ENR 1.5 HOLDING, APPROACH AND DEPARTURE PROCEDURES

1 GENERAL

1.1 The arrival, holding, approach and departure procedures in use throughout the Singapore FIR and airspace within the Jakarta FIR where ATS is provided by Singapore (see ENR 2.1) are developed in accordance with the criteria contained in ICAO DOC 8168-OPS/611: Procedures for Air Navigation Services - Operations (PANS-OPS).

1.1.1 To ensure conformity with associated procedures, this section should be read in conjunction with section ENR 3.6.

1.1.2 An aircraft approaching an aerodrome under IFR for the purpose of making a landing shall conform to the holding and instrument approach procedures for the radio navigational aid employed as prescribed in the appropriate Instrument Approach Charts in WSSS AD 2.24.

1.1.3 Pilots will be expected to know the correct holding, approach and departure procedures.

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

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

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

2 ARRIVING FLIGHTS

2.1 INSTRUMENT APPROACH PROCEDURES

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

2.2 CATEGORY I ILS APPROACHES

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

2.3 CATEGORY II ILS APPROACHES

(refer to WSSS AD 2-22 for details)

2.4 VISUAL APPROACH PROCEDURES

2.4.1 An IFR flight operating into Singapore Changi Airport may be cleared for a visual approach subject to the following conditions:

a. the pilot has the aerodrome in sight and can conduct his approach with visual reference to terrain;
b. the flight will not cause delay to other traffic;
c. there is no conflicting tall vessel movement;
d. the cloud ceiling at the aerodrome is 4,000ft or more for landing on RWY 20 and 3,000ft or more for landing on RWY 02; and
e. the visibility at the aerodrome is 5km or more.

2.4.2 Notwithstanding paragraphs 2.4.1(d) and 2.4.1(e), if the pilot reports that he has the aerodrome in sight and can conduct his approach with visual reference to terrain, the flight may be cleared for a visual approach.

2.4.3 Pilots may expect radar vectoring for separation and sequencing with other traffic prior to being cleared for a visual approach.

2.5 VESSEL MOVEMENT AFFECTING INSTRUMENT APPROACHES ON RUNWAY 02 AND 20

2.5.1 There are possible tall vessel movements in waters around Singapore Changi Airport. As these mobile vessels vary in height and location, they are only indicated as “possible vessel" obstacles in the instrument approach charts.

2.5.2 Information on the heights of these tall vessels are relayed to ATC by the Maritime and Port Authority of Singapore. ATC will advise arriving aircraft of any restrictions on the types of instrument approaches and landing runway.

3 DEPARTING FLIGHTS

3.1 INTRODUCTION

a. The Instrument Departure Procedures are only applicable for aircraft with all engines operating. It remains the responsibility of the operator to develop contingency procedures for the individual type of aeroplane and to conduct the necessary examination of obstacles throughout the areas concerned in relation to the certificated performance of the individual aeroplane type. It is also the responsibility of the operator to ensure that contingency procedures comply fully with the aeroplane performance requirements of ICAO Annex 6.

b. The specific routes to be followed are depicted in SID charts AD-2-WSSS-SID-1 to AD-2-WSSS-SID-64. Altitude restrictions at fixes and/or DME specify ATC/airspace requirements.

c. Minimum climb gradient specifies obstacle clearance requirements as well as for the purpose of air traffic management.

d. If the departing aircraft is unable to comply with the minimum climb gradient required, the pilot-in-command shall inform ATC. Delays can be expected..

3.2 RUNWAY 02L

a. Except for paragragh 3.2b, departing aircraft on Runway 02L, regardless whether on SID or vectors, shall be on a minimum climb gradient of 5% until reaching or passing 2500ft, thereafter the minimum climb gradient shall be 3.3%.

b. ATC will inform pilots of departing aircraft when ATC receives information on vessels with height above 35m AMSL. Upon receipt of such information, the pilot-in-command shall calculate the climb gradient in accordance with paragraph3.6.

c. If the departing aircraft is unable to comply with the minimum climb gradient as stated in paragraph 3.2a, the pilot- in-command shall inform ATC before reaching the holding point for departure. Delays can be expected.

3.3 RUNWAY 02C

a. Except for paragraph 3.3b, departing aircraft on Runway 02C, regardless whether on SID or vectors, shall be on a minimum climb gradient of 5% until reaching or passing 2500ft, thereafter the minimum climb gradient shall be 3.3%/

b. ATC will inform pilots of departing aircraft when ATC receives information on vessels with height above 70m AMSL. Upon receipt of such information, the pilot-in-command shall calculate the climb gradient in accordance with paragraph3.6.

c. If the departing aircraft is unable to comply with the minimum climb gradient as stated in paragraph 3.3a, the pilot-in-command shall inform ATC before reaching the holding point for departure. Delays can be expected.

3.4 RUNWAY 02R

a. Except for paragraph 3.4b, departing aircraft on Runway 02R, regardless whether on SID or vectors, shall be on a minimum climb gradient of 5% until reaching or passing 2,500ft, thereafter the minimum climb gradient shall be 3.3%.

b. ATC will inform pilots of departing aircraft when ATC receives information on vessels with height above 65m AMSL. Upon receipt of such information, the pilot-in-command shall calculate the climb gradient in accordance with paragraph3.6.

c. If the departing aircraft is unable to comply with the minimum climb gradient as stated in paragraph 3.4a, the pilot-in-command shall inform ATC before reaching the holding point for departure. Delays can be expected.

3.5 RUNWAYS 20L, 20C AND 20R

3.5.1 All aircraft departures on Runway 20C, regardless of on SID or vectors, shall be on a minimum climb gradient of 7% until reaching or passing 2,500ft. Thereafter, the minimum climb gradient shall be 3.3%.

3.5.2 All aircraft departures on Runway 20R, regardless of on SID or vectors, shall be on a minimum climb gradient of 6% until reaching or passing 2,500ft. Thereafter, the minimum climb gradient shall be 3.3%.

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

3.5.4 The minimum climb gradient restrictions stated above for Runway 20C/20R/20L are for the purpose of air traffic management. If the climb gradient restriction cannot be complied with, the pilot-in-command of an aircraft departure shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure. Delays can be expected as coordination is required.

(Please also refer to charts AD-2-WSSS-SID-1 to AD-2-WSSS-SID-64: Standard Instrument Departures for Runway 20L, Runway 20C and Runway 20R).

3.6 DETERMINATION OF CLIMB GRADIENT BY OPERATORS

3.6.1 Aircraft operators shall calculate their own climb gradients based on actual lift off point to ensure enough clearance with the vessels crossing the northern shipping channel. The calculation will have to ensure the following:

i. The most penalising obstacle is taken into account under both all engines operating procedures as well as one engine out procedures; and

ii. The required minimum obstacle clearance (MOC) is met under all engines operating procedures.

Note: The calculated climb gradient shall not be lower than the procedure climb gradient for departures.

3.6.2 For the above calculations, operators shall use the distance information for the various departure runways as follows:

DEP RWY	02L	02C	02R
Distance d	1 100m	2 590m	2 130m

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

4 OTHER RELEVANT INFORMATION AND PROCEDURES

4.1 HOLDING PROCEDURES

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

4.1.1 LOW LEVEL HOLDING AREAS

4.1.1.1 The holding areas for procedural traffic landing at Singapore Changi Airport or Seletar Airport depend on the runway in use at Singapore Changi Airport and are as follows:

a. RWY 02L/02C/02R - SAMKO Holding Area (SHA).

b. RWY 20R/20C/20L - NYLON Holding Area (NHA).

c. Details of these holding areas and those mentioned in paragraphs 4.1.1.2 and 4.1.1.3 are given in ENR 3.6. They are also shown in ENR 3.6 Area Charts.

4.1.1.2 An intermediate holding area - HOSBA Holding Area (HHA) - is also established.

4.1.1.3 A bad weather holding area - SINJON Holding Area - is established for Seletar bound commercial traffic.

4.1.2 HIGH LEVEL HOLDING AREAS

4.1.2.1 High Level Holding Areas are also established at NHA, SHA and HHA. Details of these areas are given in ENR 3.6.

4.1.3 HOLDING SPEEDS

4.1.3.1 The maximum holding speeds for all holding areas are detailed in ENR 3.6.

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