INTRODUCTION

1.1 This AIP Supplement replaces the previous AIP Supplement 106/15 due to some editorial amendments in Appendices A and B. It provides details on the revisions to the SIDs and STARs for Singapore Changi Airport to enhance air traffic management, safety and efficiency.

1.2 The revisions to the SIDs and STARs for Singapore Changi Airport shall be effective from 0000UTC, 23 July 2015.

1.3 The SIDs and STARs are designed in accordance to ICAO Doc 8168 – Procedure for Air Navigation Services – Aircraft Operations (PANS-OPS) and designated with a navigation specification of RNAV 1 in accordance to ICAO Doc 9613 – Performance Based Navigation (PBN) Manual.

DETAILS OF THE SIDs AND STARs

2.1 The new SIDs replacing the existing SIDs are shown below:

<table>
<thead>
<tr>
<th>New SIDs</th>
<th>Replaces</th>
<th>Details of New SIDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMIM 1A</td>
<td>BOBAG 1A</td>
<td>Appendix A-1</td>
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<td>ADMIM 1B</td>
<td>BOBAG 1B</td>
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<td>ADMIM 1E</td>
<td>BOBAG 1E</td>
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<td>ADMIM 1F</td>
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<td>ANITO 6A</td>
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<td>AROSO 1E</td>
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2.2 The new STARs replacing the existing STARs are shown below:

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<td>PASPU 1B BIKTA Transition</td>
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<td>LAVAX 1A TOMAN Transition</td>
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<td>LEBAR 2B</td>
<td>LEBAR 1B BOBAG Transition</td>
<td>Appendix B-10</td>
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<tr>
<td>LEBAR 2B REMES</td>
<td>LEBAR 1B REMES Transition</td>
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<td>SURGA 1A</td>
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<td>LAVAX 1B SURGA Transition</td>
<td>Appendix B-19</td>
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<tr>
<td>VEPLI 1A</td>
<td>PASPU 1A VEPLI Transition</td>
<td>Appendix B-20</td>
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<tr>
<td>VEPLI 1B</td>
<td>PASPU 1B VEPLI Transition</td>
<td>Appendix B-21</td>
</tr>
</tbody>
</table>
2.3 The following STARs will be removed permanently:

(i) BOBAG 1K & 1L
(ii) LAVAX 1K & 1L
(iii) PASPU 1K & 1L
(iv) REMES 1K & 1L

3 SPEED RESTRICTIONS ON SIDs AND STARs

3.1 To improve traffic flow, a revision to the existing departure speed restriction will be introduced. Departures shall fly an indicated airspeed of 230 knots until passing A040 and 250 knots until passing A100, unless otherwise specified in the SIDs.

3.2 Arrivals on the new STARs shall fly at the indicated airspeed as specified in the STARs.

4 CONTINGENCY PROCEDURES

4.1 In the event of airborne RNAV equipment deterioration or failure of navigation systems below the navigation requirements, pilot shall inform ATC as soon as practicable. ATC shall then provide the appropriate heading instructions to ensure flight safety and separation with other air traffic in the vicinity.

5 CANCELLATION

5.1 AIP Supplement 107/15 will remain current until the information is incorporated into AIP Singapore.
STANDARD DEPARTURE CHART
RNAV (GNSS) - INSTRUMENT (SID)

TRANSACTION ALTITUDE
11 000ft

TWR 118.6 / 118.25
APP 120.3
ACC 133.25

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C/20C
ADMIM DEPARTURES
ADMIM 1A (R02C)
ADMIM 1B (R20C)

GENERAL INFORMATION

INITIAL CLIMB
3000FT OR AS DIRECTED BY ATC

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C
IAS 230KTS UNTIL PASSING 4000FT AND
IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF.
BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

RWY 20C
IAS 230KTS UNTIL PASSING 4000FT AND
IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF.
BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 4000FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
75 100 150 200 250 300

5% V/V (fpm)
380 506 760 1013 1266 1519

3.3% V/V (fpm)
251 344 468 668 835 1003

THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20C ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20C SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C
IAS 230KTS UNTIL PASSING 4000FT AND
IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF.
BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

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DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 4000FT, THEREAFTER 3.3%.

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ADMIM 1A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

<table>
<thead>
<tr>
<th>Formal Description</th>
<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
</tr>
</thead>
<tbody>
<tr>
<td>To TOKIM on course 023° at or above 2000ft, speed 230kts, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To AGROT, turn right. To ABVIP. To ADMIM at or above 10000ft, turn right. To ASUNA.</td>
<td>TOKIM [M023; A020+; K230; R] - DOKTA [A040+; R] - DOGRA [A060-; R] - AGROT [R] - ABVIP - ADMIM [A100+; R] - ASUNA</td>
<td>CF</td>
<td>N</td>
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<td></td>
<td></td>
<td>TF</td>
<td>N</td>
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Tabular Descriptions

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<th>Path</th>
<th>Waypoint Name</th>
<th>Fly-Over</th>
<th>Course °M(°T)</th>
<th>Magnetic Variation</th>
<th>Turn Direction</th>
<th>Altitude</th>
<th>Speed Limit</th>
<th>Navigation Spec</th>
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<tbody>
<tr>
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<td>TOKIM</td>
<td>-</td>
<td>023(022.5)</td>
<td>-0.5</td>
<td>R</td>
<td>A020+</td>
<td>K230</td>
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<td>TF</td>
<td>DOKTA</td>
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<td>R</td>
<td>A040+</td>
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<td>DOGRA</td>
<td></td>
<td>169(168.5)</td>
<td>-0.5</td>
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<td>RNAV1</td>
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<td>ADMIM</td>
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<td>A100+</td>
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<td>RNAV1</td>
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<td>ASUNA</td>
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ADMIM 1B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS

Formal & Abbreviated Descriptions

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<th>Formal Description</th>
<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
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<tbody>
<tr>
<td>To SUDPO on course 203° at or above 2000ft, speed 230kts. To SUGAM. To SAMKO at or below 6000ft. To ABVIP, turn right. To ADMIM at or above 10000ft, turn right. To ASUNA.</td>
<td>SUDPO [M203; A020+; K230] - SUGAM - SAMKO [A060-] - ABVIP [R] - ADMIM [A100+; R] - ASUNA</td>
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Tabular Descriptions

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<th>Course °M(°T)</th>
<th>Magnetic Variation</th>
<th>Turn Direction</th>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600
2. COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:
   - RWY 02C - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   - RWY 20C - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
STANDARD DEPARTURE CHART
RNAV (GNSS) - INSTRUMENT (SID)

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS 128.6

ELEV. ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)

DISTANCES IN NM
NOTE: RADAR REQUIRED

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

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

GENERAL INFORMATION

INITIAL CLimb
3000FT OR AS DIRECTED BY ATC

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02L
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLimb GRADIENT CRITERIA.

RWY 20R
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLimb GRADIENT OF 5% UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
5% V/V (fpm) 380 506 760 1013 1266 1519
3.3% V/V (fpm) 251 334 501 668 835 1003

THE RESTRICTION TO CROSS SUNVA AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20R ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20R SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.

CIVIL AVIATION AUTHORITY
SINGAPORE
ADMIM 1E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

<table>
<thead>
<tr>
<th>Formal Description</th>
<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
</tr>
</thead>
<tbody>
<tr>
<td>To TOPOM on course 023° at or above 2000ft, speed 230kts, turn right. To DOKTA</td>
<td>TOPOM [M023; A020+; K230; R] - DOKTA [A040+; R] - DOGRA [A060-; R] - AGROT [R] -</td>
<td>CF</td>
<td>N</td>
</tr>
<tr>
<td>at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To AGROT,</td>
<td>ABVIP - ADMIM [A100+; R] - ASUNA</td>
<td>TF</td>
<td>N</td>
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<tr>
<td>turn right. To ABVIP. To ADMIM at or above 10000ft, turn right. To ASUNA.</td>
<td></td>
<td>TF</td>
<td>N</td>
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</table>

Tabular Descriptions

<table>
<thead>
<tr>
<th>Path Term</th>
<th>Waypoint Name</th>
<th>Fly-Over</th>
<th>Course °M(°T)</th>
<th>Magnetic Variation</th>
<th>Turn Direction</th>
<th>Altitude</th>
<th>Speed Limit</th>
<th>Navigation Spec</th>
</tr>
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<tbody>
<tr>
<td>CF</td>
<td>TOPOM</td>
<td>-</td>
<td>023(022.5)</td>
<td>0.5</td>
<td>R</td>
<td>A020+</td>
<td>K230</td>
<td>RNAV1</td>
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<tr>
<td>TF</td>
<td>DOKTA</td>
<td>-</td>
<td>115(114.5)</td>
<td>0.5</td>
<td>R</td>
<td>A040+</td>
<td>-</td>
<td>RNAV1</td>
</tr>
<tr>
<td>TF</td>
<td>DOGRA</td>
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<td>-</td>
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<tr>
<td>TF</td>
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ADMIM 1F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

Formal & Abbreviated Descriptions

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<th>Path Terminator</th>
<th>Fly-Over required</th>
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<tbody>
<tr>
<td>To SUNVA on course 203° at or above 2000ft, speed 230kts. To SUNGO, turn left.</td>
<td>SUNVA [M203; A020+; K230] - SUNGO [L] - SAMKO [A060-; R] - ABVIP [R] - ADMIM [A100+; R] - ASUNA</td>
<td>CF</td>
<td>N</td>
</tr>
<tr>
<td>To SAMKO at or below 6000ft, turn right. To ABVIP, turn right. To ADMIM at or above 10000ft, turn right. To ASUNA.</td>
<td></td>
<td>TF</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TF</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TF</td>
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</tr>
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<td></td>
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<th>Speed Limit</th>
<th>Navigation Spec</th>
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<td>RNAV1</td>
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<td>SUNGO</td>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600
2. COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:
   RWY 02L - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   RWY 20R - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
STANDARD DEPARTURE CHART
RNAV (GNSS) - INSTRUMENT (SID)

ELEV. ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)
DISTANCES IN NM
NOTE: RADAR REQUIRED
NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND TO EXPECT RADAR VECTURING, IF NECESSARY
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
NOTE: REFER TO BACK PAGE FOR - FORMAL AND TABULAR DESCRIPTIONS - RADIO COM FAILURE PROCEDURES

GENERAL INFORMATION
INITIAL CLimb
3000FT OR AS DIRECTED BY ATC
ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO.
ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLimb GRADIENT CRITERIA.

RWY 20C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLimb GRADIENT OF 3% UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

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

THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20C ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20C SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.
### ANITO 6A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

#### Formal & Abbreviated Descriptions

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<td>To TOKIM on course 023° at or above 2000ft, speed 230kts, turn right. To DOKTA at</td>
<td>TOKIM [M023; A020+; K230; R] -</td>
<td>CF</td>
<td>N</td>
</tr>
<tr>
<td>or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To DOSNO,</td>
<td>DOKTA [A040+; R] -</td>
<td>TF</td>
<td>N</td>
</tr>
<tr>
<td>turn left. To ANITO.</td>
<td>DOGRA [A060-; R] -</td>
<td>TF</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>DOSNO [L] -</td>
<td>TF</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>ANITO</td>
<td>TF</td>
<td>N</td>
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#### Tabular Descriptions

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<th>Fly-Over</th>
<th>Course °M(°T)</th>
<th>Magnetic Variation</th>
<th>Turn Direction</th>
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<th>Navigation Spec</th>
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</thead>
<tbody>
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<td>K230</td>
<td>RNAV1</td>
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<td>115(114.5)</td>
<td>-0.5</td>
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<td>A040+</td>
<td>-</td>
<td>RNAV1</td>
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<td>TF</td>
<td>DOGRA</td>
<td>-</td>
<td>169(168.5)</td>
<td>-0.5</td>
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<td>A060-</td>
<td>-</td>
<td>RNAV1</td>
</tr>
<tr>
<td>TF</td>
<td>DOSNO</td>
<td>-</td>
<td>180(179.5)</td>
<td>-0.5</td>
<td>L</td>
<td>-</td>
<td>-</td>
<td>RNAV1</td>
</tr>
<tr>
<td>TF</td>
<td>ANITO</td>
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<td>150(149.5)</td>
<td>-0.5</td>
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<td>-</td>
<td>-</td>
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### ANITO 5B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS

#### Formal & Abbreviated Descriptions

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<th>Fly-Over required</th>
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</thead>
<tbody>
<tr>
<td>To SUDPO on course 203° at or above 2000ft, speed 230kts. To SUGAM, speed 230kts,</td>
<td>SUDPO [M203; A020+; K230] -</td>
<td>CF</td>
<td>N</td>
</tr>
<tr>
<td>turn left. To SAPTI. To SASGA at or above 4000ft. To BTM. To DOGRA at or below</td>
<td>SUGAM [K230; L] -</td>
<td>TF</td>
<td>N</td>
</tr>
<tr>
<td>6000ft, turn right. To DOSNO, turn left.</td>
<td>SAPTI -</td>
<td>TF</td>
<td>N</td>
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<tr>
<td></td>
<td>SASGA [A040+] -</td>
<td>TF</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>BTM -</td>
<td>TF</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>DOGRA [A060-; R] -</td>
<td>TF</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>DOSNO [L] -</td>
<td>TF</td>
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<tr>
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<td>ANITO</td>
<td>TF</td>
<td>N</td>
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#### Tabular Descriptions

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<th>Course °M(°T)</th>
<th>Magnetic Variation</th>
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<th>Altitude</th>
<th>Speed Limit</th>
<th>Navigation Spec</th>
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<td>SUDPO</td>
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<td>-</td>
<td>A020+</td>
<td>K230</td>
<td>RNAV1</td>
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<tr>
<td>TF</td>
<td>SUGAM</td>
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<td>-</td>
<td>K230</td>
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<td>-</td>
<td>RNAV1</td>
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<tr>
<td>TF</td>
<td>DOSNO</td>
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<td>180(179.5)</td>
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<td>L</td>
<td>-</td>
<td>-</td>
<td>RNAV1</td>
</tr>
<tr>
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<td>ANITO</td>
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<td>150(149.5)</td>
<td>-0.5</td>
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<td>-</td>
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<td>RNAV1</td>
</tr>
</tbody>
</table>

### RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600
2. COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:
   - RWY 02C - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   - RWY 20C - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
**STANDARD DEPARTURE CHART**

**RNAV (GNSS) - INSTRUMENT (SID)**

**TRANSACTION ALTITUDE**

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<th>APP</th>
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<tr>
<td>118.6 / 118.25</td>
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**SINGAPORE/Singapore Changi**

**RWY 02L/20R**

**ANITO DEPARTURES**

**ANITO 6E (R02L)**

**ANITO 5F (R20R)**

**ELEV, ALT IN FEET**

BEARINGS, TRACKS AND RADIALS ARE MAGNETIC

VAR 26'E (2015)

DISTANCES IN NM

NOTE: RADAR REQUIRED

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

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

**GENERAL INFORMATION**

**INITIAL CLIMB**

3000FT OR AS DIRECTED BY ATC

ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO.

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

**RWY 02L**

IAS 230kts UNTIL PASSING 4000FT AND IAS 250kts UNTIL PASSING 10000FT.

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

SEE [ENR 1.5-4] FOR MINIMUM CLIMB GRADIENT CRITERIA.

**RWY 20R**

IAS 230kts UNTIL PASSING 4000FT AND IAS 250kts UNTIL PASSING 10000FT.

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

DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 4000FT, THEREAFTER 3.3%.

THE RESTRICTION TO CROSS SUNVA AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.

ALL DEPARTURE AIRCRAFT ON RWY 20R ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.

IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20R SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXIING TO THE HOLDING POINT FOR DEPARTURE.
### ANITO 6E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

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<tbody>
<tr>
<td>To TOPOM on course 023° at or above 2000ft, speed 230kts, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To ANITO.</td>
<td>TOPOM [M023; A020+; K230; R] - DOKTA [A040+; R] - DOGRA [A060-; R] - DOSNO [L] - ANITO</td>
<td>CF</td>
<td>N</td>
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<tr>
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<td>023(022.5)</td>
<td>-0.5</td>
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<td>A020+</td>
<td>K230</td>
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<td>DOGRA</td>
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<td>169(168.5)</td>
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<td>R</td>
<td>A060-</td>
<td>-</td>
<td>RNAV1</td>
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<td>TF</td>
<td>DOSNO</td>
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<td>ANITO</td>
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<td>-</td>
<td>RNAV1</td>
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### ANITO 5F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

#### Formal & Abbreviated Descriptions

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<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
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<tbody>
<tr>
<td>To SUNVA on course 203° at or above 2000ft, speed 230kts. To SUNGO, speed 230kts, turn left. To SASGA at or above 4000ft. To BTM. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To ANITO.</td>
<td>SUNVA [M203; A020+; K230] - SUNGO [K230; L] - SASGA [A040+] - BTM - DOGRA [A060-; R] - DOSNO [L] - ANITO</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>RNAV1</td>
</tr>
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</table>

### RADIO COMMUNICATIONS FAILURE PROCEDURE

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

**RNAV (GNSS) - INSTRUMENT (SID)**

**AROSO DEPARTURES**

**AROSO 2A (R02C)**

**AROSO 2B (R20C)**

**GENERAL INFORMATION**

**INITIAL CLimb**

3000FT OR AS DIRECTED BY ATC

All SIDs include noise preferential routes.

**RWY 02C**

IAS 230Kts until passing 4000ft and
IAS 250Kts until passing 10000ft.

Cruising levels will be issued after take-off
by Singapore RAdar.

See (ENR.1.5-4) for minimum climb gradient criteria.

**RWY 20C**

IAS 230Kts until SASGA and
IAS 250Kts until passing 10000ft.

Cruising levels will be issued after take-off
by Singapore RAdar.

Deviations shall be on a minimum net climb gradient of 5%
until reaching or passing 4000ft, thereafter 3.3%.

GND SPEED - KNOTS

<table>
<thead>
<tr>
<th>GND SPEED (kts)</th>
<th>75</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
</tr>
</thead>
<tbody>
<tr>
<td>5% V/V (fpm)</td>
<td>380</td>
<td>506</td>
<td>760</td>
<td>1013</td>
<td>1266</td>
<td>1519</td>
</tr>
<tr>
<td>3.3% V/V (fpm)</td>
<td>251</td>
<td>334</td>
<td>501</td>
<td>668</td>
<td>835</td>
<td>1003</td>
</tr>
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</table>

**NOTE:** Radar required

**NOTE:** ACFT unable to fly the SID
Profile shall inform ATC prior to departure and to expect radar vectoring,
If necessary

**NOTE:** RNAV-1 navigation specification
GNSS required

**NOTE:** Refer to back page for
- Formal and tabular descriptions
- Radio Com failure procedures

**DISTANCES IN NM**

**TRANSITION ALTITUDE**

11 000ft

**RWY 02C (DER)**

01° 21' 52" N
104° 00' 00" E

**RWY 20C (DER)**

01° 19' 35" N
103° 59' 02" E

**TEKONG**

DVOR/DME 116.5
VTK
01° 24' 55" N
104° 01' 20" E

**60M**

**SUDPO**

01° 17' 31" N
103° 58' 08" E

**SUKOK**

01° 15' 12" N
104° 04' 28" E

**SASGA**

01° 10' 37" N
104° 02' 25" E

**SAPTI**

01° 12' 18" N
103° 58' 35" E

**TOKIM**

01° 29' 33" N
104° 03' 15" E

**NOTE:** Radar required

All departures shall be on a minimum net climb gradient of 5%
until reaching or passing 4000ft, thereafter 3.3%.

The restriction to cross SUDPO at or above 2000ft is applicable between 2301/1100 UTC.

All departure aircraft on RWY 20C issued with heading
instructions by ATC shall also cross B DME VTK at or above 2000ft 6NM 2301/1100 UTC.

If the height restriction cannot be complied with, the
pilot-in-command of an aircraft departure on RWY 20C
shall inform ATC during the time when the aircraft
commences taxiing to the holding point for departure.
AROSO 2A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

<table>
<thead>
<tr>
<th>Formal Description</th>
<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
</tr>
</thead>
<tbody>
<tr>
<td>To TOKIM on course 023° at or above 2000ft, speed 230kts, turn left. To AKOMA at or above 7000ft, turn left. To AKMET at or above 11000ft. To AROSO.</td>
<td>TOKIM [M023; A020+; K230; L] - AKOMA [A070+; L] - AKMET [A110+] - AROSO</td>
<td>CF</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TF</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TF</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TF</td>
<td>N</td>
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Tabular Descriptions

<table>
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<tr>
<th>Path Term</th>
<th>Waypoint Name</th>
<th>Fly-Over</th>
<th>Course °M(°T)</th>
<th>Magnetic Variation</th>
<th>Turn Direction</th>
<th>Altitude</th>
<th>Speed Limit</th>
<th>Navigation Spec</th>
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<tr>
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<td>TOKIM</td>
<td>-</td>
<td>023(022.5)</td>
<td>-0.5</td>
<td>L</td>
<td>A020+</td>
<td>K230</td>
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<tr>
<td>TF</td>
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<td>332(331.5)</td>
<td>-0.5</td>
<td>L</td>
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<td>-</td>
<td>RNAV1</td>
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<tr>
<td>TF</td>
<td>AKMET</td>
<td>-</td>
<td>308(307.5)</td>
<td>-0.5</td>
<td>-</td>
<td>A110+</td>
<td>-</td>
<td>RNAV1</td>
</tr>
<tr>
<td>TF</td>
<td>AROSO</td>
<td>-</td>
<td>308(307.5)</td>
<td>-0.5</td>
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<td>-</td>
<td>-</td>
<td>RNAV1</td>
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AROSO 2B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS

Formal & Abbreviated Descriptions

<table>
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<tr>
<th>Formal Description</th>
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<th>Fly-Over required</th>
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Tabular Descriptions

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<th>Waypoint Name</th>
<th>Fly-Over</th>
<th>Course °M(°T)</th>
<th>Magnetic Variation</th>
<th>Turn Direction</th>
<th>Altitude</th>
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<th>Navigation Spec</th>
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</tr>
<tr>
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<td>-</td>
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<td>-0.5</td>
<td>L</td>
<td>A040+</td>
<td>K230</td>
<td>RNAV1</td>
</tr>
<tr>
<td>TF</td>
<td>SUKOK</td>
<td>-</td>
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<td>-</td>
<td>RNAV1</td>
</tr>
<tr>
<td>TF</td>
<td>VTK</td>
<td>-</td>
<td>342(341.5)</td>
<td>-0.5</td>
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<td>A070+</td>
<td>-</td>
<td>RNAV1</td>
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<tr>
<td>TF</td>
<td>AKOMA</td>
<td>-</td>
<td>342(341.5)</td>
<td>-0.5</td>
<td>L</td>
<td>-</td>
<td>-</td>
<td>RNAV1</td>
</tr>
<tr>
<td>TF</td>
<td>AKMET</td>
<td>-</td>
<td>308(307.5)</td>
<td>-0.5</td>
<td>-</td>
<td>A110+</td>
<td>-</td>
<td>RNAV1</td>
</tr>
<tr>
<td>TF</td>
<td>AROSO</td>
<td>-</td>
<td>308(307.5)</td>
<td>-0.5</td>
<td>-</td>
<td>-</td>
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<td>RNAV1</td>
</tr>
</tbody>
</table>

RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600
2. COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:
   RWY 02C - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   RWY 20C - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
STANDARD DEPARTURE CHART
RNAV (GNSS) - INSTRUMENT (SID)

SINGAPORE/Singapore Changi
RWY 02L/20R
AROSO DEPARTURES
AROSO 2E (R02L)
AROSO 2F (R20R)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26'E (2015)

NOTE: RADAR REQUIRED
NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND TO EXPECT RADAR VECTOING, IF NECESSARY
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
NOTE: REFER TO BACK PAGE FOR - FORMAL AND TABULAR DESCRIPTIONS - RADIO COM FAILURE PROCEDURES

GENERAL INFORMATION

INITIAL CLIMB
3000FT OR AS DIRECTED BY ATC

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02L
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT. CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR. SEE (ENR 1.5-4) FOR MINIMUM CLimb GRADIENT CRITERIA.

RWY 20R
IAS 230KTS UNTIL SASGA AND IAS 250KTS UNTIL PASSING 10000FT. CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR. DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REAching OR PASSING 4000FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
75 100 150 200 250 300

5% V/V (fpm) 380 506 740 1013 1264 1559
3.3% V/V (fpm) 251 334 501 648 835 1003

THE RESTRICTION TO CROSS 8 DME VTK AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC. ALL DEPARTURE AIRCRAFT ON RWY 02L ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.

IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20R SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.
AROSO 2E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

### Formal & Abbreviated Descriptions

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<thead>
<tr>
<th>Formal Description</th>
<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
</tr>
</thead>
<tbody>
<tr>
<td>To TOPOM on course 023° at or above 2000ft, speed 230kts, turn left. To ATRUM. To AKOMA at or above 7000ft, turn left. To AKMET at or above 11000ft. To AROSO.</td>
<td>TOPOM [M023; A020+; K230; L] - ATRUM - AKOMA [A070+; L] - AKMET [A110+] - AROSO</td>
<td>CF</td>
<td>N</td>
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### Tabular Descriptions

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<th>Path Term</th>
<th>Waypoint Name</th>
<th>Fly-Over</th>
<th>Course °M(°T)</th>
<th>Magnetic Variation</th>
<th>Turn Direction</th>
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<th>Speed Limit</th>
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<tr>
<td>CF</td>
<td>TOPOM</td>
<td>-</td>
<td>023(022.5)</td>
<td>-0.5</td>
<td>L</td>
<td>A020+</td>
<td>K230</td>
<td>RNAV1</td>
</tr>
<tr>
<td>TF</td>
<td>ATRUM</td>
<td>-</td>
<td>333(332.5)</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>RNAV1</td>
</tr>
<tr>
<td>TF</td>
<td>AKOMA</td>
<td>-</td>
<td>333(332.5)</td>
<td>-0.5</td>
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<td>A070+</td>
<td>-</td>
<td>RNAV1</td>
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<tr>
<td>TF</td>
<td>AKMET</td>
<td>-</td>
<td>308(307.5)</td>
<td>-0.5</td>
<td>-</td>
<td>A110+</td>
<td>-</td>
<td>RNAV1</td>
</tr>
<tr>
<td>TF</td>
<td>AROSO</td>
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<td>308(307.5)</td>
<td>-0.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
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### AROSO 2F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

#### Formal & Abbreviated Descriptions

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<th>Formal Description</th>
<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
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#### Tabular Descriptions

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<th>Path Term</th>
<th>Waypoint Name</th>
<th>Fly-Over</th>
<th>Course °M(°T)</th>
<th>Magnetic Variation</th>
<th>Turn Direction</th>
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<td>RNAV1</td>
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<td>-0.5</td>
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<td>-</td>
<td>K230</td>
<td>RNAV1</td>
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<tr>
<td>TF</td>
<td>SASGA</td>
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<td>L</td>
<td>A040+</td>
<td>K230</td>
<td>RNAV1</td>
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<tr>
<td>TF</td>
<td>SUKOK</td>
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<td>023(023.6)</td>
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<tr>
<td>TF</td>
<td>VTK</td>
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<td>342(341.5)</td>
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<td>A070+</td>
<td>-</td>
<td>RNAV1</td>
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<td>AKOMA</td>
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<td>RNAV1</td>
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<td>A110+</td>
<td>-</td>
<td>RNAV1</td>
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<tr>
<td>TF</td>
<td>AROSO</td>
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<td>308(307.5)</td>
<td>-0.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>RNAV1</td>
</tr>
</tbody>
</table>

### RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600
2. COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:
   - RHWY 02L - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   - RHWY 20R - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
STANDARD DEPARTURE CHART
RNAV (GNSS) - INSTRUMENT (SID)

TWR 118.6 / 118.25
APP 120.3
ACC 134.4

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

SINGAPORE/Singapore Changi
RWY 02C/20C
BAVUS DEPARTURES
BAVUS 1A (R02C)
BAVUS 1B (R20C)

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)

DISTANCES IN NM
NOTE: RADAR REQUIRED
NOTE: ACFT UNABLE TO FLY THE SID
PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND TO EXPECT RADAR VECTORS, IF NECESSARY
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
NOTE: REFER TO BACK PAGE FOR - FORMAL AND TABULAR DESCRIPTIONS - RADIO COM FAILURE PROCEDURES

GENERAL INFORMATION

INITIAL CLIMB
3000FT OR AS DIRECTED BY ATC
ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO
ALL SIDS INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

RWY 20C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
5% V/V (fpm)
3.3% V/V (fpm)

75 100 150 200 250 300
150 200 250 300
300

GND SPEED - METRES PER MINUTE
380 506 780 1013 1266 1519
506 780 1013 1266 1519
1519

THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20C ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20C SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXIING TO THE HOLDING POINT FOR DEPARTURE.

INITIAL CLIMB
3000FT OR AS DIRECTED BY ATC
ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO
ALL SIDS INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

RWY 20C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
5% V/V (fpm)
3.3% V/V (fpm)

75 100 150 200 250 300
150 200 250 300
300

GND SPEED - METRES PER MINUTE
380 506 780 1013 1266 1519
506 780 1013 1266 1519
1519

THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20C ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20C SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXIING TO THE HOLDING POINT FOR DEPARTURE.

INITIAL CLIMB
3000FT OR AS DIRECTED BY ATC
ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO
ALL SIDS INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

RWY 20C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
5% V/V (fpm)
3.3% V/V (fpm)

75 100 150 200 250 300
150 200 250 300
300

GND SPEED - METRES PER MINUTE
380 506 780 1013 1266 1519
506 780 1013 1266 1519
1519

THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20C ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20C SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXIING TO THE HOLDING POINT FOR DEPARTURE.
## BAVUS 1A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

### Formal & Abbreviated Descriptions

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<td>TOKIM [M023; A020+; K230; R] - DOKTA [A040+; R] - DOGRA [A060-; R] - DOSNO [L] - VENPA [L] - ATKAX [L] - BAVUS</td>
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## BAVUS 1B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS

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## RADIO COMMUNICATIONS FAILURE PROCEDURE

1. **SET TRANSPONDER TO MODE A/C CODE 7600**
2. **COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:**
   - **RWY 02C** - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   - **RWY 20C** - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
STANDARD DEPARTURE CHART
RNAV (GNSS) - INSTRUMENT (SID)

GENERAL INFORMATION

**INITIAL CLimb**
3000ft or as directed by ATC

ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

**RWY 02L**
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

**RWY 20R**
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
3% V/V (fpm) 3.3% V/V (fpm)
75 100 150 200 250 300
251 334 501 668 835 1003

THE RESTRICTION TO CROSS SUNVA AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20R SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.

**RWY 02L**
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.

**INITIAL CLimb**
3000ft or as directed by ATC

ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

**RWY 02L**
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

**RWY 20R**
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
3% V/V (fpm) 3.3% V/V (fpm)
75 100 150 200 250 300
251 334 501 668 835 1003

THE RESTRICTION TO CROSS SUNVA AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20R SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.
RAF SINGAPORE

BAVUS 1E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

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<tr>
<td>To TOPOM on course 023° at or above 2000ft, speed 230kts, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To ATKAX, turn left. To BAVUS.</td>
<td>TOPOM [M023; A020+; K230; R] - DOKTA [A040+; R] - DOGRA [A060-; R] - DOSNO [L] - VENPA [L] - ATKAX [L] - BAVUS</td>
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BAVUS 1F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600
2. COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:
   RWY 02L - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   RWY 20L - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
STANDARD DEPARTURE CHART
RNAV (GNSS) - INSTRUMENT (SID)

GENERAL INFORMATION

INITIAL CLIMB
3000FT OR AS DIRECTED BY ATC
ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO
ALL SIDS INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

RWY 20C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
5% V/V (fpm) 75 100 150 200 250 300
3.3% V/V (fpm) 380 506 760 1013 1266 1519

THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20C ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20C SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.

INITIAL CLIMB
3000FT OR AS DIRECTED BY ATC
ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO
ALL SIDS INCLUDE NOISE PREFERENTIAL ROUTES.

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CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

RWY 20C
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CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
5% V/V (fpm) 75 100 150 200 250 300
3.3% V/V (fpm) 380 506 760 1013 1266 1519

THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
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INITIAL CLIMB
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ALL SIDS INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

RWY 20C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
5% V/V (fpm) 75 100 150 200 250 300
3.3% V/V (fpm) 380 506 760 1013 1266 1519

THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20C ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20C SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.

INITIAL CLIMB
3000FT OR AS DIRECTED BY ATC
ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO
ALL SIDS INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

RWY 20C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
5% V/V (fpm) 75 100 150 200 250 300
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THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
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IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20C SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.

INITIAL CLIMB
3000FT OR AS DIRECTED BY ATC
ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO
ALL SIDS INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

RWY 20C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
5% V/V (fpm) 75 100 150 200 250 300
3.3% V/V (fpm) 380 506 760 1013 1266 1519

THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20C ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20C SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.
### KADAR 1A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

#### Formal & Abbreviated Descriptions

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<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
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</thead>
<tbody>
<tr>
<td>To TOKIM on course 023° at or above 2000ft, speed 230kts, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To ATKAX, turn right. To KADAR.</td>
<td>TOKIM [M023; A020+; K230; R] - DOKTA [A040+; R] - DOGRA [A060-; R] - DOSNO [L] - VENPA [L] - ATKAX [R] - KADAR</td>
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#### Tabular Descriptions

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<th>Waypoint Name</th>
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<th>Course °M(°T)</th>
<th>Magnetic Variation</th>
<th>Turn Direction</th>
<th>Altitude</th>
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<th>Navigation Spec</th>
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### KADAR 1B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS

#### Formal & Abbreviated Descriptions

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<td>To SUDPO on course 203° at or above 2000ft, speed 230kts. To SUGAM, speed 230kts, turn left. To SAPTI. To SASGA at or above 4000ft. To BTM. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To ATKAX, turn right. To KADAR.</td>
<td>SUDPO [M203; A020+; K230] - SUGAM [K230; L] - SAPTI - SASGA [A040+] - BTM - DOGRA [A060-; R] - DOSNO [L] - VENPA [L] - ATKAX [R] - KADAR</td>
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#### Tabular Descriptions

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### RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600
2. COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:
   - RWY 02C - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   - RWY 20C - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
STANDARD DEPARTURE CHART
RNAV (GNSS) -
INSTRUMENT (SID)

ELEV. ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 26E (2015)

DISTANCES IN NM
NOTE: RADAR REQUIRED
NOTE: ACFT UNABLE TO FLY THE SID
PROFILE SHALL INFORM ATC
PRIOR TO DEPARTURE AND TO
EXPECT RADAR VECTORING,
IF NECESSARY
NOTE: RNAV-1 NAVIGATION SPECIFICATION
GNSS REQUIRED
NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

GENERAL INFORMATION
INITIAL CLIMB
3000FT OR AS DIRECTED BY ATC

ON INITIAL CONTACT WHEN REQUESTING ATC,
INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT
CAN CROSS ANITO
ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02L
IAS 230KT UNTIL PASSING 4000FT AND
IAS 250KT UNTIL PASSING 10000FT.
CRUSING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

RWY 20R
IAS 230KT UNTIL PASSING 4000FT AND
IAS 250KT UNTIL PASSING 10000FT.
CRUSING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%

GND SPEED - KNOTS
5% V/V (fpm)
3.3% V/V (fpm)

75 100 150 200 250 300
251 334 501 668 835 1003

ALL DEPARTURE AIRCRAFT ON RWY 20R ISSUED WITH HEADING
INSTRUCTIONS BY ATC SHALL ALSO CROSS DME VTK AT OR
ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE
PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20R
SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT
COMMENCES TAXIING TO THE HOLDING POINT FOR DEPARTURE.

INITIAL CLimb
3000FT OR AS DIRECTED BY ATC
ON INITIAL CONTACT WHEN REQUESTING ATC,
INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT
CAn CROSS ANITO
ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RwY 02L
IAS 230KT UNTIL PASSING 4000FT AND
IAS 250KT UNTIL PASSING 10000FT.
CRUSING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

RwY 20R
IAS 230KT UNTIL PASSING 4000FT AND
IAS 250KT UNTIL PASSING 10000FT.
CRUSING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5%
UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%

GND SPEED - KNOTS
5% V/V (fpm)
3.3% V/V (fpm)

75 100 150 200 250 300
251 334 501 668 835 1003

ALL DEPARTURE AIRCRAFT ON RWY 20R ISSUED WITH HEADING
INSTRUCTIONS BY ATC SHALL ALSO CROSS DME VTK AT OR
ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE
PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20R
SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT
COMMENCES TAXIING TO THE HOLDING POINT FOR DEPARTURE.
# KADAR 1E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

## Formal & Abbreviated Descriptions

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<th>Fly-Over required</th>
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<tbody>
<tr>
<td>To TOPOM on course 023° at or above 2000ft, speed 230kts, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To ATKAX, turn right. To KADAR.</td>
<td>TOPOM [M023; A020+; K230; R] - DOKTA [A040+; R] - DOGRA [A060-; R] - DOSNO [L] - VENPA [L] - ATKAX [R] - KADAR</td>
<td>CF</td>
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<th>Navigation Spec</th>
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## KADAR 1F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

## Formal & Abbreviated Descriptions

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<td>To SUNVA on course 203° at or above 2000ft, speed 230kts. To SUNGO, speed 230kts, turn left. To SAPTI. To SASGA at or above 4000ft. To BTM. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To ATKAX, turn right. To KADAR.</td>
<td>SUNVA [M203; A020+; K230] - SUNGO [K230; L] - SASGA [A040+] - BTM - DOGRA [A060-; R] - DOSNO [L] - VENPA [L] - ATKAX [R] - KADAR</td>
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## RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. **COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:**

   **RWY 02L** - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

   **RWY 20L** - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
STANDARD DEPARTURE CHART
RNAV (GNSS) - INSTRUMENT (SID)

ELEV. ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)
DISTANCES IN NM

NOTE: RADAR REQUIRED
NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND TO EXPECT RADAR VECTORYING, IF NECESSARY
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

GENERAL INFORMATION
INITIAL CLimb
3000FT OR AS DIRECTED BY ATC
ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLimb GRADIENT CRITERIA.

RWY 20C
IAS 230KTS UNTIL SASGA AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLimb GRADIENT OF 5% UNTIL REACHING OR PASSING 4000FT, THEREAFTER 3.3%.

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

THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20C ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS B DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20C SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.

RSWY 02C (DER)
01° 21’52”N 104°00’00”E

RSWY 20C (DER)
01° 19’35”N 103°59’02”E

SINGAPORE/Singapore Changi
RWY 02C/20C
MASBO DEPARTURES
MASBO 2A (R02C)
MASBO 2B (R20C)

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

CIVIL AVIATION AUTHORITY
SINGAPORE
### MASBO 2A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

**Formal & Abbreviated Descriptions**

<table>
<thead>
<tr>
<th>Formal Description</th>
<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
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</thead>
<tbody>
<tr>
<td>To TOKIM on course 023° at or above 2000ft, speed 230kts, turn left. To AKOMA at or above 7000ft, turn left. To AGVAR at or above 11000ft. To SABKA, turn right. To MASBO.</td>
<td>TOKIM [M023; A020+; K230; L] - AKOMA [A070+; L] - AGVAR [A110+] - SABKA [R] - MASBO</td>
<td>CF</td>
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**Tabular Descriptions**

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<thead>
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<th>Path Term</th>
<th>Waypoint Name</th>
<th>Fly-Over Course °M(°T)</th>
<th>Magnetic Variation</th>
<th>Turn Direction</th>
<th>Altitude</th>
<th>Speed Limit</th>
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### MASBO 2B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS

**Formal & Abbreviated Descriptions**

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<th>Navigation Spec</th>
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### RADIO COMMUNICATIONS FAILURE PROCEDURE

1. **SET TRANSPONDER TO MODE A/C CODE 7600**
2. **COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:**
   - **RWY 02C** - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   - **RWY 20C** - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
STANDARD DEPARTURE CHART
RNAV (GNSS) - INSTRUMENT (SID)

NOTE: RADAR REQUIRED
NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND TO EXPECT RADAR VECTORING, IF NECESSARY
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
NOTE: REFER TO BACK PAGE FOR - FORMAL AND TABULAR DESCRIPTIONS - RADIO COM FAILURE PROCEDURES

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26'E (2015)

DISTANCES IN NM

GENERAL INFORMATION

INITIAL CLimb
3000FT OR AS DIRECTED BY ATC
ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02L
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR. SEE (ENR 1.5-4) FOR MINIMUM CLimb GRADIENT CRITERIA.

RWY 20R
IAS 230KTS UNTIL SASGA AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLimb GRADIENT OF 5% UNTIL REACHING OR PASSING 4000FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
5% V/V (fpm)
380 506 760 1013 1266 1519
3.3% V/V (fpm)
251 334 501 668 835 1003

THE RESTRICTION TO CROSS SUNVA AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20R ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS B DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20R SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.
### MASBO 2E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

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<tbody>
<tr>
<td>To TOPOM on course 023° at or above 2000ft, speed 230kts, turn left. To ATRUM. To AKOMA at or above 7000ft, turn left. To AGVAR at or above 11000ft. To SABKA, turn right. To MASBO.</td>
<td>TOPOM [M023; A020+; K230; L] - ATRUM - AKOMA [A070+; L] - AGVAR [A110+] - SABKA [R] - MASBO</td>
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<td>-</td>
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<td>-</td>
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### MASBO 2F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

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<td>K230</td>
<td>RNAV1</td>
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<td>K230</td>
<td>RNAV1</td>
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<td>RNAV1</td>
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### RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600
2. COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:
   - RWY 02L - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   - RWY 20R - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
ELEV. ALT IN FEET
BEARINGS, TRACKS AND RADIANS ARE MAGNETIC
VAR 26'E (2015)
DISTANCES IN NM
NOTE: RADAR REQUIRED
NOTE: ACFT UNABLE TO FLY THE SID PROFILE SHALL INFORM ATC PRIOR TO DEPARTURE AND TO EXPECT RADAR VECTORED. IF NECESSARY
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
NOTE: REFER TO BACK PAGE FOR - FORMAL AND TABULAR DESCRIPTIONS - RADIO COM FAILURE PROCEDURES

GENERAL INFORMATION
INITIAL CLIMB
3000FT OR AS DIRECTED BY ATC
ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C
IAS 230kts until passing 400ft and IAS 250kts until passing 1000ft. Cruising levels will be issued after take-off by SINGAPORE RADAR. See (ENR 1.6-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

RWY 20C
IAS 230kts until passing 400ft and IAS 250kts until passing 1000ft. Cruising levels will be issued after take-off by SINGAPORE RADAR. DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

GND SPEED - KNOTS

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<tbody>
<tr>
<td>5% V/V (fpm)</td>
<td>380</td>
<td>506</td>
<td>760</td>
<td>1013</td>
<td>1266</td>
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<td>3.3% V/V (fpm)</td>
<td>251</td>
<td>334</td>
<td>501</td>
<td>668</td>
<td>835</td>
<td>1003</td>
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THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC. ALL DEPARTURE AIRCRAFT ON RWY 20C ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC. IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20C SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXIING TO THE HOLDING POINT FOR DEPARTURE.

INITIAL CLIMB
3000FT OR AS DIRECTED BY ATC
ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C
IAS 230kts until passing 400ft and IAS 250kts until passing 1000ft. Cruising levels will be issued after take-off by SINGAPORE RADAR. See (ENR 1.6-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

RWY 20C
IAS 230kts until passing 400ft and IAS 250kts until passing 1000ft. Cruising levels will be issued after take-off by SINGAPORE RADAR. DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

GND SPEED - KNOTS

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<tr>
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<th>75</th>
<th>100</th>
<th>150</th>
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<tr>
<td>5% V/V (fpm)</td>
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<td>506</td>
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<td>668</td>
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<td>1003</td>
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THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC. ALL DEPARTURE AIRCRAFT ON RWY 20C ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC. IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20C SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXIING TO THE HOLDING POINT FOR DEPARTURE.
### TOMAN 2A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

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<tbody>
<tr>
<td>To TOKIM on course 023° at or above 2000ft, speed 230kts, turn right. To DOKTA at or above 4000ft. To HOSBA at or above 7000ft, turn left. To TOMAN.</td>
<td>TOKIM [M023; A020+; K230; R] - DOKTA [A040+] - HOSBA [A070+; L] - TOMAN</td>
<td>CF</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TF</td>
<td>N</td>
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<tr>
<td></td>
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<th>Speed Limit</th>
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<tr>
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### TOMAN 2B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS

#### Formal & Abbreviated Descriptions

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<thead>
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<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
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<tbody>
<tr>
<td>To SUDPO on course 203° at or above 2000ft, speed 230kts. To SUGAM, speed 230kts, turn left. To SAPTI. To SASGA at or above 4000ft. To BTM. To DOGRA at or below 6000ft, turn left. To RUVIK at or below 7000ft. To HOSBA at or above 7000ft, turn right. To TOMAN.</td>
<td>SUDPO [M203; A020+; K230] - SUGAM [K230; L] - SAPTI - SASGA [A040+] - BTM - DOGRA [A060-; L] - RUVIK [A070-] - HOSBA [A070+; R] - TOMAN</td>
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### RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600
2. COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:
   - RWY 02C - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   - RWY 20C - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
TOMAN DEPARTURES
TOMAN 2E (R02L)
TOMAN 2F (R20R)

INITIAL CLimb
3000FT OR AS DIRECTED BY ATC

ALL SIDs INCLUDE NOISE PREFERRED ROUTES.

RWY 02L
IAS 230KTS UNTIL PASSING 400FT AND
IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.

See [ENR 1.5-4] FOR MINIMUM CLimb GRADIENT CRITERIA.

RWY 20R
IAS 230KTS UNTIL PASSING 400FT AND
IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF
BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLimb GRADIENT OF 5%
UNTIL REACHING OR PASSING 400FT, THEREAFTER 3.3%.

GROUND SPEED - KNOTS

V/V (fpm)

5% V/V (fpm) 380 506 760 1013 1266 1519
3.3% V/V (fpm) 251 334 501 668 835 1003

THE RESTRICTION TO CROSS SUNVA AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20R ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.

IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20R SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXIING TO THE HOLDING POINT FOR DEPARTURE.

SUNGO
01° 17' 56" N
103° 45' 22" E

SUNVA
01° 17' 56" N
104° 01' 20" E

2000FT

TOMAN
01° 21' 47" N
105° 47' 17" E

DORTA
01° 28' 55" N
104° 10' 46" E

DOGRA
01° 05' 25" N
104° 14' 23" E

RUVIK
01° 14' 22" N
104° 20' 33" E

SASGA
01° 10' 37" N
103° 55' 32" E

DOGRA
01° 02' 25" N
104° 14' 23" E

DORTA
01° 28' 55" N
104° 10' 46" E

TEKONG
DVOR/DME 116.5
VKI 350°
01° 24' 55" N
104° 01' 20" E

SUNGO
01° 13' 38" N
103° 55' 32" E

SUNVA
01° 17' 56" N
103° 45' 22" E

DORTA
01° 28' 55" N
104° 10' 46" E

DOGRA
01° 05' 25" N
104° 14' 23" E

RUVIK
01° 14' 22" N
104° 20' 33" E

SASGA
01° 10' 37" N
103° 55' 32" E

COMING FROM GIRANDOPEE
01° 19' 48" N
104° 24' 18" E

SUNVA
01° 17' 56" N
104° 01' 20" E

DOGRA
01° 02' 25" N
104° 14' 23" E

RUVIK
01° 14' 22" N
104° 20' 33" E

SASGA
01° 10' 37" N
103° 55' 32" E

BTM
01° 08' 13" N
104° 01' 28" E

D-ATIS APID-WSSS
128.6

SUNGO
01° 13' 38" N
103° 55' 32" E

SUNVA
01° 17' 56" N
103° 45' 22" E

TOMAN 2E (R02L)
TOMAN 2F (R20R)

NOT TO SCALE

CIVIL AVIATION AUTHORITY
SINGAPORE
### TOMAN 2E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

#### Formal & Abbreviated Descriptions

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<td>To TOPOM on course 023° at or above 2000ft, speed 230kts, turn right. To DOKTA at or above 4000ft. To HOSBA at or above 7000ft, turn left. To TOMAN.</td>
<td>TOPOM [M023; A020+; K230; R] - DOKTA [A040+] - HOSBA [A070+; L] - TOMAN</td>
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### TOMAN 2F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

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<td>To SUNVA on course 203° at or above 2000ft, speed 230kts. To SUNGO, speed 230kts, turn left. To SASGA at or above 4000ft. To BTM. To DOGRA at or below 6000ft, turn left. To RUVIK at or below 7000ft. To HOSBA at or above 7000ft, turn right. To TOMAN.</td>
<td>SUNVA [M203; A020+; K230] - SUNGO [K230; L] - SASGA [A040+] - BTM - DOGRA [A060-; L] - RUVIK [A070-] - HOSBA [A070+; R] - TOMAN</td>
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### RADIO COMMUNICATIONS FAILURE PROCEDURE

1. **SET TRANSPONDER TO MODE A/C CODE 7600**
2. **COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:**
   - **RWY 02L** - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   - **RWY 20R** - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
SINGAPORE/Singapore Changi RWY 02C/20C VENIX DEPARTURES VENIX 1A (R02C) VENIX 1B (R20C)

**ELEV, ALT IN FEET**
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)

**DISTANCES IN NM**

**NOTE:** RADAR REQUIRED

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

**NOTE:** RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

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**GENERAL INFORMATION**

**INITIAL CLimb**
3000ft or as directed by ATC

ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

**RWY 02C**
IAS 230KTS until passing 4000ft and IAS 250KTS until passing 10000ft.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

**RWY 20C**
IAS 230KTS until passing 4000ft and IAS 250KTS until passing 10000ft.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 4000ft, THEREAFTER 3.3%.

GND SPEED - KNOTS
5% V/V (fpm)
3.3% V/V (fpm)

75 100 150 200 250 300

380 506 780 1013 1266 1519

251 334 501 668 835 1003

THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000ft IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20C ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS 8 DME VTK AT OR ABOVE 2000ft BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20C SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.

**INITIAL CLimb**
3000ft or as directed by ATC

ON INITIAL CONTACT WHEN REQUESTING ATC, INFORM ATC OF THE FLIGHT LEVEL AIRCRAFT CAN CROSS ANITO

ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

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VENIX 1A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

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<td>To TOKIM on course 023° at or above 2000ft, speed 230kts, turn right. To DOKTA at or above 4000ft, turn right. To DOGRA at or below 6000ft, turn right. To DOSNO, turn left. To VENPA, turn left. To VENIX, turn left. To SURGA.</td>
<td>TOKIM [M023; A020+; K230; R] - DOKTA [A040+; R] - DOGRA [A060-; R] - DOSNO [L] - VENPA [L] - VENIX [L] - SURGA</td>
<td>CF</td>
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VENIX 1B (SID) RNAV GNSS RWY 20C - DESCRIPTIONS

Formal & Abbreviated Descriptions

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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:

   RWY 02C - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.

   RWY 20C - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
SINGAPORE/Singapore Changi
RWY 02L/20R
VENIX DEPARTURES
VENIX 1E (R02L)
VENIX 1F (R20R)

TRANSACTION ALTITUDE 11 000ft

GENERAL INFORMATION

INITIAL CLimb
3000ft or as directed by ATC

On initial contact when requesting ATC, inform ATC of the flight level aircraft can cross ANTO.
All SIDs include Noise Preferential Routes.

RWY 02L
IAS 230kts until passing 4000ft and
IAS 250kts until passing 10000ft.
Cruising levels will be issued after take-off by Singapore Radar.
See (ENR 1.5-4) for Minimum Climb Gradient Criteria.

RWY 20R
IAS 230kts until passing 4000ft and
IAS 250kts until passing 10000ft.
Cruising levels will be issued after take-off by Singapore Radar.
Departures shall be on a minimum net climb gradient of 5% until reaching or passing 400ft, thereafter 3.3%.

GND SPEED - KNOTS
3% V/V (fpm)
75 100 150 200 250 300
1.3% V/V (fpm)
251 334 501 668 835 1003

The restriction to cross Sunva at or above 2000ft is applicable between 0001/1100 UTC.
All departure aircraft on RWY 20R issued with heading instructions by ATC shall also cross 8 DME VTK at or above 2000ft 2301/1100 UTC.
If the height restriction cannot be complied with, the Pilot-In-Command of an aircraft departure on RWY 20R shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure.

Initial Climb
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GENERAL INFORMATION

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RWY 02L
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Cruising levels will be issued after take-off by Singapore Radar.
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RWY 20R
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### VENIX 1E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

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<td>TOPOM [M023; A020+; K230; R] - DOKTA [A040+; R] - DOGRA [A060-; R] - DOSNO [L] - VENPA [L] - VENIX [L] - SURGA</td>
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### VENIX 1F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

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### RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600
2. COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:
   - RWY 02L - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   - RWY 20L - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
STANDARD DEPARTURE CHART
RNAV (GNSS) - INSTRUMENT (SID)

SINGAPORE/Singapore Changi
RWY 02C/20C
MERSING DEPARTURES
VMR 5A (R02C)
VMR 6B (R20C)

ELEV. ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26'E (2015)

DISTANCES IN NM
NOTE: RADAR REQUIRED

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

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

GENERAL INFORMATION
INITIAL CLimb
3000FT OR AS DIRECTED BY ATC
ALL SIDs INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02C
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE [ENR 1.5-4] FOR MINIMUM CLimb GRADIENT CRITERIA.

RWY 20C
IAS 230KTS UNTIL SASGA AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLimb GRADIENT OF 5% UNTIL REACHING OR PASSING 4000FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
5% V/V (fpm) 380 506 760 1013 1266 1519
3.3% V/V (fpm) 251 334 501 668 835 1003

THE RESTRICTION TO CROSS SUDPO AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20C ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS B DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20C SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.

CIVIL AVIATION AUTHORITY
SINGAPORE
VMR 5A (SID) RNAV GNSS RWY 02C - DESCRIPTIONS

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<td>TOKIM [M023; A020+; K230; L] - AKOMA [A070+; R] - VMR</td>
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<td>SASGA</td>
<td>-</td>
<td>113(113.3)</td>
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<td>A040+</td>
<td>K230</td>
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<td>-</td>
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<td>-0.5</td>
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<td>RNAV1</td>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:
   - RWY 02C - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   - RWY 20C - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
STANDARD DEPARTURE CHART
RNAV (GNSS) - INSTRUMENT (SID)

ELEV. ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)

DISTANCES IN NM
NOTE: RADAR REQUIRED

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

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

GENERAL INFORMATION

INITIAL CLIMB
3000FT OR AS DIRECTED BY ATC

ALL SIDS INCLUDE NOISE PREFERENTIAL ROUTES.

RWY 02L
IAS 230KTS UNTIL PASSING 4000FT AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
SEE (ENR 1.5-4) FOR MINIMUM CLIMB GRADIENT CRITERIA.

RWY 20R
IAS 230KTS UNTIL SASGA AND IAS 250KTS UNTIL PASSING 10000FT.
CRUISING LEVELS WILL BE ISSUED AFTER TAKE-OFF BY SINGAPORE RADAR.
DEPARTURES SHALL BE ON A MINIMUM NET CLIMB GRADIENT OF 5% UNTIL REACHING OR PASSING 4000FT, THEREAFTER 3.3%.

GND SPEED - KNOTS
5% V/V (fpm) 250 300
5% V/V (fpm) 250 300
3.3% V/V (fpm) 250 300

THE RESTRICTION TO CROSS SUNVA AT OR ABOVE 2000FT IS APPLICABLE BETWEEN 2301/1100 UTC.
ALL DEPARTURE AIRCRAFT ON RWY 20R ISSUED WITH HEADING INSTRUCTIONS BY ATC SHALL ALSO CROSS B DME VTK AT OR ABOVE 2000FT BTN 2301/1100 UTC.
IF THE HEIGHT RESTRICTION CANNOT BE COMPLIED WITH, THE PILOT-IN-COMMAND OF AN AIRCRAFT DEPARTURE ON RWY 20R SHALL INFORM ATC DURING THE TIME WHEN THE AIRCRAFT COMMENCES TAXING TO THE HOLDING POINT FOR DEPARTURE.

CIVIL AVIATION AUTHORITY
SINGAPORE

APPENDIX A-18
### VMR 5E (SID) RNAV GNSS RWY 02L - DESCRIPTIONS

#### Formal & Abbreviated Descriptions

<table>
<thead>
<tr>
<th>Formal Description</th>
<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
</tr>
</thead>
<tbody>
<tr>
<td>To TOPOM on course 023° at or above 2000ft, speed 230kts, turn left. To ATRUM. To AKOMA at or above 7000ft, turn right. To VMR.</td>
<td>TOPOM [M023; A020+; K230; L] - ATRUM - AKOMA [A070+; R] - VMR</td>
<td>CF</td>
<td>N</td>
</tr>
</tbody>
</table>

#### Tabular Descriptions

<table>
<thead>
<tr>
<th>Path Term</th>
<th>Waypoint Name</th>
<th>Fly-Over</th>
<th>Course °M(°T)</th>
<th>Magnetic Variation</th>
<th>Turn Direction</th>
<th>Altitude</th>
<th>Speed Limit</th>
<th>Navigation Spec</th>
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<tbody>
<tr>
<td>CF</td>
<td>TOPOM</td>
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<td>023(022.5)</td>
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<td>RNAV1</td>
</tr>
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</table>

### VMR 6F (SID) RNAV GNSS RWY 20R - DESCRIPTIONS

#### Formal & Abbreviated Descriptions

<table>
<thead>
<tr>
<th>Formal Description</th>
<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
</tr>
</thead>
</table>

#### Tabular Descriptions

<table>
<thead>
<tr>
<th>Path Term</th>
<th>Waypoint Name</th>
<th>Fly-Over</th>
<th>Course °M(°T)</th>
<th>Magnetic Variation</th>
<th>Turn Direction</th>
<th>Altitude</th>
<th>Speed Limit</th>
<th>Navigation Spec</th>
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</thead>
<tbody>
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<td>203(202.5)</td>
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<td>SUNGO</td>
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<td>203(202.5)</td>
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<td>K230</td>
<td>RNAV1</td>
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<tr>
<td>TF</td>
<td>SASGA</td>
<td>-</td>
<td>113(113.3)</td>
<td>-0.5</td>
<td>L</td>
<td>A040+</td>
<td>K230</td>
<td>RNAV1</td>
</tr>
<tr>
<td>TF</td>
<td>SUKOK</td>
<td>-</td>
<td>023(023.6)</td>
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<tr>
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<td>AKOMA</td>
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<td>TF</td>
<td>VMR</td>
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<td>356(355.5)</td>
<td>-0.5</td>
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</table>

### RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600
2. COMMUNICATIONS FAILURE OCCURS IMMEDIATELY AFTER DEPARTURE ON:
   - RWY 02L - PROCEED STRAIGHT AHEAD TO NYLON HOLDING AREA (NHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
   - RWY 20R - PROCEED STRAIGHT AHEAD TO SAMKO HOLDING AREA (SHA) CLIMBING TO THE LAST ASSIGNED ALTITUDE, THEREAFTER REFER TO SINGAPORE AIP ON RADIO COMMUNICATIONS FAILURE PROCEDURE.
FOR ILS APPROACH RWY 02
EXPECT RADAR VECTORS
RADAR ROUTE
A040 - F140
Max 220kts (IAS)
1 min
A060 - F180
Max 220kts (IAS)
1 min

ARAMA
01° 36' 54" N
103° 07' 12" E
IAS 250kts

BOBAG
01° 02' 30" N
103° 29' 54" E
Cross 10,000ft or abv
IAS 220kts

SAMKO
01° 00' 20" N
103° 52' 50" E
Cross 4000ft or abv
IAS 190kts

BOKIP
01° 00' 21" N
103° 43' 53" E
Cross 6000ft or abv

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

NOTE:
RADAR REQUIRED
NOTE:
RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
NOTE:
REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 26°E (2015)
DISTANCES IN NM

CIVIL AVIATION AUTHORITY
SINGAPORE
**ARAMA 1A (STAR) RNAV GNSS RWY 02L/02C - DESCRIPTIONS**

**Formal & Abbreviated Descriptions**

<table>
<thead>
<tr>
<th>Formal Description</th>
<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
</tr>
</thead>
<tbody>
<tr>
<td>From ARAMA, speed 250kts. To BOBAG at or above 10000ft, speed 220kts, turn left. To BOKIP at or above 6000ft. To SAMKO at or above 4000ft, speed 190kts.</td>
<td>ARAMA [K250] - BOBAG [A100+; K220; L] - BOKIP [A060+] - SAMKO [A040+; K190]</td>
<td>TF</td>
<td>N</td>
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**Tabular Descriptions**

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<thead>
<tr>
<th>Path Term</th>
<th>Waypoint Name</th>
<th>Fly-Over</th>
<th>Course °M(°T)</th>
<th>Magnetic Variation</th>
<th>Turn Direction</th>
<th>Altitude</th>
<th>Speed Limit</th>
<th>Navigation Spec</th>
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<td>BOBAG</td>
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<td>A100+</td>
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**RADIO COMMUNICATIONS FAILURE PROCEDURE**

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via ARAMA 1A by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on ARAMA 1A to SAMKO
   (b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure
When Runway 20 at Singapore Changi Airport is in use, arrivals from west within 120 DME SJ are to request for the STAR from Singapore ATC on PRI freq 133.25MHz or SEC freq 135.8MHz. Flight shall still remain under the control of WMKK ATC.
### ARAMA 1B (STAR) RNAV GNSS RWY 20R/20C - DESCRIPTIONS

#### Formal & Abbreviated Descriptions

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<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
</tr>
</thead>
<tbody>
<tr>
<td>From ARAMA, speed 250kts. To BOBAG at or above 10000ft, speed 220kts, turn left. To SAMKO. To BTM at or above 7000ft, speed 220kts, turn left. To DOVAN at or above 4000ft, turn left. To BIPOP at or above 3000ft, speed 190kts.</td>
<td>ARAMA [K250] - BOBAG [A100+; K220; L] - SAMKO - BTM [A070+; K220; L] - DOVAN [A040+; L] - BIPOP [A030+; K190]</td>
<td>IF</td>
<td>N</td>
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#### Tabular Descriptions

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<th>Turn Direction</th>
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<th>Navigation Spec</th>
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<tbody>
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<td>IF</td>
<td>ARAMA</td>
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<td>A100+</td>
<td>K220</td>
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<tr>
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<td>SAMKO</td>
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<td>-0.5</td>
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<tr>
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<td>DOVAN</td>
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<td>RNAV1</td>
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<tr>
<td>TF</td>
<td>BIPOP</td>
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<td>347(347.8)</td>
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<td>A030+</td>
<td>K190</td>
<td>RNAV1</td>
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#### RADIO COMMUNICATIONS FAILURE PROCEDURE

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<th>1</th>
<th>SET TRANSPONDER TO MODE A/C CODE 7600</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td><strong>When cleared via ARAMA 1B by Singapore ATC</strong></td>
</tr>
<tr>
<td></td>
<td>(a) Maintain last assigned flight level or altitude and proceed on ARAMA 1B to BIPOP, then direct to NYLON</td>
</tr>
<tr>
<td></td>
<td>(b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA</td>
</tr>
<tr>
<td></td>
<td>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</td>
</tr>
<tr>
<td>3</td>
<td><strong>No clearance or instruction received from Singapore ATC</strong></td>
</tr>
<tr>
<td></td>
<td>- Refer to Singapore AIP for radio communications failure procedure</td>
</tr>
</tbody>
</table>
FOR ILS APPROACH RWY 02
EXPECT RADAR VECTORS

RADAR ROUTE
A040 - F140
Max 220kts (IAS) 1 min

A060 - F180
Max 220kts (IAS) 1 min

TRANSITION ALTITUDE
11,000 ft

D-ATIS AP ID-WSSS
128.6

ASUNA ONE ALPHA ARRIVAL
ASUNA 1A

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)

DISTANCES IN NM

NOTE: RN0.25 CHANGI
SINGAPORE RWY 02L/C

NOTE: FORMAL AND TABULAR DESCRIPTIONS
NOTE: RADIO COM FAILURE PROCEDURES

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

SINGAPORE/Singapore Changi

AIP
SINGAPORE

CIVIL AVIATION AUTHORITY
SINGAPORE

TRANSITION ALTITUDE
11,000 ft

ACC 133.25
APP 124.6 / 120.3
ARR 119.3
TWR 118.8 / 118.25

D-ATIS AP ID-WSSS
128.6

ASUNA ONE ALPHA ARRIVAL
ASUNA 1A

NOTE: RN0.25 CHANGI
SINGAPORE RWY 02L/C

NOTE: FORMAL AND TABULAR DESCRIPTIONS
NOTE: RADIO COM FAILURE PROCEDURES

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

SINGAPORE/Singapore Changi

AIP
SINGAPORE

CIVIL AVIATION AUTHORITY
SINGAPORE

TRANSITION ALTITUDE
11,000 ft

ACC 133.25
APP 124.6 / 120.3
ARR 119.3
TWR 118.8 / 118.25

D-ATIS AP ID-WSSS
128.6

ASUNA ONE ALPHA ARRIVAL
ASUNA 1A

NOTE: RADAR REQUIRED

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- RADIO COM FAILURE PROCEDURES

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)

DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
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- RADIO COM FAILURE PROCEDURES

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

SINGAPORE/Singapore Changi

AIP
SINGAPORE

CIVIL AVIATION AUTHORITY
SINGAPORE

TRANSITION ALTITUDE
11,000 ft

ACC 133.25
APP 124.6 / 120.3
ARR 119.3
TWR 118.8 / 118.25

D-ATIS AP ID-WSSS
128.6

ASUNA ONE ALPHA ARRIVAL
ASUNA 1A

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)

DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

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

SINGAPORE/Singapore Changi

AIP
SINGAPORE

CIVIL AVIATION AUTHORITY
SINGAPORE

TRANSITION ALTITUDE
11,000 ft

ACC 133.25
APP 124.6 / 120.3
ARR 119.3
TWR 118.8 / 118.25

D-ATIS AP ID-WSSS
128.6

ASUNA ONE ALPHA ARRIVAL
ASUNA 1A

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)

DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

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

SINGAPORE/Singapore Changi

AIP
SINGAPORE

CIVIL AVIATION AUTHORITY
SINGAPORE

TRANSITION ALTITUDE
11,000 ft

ACC 133.25
APP 124.6 / 120.3
ARR 119.3
TWR 118.8 / 118.25

D-ATIS AP ID-WSSS
128.6

ASUNA ONE ALPHA ARRIVAL
ASUNA 1A

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)

DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

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

SINGAPORE/Singapore Changi

AIP
SINGAPORE

CIVIL AVIATION AUTHORITY
SINGAPORE

TRANSITION ALTITUDE
11,000 ft

ACC 133.25
APP 124.6 / 120.3
ARR 119.3
TWR 118.8 / 118.25

D-ATIS AP ID-WSSS
128.6

ASUNA ONE ALPHA ARRIVAL
ASUNA 1A

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)

DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

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

SINGAPORE/Singapore Changi

AIP
SINGAPORE

CIVIL AVIATION AUTHORITY
SINGAPORE

TRANSITION ALTITUDE
11,000 ft

ACC 133.25
APP 124.6 / 120.3
ARR 119.3
TWR 118.8 / 118.25

D-ATIS AP ID-WSSS
128.6

ASUNA ONE ALPHA ARRIVAL
ASUNA 1A

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)

DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

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

SINGAPORE/Singapore Changi

AIP
SINGAPORE

CIVIL AVIATION AUTHORITY
SINGAPORE

TRANSITION ALTITUDE
11,000 ft

ACC 133.25
APP 124.6 / 120.3
ARR 119.3
TWR 118.8 / 118.25

D-ATIS AP ID-WSSS
128.6

ASUNA ONE ALPHA ARRIVAL
ASUNA 1A

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES
ASUNA 1A (STAR) RNAV GNSS RWY 02L/02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

<table>
<thead>
<tr>
<th>Formal Description</th>
<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
</tr>
</thead>
<tbody>
<tr>
<td>From ARAMA, speed 250kts. To BOBAG at or above 10000ft, speed 220kts, turn left. To BOKIP at or above 6000ft. To SAMKO at or above 4000ft, speed 190kts.</td>
<td>ARAMA [K250] - BOBAG [A100+; K220; L] - BOKIP [A060+] - SAMKO [A040+; K190]</td>
<td>IF</td>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via ASUNA 1A by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on ASUNA 1A to SAMKO
   (b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure
FOR ILS APPROACH RWY 20
EXPECT RADAR VECTORS

083° BTM
01° 08' 13'' N
104° 07' 58'' E
Cross 7000ft or abv
IAS 220kts

083° BOBAG
01° 02' 30'' N
103° 29' 54'' E
Cross 10,000ft or abv
IAS 220kts

023° NYLON
01° 36' 57'' N
104° 06' 24'' E
Max 220kts (IAS)
1 min

15° NYLON
01° 36' 57'' N
104° 06' 24'' E

083° SAMKO
01° 05' 30'' N
103° 52' 55'' E
Cross 3000ft or abv
IAS 190kts

083° DOVAN
01° 19' 38'' N
104° 12' 49'' E
Cross 4000ft or abv

023° DOVAN
01° 19' 38'' N
104° 12' 49'' E

083° BIPOP
01° 31' 22'' N
104° 10' 18'' E
Cross 3000ft or abv
IAS 190kts

083° BIPOP
01° 31' 22'' N
104° 10' 18'' E

080° ASUNA
01° 02' 30'' N
103° 29' 54'' E

083° ASUNA
01° 02' 30'' N
103° 29' 54'' E
IAS 250kts

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES
ASUNA 1B (STAR) RNAV GNSS RWY 20R/20C - DESCRIPTIONS

Formal & Abbreviated Descriptions

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<tbody>
<tr>
<td>From ASUNA, speed 250kts. To BOBAG at or above 10000ft, speed 220kts. To SAMKO.</td>
<td>ASUNA [K250] - BOBAG [A100+; K220] -</td>
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<td>N</td>
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<td>To BTM at or above 7000ft, speed 220kts, turn left. To DOVAN at or above 4000ft, turn left. To BIPOP at or above 3000ft, speed 190kts.</td>
<td>SAMKO - BMT [A070+; K220; L] - DOVAN [A040+; L] - BIPOP [A030+; K190]</td>
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Tabular Descriptions

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<th>Altitude</th>
<th>Speed Limit</th>
<th>Navigation Spec</th>
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<td>DOVAN</td>
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<td>TF</td>
<td>BIPOP</td>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via ASUNA 1B by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on ASUNA 1B to BIPOP, then direct to NYLON
   (b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure
ELEV. ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)

DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

BIKTA
01°36'57" N
103°43'08" E

PIBAP
02°30'23" N
104°06'18" E
Cross FL210 or blw
IAS 250kts

PASPU
01°59'13" N
104°06'18" E
IAS 220kts

NYLON
01°36'57" N
104°06'24" E

SAMKO
01°05'30" N
103°52'55" E

SANAT
01°07'49" N
103°59'30" E
Cross 4000ft or abv
IAS 190kts

POSUB
01°27'25" N
104°03'48" E
Cross 6000ft or abv
IAS 220kts

A040 - F140
Max 220kts [IAS]
1 min

FOR ILS APPROACH RWY 02
EXPECT RADAR VECTORS

APPLE 133.8
APP 124.05 / 120.3
ARR 119.3
TWR 118.6 / 118.25

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6
BIKTA 1A (STAR) RNAV GNSS RWY 02L/02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

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<td>From BIKTA. To PIBAP at or below FL210, speed 250kts, turn right. To PASPU, speed 220kts. To NYLON, turn left. To POSUB at or above 6000ft, speed 220kts, turn right. To SANAT at or above 4000ft, speed 190kts.</td>
<td>BIKTA - PIBAP [FL210-; K250; R] - PASPU [K220] - NYLON [L] - POSUB [A060+; K220; R] - SANAT [A040+; K190]</td>
<td>IF</td>
<td>N</td>
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<tr>
<td></td>
<td></td>
<td>TF</td>
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<td>RNAV1</td>
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<td>-</td>
<td>A040+</td>
<td>K190</td>
<td>RNAV1</td>
</tr>
</tbody>
</table>

RADIO COMMUNICATIONS FAILURE PROCEDURE

| 1 | SET TRANSPONDER TO MODE A/C CODE 7600 |
| 2 | When cleared via BIKTA 1A by Singapore ATC |
|    | (a) Maintain last assigned flight level or altitude and proceed on BIKTA 1A to SANAT, then direct to SAMKO |
|    | (b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA |
|    | (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure |
| 3 | No clearance or instruction received from Singapore ATC |
|    | - Refer to Singapore AIP for radio communications failure procedure |
STANDARD ARRIVAL CHART
RNAV (GNSS) - INSTRUMENT (STAR)

BIKTA ONE BRAVO ARRIVAL

NOTE: RADAR REQUIRED
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

ELEV, ALT IN FEET
BEARINGS, TRACKS AND RADIALS ARE MAGNETIC
VAR 26°E (2015)

DISTANCES IN NM

CIVIL AVIATION AUTHORITY
SINGAPORE
BIKTA 1B (STAR) RNAV GNSS RWY 20R/02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

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<tr>
<td>From BIKTA. To PIBAP at or below FL210, speed 250kts, turn right. To PASPU, at or above 6000ft, speed 220kts. To NYLON at or above 3000ft, speed 190kts.</td>
<td>BIKTA - PIBAP [FL210-; K250; R] - PASPU [A060+; K220] - NYLON [A030+; K190]</td>
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<td>K190</td>
<td>RNAV1</td>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via BIKTA 1B by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on BIKTA 1B to NYLON
   (b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure
FOR ILS APPROACH RWY 02
EXPECT RADAR VECTORS

TOMAN
01° 21' 47'' N
105° 47' 17'' E

KARTO
01° 11' 24'' N
105° 33' 43'' E

NOTE: RADAR REQUIRED
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 26'E (2015)
DISTANCES IN NM

A040 - F140
Max 220kts (IAS)
1 min

FOR ILS APPROACH RWY 02
EXPECT RADAR VECTORS

IGNON
01° 08' 47'' N
104° 12' 57'' E
Cross 7000ft or abv

A070 - F140
Max 220kts (IAS)
1 min

F260 - F310
Max 280kts (IAS)
1.5 min

NOTE:
RADAR REQUIRED
RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

ELEVATION, ALTITUDE IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 26'E (2015)
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ELEVATION, ALTITUDE IN FEET
BEARINGS, TRACKS AND
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VAR 26'E (2015)
DISTANCES IN NM
NOTE: RADAR REQUIRED
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
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KARTO 1A (STAR) RNAV GNSS RWY 02L/02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

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<tbody>
<tr>
<td>From KARTO. To KEXAS at or below FL160, speed 250kts. To LAVAX, speed 220kts. To IGNON at or above 7000ft. To SANAT at or above 4000ft, speed 190kts.</td>
<td>KARTO - KEXAS [FL160-; K250] - LAVAX [K220] - IGNON [A070+] - SANAT [A040+; K190]</td>
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<td>K190</td>
<td>RNAV1</td>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via KARTO 1A by Singapore ATC
   
   (a) Maintain last assigned flight level or altitude and proceed on KARTO 1A to SANAT, then direct to SAMKO
   
   (b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA
   
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   
   - Refer to Singapore AIP for radio communications failure procedure
KARTO 1B (STAR) RNAV GNSS RWY 20R/20C - DESCRIPTIONS

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<tbody>
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<td>From KARTO. To KEXAS at or below FL160, speed 250kts. To LAVAX, speed 220kts, turn right. To RUVIK at or above 8000ft. To DOVAN at or above 4000ft, turn right. To BIPOP at or above 3000ft, speed 190kts.</td>
<td>KARTO - KEXAS [FL160-; K250] - LAVAX [K220; R] - RUVIK [A080+] - DOVAN [A040+; R] - BIPOP [A030+; K190]</td>
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Tabular Descriptions

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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via KARTO 1B by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on KARTO 1B to BIPOP, then direct to NYLON
   (b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure
LEBAR 2A (STAR) RNAV GNSS RWY 02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

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<tr>
<td>From PASPU, speed 220kts, turn right. To PU at or above 7000 ft, turn right. To SJ at or above 7000 ft, turn right. To PALGA, speed 220kts, turn left. To PAMSI, turn left. To SAMKO at or above 4000 ft, speed 190kts.</td>
<td>PASPU [K220; R] - PU [A070+; R] - SJ [A070+; R] - PALGA [K220; L] - PAMSI [L] - SAMKO [A040+; K190]</td>
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Tabular Descriptions

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<th>Course °M(°T)</th>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1 SET TRANSPONDER TO MODE A/C CODE 7600

2 When cleared via LEBAR 2A by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on LEBAR 2A to SAMKO
   (b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02L as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3 No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure
LEBAR 2B (STAR) RNAV GNSS RWY 20R - DESCRIPTIONS

Formal & Abbreviated Descriptions

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<tbody>
<tr>
<td>From BOBAG at or above 10000ft, speed 220kts, turn left. To SJ at or above 7000ft, turn left. To PU at or above 7000ft, speed 220kts, turn left. To BETBA, turn right. To BIDUS at or above 3000ft, speed 190kts.</td>
<td>BOBAG [A100+; K220; L] - SJ [A070+; L] - PU [A070+; K220; L] - BETBA [R] - BIDUS [A030+; K190]</td>
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Formal Description (REMES Transition)

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<td>From REMES, speed 220kts, turn left. To SJ at or above 7000ft, turn right. To PU at or above 7000ft, speed 220kts, turn left. To BETBA, turn right. To BIDUS at or above 3000ft, speed 190kts.</td>
<td>REMES [K220; L] - SJ [A070+; R] - PU [A070+; K220; L] - BETBA [R] - BIDUS [A030+; K190]</td>
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Tabular Descriptions (BOBAG Transition)

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Tabular Descriptions (REMES Transition)

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<td>K190</td>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via LEBAR 2B by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on LEBAR 2B to BIDUS, then direct to NYLON
   (b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20R as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure
When Runway 20 at Singapore Changi Airport is in use, arrivals from west within 120 DME SJ are to request for the STAR from Singapore ATC on PRI freq 133.25MHz or SEC freq 135.8MHz. Flight shall still remain under the control of WMKK ATC.
LELIB 3B (STAR) RNAV GNSS RWY 20R/20C - DESCRIPTIONS

Formal & Abbreviated Descriptions

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<tbody>
<tr>
<td>From ARAMA, speed 250kts. To LELIB at or above 10000ft, turn left. To JAYBEE at or above 7000ft, speed 220kts. To ALFA at or above 6000ft, turn left. To BIDUS at or above 3000ft, speed 190kts.</td>
<td>ARAMA [K250] - JAYBEE [A070+; K220] - ALFA [A060+; L] - BIDUS [A030+; K190]</td>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via LELIB 3B by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on LELIB 3B to BIDUS, then direct to NYLON
   (b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure
MABAL 1A (STAR) RNAV GNSS RWY 02L/02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

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<tr>
<td>From MABAL. To KILOT, turn right. To VINIL, turn left. To PIBAP at or below FL210, speed 250kts. To PASPU, speed 220kts. To NYLON, turn left. To POSUB at or above 6000ft, speed 220kts, turn right. To SANAT at or above 4000ft, speed 190kts.</td>
<td>MABAL - KILOT [R] - VINIL [L] - PIBAP [FL210-; K250] - PASPU [K220] - NYLON [L] - POSUB [A060+; K220; R] - SANAT [A040+; K190]</td>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1 SET TRANSPONDER TO MODE A/C CODE 7600

2 When cleared via MABAL 1A by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on MABAL 1A to SANAT, then direct to SAMKO
   (b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3 No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure
STANDARD ARRIVAL CHART
RNAV (GNSS) -
INSTRUMENT (STAR)

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

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 26°E (2015)

DISTANCES IN NM

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

CIVIL AVIATION AUTHORITY
SINGAPORE
MABAL 1B (STAR) RNAV GNSS RWY 20R/02L - DESCRIPTIONS

Formal & Abbreviated Descriptions

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<th>Fly-Over required</th>
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<tr>
<td>From MABAL, To KILOT, turn right. To VINIL, turn left. To PIBAP at or below FL210, speed 250kts. To PASPU, at or above 6000ft, speed 220kts. To NYLON at or above 3000ft, speed 190kts.</td>
<td>MABAL - KILOT [R] - VINIL [L] - PIBAP [FL210-; K250] - PASPU [A060+; K220] - NYLON [A030+; K190]</td>
<td>IF</td>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via MABAL 1B by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on MABAL 1B to NYLON
   (b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure
OBDOS 1A (STAR) RNAV GNSS RWY 02L/02C - DESCRIPTIONS

Formal & Abbreviated Descriptions

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<th>Fly-Over required</th>
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<tbody>
<tr>
<td>From OBDOS. To IKAGO. To IKIMA, turn right. To IBULA at or below FL180, speed 250kts, turn right. To LAVAX, speed 220kts, turn left. To IGNON at or above 7000ft. To SANAT at or above 4000ft, speed 190kts.</td>
<td>OBDOS - IKAGO - IKIMA [R] - IBULA [FL180--; K250; R] - LAVAX [K220; L] - IGNON [A070+; K190] - SANAT [A040+; K190]</td>
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<th>Waypoint Name</th>
<th>Fly-Over</th>
<th>Course °M(°T)</th>
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<th>Speed Limit</th>
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</thead>
<tbody>
<tr>
<td>IF</td>
<td>OBDOS</td>
<td>-</td>
<td>278(278.7)</td>
<td>-0.5</td>
<td>-</td>
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<tr>
<td>TF</td>
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<td>K250</td>
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</tbody>
</table>

RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via OBDOS 1A by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on OBDOS 1A to SANAT, then direct to SAMKO
   (b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure
FOR ILS APPROACH RWY 20
EXPECT RADAR VECTORS

IKAGO
00° 38' 16'' N
105° 29' 31'' E

OBDOS
00° 25' 33'' N
106° 55' 51'' E

87
279°
35
291°
20

NYLON
01° 06' 57'' N
104° 06' 24'' E

BIPOP
01° 31' 22'' N
104° 10' 18'' E

LAVAX
01° 09' 50'' N
104° 27' 14'' E

DOVAN
01° 19' 36'' N
104° 12' 49'' E

RUVID
01° 14' 22'' N
104° 30' 22'' E

IBULA
00° 39' 36'' N
104° 30' 00'' E

IKUKA
00° 43' 14'' N
104° 55' 00'' E

Cross F180 or blw
IAS 220kts

Cross 3000ft or abv
IAS 190kts

Cross 8000ft or abv
IAS 250kts

Cross 4000ft or abv
IAS 220kts

F150 - F250Max 250kts (IAS)
1.5 min

A070 - F140
Max 220kts (IAS)
1 min

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES
OBDO1B (STAR) RNAV GNSS RWY 20R/20C - DESCRIPTIONS

Formal & Abbreviated Descriptions

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<tbody>
<tr>
<td>From OBDO1. To IKAGO. To IKIMA, turn right. To IBULA at or below FL180, speed 250kts, turn right. To LAVAX, speed 220kts, turn left. To RUVIK at or above 8000ft. To DOVAN at or above 4000ft, turn right. To BIPOP at or above 3000ft, speed 190kts.</td>
<td>OBDO1 - IKAGO - IKIMA [R] - IBULA [FL180-; K250; R] - LAVAX [K220; L] - RUVIK [A080+] - DOVAN [A040+; R] - BIPOP [A030+; K190]</td>
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<td>N</td>
</tr>
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<tr>
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<tr>
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<td>RUVIK</td>
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</tr>
<tr>
<td>TF</td>
<td>DOVAN</td>
<td>-</td>
<td>304(304.1)</td>
<td>-0.5</td>
<td>R</td>
<td>A040+</td>
<td>-</td>
<td>RNAV1</td>
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<tr>
<td>TF</td>
<td>BIPOP</td>
<td>-</td>
<td>347(347.8)</td>
<td>-0.5</td>
<td>-</td>
<td>A030+</td>
<td>K190</td>
<td>RNAV1</td>
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</table>

RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via OBDO1B by Singapore ATC
   
   (a) Maintain last assigned flight level or altitude and proceed on OBDO1B to BIPOP, then direct to NYLON
   
   (b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA
   
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   
   - Refer to Singapore AIP for radio communications failure procedure
FOR ILS APPROACH RWY 02
EXPECT RADAR VECTORS
SAMKO
01o 05' 30'' N
103o 52' 55'' E
Cross 4000ft or abv
IAS 190kts

REMES
00o 43' 42'' N
103o 57' 35'' E
Cross 6000ft or abv
IAS 220kts

REPOV
00o 16' 23'' N
104o 03' 00'' E
Cross FL210 or blw
IAS 250kts

F150 - F250
Max 250kts (IAS)
1.5 min

A060 - F140
Max 220kts (IAS)
1 min

A040 - F140
Max 220kts (IAS)
1 min

NOTE: RADAR REQUIRED
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 26'E (2015)

DISTANCES IN NM

FOR ILS APPROACH RWY 02
EXPECT RADAR VECTORS

NOT TO SCALE
REPOV 1A (STAR) RNAV GNSS RWY 02L/02C - DESCRIPTIONS

**Formal & Abbreviated Descriptions**

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</thead>
<tbody>
<tr>
<td>From REPOV at or below FL210, speed 250kts. To REMES at or above 6000ft, speed 220kts. To SAMKO at or above 4000ft, speed 190kts.</td>
<td>REPOV [FL210-; K250] - REMES [A060+; K220] - SAMKO [A040+; K190]</td>
<td>IF</td>
<td>N</td>
</tr>
<tr>
<td>TF REMES - 348(348.7) -0.5 - A060+ K220 RNAV1</td>
<td>TF</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>TF SAMKO - 347(347.8) -0.5 - A040+ K190 RNAV1</td>
<td>TF</td>
<td>N</td>
<td></td>
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</table>

**Tabular Descriptions**

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<tr>
<td>IF</td>
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<td>FL210-</td>
<td>K250</td>
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<td>SAMKO</td>
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**RADIO COMMUNICATIONS FAILURE PROCEDURE**

<table>
<thead>
<tr>
<th>1</th>
<th>SET TRANSPONDER TO MODE A/C CODE 7600</th>
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<tbody>
<tr>
<td>2</td>
<td>When cleared via REPOV 1A by Singapore ATC</td>
</tr>
<tr>
<td></td>
<td>(a) Maintain last assigned flight level or altitude and proceed on REPOV 1A to SAMKO</td>
</tr>
<tr>
<td></td>
<td>(b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA</td>
</tr>
<tr>
<td></td>
<td>(c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure</td>
</tr>
<tr>
<td>3</td>
<td>No clearance or instruction received from Singapore ATC</td>
</tr>
<tr>
<td></td>
<td>- Refer to Singapore AIP for radio communications failure procedure</td>
</tr>
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</table>
FOR ILS APPROACH RWY 20
EXPECT RADAR VECTORS

F150 - F250
Max 250kts (IAS)
1.5 min

A060 - F140
Max 220kts (IAS)
1 min

NOTE: RADAR REQUIRED
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

CIVIL AVIATION AUTHORITY
SINGAPORE
REPOV 1B (STAR) RNAV GNSS RWY 20R/20C - DESCRIPTIONS

Formal & Abbreviated Descriptions

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<tbody>
<tr>
<td>From REPOV at or below FL210, speed 250kts. To REMES, speed 220kts, turn right.</td>
<td>REPOV [FL210-; K250] - REMES [K220; R] -</td>
<td>IF</td>
<td>N</td>
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<tr>
<td>To BTM at or above 7000ft, speed 220kts. To DOVAN at or above 4000ft, turn left.</td>
<td>BTM [A070+; K220] - DOVAN [A040+; L] -</td>
<td>TF</td>
<td>N</td>
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<tr>
<td>BIPOP at or above 3000ft, speed 190kts.</td>
<td>BIPOP [A030+; K190]</td>
<td>TF</td>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via REPOV 1B by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on REPOV 1B to BIPOP, then direct to NYLON
   (b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure
FOR ILS APPROACH RWY 02
EXPECT RADAR VECTORS

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

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

ELEV. ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 26°E (2015)

DISTANCES IN NM

NOTE: RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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

FOR ILS APPROACH RWY 02
EXPECT RADAR VECTORS

AIP
SINGAPORE

SINGAPORE/Singapore Changi
RWY 02L/C
SURGA ONE ALPHA ARRIVAL
SURGA 1A

TRANSITION ALTITUDE
11 000ft

D-ATIS AP ID-WSSS
128.6

A070 - F140
Max 220kts (IAS)
1 min

A040 - F140
Max 220kts (IAS)
1 min

SAMKO
01°02' 30'' N
103°52' 55'' E
Cross 4500ft or abv
IAS 190kts

SANAT
01°09' 49'' N
103°59' 30'' E
Cross 4500ft or abv
IAS 190kts

LAVAX
01°09' 50'' N
104°27' 14'' E
IAS 220kts

IGNON
01°08' 47'' N
104°12' 57'' E
Cross 7000ft or abv

IBULA
00°52' 36'' N
104°36' 00'' E
Cross F180 or blw
IAS 250kts

IKIMA
00°43' 14'' N
104°55' 00'' E

IKAGO
00°38' 16'' N
105°29' 31'' E

SURGA
00°36' 57'' S
106°31' 19'' E

NOTE:
RADAR REQUIRED

NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED

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SURGA 1A (STAR) RNAV GNSS RWY 02L/02C - DESCRIPTIONS

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<tr>
<td>From SURGA. To IKAGO, turn left. To IKIMA, turn right. To IBULA at or below FL180, speed 250kts, turn right. To LAVAX, speed 220kts, turn left. To IGNON at or above 7000ft. To SANAT at or above 4000ft, speed 190kts.</td>
<td>SURGA - IKAGO [L] - IKIMA [R] - IBULA [FL180-; K250; R] - LAVAX [K220; L] - IGNON [A070+] - SANAT [A040+; K190]</td>
<td>IF</td>
<td>N</td>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via SURGA 1A by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on SURGA 1A to SANAT, then direct to SAMKO
   (b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure
FOR ILS APPROACH RWY 20
EXPECT RADAR VECTORS

SURGA
00o 36' 57'' S
106o 31' 19'' E

BIPOP
00o 31' 22'' N
104° 10' 18'' E
Cross 3000ft or abv
IAS 190kts

RUVIK
01° 14' 22'' N
104° 20' 33'' E
Cross 8000ft or abv

DOVAN
01° 19' 38'' N
104° 12' 49'' E
Cross 4000ft or abv

NYLON
01° 36' 57'' N
104° 00' 24'' E

IJKAGO
00° 43' 14'' N
104° 55' 00'' E
Cross F180 or blw
IAS 250kts

BIPOP
00° 31' 22'' N
104° 10' 18'' E
Cross 3000ft or abv
IAS 190kts

NYLON
01° 36' 57'' N
104° 00' 24'' E

LAVAX
01° 09' 50'' N
104° 27' 14'' E
IAS 220kts

DOVAN
01° 19' 38'' N
104° 12' 49'' E
Cross 4000ft or abv

NOTE:
- RADAR REQUIRED
- RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
- NOTE: REFER TO BACK PAGE FOR
  - FORMAL AND TABULAR DESCRIPTIONS
  - RADIO COM FAILURE PROCEDURES

ELEV, ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 26'E (2015)

DISTANCES IN NM

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

CIVIL AVIATION AUTHORITY
SINGAPORE
SURGA 1B (STAR) RNAV GNSS RWY 20R/20C - DESCRIPTIONS

Formal & Abbreviated Descriptions

<table>
<thead>
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<th>Formal Description</th>
<th>Abbreviated Description</th>
<th>Path Terminator</th>
<th>Fly-Over required</th>
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<tbody>
<tr>
<td>From SURGA. To IKAGO, turn left. To IKIMA, turn right. To IBULA at or below FL180, speed 250kts, turn right. To LAVAX, speed 220kts, turn left. To RUVIK at or above 8000ft. To DOVAN at or above 4000ft, turn right. To BIPOP at or above 3000ft, speed 190kts.</td>
<td>SURGA - IKAGO [L] - IKIMA [R] - IBULA [FL180-; K250; R] - LAVAX [K220; L] - RUVIK [A080+] - DOVAN [A040+; R] - BIPOP [A030+; K190]</td>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via SURGA 1B by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on SURGA 1B to BIPOP, then direct to NYLON
   (b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure
STANDARD ARRIVAL CHART
RNAV (GNSS) - INSTRUMENT (STAR)

SINGAPORE/Singapore Changi
RWY 02L/C
VEPLI ONE ALPHA ARRIVAL
VEPLI 1A

ELEV. ALT IN FEET
BEARINGS, TRACKS AND
RADIALS ARE MAGNETIC
VAR 26°E (2015)
DISTANCES IN NM

NOTE: RADAR REQUIRED
NOTE: RNAV-1 NAVIGATION SPECIFICATION GNSS REQUIRED
NOTE: REFER TO BACK PAGE FOR
- FORMAL AND TABULAR DESCRIPTIONS
- RADIO COM FAILURE PROCEDURES

CIVIL AVIATION AUTHORITY
SINGAPORE
### VEPLI 1A (STAR) RNAV GNSS RWY 02L/02C - DESCRIPTIONS

#### Formal & Abbreviated Descriptions

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<tr>
<th>Formal Description</th>
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</table>
| From VEPLI. To VINIL. To PIBAP at or below FL210, speed 250kts. To PASPU, speed 220kts. To NYLON, turn left. To POSUB at or above 6000ft, speed 220kts, turn right. To SANAT at or above 4000ft, speed 190kts. | VEPLI - 
VINIL - 
PIBAP [FL210-; K250] - 
PASPU [K220] - 
NYLON [L] - 
POSUB [A060+; K220; R] - 
SANAT [A040+; K190] | IF 
TF 
TF 
TF 
TF 
TF | N 
N 
N 
N 
N 
N |

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### RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via VEPLI 1A by Singapore ATC
   
   (a) Maintain last assigned flight level or altitude and proceed on VEPLI 1A to SANAT, then direct to SAMKO
   
   (b) From SAMKO commence descent and carry out appropriate landing procedure for RWY 02 as close as possible to EAT or ETA
   
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   
   - Refer to Singapore AIP for radio communications failure procedure
VEPLI 1B (STAR) RNAV GNSS RWY 20R/02L - DESCRIPTIONS

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<td>VEPLI - VINIL - PIBAP [FL210; K250] - PASPU [A060+; K220] - NYLON [A030+; K190]</td>
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RADIO COMMUNICATIONS FAILURE PROCEDURE

1. SET TRANSPONDER TO MODE A/C CODE 7600

2. When cleared via VEPLI 1B by Singapore ATC
   (a) Maintain last assigned flight level or altitude and proceed on VEPLI 1B to NYLON
   (b) From NYLON commence descent and carry out appropriate landing procedure for RWY 20 as close as possible to EAT or ETA
   (c) If unable to effect a landing, refer to Singapore AIP for missed approach procedure

3. No clearance or instruction received from Singapore ATC
   - Refer to Singapore AIP for radio communications failure procedure