400. Coverage 30NM. EM: A3
SINJON DVOR/DME	SJ	113.5 MHz (CH 82X)	H24	011321.34N 1035115.22E	Antenna HGT: 150 FT AMSL	BRG 201° DIST 14.5km from THR RWY 02 (Paya Lebar Airport). MAINT Period: Third THU of EV month BTN 0200-0600. Coverage 200NM. EM: F1
TANJUNG PINANG NDB	TI	385 kHz	from 00:00 to 14:00	005511N 1043134E	-	Operating Authority: Directorate-General of Civil Aviation, Indonesia. EM: Non/A2A (NDB)
TANJUNG PINANG VOR/DME	TPG	114.8 MHz (CH 95X)	from 00:00 to 14:00	005413N 1043052E	-	Operating Authority: Directorate-General of Civil Aviation, Indonesia. Coverage 40NM.
TEKONG DVOR/DME	VTK	116.5 MHz (CH 112X)	H24	012455N 1040120E	Antenna HGT: 150 FT AMSL	BRG 023° DIST 6.4km from THR RWY 20C (Singapore Changi Airport). MAINT Period: Third FRI of EV month BTN 0200-0600. Coverage 200NM. EM:F1

Name of station (VOR/VAR)	ld	Frequency (CH)	Hours of operation	Co-ordinates	ELEV DME antenna	Remarks
1	2	3	4	5	6	7
TENGAH TACAN	TNG	(CH 86X)	BTN 2300-1100 SUN/MON to THU/FRI; BTN 2300-0500 FRI/SAT; PPR from RSAF HQ via Tengah OPS at other times	012336N 1034242E	-	BRG 043° DIST 0.55km from ARP. MAINT Period: Second SAT of EV month BTN 0001-0900.

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

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

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

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Slope of RWY-SWY Transverse / Longitudinal	SWY Dimensions (m)	CWY Dimensions (m)	STRIP dimensions (m)	Dimensions of RESA (m)	Locations and description of ARST system	OFZ
7	8	9	10	11	12	13
RWY 20L 1.25% / 0% SWY 1.22% / 0%	60 X 60	60 X 150	4240 X 280	240 X 150	Not Applicable	Yes

Remarks

1) Open-air drains, demarcated by frangible poles, within the runway strip of RWY 02R/20L.

2) Not in use military hookwire system embedded in runway pavement at 490m from RWY 02R and RWY 20L thresholds.

3) Scheduled Closure of RWY 02L/20R

- a. BTN 1700-2100UTC on every SUN and WED of the month (preventive maintenance work). In the event of emergency, RWY will be re-opened within 30 minutes.
- b. A 5-minute inspection conducted within the periods BTN 0100-0359UTC, 0500-0759UTC and 0800-1059UTC daily.

4) Scheduled Closure of RWY 02C/20C

- a. BTN 1700-2100UTC on every FRI of the month (preventive maintenance work). In the event of emergency, RWY will be re-opened within 30 minutes.
- b. A 5-minute inspection conducted within the periods BTN 0100-0359UTC, 0500-0759UTC and 0800-1059UTC daily.

5) Scheduled Closure of RWY 02R/20L

- a. BTN 1700-2100UTC on every MON of the month (preventive maintenance work). In the event of emergency, RWY will be re-opened within 30 minutes.
- b. A 5-minute inspection conducted within the periods BTN 0100-0359UTC, 0500-0759UTC and 0800-1059UTC daily.

6) Additional Inspection and Maintenance Closures

- a. On days when there is a scheduled 4-hour runway closure BTN 1700-2100UTC
 - i. 10-minute inspection conducted within the period BTN 1500-1610UTC on the other operational runway(s);
 - ii. 15-minute inspection conducted within the period BTN 2300-2359UTC on the other operational runway(s);
 - iii. 5-minute inspection conducted within period BTN 2300-2359UTC on the re-opened runway.
- b. On days when there is no scheduled 4-hour runway closure BTN 1700-2100UTC
 - I. RWY 02L/20R:
 - i. 5-minute inspection conducted BTN 2300-2305UTC
 - ii. 30-minute maintenance will be conducted BTN 1830-1900UTC
 - II. RWY 02C/20C:
 - i. 5-minute inspection conducted BTN 2315-2320UTC
 - ii. 30-minute maintenance will be conducted BTN 1915-1945UTC
 - III. RWY 02R/20L:
 - i. 5-minute inspection conducted BTN 2330-2335UTC
 - ii. 60-minute maintenance will be conducted BTN 2000-2100UTC

RWY Designator	Intersection Departures	TORA (m)	TODA (m)	ASDA (m)	LDA (m)	Remarks
1	2	3	4	5	6	7
	Not applicable	4000	4270	4060	3260	
20R	W2	3842	4112	3902	Not applicable	THR displaced by
	W3	3026	3296	3086	Not applicable	- 740111 SOULI WAI US
	Not applicable	4000	4270	4060	4000	
02L	W8	3842	4112	3902	Not applicable	NIL
	W7	3026	3296	3086	Not applicable	_
	Not applicable	4000	4060	4060	4000	
200	T3	3808	3868	3868	Not applicable	- NUL
200	T4	3421	3481	3481	Not applicable	INIL
	T5	2721	2781	2781	Not applicable	_
	Not applicable	4000	4060	4060	4000	NIL
	T11	3842	3902	3902	Not applicable	
02C	T10	3329	3389	3389	Not applicable	
	Т9	3197	3257	3257	Not applicable	
	T8	2551	2611	2611	Not applicable	_
	Not applicable	4000	4060	4060	4000	
201	A3	3842	3902	3902	Not applicable	NIII
20L	A4	3027	3087	3087	Not applicable	
	A5	2552	2612	2612	Not applicable	
	Not applicable	4000	4060	4060	4000	
000	A10	3842	3902	3902	Not applicable	
UZK	A9	2877	2937	2937	Not applicable	- NIL
-	A8	2402	2462	2462	Not applicable	

WSSS AD 2.13 DECLARED DISTANCES

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 (20.0m), 3 White LGT (24.0m), 4 White LGT (26.4m). ACFT with eye-to-wheel height greater than 8m are advised to fly with 2 White and 2 Red LGT visible so as to achieve sufficient wheel clearance.	White	Inset High Intensity centreline lights (longitudinal spacing at 30m apart) as follow: From THR to 900m from RWY end: White, 300m to 900m from RWY end: ALTN Red/ White, 300m to RWY end: Red.	Bi-directional White/Amber edge lights (longitudinal spacing at 60m apart) as follow: From THR to 600m from RWY end: White, 600m to RWY end: Amber.	Red	Elevated Red

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

22 LIGHT AIRCRAFT OPERATIONS

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

23 CHANGI FLOW MANAGEMENT PROCEDURES

23.1 INTRODUCTION

- 23.1.1 The objectives of the procedures are to improve the efficiency of Singapore's air traffic service by minimising radar vectoring as well as improving airspace capacity.
- 23.1.2 The procedures require the holding of Changi arrivals over established holding areas.

23.2 ENTRY AND EXIT GATES

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

Coordinates
010230N 1032954E
015915N 1040618E
004342N 1035735E
010950N 1042714E

23.3 ARRIVING AIRCRAFT TO SINGAPORE CHANGI AIRPORT

23.3.1 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.

23.3.2 ENTRY GATE TIME

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

23.3.3 DESCENT PROFILE

Pilots shall plan their descent profile in accordance with the published STAR procedures.

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

23.4 APPROACH AIRSPACE HOLDING PROCEDURES

23.4.1 ENTRY PROCEDURE

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

23.4.2 RATE OF TURN

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

23.4.3 DESCENT PROCEDURE

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

23.4.4 DETAILS OF APPROACH AIRSPACE HOLDING AREAS

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

23.4.5 ALTERNATE HOLDING AREAS

In the event of inclement weather or capacity constraints rendering a specific holding area unusable, arrivals may be cleared to an alternate holding area for re-sequencing. To ensure smooth transition to alternate holding area, all arrivals bound for Singapore Changi Airport shall have their FMS programmed with all the four promulgated holding areas (paragraph 23.4.4).

23.5 EXPECTED TIME TO LEAVE HOLDING AREA

- 23.5.1 If arrival delay is processed by means of holding, pilots will be informed of the expected time to leave the respective holding area.
- 23.5.2 The expected time to leave is issued to serve as an early notification of the probable holding duration as well as for unforeseen circumstance such as radio failure (see ENR 1.6). Subsequently, a specified time to leave the holding area will be issued to pilots to resume the flight according to the assigned RNAV STARs.

23.6 DEPARTING AIRCRAFT FROM SINGAPORE CHANGI AIRPORT

23.6.1 DEPARTURE SPEED CONTROL

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

24 SIMULTANEOUS INDEPENDENT PARALLEL APPROACHES

24.1 INTRODUCTION

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

24.2 PROCEDURES FOR SIMULTANEOUS INDEPENDENT PARALLEL APPROACHES

- 24.2.1 To ensure safe operations between aircraft on parallel approaches, Normal Operating Zones (NOZs) are established for each extended runway centreline and a No Transgression Zone (NTZ) is established between the NOZs.
- 24.2.2 ATC will vector arriving flights into Singapore Changi Airport from the final waypoint of the respective STARs to the respective NOZs.
- 24.2.3 Within the NOZ, ATC shall provide a minimum vertical separation of 1,000ft or 3NM surveillance separation between pairs of aircraft until both aircraft are established on the ILS Localizer course.
- 24.2.4 ATC is not required to provide separation between aircraft on adjacent ILS Localizers and will monitor aircraft for deviation from the approach path.
- 24.2.5 Aircraft can expect to maintain altitude 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 180 knots at base turn or earlier till 8NM from touchdown.

24.3 BREAK-OUT MANOEUVRE

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

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

or

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

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

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

24.4 PILOT NOTIFICATION AND CONDITIONS FOR OPERATIONS

- 24.4.1 Simultaneous approaches to parallel runways operation will be broadcasted on ATIS during the active period.
- 24.4.2 Simultaneous approaches to the parallel runways will be suspended in the event of adverse weather or any other conditions that may affect the safe conduct of such approaches to the parallel runways.

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WSSS AD 2.23 ADDITIONAL INFORMATION

1 BIRD CONCENTRATION IN THE VICINITY OF THE AIRPORT

- 1.1 A number of varieties of birds are found in Singapore throughout the year. The larger birds commonly found in Singapore Changi Airport include the following:
 - cattle egrets (weighing approximately 400g each)
 - intermediate egrets (weighing approximately 500g each)
 - brahminy kites (weighing approximately 600g each)
 - grey herons (weighing approximately 1500g each)
 - white-bellied sea eagle (weighing approximately 2900g each)
- 1.2 There could be an increase in bird activities during the migratory months of September to March. During this period, migratory birds may use the airport as their feeding ground.
- 1.3 Various active dispersal devices generating light, sound or cracking effects are used for bird dispersal to mitigate wildlife hazards where necessary within Singapore Changi Airport (such as handheld laser device, long range acoustic device, scarecrow, stock-whip, pyrotechnic, etc.).

WSSS AD 2.24 CHARTS RELATED TO AN AERODROME

Location of RWY 02R/20L in relation to RWY 02L/20/R and RWY 02C/20C	<u>AD-2-WSSS-ADC-1</u>
Aerodrome Chart - ICAO	<u>AD-2-WSSS-ADC-2</u>
Aerodrome Advisory Chart - ICAO	<u>AD-2-WSSS-ADC-3</u>
Aerodrome Obstacle Chart - ICAO - TYPE A - RWY 02L/20R	<u>AD-2-WSSS-AOC-1</u>
Aerodrome Obstacle Chart - ICAO - TYPE R - RWY 020/200	AD-2-WSSS-AOC-2 AD-2-WSSS-AOC-3
Aerodrome Obstacle Chart - ICAO - TYPE A - BWY 02B/201	AD-2-WSSS-A0C-4
Precision Approach Terrain Chart - ICAO - RWY 02L	AD-2-WSSS-PATC-1
Precision Approach Terrain Chart - ICAO - RWY 20C	AD-2-WSSS-PATC-2
Precision Approach Terrain Chart - ICAO - RWY 02R	AD-2-WSSS-PATC-3
Precision Approach Terrain Chart - ICAO - RWY 20L	<u>AD-2-WSSS-PATC-4</u>
RNAV _(GNSS) SIDs and STARs - Introduction	
	AD-2-WSSS-SID-1 to 1.1
RNAV = SID - RWV 02C/20C - ANITO 6A / ANITO 7B	AD-2-WSSS-SID-2 to 2.1
RNAV = RWV 021/200 = ARTO 047 ARTO 70 = RWV 021/200 = RWV 021/200 = ARTO 047 ARTO 70 = RWV 047 ARTO 70	AD-2-WSSS-SID-2 to 2.1
RNAV SID - RWX 02C/20C - ADMIM 1A / ADMIM 3B	AD-2-WSSS-SID-3 to 3.1
	AD 2 WSSS SID 5 to 5 1
	AD 2 WSSS-SID-5 to 5.1
	AD 2 WSSS-SID-0 to 0.1
NINAV (GNSS) SID - RWY UZL/ZUR - BAVUS TE / BAVUS 3F	AD-2-WSSS-SID-7 to 7.1
RNAV (GNSS) SID - RWY 02C/20C - BAVUS TA / BAVUS 3B	AD-2-WSSS-SID-8 to 8.1
RNAV (GNSS) SID - RWY UZL/ZUR - ARUSU 2E / ARUSU 4F	AD-2-WSSS-SID-9 to 9.1
RNAV (GNSS) SID - RWY 02L/20R - MASBO 2E / MASBO 4F	<u>AD-2-WSSS-SID-10 to 10.1</u>
RNAV (GNSS) SID - RWY 02C/20C - AROSO 2A / AROSO 4B	<u>AD-2-WSSS-SID-11 to 11.1</u>
RNAV (GNSS) SID - RWY 02C/20C - MASBO 2A / MASBO 4B	<u>AD-2-WSSS-SID-12 to 12.1</u>
RNAV (GNSS) SID - RWY 02L/20R - MERSING 5E / MERSING 8F	<u>AD-2-WSSS-SID-13 to 13.1</u>
RNAV (GNSS) SID - RWY 02C/20C - MERSING 5A / MERSING 8B	<u>AD-2-WSSS-SID-14 to 14.1</u>
RNAV (GNSS) SID - RWY 02C/20C - VENIX 1A / VENIX 3B	<u>AD-2-WSSS-SID-15 to 15.1</u>
RNAV (GNSS) SID - RWY 02L/20R - VENIX 1E / VENIX 3F	<u>AD-2-WSSS-SID-16 to 16.1</u>
RNAV (GNSS) SID - RWY 02C/20C - KADAR 1A / KADAR 3B	<u>AD-2-WSSS-SID-17 to 17.1</u>
RNAV (GNSS) SID - RWY 02L/20R - KADAR 1E / KADAR 3F	<u>AD-2-WSSS-SID-18 to 18.1</u>
RNAV (GNSS) SID - RWY 02R/20L - CHA 1C / CHA 1D	AD-2-WSSS-SID-19 to 19.1
RNAV _(GNSS) STAR - RWY 02L/02C/02R - ARAMA 1A	<u>AD-2-WSSS-STAR-1 to 1.1</u>
RNAV _(GNSS) STAR - RWY 02L/02C/02R - ASUNA 1A	<u>AD-2-WSSS-STAR-2 to 2.1</u>
RNAV _(GNSS) STAR - RWY 20R/20C/20L - ARAMA 1B	<u>AD-2-WSSS-STAR-3 to 3.1</u>
RNAV _(GNSS) STAR - RWY 20R/20C/20L - ASUNA 1B	<u>AD-2-WSSS-STAR-4 to 4.1</u>
RNAV _(GNSS) STAR - RWY 02L/02C/02R - KARTO 1A	AD-2-WSSS-STAR-5 to 5.1
RNAV _(GNSS) STAR - RWY 02L/02C/02R - OBDOS 1A	<u>AD-2-WSSS-STAR-6 to 6.1</u>
RNAV _(GNSS) STAR - RWY 20R/20C/20L- KARTO 1B	<u>AD-2-WSSS-STAR-7 to 7.1</u>
RNAV _(GNSS) STAR - RWY 20R/20C/20L - OBDOS 1B	<u>AD-2-WSSS-STAR-8 to 8.1</u>
RNAV _(GNSS) STAR - RWY 20R/20C/20L- LELIB 3B	<u>AD-2-WSSS-STAR-9 to 9.1</u>
RNAV _(GNSS) STAR - RWY 02L/02C/02R - MABAL 2A	AD-2-WSSS-STAR-11 to 11.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - MABAL 2B	AD-2-WSSS-STAR-13 to 13.1
RNAV _(GNSS) STAR - RWY 02L/02C/02R - LEBAR 2A	AD-2-WSSS-STAR-14 to 14.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - LEBAR 2B	AD-2-WSSS-STAR-15 to 15.1
RNAV (GNSS) STAR - RWY 02L/02C/02R - REPOV 1A	AD-2-WSSS-STAR-16 to 16.1
RNAV _(GNSS) STAR - RWY 02L/02C/02R - SURGA 1A	AD-2-WSSS-STAR-17 to 17.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - REPOV 1B	AD-2-WSSS-STAR-18 to 18.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - SURGA 1B	AD-2-WSSS-STAR-19 to 19.1
RNAV _(GNSS) STAR - RWY 02L/02C/02R - ELALO 1A	AD-2-WSSS-STAR-20 to 20.1
RNAV _(GNSS) STAR - RWY 20R/20C/20L - ELALO 1B	AD-2-WSSS-STAR-21 to 21.1
Instrument Approach Chart - ICAO - RWY 02L - ICW ILS/DME	AD-2-WSSS-IAC-1
Instrument Approach Chart - ICAO - RWY 02C - ICE ILS/DME	AD-2-WSSS-IAC-2
Instrument Approach Chart - ICAO - RWY 20R - ICH ILS/DME	AD-2-WSSS-IAC-5
Instrument Approach Chart - ICAO - RWY 20C - ICC ILS/DME	AD-2-WSSS-IAC-6
Instrument Approach Chart - ICAO - RWY 20C - VTK DVOR/DME	<u>AD-2-WSSS-IAC-7</u>
Instrument Approach Chart ICAO RWY 02L - KNY	AD 2 WSSS-IAC 10 to 10 to
Instrument Approach Chart - ICAO - RWY 20R - RNP	AD-2-WSSS-IAC-10 10 10.1 AD-2-WSSS-IAC-11 to 11 1
Instrument Approach Chart - ICAO - RWY 20C - RNP	AD-2-WSSS-IAC-12 to 12.1
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Instrument Approach Chart - ICAO - RWY 02R - RNP	AD-2-WSSS-IAC-13 to 13.1
Instrument Approach Chart - ICAO - RWY 20L - RNP	AD-2-WSSS-IAC-14 to 14.1
Visual Approach Chart - ICAO	. AD-2-WSSS-VAC-1 to 1.1

WSSL AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of Aid and Variation	IDENT	Frequency	OPR Hour	Position of Transmitting Antenna Coordinates	DME Transmitting Antenna Elevation / Remarks
1	2	3	4	5	6 & 7
NIL	NIL	NIL	NIL	NIL	NIL

WSSL AD 2.20 LOCAL TRAFFIC REGULATIONS

1 LOCAL FLYING RESTRICTIONS:

- 1.1 Fixed-wing aircraft operations including circuit flying and training operations are restricted to the west of Seletar runway. Helicopter operations are confined to the west of Seletar runway between sunset and sunrise, subject to the restrictions in paragraph 1.3 below.
- 1.2 Circuit Heights:

Light aircraft 800ft (west of Seletar runway only);

Other aircraft 1,000ft - 1,500ft (west of Seletar runway only);

Helicopter-only area east of runway up to 600ft AGL

- 1.3 Circuit Flying and Training Operations are not permitted between 1400-2300 daily.
- 1.4 Pilots are required to keep clear of PAYA LEBAR CTR and SEMBAWANG ATZ.
- 1.5 During the designated hours for training flights, non-training flights will not be permitted to operate at Seletar Airport. Refer to GEN 1.2 paragraph 3.8 and WSSL AD 2.22 paragraph 2 for details.
 - a. All non-training flights are advised to plan to depart or arrive outside the designated hours for training flights.
 - b. Non-training flights include test flights conducted within Seletar Airport and Light Aircraft Training Areas A, B and C.

2 TEST/TRAINING FLIGHTS WITHIN SELETAR CIRCUIT AND LIGHT AIRCRAFT TRAINING AREAS

- 2.1 Flight notification shall be given prior to departure. Flight notification by means of RTF should be avoided.
- ← 2.2 For flights planned to be conducted in Seletar circuits or in Light Aircraft Training Areas A, B and C, locally based operators shall submit details of their flight by electronic mail using the Seletar Test / Training Form which can be retrieved from webpage:

https://aim-sg.caas.gov.sg

- ← 2.3 Operators of test flights conducting circuits within Seletar or in Light Aircraft Training Areas A, B and C, shall contact Seletar Tower Manager at least 2 days for advance notice from the date of flight. These flights shall not operate within the designated hours for training flights. Refer to GEN 1.2 paragraph 3.8 and WSSL AD 2.20 paragraph 1.5 for details.
 - 2.4 Flight details should contain the following information:
 - a. Aircraft identification;
 - b. Name and contact number of pilot;
 - c. Number of persons on board;
 - d. ETD;
 - e. Flight duration;
 - f. Total endurance; and
 - g. Area of flight.
- \leftarrow 2.5 For flights other than those classified in paragraphs 2.2 and 2.3 above, a flight plan shall be filed.
- 2.6 Light aircraft engaged in flying training shall maintain VHF communication.

2.7 Light aircraft flying on airways shall, in addition to radio communication apparatus, be equipped with a radio compass.
2.8 All fixed wing aircraft are to use the runway for take-off and landing. After landing, 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

3 WRONG APPROACHES AND LANDINGS OF AIRCRAFT BOUND FOR SELETAR AERODROME AND SEMBAWANG MILITARY AERODROME

3.1 INTRODUCTION

procedure.

- 3.1.1 The attention of all pilots is drawn to the existence of RSAF Sembawang Aerodrome, 3NM to the west of Seletar Aerodrome. The runway at Sembawang is orientated in almost the same direction as the runway at Seletar Aerodrome i.e. 03/21 for Seletar Aerodrome and 05/23 for Sembawang. Due to the close proximity of these two runways, pilots are cautioned against mistaking Sembawang Aerodrome for Seletar Aerodrome and thus making an inadvertent visual landing or approach to land at Sembawang.
- 3.1.2 Erroneous approaches or landings usually occurred in marginal weather conditions. In almost every instance, the prevailing weather at the time of the incident contributed towards a hasty and erroneous identification of the correct aerodrome.
- 3.1.3 There is intensive local flying at both aerodromes during the day and night. As pilot training is the major activity at both aerodromes, the risk of collision is very great if a wrong approach or landing is made at either of the two aerodromes.

3.2 POINTS TO BEAR IN MIND WHEN APPROACHING SELETAR AD OR SEMBAWANG AD

- 3.2.1 The following points are highlighted to serve as a guide to assist pilots in identifying Seletar AD or Sembawang AD and should be remembered and followed:
 - a. The runways at Seletar and Sembawang are almost identically aligned. Extra vigilance, therefore, is required when approaching either aerodrome, or when commencing an approach to land.
 - b. Make full use of available navigational and landing aids, and positively identify each aid used.
 - c. Adhere strictly to the joining instructions issued by ATC.
 - d. To keep clear of Sembawang ATZ while approaching Seletar AD for landing and vice versa.
- 3.2.2 Pilots are required to take note of the proximity of Sembawang ATZ, Paya Lebar CTR and all Prohibited/ Restricted/Danger Areas (e.g. WSR38 and WSD4). All arriving and departing aircraft will have to keep clear of these areas.
AIP Singapore AD 2.WSSL-17 08 SEP 2022 1.4.2 From GUMPU Cross GUMPU at or above 6,000ft enroute to Point ALFA. On passing Point ALFA, descend in VMC to 2,000ft or altitude cleared by ATC. (Point ALFA is located at 013033N 1034942E or Radial 296/7 DME VTK) i. Straight-in-Approach On passing Point ALFA, turn right for downwind RWY 03 (keeping clear of Sembawang ATZ). At downwind descend from 2,000ft for a visual approach RWY 03, or as cleared by ATC. Pilots should have the runway in sight. ii. **Circling Approach** On passing Point ALFA, turn right for downwind RWY 03 (keeping clear of Sembawang ATZ). At end of downwind, turn left and overfly the runway. Passing over north end of the runway (THR RWY 21), descend from 2.000ft to 1.500ft and turn left for downwind RWY 03. At downwind descend for a visual approach RWY 03 or as cleared by ATC. Pilots should have the runway in sight. 1.4.3 From SJ Cross SJ at 4,000ft or as cleared by ATC. On passing SJ, descend to 3,000ft for PONJO. On passing PONJO, descend in VMC to 2,000ft or altitude cleared by ATC. (PONJO is located at 011629N 1034629E or Radial 303 SJ) i. Straight-in-Approach Join direct for a straight-in visual approach RWY 03 descending from 2,000ft at a speed of not more than 170kt, or as cleared by ATC. Pilots should have the runway in sight. ii. **Circling Approach** Overfly the runway at 2,000ft at a speed of not more than 160kt, or as cleared by ATC. When passing over the north-end of runway (THR RWY 21), descend from 2,000ft to 1,500ft and turn left for downwind RWY 03 (keeping clear of Sembawang ATZ and Light Aircraft Training Area A). At downwind, descend for visual approach or as cleared by ATC. Pilots should have the runway in sight. Procedures are illustrated in the following charts: 1.4.4 AD-2-WSSL-VAC-3 : Visual Approach Chart - RWY 03 AD-2-WSSL-IFR-1 : Seletar Aerodrome Joining Procedures (IFR flights) from GUMPU, OMKOM and SJ - RWY 03 1.5 Joining Procedures for IFR flights from GUMPU, OMKOM or SJ - RWY 21

1.5.1 From OMKOM

Cross OMKOM at or above 3,000ft. On passing OMKOM descend in VMC to 2,000ft or altitude cleared by ATC.

i. Straight-in-Approach

Join direct for a straight-in visual approach Rwy 21 descending from 2,000ft, or as cleared by ATC. Pilots should have the runway in sight.

ii. **Circling Approach**

Overfly the runway at 2,000ft, or as cleared by ATC. Passing over the south-end of the runway (THR RWY 03), descend from 2.000ft to 1.500ft and turn right for downwind RWY 21 (keeping clear of Light Aircraft Training Area A and Sembawang ATZ). At downwind descend for a visual approach RWY 21 or as cleared by ATC. Pilots should have the runway in sight.

From GUMPU 1.5.2

Cross GUMPU at or above 6,000ft enroute to Point ALFA. On passing Point ALFA, descend in VMC to 2,000ft or altitude cleared by ATC. (Point ALFA is located at 013033N 1034942E or Radial 296 VTK)

- i. Straight-in-Approach On passing Point ALFA, join direct for a straight-in visual approach RWY 21 descending from 2,000ft, or as cleared by ATC (keeping clear of Sembawang ATZ).
- ii. **Circling Approach**

On passing Point ALFA, overfly the runway at 2,000ft. When passing over the south end of the runway (THR RWY 03), descend from 2,000ft to 1,500ft and turn right for downwind RWY 21 (keeping clear of Light Aircraft Training Area A and Sembawang ATZ). At downwind descend for a visual approach RWY 21 or as cleared by ATC. Pilots should have the runway in sight.

1.5.3 From SJ Cross SJ at 4,000ft or as cleared by ATC. On passing SJ, descend to 3,000ft for PONJO. On passing PONJO, descend in VMC to 2,000ft or altitude cleared by ATC and join downwind RWY 21 via RECHI-SETHI. (RECHI is located at 012033N 1034908E or Radial 235 PU and SETHI is located at 012439N 1035006E or Radial 263

i. Straight-in-Approach

PU)

Join downwind RWY 21 via SETHI at 2,000ft (keeping clear of Sembawang ATZ) at a speed of not more than 170kt. When downwind, descend from 2,000ft for visual approach, or as cleared by ATC. Pilots should have the runway in sight.

ii. Circling Approach

Join downwind RWY 21 via SETHI at 2,000ft (keeping clear of Sembawang ATZ) at a speed of not more than 160kt. At end of downwind, turn right and overfly the runway. When passing over south-end of the runway (THR RWY 03), descend from 2,000ft to 1,500ft and turn right for downwind RWY 21. At downwind, descend for visual approach or as cleared by ATC. Pilots should have the runway in sight.

- 1.5.4 Procedures are illustrated in the following charts:
 - AD-2-WSSL-VAC-4 : Visual Approach Chart RWY 21
 - AD-2-WSSL-IFR-2 : Seletar Aerodrome Joining Procedures (IFR flights) from GUMPU, OMKOM and SJ RWY 21

1.6 Holding Procedure

1.6.1 A low level holding procedure is established at SJ DVOR/DME. Suitably equipped aircraft bound for Seletar which may wish to hold for weather improvement may use this procedure (ENR 3.6-3 refers)

1.7 Approaches to Seletar Aerodrome

- 1.7.1 A deep-water shipping channel approximately 1525m from the northern threshold cuts across the extended centreline of Seletar RWY 21.
- 1.7.2 Information on the mast heights of tall vessels is relayed to ATC by Maritime and Port Authority of Singapore. ATC shall inform pilots of landing and departing aircraft of such information if the reported mast height of the vessel is above 30m.
- 1.7.3 At night ATC shall not permit landing on RWY 21 when vessels of mast height above 30m are reported.
- 1.7.4 Aircraft making approaches into Seletar are required to keep clear of Sembawang ATZ and any Prohibited/Restricted/Danger Areas (e.g. WSR38 and WSD4) within the vicinity.
- 1.7.5 Aircraft are restricted from overflying built-up residential areas around Seletar Airport (charts AD-2-WSSL-VAC-1 to AD-2-WSSL-VAC-4 refer) at an altitude of below 1,500ft. Aircraft types which are unable to safely manoeuvre clear of the built-up residential areas are not allowed to operate at Seletar Airport.

2 GROUND PROCEDURES FOR NON-TRAINING FLIGHTS

- 2.1 Pilots shall contact ATC (Seletar Ground on 121.6MHz) with the following details when the aircraft is ready to start up for departure within 5 minutes.
 - a. Callsign;
 - b. Destination;
 - c. Proposed flight level and alternate level, if any; and
 - d. Parking position.
- 2.1.1 Pilots shall request ATC clearance no later than 15 minutes prior to the start of noise abatement procedures or designated training hours and to expect delay if unable to comply. Refer to GEN 1.2 paragraph 3.8 and WSSL AD 2.21 for details.
- 2.2 ATC will advise the pilot whether the proposed flight level or other alternate flight level is available, and an ATC clearance will be issued accordingly.
- 2.3 Once flight level is accepted by the pilot and an ATC clearance issued, the aircraft must start up within 5 minutes from the time the ATC clearance is accepted unless other ATC restrictions are imposed. The ATC clearance will be cancelled on expiry of the 5 minutes grace period. This also applies to situations when aircraft develop technical issues and is unable to continue taxi for departure.
- 2.4 Pilots who are ready to depart following the cancellation of an ATC clearance shall adopt the procedures as if it is the first time they are ready to depart.

3 DEPARTURES FROM SELETAR AERODROME

- 3.1 Aircraft departing Seletar are required to keep clear of Sembawang ATZ and any Prohibited/Restricted/Danger Areas (e.g. WSR38 and WSD4) within the vicinity.
- 3.2 The pilot-in-command or the operator of IFR flight operating out of Seletar is required to file via OMKOM or RECHI PONJO SJ under item 15 of the flight plan. All departure clearances subject to ATC coordination.
- 3.3 Aircraft departing Seletar are required to adhere to the speed restrictions (charts AD-2-WSSL-VDC-1 and AD-2-WSSL-VDC-2 refer).

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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.					
	Sembawang ATZ Seletar CTR DisST/(%) (05000.746 DisST/(%) (05000.746 DisST/(%) (05000.746 DisST/(%) (05000.746 DisST/(%) (05000.746 DisST/(%) (05000.746 DisST/(%) (05000.746 DisST/(%) (05000.746 DisST/(%) (05000.746 DisST/(%) (05000.746) DisST/(%) (05000.746) DisST					

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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-	- <u>AOC-1</u>
Aerodrome Obstacle Chart (AOC) - ICAO - TYPE B - RWY 03/21	AD-2-WSSL-	-AOC-2
Visual Approach Chart (VAC) - ICAO - RWY 03	AD-2-WSSL	-VAC-1
Visual Approach Chart (VAC) - ICAO - RWY 21	AD-2-WSSL	-VAC-2
Visual Approach Chart (VAC) - ICAO - Advisory Joining Procedures - RWY 03	AD-2-WSSL	<u>-VAC-3</u>
Visual Approach Chart (VAC) - ICAO - Advisory Joining Procedures - RWY 21	AD-2-WSSL	-VAC-4
Visual Departure Chart - RWY 03 AD-2	-WSSL-VDC-	<u>1 to 1.1</u>
Visual Departure Chart - RWY 21 AD-2	-WSSL-VDC-	2 to 2.1
Joining Procedures - VFR Flights from Johor Bahru	AD-2-WSSL	<u>-VFR-1</u>
Joining procedures - IFR Flights from GUMPU, OMKOM and SJ - RWY 03	AD-2-WSSI	L-IFR-1
Joining procedures - IFR Flights from GUMPU, OMKOM and SJ - RWY 21	AD-2-WSSI	L-IFR-2

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AIP Singapore

SELETAR AERODROME LAYOUT OF SIGNIFICANT AERODROME BUILDINGS AND APRON FACILITIES



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CHANGES : Annotation 'WDA' changed to 'WOA'.

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WSAG AD 2.18 COMMUNICATION FACILITIES

Service	Call sign	Frequency	Hours of operation	Bemarks
1	2	2	Λ	5
APP	PAYA LEBAR APPROACH	127.7 MHz 255.8 MHz	BTN 2300-1100 SUN/MON	Nil
TWR	SEMBAWANG TOWER	129.7 MHz 239.0 MHz	to THU/FRI and BTN 2300-0500 FRI/SAT. Drier permission required on	Nil
GND	SEMBAWANG GROUND	277.1 MHz 118.8 MHz	SUN and Public holidays	Nil
Flight Information Service	SINGAPORE RADAR	119.1 MHz	H24	Nil
ACC	SINGAPORE RADAR	P123.7 MHz S127.3 MHz	H24	for ATS Routes B469, G219, G334, R208, L625, L629, L635, L642,
		133.8 MHz	0000 - 1430	L644, M751, M753, M758, M761, M763, M771, N875, N884, N891, N892 and Y514.
		P134.7 MHz S134.15 MHz	H24	for ATS Routes G334, L625, L644, M758, M761, M771, N875, N884 and N892.
		P133.25 MHz S135.8 MHz	_	for ATS Routes A457, A464, A576, L762, M630 and R469.
		P134.2 MHz S133.35 MHz		for ATS Routes G334, G580, L625, L644, M646, M767 and N875.
		P134.4 MHz S128.1 MHz		For ATS Routes B338, B469, B470, G579, L504, L644, M635, M774, N502, N875, P501 and in area in the immediate vicinity of Singapore
	SINGAPORE CONTROL	P134.35 MHz S133.6 MHz	H24	AUTOMATIC DEPENDENT SURVEILLANCE BROADCAST (ADS-B) OUT EXCLUSIVE AIRSPACE WITHIN PARTS OF THE SINGAPORE FIR - L642, L644, M753, M771, M904, N891, N892, Q801, Q802, Q803 and T611 within airspace bounded by 073605N 1090045E, 040713N 1063543E, 041717N 1061247E (MABLI), 044841N 1052247E (DOLOX), 045224N 1041442E (ENREP), 045000N 1034400E, thence north along the Singapore FIR boundary to 070000N 1080000E at or above FL290.
	SINGAPORE RADIO	6556 kHz 11297 kHz	H24	SEA 1. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
		5655 kHz 8942 kHz 11396 kHz	Hz Hz kHz Hz	SEA 2. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
		6556 kHz		SEA 3. Emission: A3AJ. SSB suppressed carrier, SATCOM service available.
APP	PP SINGAPORE P11 ARRIVAL S11 S11		H24	TAR - Intermediate and final approach to Singapore Changi AP.
	SINGAPORE APPROACH	P124.05 MHz S124.6 MHz S126.3 MHz		TAR – flow control service provided for ARR/DEP ACFT. Intermediate approach to Singapore Changi AP and other airports in Singapore. DEP from all airports in Singapore.

WSAG AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of Aid	IDENT	Frequency	OPR HR	Coordinates	Remarks
1	2	3	4	5	6
SEMBAWANG NDB	AG	325 kHz	H24	012526.4N 1034913.0E	For training approaches in VMC only.